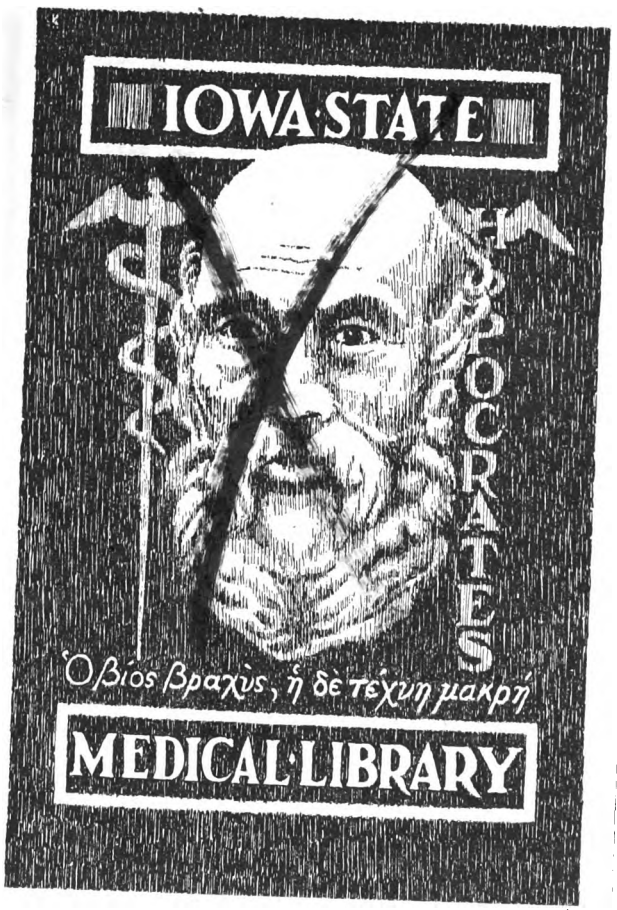

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ADDRESSES AND ORIGINAL ARTICLES

ŒSTROGENIC PROPERTIES OF STILBŒSTROL DIPROPIONATE AND HEXŒSTROL *

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INTRODUCTORY NOTE (Dr. Bishop)

AT the request of the Therapeutic Trials Committee of the Medical Research Council the authors of this paper have investigated the effects of the administration of stilbœstrol dipropionate and hexœstrol on man. On June 22, 1939, a meeting was called at which the various workers reported verbally on their experiences with these two compounds. At this meeting the following general observations were made:—

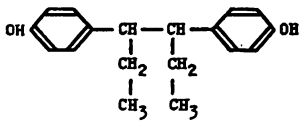
It was agreed that stilbœstrol dipropionate and hexœstrol were both active œstrogens in man, but that hexœstrol, given by mouth, appeared to be somewhat less active than stilbœstrol or its dipropionate.

There was general agreement that stilbœstrol dipropionate and hexœstrol both caused in some patients toxic effects (nausea and sickness) similar to those of the unesterified stilbœstrol, but the incidence of these effects appeared, on the available evidence, to be less with the two newer compounds. It had been found that giving the original stilbœstrol as sugar-coated tablets had not reduced the incidence of its side-effects. None of the clinicians present had seen any toxic jaundice after the administration of stilbœstrol—such as had been reported in France by Varangot (1939)—and none appeared to have been recorded by other clinicians in Britain.

It was resolved that the results of this work should be published. Dr. Robert Kellar kindly consented to collect the data, and he and I undertook to present them in a short paper for publication after it had been approved by the remaining authors. Before the collection of the data had been completed, Dr. Kellar was called up to join H.M. Forces, and the task has fallen to me. Since it is not now possible to get in touch with all the authors, I have confined myself as far as possible to the statement of fact. For any expression of opinion made in this paper I, and not my co-authors, am responsible.

CHEMISTRY OF STILBŒSTROL DIPROPIONATE AND HEXŒSTROL

The development of the stilbœstrol series of œstrogenic substances began with the demonstration by Dodds and Lawson (1937) that anol (*p*-hydroxypropenylbenzene) undergoes polymerisation to yield traces of a highly active œstrogenic substance. During the period devoted to the isolation and elucidation of the composition of this highly active polymer several dimerides of anol were synthesised. Of these the most potent was 4–4′-dihydroxy-α-β-diethyl stilbene, or stilbœstrol (Dodds, Goldberg, Lawson, and Robinson 1938). Several esters of this substance were prepared which were analogous to the corresponding esters of œstrone and œstradiol in physiological activity. It was found that the most prolonged activity was that of the dipropionate; it was therefore decided to test this substance clinically. After intensive research Campbell, Dodds, and Lawson (1938) isolated the highly active polymer of anol, and this was found to be the hydrogenated form of stilbœstrol, in which the double bond between the two carbon atoms had been removed. This was termed hexœstrol and has the following formula:



It can be prepared synthetically in much better yields and by much simpler methods than by the polymerisation of anol. Thus, it can be obtained by the hydrogenation of stilbœstrol or by direct synthesis from anethole. Since the substance contains two asymmetric carbon atoms, it can exist either in a racemised form or in a meso form—i.e., either externally or internally compensated. The highly active hexœstrol, which is being investigated clinically, is thought to be the meso form, with a melting-point of 184° C.

CLINICAL TRIALS

Reports on the clinical effects of stilbœstrol were made to the Therapeutic Trials Committee of the Medical Research Council by Winterton and MacGregor (1939) and by Bishop, Boycott and Zuckerman (1939). The present communication is a similar report on stilbœstrol dipropionate and hexœstrol.

Effect of stilbœstrol dipropionate and hexœstrol in the menopausal syndrome and in atrophic conditions of the vagina.—In these cases the chief criteria of response were reduction in the daily hot-flush count, relief of symptoms, and improvement of the vaginal-smear picture (return of cornified cells) and of the condition of the vaginal mucosa. Of 66 cases in the menopausal series, 8 did not react to stilbœstrol dipropionate or to hexœstrol or to both. In the series of 36 cases of atrophic vaginitis 1 case did not respond either to the dipropionate or to hexœstrol. Thus, in 102 patients with subjective and/or objective menopausal manifestations relief was obtained in 93 (91·2 per cent.). Of the 60 cases treated with stilbœstrol dipropionate 6 (10 per cent.) did not respond. Of the 63 cases treated with hexœstrol 17 (27 per cent.) did not respond. The higher percentage of failures with hexœstrol was probably due to the relatively lower dosage (see tables I and II).

Effect of stilbœstrol dipropionate and hexœstrol on patients with amenorrhœa.—Treatment was given to 48 patients with amenorrhœa of various durations. Uterine hæmorrhage was induced in 28 by stilbœstrol dipropionate or by hexœstrol or by both. Of 31 cases treated with stilbœstrol dipropionate 9 did not respond; nor did 20 out of the 27 cases treated with hexœstrol (see table III). These rather poor

* A clinical report to the Therapeutic Trials Committee of the Medical Research Council.

results are almost undoubtedly due to low dosage. Of the 20 failures with hexœstrol, for instance, 12 were treated with 0·25 mg. single doses. It was not our sole aim to obtain as high a percentage of success as possible, but we were also trying to determine the approximate threshold doses. It appears that, at any rate so far as amenorrhœa is concerned, it is unlikely that results will be obtained unless each dose is 1 mg. or more.

Effect of stilbœstrol dipropionate and hexœstrol in dysmenorrhœa and in checking lactation.—A small series of cases of dysmenorrhœa and of cases in which inhibition of lactation was required shows poor results in dysmenorrhœa and uniformly successful results in inhibiting lactation (see tables IV and V). Failure to relieve dysmenorrhœa was probably largely a question of dosage, although there is no record in some cases of the individual doses given.

TABLE I—MENOPAUSAL SYNDROME

		Stilbœstrol dipropionate		Hexœstrol		Stilbœstrol		Natural œstrogen		
		+	−	+	−	+	−	+	−	
Responsive to all ..	1	2:28*	..	2:28	..	1·5:21	..	..	..	Stilbœstrol dipropionate, hexœstrol and other œstrogens (5 cases)
	2	0·5:7	..	0·5:7	..	..	..	0·1:1·4	..	
Responding to natural œstrogens and S.D. ..	3	0·5:7	..	..	0·5:7	..	..	5:—	..	
	4	0·5:7	..	..	0·25:3·5	..	..	0·15:2·1	..	
Responding to S. but not S.D. and H.	5	..	1:14	..	1:14	1:14	..	..	..	
Responding to stilbœstrol dipropionate and natural œstrogens	6	2:84	..	..	..	..	..	?	..	Stilbœstrol dipropionate, and natural œstrogens (7 cases)
	7	1:84	..	..	..	1:—	..	0·5:—	..	
	8	1:28	(0·5:7)	..	..	..	..	5:—	..	
	9	1:28	..	..	..	1:—	..	3:—	..	
	10	1:28	..	..	..	..	..	0·3:—	..	
Responding to S.D. but not to other œstrogens	11	5:—	..	..	..	..	..	..	5:—	
	12	1:14	..	..	..	..	0·1:—	..	0·1:—	
Responding to hexœstrol and natural œstrogens	13	..	..	1:91	..	..	..	?	..	Hexœstrol and other œstrogens (8 cases)
	14	..	..	1:49	..	?	..	..	..	
	15	..	..	1:28	(0·25:3·5)	..	(1:14)	5:70	(1:14)	
	16	..	..	1:14	..	..	..	?	..	
	17	..	..	0·25:15	..	?	..	..	..	
Responding to natural œstrogens but not to hexœstrol	18	..	..	..	3:21	..	..	5:—	..	
	19	..	..	..	0·25:10·5	..	..	0·2– 0·6:—	..	
Responding to neither ..	20	..	..	..	0·25:10·5	..	1:28	..	0·1:14	
Responding to stilbœstrol dipropionate and hexœstrol	21	1:28	(0·5:7)	1:28	..	..	..	..	..	Stilbœstrol dipropionate and hexœstrol (11 cases)
	22	1:28	..	0·25:3·5	..	..	..	..	..	
	23	0·5:10·5	..	1:28 (fair)	..	..	..	..	..	
				1:28	(0·25:1·75)	..	..	..	..	
	24	0·5:10·5	..	0·25:1·75 (fair)	..	..	..	..	..	
	25	0·5:7	..	..	..	..	..	..	..	
	26	0·5:7	..	0·5:7	(0·25:1·75)	..	..	..	..	
Responding to stilbœstrol dipropionate but not to hexœstrol	27	1:42	..	..	0·75:10·5	..	..	..	..	
	28	1:14	..	..	1:14	..	..	..	..	
	29	0·5:21	..	..	0·75:10·5	..	..	..	..	
	30	0·5:21	..	..	0·75:10·5	..	..	..	..	
Responding to neither ..	31	..	1:—	..	0·75:10·5	..	..	..	..	
Responding to stilbœstrol dipropionate	32	1:30	..	..	..	..	..	..	..	Stilbœstrol dipropionate (17 cases)
	33	1:28	..	..	..	..	..	..	..	
	34	0·5:21	..	..	..	..	..	..	..	
	35	0·5:21	..	..	..	..	..	..	..	
	36	0·5:21	..	..	..	..	..	..	..	
	37	0·5:21	..	..	..	..	..	..	..	
	38	0·5:21	..	..	..	..	..	..	..	
	39	0·5:21	..	..	..	..	..	..	..	
	40	0·5:10·5	..	..	..	..	..	..	..	
	41	0·5:10·5	..	..	..	..	..	..	..	
	42	0·5:10·5	..	..	..	..	..	..	..	
	43	0·5:7	..	..	..	..	..	..	..	
	44	0·5:7	..	..	..	..	..	..	..	
	45	0·5:7	..	..	..	..	..	..	..	
	46	0·5:3·5	..	..	..	..	..	..	..	
Failure to respond to S.D.	47	..	0·5:10·5	..	..	..	..	..	..	
	48	..	0·1:0·7	..	..	..	..	..	..	
Responding to hexœstrol	49	..	..	5:20 (inj.)	..	..	..	..	..	Hexœstrol (18 cases)
	50	..	..	1·5:21	..	..	..	..	..	
	51	..	..	1·5:21	..	..	..	..	..	
	52	..	..	1·5:21	..	..	..	..	..	
	53	..	..	1·5:21	..	..	..	..	..	
	54	..	..	1·5:21	..	..	..	..	..	
	55	..	..	1:51	..	..	..	..	..	
	56	..	..	1:42	..	..	..	..	..	
	57	..	..	1:42	..	..	..	..	..	
	58	..	..	1:42	..	..	..	..	..	
	59	..	..	1:42	..	..	..	..	..	
	60	..	..	1:15	..	..	..	..	..	
	61	..	..	1:14	(0·25:1·75)	..	..	..	..	
	62	..	..	1:14	..	..	..	..	..	
	63	..	..	0·75:10·5	..	..	..	..	..	
	64	..	..	0·25:20	..	..	..	..	..	
	65	..	..	0·25:20	..	..	..	..	..	
Failure to respond to hexœstrol	66	..	..	..	0·75:10·5	..	..	..	..	
		36	4	30	12	6	2	13	3	

Chief criteria of response are reduction in daily hot-flush count, and relief of symptoms. Observations have been made in some cases on the vaginal smear.

* The first figure indicates the size of the single dose, and the second the total dosage of a course.

S = Stilbœstrol. H = Hexœstrol.

SD = Stilbœstrol dipropionate.

Stilbœstrol dipropionate and hexœstrol were administered by mouth unless stated to the contrary.

Comparative potency.—Opportunity for comparison of relative potency of these preparations and of stilbœstrol and the natural œstrogens is limited, and it would be unwise to draw conclusions from these results. It is not the object of this investigation to make these comparisons. Such a task would best be accomplished by careful observation of a few patients with easily defined degrees of ovarian deficiency submitted to suitably chosen doses; 155 cases of the present series. Of these, 23 showed toxic symptoms with stilbœstrol dipropionate or with hexœstrol or with both (14·8 per cent.). Altogether in these 155 cases 252 courses have been given, toxic effects being noted in 26 (10·3 per cent.). Table VI shows that the toxicity-incidence of stilbœstrol dipropionate is about five times as much as that of hexœstrol and roughly about the same as that of stilbœstrol. None of us has recorded serious

TABLE II—ATROPHIC VAGINITIS

		Stilbœstrol dipropionate		Hexœstrol		Stilbœstrol		Natural œstrogen		
		+	−	+	−	+	−	+	−	
Responding to S.D. and natural œstrogens but not to H.	1	1:42	..	..	2:28	..	1:14	0·3:84	..	S.D., H., and other œstrogens (1 case)
Responding to S.D. and natural œstrogens	2	5:70	..	..	..	..	5:70	1:14	..	Stilbœstrol dipropionate and other œstrogens (3 cases)
	3	2:60	..	..	..	..	..	5:90 (inj.)	..	
	4	2:28	(0·5:7)	..	..	2:28	..	..	..	
Responding to hexœstrol and other œstrogens	5	..	..	1:28	..	1:28	..	..	5:1 (inj.)	Hexœstrol and other œstrogens (3 cases)
	6	..	..	0·25:3·5	..	1:42	..	1:14	..	
Responding to S. but not to hexœstrol	7	..	..	..	1:14	..	5:70	..	..	
Responding to S.D. but not to H.	8	1:42	..	..	0·25:10·5	..	..	..	..	Stilbœstrol dipropionate and hexœstrol (4 cases)
	9	0·5:31·5	..	..	0·25:10·5	..	..	..	..	
	10	0·5:21	..	..	0·25:10·5	..	..	..	..	
Responding to H. but not to S.D.	11	..	1:14	1:28	..	..	..	..	..	
Responding to stilbœstrol dipropionate	12	5:150	..	..	..	..	..	..	..	Stilbœstrol dipropionate (12 cases)
	13	1:28	..	..	..	..	..	..	..	
	14	1:14	..	..	..	..	..	..	..	
	15	0·5–1:105	..	..	..	..	..	..	..	
	16	0·5–1:63	..	..	..	..	..	..	..	
	17	0·5–1:63	..	..	..	..	..	..	..	
	18	0·5:63	..	..	..	..	..	..	..	
	19	0·5:42	..	..	..	..	..	..	..	
	20	0·5:42	..	..	..	..	..	..	..	
	21	0·5:42	..	..	..	..	..	..	..	
	22	0·5:42	..	..	..	..	..	..	..	
Failure to respond to S.D.	23	..	5:90	..	..	..	..	..	..	
Responding to hexœstrol	24	..	..	5:100	..	..	..	..	..	Hexœstrol (13 cases)
	25	..	..	5:75	..	..	..	..	..	
	26	..	..	3:63	..	..	..	..	..	
	27	..	..	3:42	..	..	..	..	..	
	28	..	..	3:42	..	..	..	..	..	
	29	..	..	3:35	..	..	..	..	..	
	30	..	..	1:28	..	..	..	..	..	
	31	..	..	1:18	..	..	..	..	..	
	32	..	..	1:14	..	..	..	..	..	
	33	..	..	0·25:21	..	..	..	..	..	
	34	..	..	0·25:21	..	..	..	..	..	
	35	..	..	0·25:10·5	..	..	..	..	..	
	36	..	..	0·25:3	..	..	..	..	..	
		18	2	16	5	3	3	4	1	

Criteria of response are similar to those used in the menopausal series plus objective signs of improvement of the atrophic condition of the vaginal mucosa. (Symbols as in table I.)

response to these could be recorded by such objective signs as induction of uterine hæmorrhage in ovariectomised subjects, which would provide indicators with a clear-cut end-point. Of the present series 5 cases responded to stilbœstrol dipropionate but not to an identical dose of hexœstrol; 1 case responded to stilbœstrol dipropionate but not to similar dosage of œstradiol benzoate; and, finally, 1 case which responded to the dipropionate did not respond to a similar course of stilbœstrol, though, on the other hand, 3 cases compared unfavourably when treated with the dipropionate as opposed to stilbœstrol.

Toxicity.—There have been many published reports of toxic symptoms, such as nausea, vomiting, and even jaundice, following treatment with synthetic œstrogens, though seldom if ever after treatment with natural œstrogens. This was discussed in our papers on stilbœstrol (Winterton and McGregor 1939, Bishop, Boycott, and Zuckerman 1939). We have studied the incidence of toxic by-effects among

by-effects; they have usually been only transient and mild, such as nausea and occasionally vomiting and constipation.

TOXIC SYMPTOMS ASSOCIATED WITH ADMINISTRATION OF SYNTHETIC ŒSTROGENS (Dr. Bishop)

Apart from the foregoing description of the combined results obtained by the joint authors, it seems appropriate to record separately and to analyse more fully a series I observed alone. In this small series stilbœstrol was given to 83 patients, stilbœstrol dipropionate to 20, and hexœstrol to 18. The total number of patients receiving synthetic œstrogens was 96. Toxic symptoms developed in 21 patients out of 96 receiving synthetic œstrogens; in 19 out of 83 patients receiving stilbœstrol; in 6 out of 20 receiving stilbœstrol dipropionate; and in none of the 18 patients receiving hexœstrol. In so few cases were the synthetic œstrogens given by injection that I am not in a position to compare

TABLE III—AMENORRHŒA

		Stilbœstrol dipropionate		Hexœstrol		Stilbœstrol		Natural œstrogen		
		+	−	+	−	+	−	+	−	
Responsive to all	1	1:28	..	1:42	(1:28)	..	..	3:12 (inj.)	..	S.D., H., and other œstrogens (3 cases)
Responding to natural œstrogens and S.D.	2	1:42	..	..	1:42	..	..	3:12 (inj.)	..	
Responding to natural œstrogens	3	..	0·5:14	..	0·25:10·5	..	..	3:12 (inj.)	..	
Responding to stilbœstrol dipropionate and natural œstrogens	4	10:10 (inj.)	..	..	..	..	..	5:20 (inj.)	..	Stilbœstrol dipropionate and other œstrogens (12 cases)
	5	5:150	..	..	..	..	..	..	?	
	6	5:150	..	..	..	..	..	?	..	
	7	5:150	..	..	..	..	..	?	..	
	8	1:42	..	..	..	..	..	3:12 (inj.)	..	
	9	1:42	(1:28)	..	..	..	..	2:8 (inj.)	..	
	10	1:35	..	..	..	..	..	?	..	
	11	1:28	..	..	..	..	..	3:12 (inj.)	..	
Response to other œstrogens—not to S.D.	12	..	10:10 (inj.)	..	..	5:70	..	5:25 (inj.)	..	
	13	..	5:150	..	..	..	..	?	..	
	14	..	1:18	..	..	2:56	..	..	..	
Response to neither	15	..	1:14	..	..	..	1:14	..	..	
Response to H. and other œstrogens	16	..	..	1:30	..	5:20 (inj.)	..	..	..	Hexœstrol and other œstrogens (5 cases)
	17	..	..	1:28		..	..	2:10 (inj.)	..	
Response to natural œstrogens but not to H.	18	..	..	..	0·25:4 (inj.)	..	..	5:25 (inj.)	..	
	19	..	..	..	1:10	1:14	..	5:5 (inj.)	..	
Response to neither	20	..	..	..	2:28	..	..	..	5:25 (inj.)	
Response to stilbœstrol dipropionate but not to hexœstrol	21	1:42	..	..	0·25:10·5	..	..	..	..	Stilbœstrol dipropionate and hexœstrol (7 cases)
	22	1:42	..	..	0·25:10·5	..	..	..	..	
	23	1:28	..	..	1:28	..	..	..	..	
	24	0·5:25	..	..	0·25:10·5	..	..	..	..	
	25	0·5:15	..	..	0·25:10·5	..	..	..	..	
Response to neither	26	..	1–1·5:105	..	1:28	..	..	..	..	
	27	..	1:28	..	1:42	..	..	..	..	
Response to stilbœstrol dipropionate	28	10:10 (inj.)	..	..	..	..	..	..	..	Stilbœstrol dipropionate only (9 cases)
	29	5:150	(5:20)	..	..	..	..	..	..	
	30	5:150	..	..	..	..	..	..	..	
	31	1:42	..	..	..	..	..	..	..	
	32	1:28	..	..	..	..	..	..	..	
	33	1:14	..	..	..	..	..	..	..	
	34	0·5:21	..	..	..	..	..	..	..	
Failure to respond to S.D.	35	..	10:300	..	..	..	..	..	..	
	36	..	1:28	..	..	..	..	..	..	
Response to hexœstrol	37	..	..	2:60	..	..	..	..	..	Hexœstrol only (12 cases)
	38	..	..	1:36	..	..	..	..	..	
	39	..	..	1:14	..	..	..	..	..	
	40	..	..	0·25:7	..	..	..	..	..	
Failure to respond to hexœstrol	41	..	..	..	5:50	..	..	..	..	
	42	..	..	..	2:98	..	..	..	..	
	43	..	..	..	1:28	..	..	..	..	
	44	..	..	..	1:28	..	..	..	..	
	45	..	..	..	0·25:10·5	..	..	..	..	
	46	..	..	..	0·25:10·5	..	..	..	..	
	47	..	..	..	0·25:10·5	..	..	..	..	
	48	..	..	..	0·25:10·5	..	..	..	..	
		22	9	7	20	4	1	15	2	

The sole indicator of response is induction of uterine hæmorrhage. (Symbols as in table I.)

the incidence of toxic symptoms when the material is given by injection with the effects of its oral administration. Subsequent observations refer exclusively to oral administration, unless special mention is made of parenteral administration.

Stilbœstrol.—An analysis has been made of the single and total dosage per course of those cases treated with stilbœstrol. The average single dose associated with toxic symptoms is 3 mg. as compared with an average single dose of 2·3 mg. where toxic symptoms did not appear. The average total dosage of all subjects receiving stilbœstrol was 106·5 mg., and of those who showed no toxic symptoms 96·2 mg., as compared with 139·2 mg. in those cases where toxic symptoms developed. The average total dosage of a single course of stilbœstrol in cases showing no toxic symptoms was 39 mg., whereas the average total dose of single courses associated with toxic symptoms was 81 mg. From these figures it appears that the size of the dose may be an important factor in the production of toxic symptoms. Further analysis of the 19 cases showing toxic symptoms with stilbœstrol reveals that in 1 case only did the toxic symptoms continue throughout the period of administration (two fourteen-day courses of 1 mg. were administered); in 8 cases one course only was

TABLE V—INHIBITION OF LACTATION

		Stilbœstrol dipropionate		Hexœstrol	
		+	−	+	−
Responding to stilbœstrol dipropionate (4 cases)	1	5:20–30	..	..	..
	2	5:20–30	..	..	..
	3	5:20–30	..	..	..
	4	5:20–30	..	..	..
Responding to hexœstrol (5 cases)	5	..	..	6:—	..
	6	..	..	1:15	..
	7	..	..	1:14	..
	8	..	..	1:9	..
	9	..	..	1:7	..
		4		5	

Forty-five further cases were successfully treated, but details of dosage are not available.

TABLE IV—DYSMENORRHŒA

		Stilbœstrol dipropionate		Hexœstrol		Stilbœstrol		Natural œstrogen		
		+	−	+	−	+	−	+	−	
Response to other œstrogens but not to S.D. or H.	1	..	2·5:35	..	1:14	..	..	5:25 (inj.)	..	S.D., H., and other œstrogens (2 cases)
	2	..	2:28	..	1:14	2:28	..	5:25 (inj.)	..	
Responding to S.D. but not to S.	3	5:75	..	..	..	..	5:25	..	..	S.D. and other œstrogens (4 cases)
Responding to other œstrogens but not to S.D.	4	..	5:25	..	..	5:50	..	5:15 (inj.)	..	
	5	..	1:14	..	..	1:14	..	..	..	
Responding to neither	6	..	1:14	..	..	..	1:14	..	..	
Responding to H. and natural œstrogens	7	..	..	0·5:5	..	..	..	1:10	..	H. and other œstrogens (3 cases)
Responding to S. but not to H.	8	..	..	..	0·5:7	1:14	..	..	..	
Responding to neither	9	..	..	..	1:14	..	2:14	..	5:25	
Responding to S.D. but not to H.	10	—:30	..	..	—:1·5	..	..	..	..	S.D. and H. (1 case)
Responding to S.D.	11	—:60	..	..	..	..	..	..	..	Stilbœstrol dipropionate (5 cases)
	12	—:45	..	..	..	..	..	..	..	
Failure to respond to S.D.	13	..	—:150	..	..	..	..	..	..	
	14	..	—:60	..	..	..	..	..	..	
	15	..	1:14	..	..	..	..	..	..	
Responding to H.	16	..	..	—:60	..	..	..	..	..	Hexœstrol (3 cases)
Failure to respond to H.	17	..	..	..	—:60	..	..	..	..	
	18	..	..	..	—:12	..	..	..	..	
		4	8	2	7	4	3	4	1	

The indicator of response is relief of pain.

administered and toxic symptoms were experienced during this course ; in the remaining 10 cases toxic symptoms developed in association with only some of the courses. In 6 of these cases the toxic symptoms developed with the higher but not with the lower doses. In 2 the symptoms were associated with the lower but not with the higher doses. From these figures the following observations may be made :—

(1) Toxic symptoms are more likely to develop when high doses are given.

(2) There may be a personal idiosyncrasy to stilbœstrol.

(3) Toxic symptoms tend to appear early in treatment and to be overcome if treatment is persisted in.

Stilbœstrol dipropionate was given to 20 patients and 6 of them showed toxic symptoms. Of those showing toxic symptoms 2 out of 13 showed these symptoms both with stilbœstrol and its ester ; 4 showed symptoms with stilbœstrol but not with the dipropionate ; and 2 showed symptoms with the dipropionate but not with the pure synthetic œstrogen. There is no reason to suppose, from these observations, that stilbœstrol dipropionate is any less toxic than stilbœstrol.

Hexœstrol was administered to 18 patients. No toxic symptoms developed. The doses were comparatively low, the highest single dose being 2 mg.

TABLE VI—INCIDENCE OF TOXIC EFFECTS

	Number and per cent.
Cases in which presence or absence of toxic effects has been noted	155
Toxic effects present in	23 (14·8)
Courses given in which presence or absence of toxic effects has been noted	252
Toxic effect present in	26 (10·3)
Cases treated with stilbœstrol dipropionate	93
Toxic effects present in	20
Courses of stilbœstrol dipropionate given	132
Toxic effects present in	22 (16·6)
Cases treated with hexœstrol	89
Toxic effects present in	4
Courses of hexœstrol given	120
Toxic effects present in	4 (3·3)
Cases treated also with stilbœstrol	22
Toxic effects due to stilbœstrol present in	6
Courses of stilbœstrol given	77
Toxic effects present in	6

SUMMARY

Stilbœstrol dipropionate and hexœstrol have œstrogenic properties similar to those of stilbœstrol, in so far as they are capable of the following actions :—

(1) inducing uterine hæmorrhage in cases of amenorrhœa ;

(2) relieving the symptoms of the menopausal syndrome ;

(3) leading to the appearance of cornified cells in the vaginal smear in menopausal cases ;

(4) restoring the normal condition of the vulva and vagina in senile atrophic vaginitis ;

(5) relieving the pain of dysmenorrhœa ;

(6) inhibiting lactation.

Toxic effects, though not in our experience severe, developed in 21·6 per cent. of cases treated with stilbœstrol dipropionate and in 4·5 per cent. of cases treated with hexœstrol.

The stilbœstrol dipropionate used in these investigations was supplied by British Drug Houses, Ltd., and by Boots Pure Drug Co., Ltd. ; the hexœstrol was supplied by the latter firm.

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PNEUMOCOCCAL PAROTITIS
AND ANTECEDENT AURICULOTEMPORAL SYNDROME

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This case is reported to illustrate two different types of pyogenic parotitis, one of which was followed by a rare complication. The earlier parotitis, on the left side, was staphylococcal and followed by an auriculotemporal syndrome, whereas the second attack of parotitis, on the right side, was pneumococcal. The case is reported primarily from the point of view of the auriculotemporal syndrome, which is an unusual complication of acute parotitis and the only one of this type which has come under my care. At the same time, the case shows the extreme susceptibility of the patient to parotid infections and illustrates some of the main differences between staphylococcal and pneumococcal parotitis.

RIGHT PNEUMOCOCCAL PAROTITIS

The patient, a woman aged 60, came under observation in August, 1937, because of a right-sided acute parotitis. Some two years previously she had had a rather obscure pulmonary infection, with moderate fever, cough, and asthmatic attacks, probably bronchitis or low-grade bronchopneumonia. She said that it had cleared up with a pneumococcal vaccine. About the time of this illness she began to have sudden intermittent swelling of the left parotid. On the first occasion this happened during influenza, but the other attacks had come on during her usual health. The attacks always came on suddenly, had no relation to meals, and never lasted more than an hour. The last attack took place twelve days before the patient came under observation. During the previous year there had been a small swelling behind and below the angle of the jaw on the right side, which was thought to be due to a tonsillar gland. The patient, however, said that this swelling was not persistent, but also came and went. Thirteen days before coming under my care she developed a sudden swelling of the whole of the right parotid region; this persisted and became very painful, and three days later she could hardly open her mouth. There was fever up to 100° F. The swelling and pain varied somewhat from day to day.

Past history.—The patient had never enjoyed very good health but had led an active life. A nævus of the right cheek and parotid region had been treated many times with surface radium. Mumps in childhood had involved both parotids. The appendix had been removed thirty years previously. Shortly after this the patient had had a severe left-sided parotitis with abscess after influenza. She was desperately ill, there were long periods of unconsciousness, and she was thought to be dying. As a last resort, a small incision was made over the lower part of the parotid without anæsthesia and a large abscess evacuated. From the pus *Staphylococcus aureus* was grown. The rest of the relevant details in this connexion are considered in the section dealing with the auriculotemporal syndrome (see below). All the teeth had been removed many years ago. Twenty years previously the left ovary had been removed because of a cystic condition.

Physical signs.—On August 24, 1937, the patient was very exhausted, ill-looking, dusky complexioned, and obviously in great pain. The temperature had never exceeded 100° F. and the pulse was raised proportionately. The right parotid was moderately enlarged, the maximal swelling being over the angle of the jaw. The overlying skin was shiny and slightly reddened, and there was a trace of œdema. Evidence of the old nævus was present, together with some scarring. The region of the angle of the jaw was exquisitely tender, and there was tenderness over the whole gland. No pus could be expressed through the right parotid duct. The other salivary glands and their ducts and orifices were normal, and the mouth was edentulous and dry. Next day the right parotid duct was catheterised and a small amount of thick tenacious yellowish pus obtained. Cultures of this produced a pure growth of type II pneumococcus.

Course and treatment.—Heat was applied locally with hot-water bottles, and hot mouth-washes were given repeatedly. A 1 in 10,000 solution of Optochin hydrochloride was also used as a mouth-wash twice a day. The gland was massaged for 5 min. each day to empty the ducts of thick tenacious yellowish secretion. After two days' treatment the swelling had practically disappeared, the pus was much less tenacious and was pouring freely into the mouth, the pain was lessened, and the general condition was much improved. Throughout this period the patient was kept on a diet as solid as possible to stimulate the flow of saliva.

By Sept. 3 the condition had practically cleared up. Three days later, however, there was a recurrence of local swelling, increase in local pain, and diminution of discharge along the duct. This necessitated repeated catheterisation of the duct. Gradually the condition subsided, and by the 30th there was no obvious swelling of the parotid, but the anterior border of the gland was just palpable. The orifice of the duct was still a little dilated but not inflamed, and the saliva was still diffusely turbid but contained no large flakes of mucopus.

Subsequently the condition caused no further anxiety, and the patient did not come under observation again till December, 1938. She had remained well in the intervening period, and there had been no further trouble with the right parotid. A catheter specimen of the secretion of the right parotid was copious and clear. Culture produced no pneumococci, but there were a few colonies of staphylococci of the aureus and albus types.

LEFT AURICULOTEMPORAL SYNDROME

The patient reported that, after the left parotid abscess had been drained thirty years previously, the wound had discharged for about four months. There was no evidence that the discharge was parotid secretion. For many weeks after operation a left-sided facial paralysis affected the eye and the mouth. Ever since the wound had healed there had been redness and sweating of the left side of the face, involving the temporal and zygomatic regions, on eating. Shortly after the operation the affected region always became bluish on eating. For some time after operation the moisture would trickle down over the cheek and drip off the face, and for some time the patient could not take meals in company. At the present time this moisture is produced particularly with acid foods and with foods the patient likes. During a typical meal the face has to be mopped usually during the second course and again at the end, but there is no longer enough moisture to trickle off the face.

Physical signs.—On Dec. 9, 1938, there was no obvious abnormality on the left side of the face or cheek, apart from a small scar in the lower part of the parotid region. Sensation was slightly impaired in the area supplied by the auriculotemporal nerve and on the side of the face as far as the outer canthus and the upper part of the cheek to about 1 in. below the zygoma. The left parotid gland was not palpable, the orifice of the duct was patent, and secretion could be expressed into the mouth by massage. In the mouth there were many raised pearly white patches of lichen planus.

The patient was given a piece of lemon to suck. Within a few seconds the skin of the affected region became definitely reddened, and minute beads of moisture appeared on the surface. The reddened

area seemed to be mainly a broad band about 1½ in. wide, passing backwards and slightly downwards from the outer part of the eye towards the upper part of the ear. This area almost gave the impression of having a slightly raised edge, and extended just into the hair. The area from which the moisture was coming seemed to extend rather more widely than the area of the hyperæmia. The patient was not conscious of any unusual sensations in the affected area. Within 10 min. of the cessation of the stimulus the sweating had ceased and the skin had returned to a normal colour. No changes were noted in the pupils.

COMMENT

This case corresponds closely to most of the reported cases of the auriculotemporal syndrome. I have not made an exhaustive study of all the reported case-histories of this condition, but I am not aware of any report of a case in which the characteristic phenomena were observed so late as thirty years after the original parotid lesion. In the present instance the sweating had gradually diminished but could still be readily elicited, and was sufficiently troublesome to require mopping twice during every meal. The patient would not submit to more detailed experiments.

THE AURICULOTEMPORAL SYNDROME

The auriculotemporal syndrome is well recognised but rare. It is also called Frey's syndrome or local hyperhidrosis of the face. The term "auriculotemporal syndrome" is the most descriptive, because the phenomena are almost always present in the area supplied by the auriculotemporal nerve, though in some cases they may extend to areas supplied by neighbouring nerves.

The condition was extensively studied by Frey (1923), who reviewed some of the earlier reports. Trioumphoff reported 14 cases to the Russian Congress of Neurologists in 1924 and surveyed the subject again in 1926. In all his cases there was an antecedent history of suppurative parotitis. Many other cases have been reported by Vaughan (1925), Kaminsky (1929), Fridberg (1931), Bassoe (1932), and Lemaitre and Baudouin (1934). Wilson (1936) has considered the phenomena in connexion with the innervation of the sweat glands of the face, and Ford and Woodhall (1938) in connexion with misdirection of regenerating fibres of cranial, spinal, and autonomic nerves.

Ætiology.—The auriculotemporal syndrome may follow injury to the parotid or its immediate vicinity, but most of the cases are sequelæ of suppurative parotitis. The parotitis has usually been severe and has either necessitated drainage or has ruptured spontaneously. In cases of this type reported from Poland and Russia the parotitis has generally been secondary to either typhus or typhoid fever. This fact suggests that the *Staphylococcus aureus* has most likely been the infecting organism. Cases have also been reported following gunshot wounds in the region or even after the surgical removal of a mixed parotid tumour. In a few cases the condition has developed in syringomyelia. Some of the cases which have been secondary to a local parotid lesion have been associated with either a temporary or a permanent facial paralysis.

Area of involvement.—The characteristic phenomena are seen in the area supplied by the auriculotemporal nerve and to a less extent in the area supplied by the third division of the fifth nerve and by the great auricular nerve, all of which nerves traverse the substance of the parotid gland in the course of their peripheral distribution.

Clinical features.—All the writers emphasise that the symptoms of the auriculotemporal syndrome develop not at the time of the original parotid lesion but during convalescence some weeks or even months later. In one case (Bassoe 1932) the condition developed three years after a suppurative parotitis. The characteristic phenomena consist of hyperæmia and sweating in the affected area, which develop in response to eating and are initiated by a taste reflex from the posterior third of the tongue. At times the sweating may be sufficient for the moisture to trickle off the face and cause serious embarrassment to the patient. Some of the patients also get tingling or even pain, which precedes the redness and sweating. There are considerable variations in the size of the affected areas, but in all cases the area supplied by the auriculotemporal nerve is involved. For each patient, however, the area of involvement remains constant. Changes in the size of the pupil have been noted in some cases, and others have shown sensory disturbances in the affected areas.

Mechanism.—The evidence suggests that the auriculotemporal syndrome is a reflex from taste stimuli from the posterior third of the tongue. Chewing a tasteless substance, such as wood, does not induce the phenomena. In some normal people hyperæmia and sweating of the face may follow the eating of certain foods, especially spiced ones. The face is a region where vasomotor phenomena are conspicuous. The auriculotemporal nerve contains, besides its sensory fibres, vasodilator fibres from the cervical sympathetic to the blood-vessels of the skin and secretory fibres which are motor to the sweat glands. Further, for a short part of its course it also contains secretory and vasodilator fibres to the parotid gland, which are derived from the ninth nerve through the otic ganglion. Ford and Woodhall (1938) summarise the position as follows:—

"It is evident, therefore, that when the nerve is injured between the parotid gland and the point at which it receives its communication from the ninth nerve the various groups of nerve fibres enumerated may be severed, and in the process of regeneration may become misdirected along pathways other than those they originally pursued. It seems probable that the auriculotemporal syndrome is the result of misdirection of some of the secretory fibres of the parotid gland so that they form connections with the sweat glands and blood-vessels of the skin. As a result, when the patient is eating and a volley of nervous impulses passes over the parotid fibres, paroxysmal sweating and vasodilatation occur in the distribution of the auriculotemporal nerve."

Ford and Woodhall (1938) also suggest that the condition is always preceded by division of the auriculotemporal nerve; that initially there is an area of anæsthesia which corresponds to the area supplied by the auriculotemporal nerve; and that the typical phenomena which develop sometime later appear after the nerve has regenerated. This point is not sufficiently brought out in the available case-records. Certainly the pain which some patients get, particularly in the early days after the development of the condition, supports the view of division of the nerve. It is not necessary, however, to postulate complete division of the auriculotemporal nerve, for an inflammation might be severe enough to destroy some of the parotid secretory fibres, and during regeneration some of these fibres might become misdirected and join vasomotor or sweat fibres in the auriculotemporal nerve. The evidence thus suggests that the auriculotemporal syndrome is a reflex initiated by a taste stimulus from the posterior third of the tongue, passing through normal reflex channels but in part diverted from these as the result of

abnormal communications between parotid secreting fibres and vasomotor and sweat fibres in the auriculotemporal nerve due to antecedent injury or inflammation. Briefly, it is due to faulty regeneration of parotid secreting fibres.

Wilson (1936) has shown that the sweat glands of the face have a double nerve-supply: the sympathetic fibres and accessory fibres. The sympathetic secretory fibres leave the carotid plexus and join the peripheral branches of the trigeminal nerve, probably extracranially. These are distributed with the trigeminal branches and not with the periarterial nerves. The accessory secretory fibres probably arise from the brain stem and join the trigeminal nerve at some point distal to its sensory root. These too are distributed with the trigeminal branches. Although they supply the sweat glands of the face, there is no evidence that they play any important part in sweating under normal conditions, and their importance in relation to the auriculotemporal syndrome has still to be determined.

Prognosis.—Few of the reported cases have been followed over a long period of time or seen many years after the onset of the condition. Trioumphoff (1926) followed some of his cases up to five years; in 1 case only was there complete recovery at the end of three years, and in all the other cases the condition persisted without appreciable alteration. In my case reported here the condition had been present for thirty years, during which time the sweating had diminished and perspiration no longer ran off the face during meals, but it still developed during eating and could readily be evoked by eating lemon.

Treatment.—Few observations exist relating to the therapy of this condition. In Frey's case (1923) another physician suggested the injection of alcohol into the facial nerve, although there was no facial palsy. In this attempt he failed, but he apparently injected the auriculotemporal nerve, because the characteristic symptoms disappeared temporarily. Avulsion of the auriculotemporal nerve has been tried in a few cases, but there are few accurate records of this. Trioumphoff (1926) showed that atropine in ordinary doses had no effect on the condition. In 1 of his cases, where the sweating was confined to the great auricular nerve, division of this nerve relieved the symptoms.

SUMMARY

(1) A case of auriculotemporal syndrome is reported in a patient who came under observation for acute pneumococcal parotitis on the opposite side.

(2) The auriculotemporal syndrome had developed a few months after a serious suppurative parotitis, which had complicated influenza thirty years previously.

(3) The typical symptoms of local hyperæmia and sweating on eating had persisted ever since.

(4) For many years the degree of sweating was severe and sweat poured off the face during eating. When the patient came under observation, the hyperæmia and sweating were still both readily induced by eating or by taste stimuli, but the sweating was not so copious as formerly.

(5) The auriculotemporal syndrome typically follows a severe attack of suppurative parotitis or less often injury to the parotid and occasionally develops during syringomyelia. The cases secondary to parotitis are by far the most numerous.

(6) The area of involvement is that of the distribution of the auriculotemporal nerve, and at times includes that of the third division of the trigeminal nerve and of the great auricular nerve, all of which traverse the parotid gland.

(7) The characteristic phenomena are described.

(8) The evidence suggests that the phenomena are reflex and result from the establishment of connexions between parotid secretory fibres of the auriculotemporal nerve and vasomotor and sweat secretory fibres running with the same nerve. These abnormalities may follow division of the nerve or be secondary to inflammation.

(9) The condition usually persists, though complete recovery has been reported. In the case here described the symptoms were still present after thirty years though less severe than originally.

(10) The possible lines of treatment are briefly described.

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BLOOD-UREA AND UREA CLEARANCE

BEFORE AND AFTER THE ADMINISTRATION OF UREA BY MOUTH

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It is well known that the vast reserve power of the kidneys renders accurate assessment of their efficiency difficult. From the earliest days of clinical biochemistry, therefore, there has been an almost continual succession of tests leading to improved methods of measuring the functional capacity of these organs. The number and variety of tests to estimate renal efficiency are too extensive to mention here, but the most outstanding of recent times are the Van Slyke urea-clearance test and Fowweather's modification of this.

The original work of Van Slyke (Möller et al. 1928) is by this time so well known that a detailed reference to it here is superfluous, but certain aspects of his test deserve critical mention. Van Slyke's mathematical formula, which expresses the number of c.cm. of blood cleared of urea per minute, was based on the findings of only a few normal subjects. Multiple observations were made on these subjects, and the published results show that a considerable degree of variation of clearing power was displayed by each person.

As an example, eleven identical tests were carried out on one person and gave results ranging from 48 to 76 c.cm. of blood cleared of urea per minute, which in terms of normal average of the whole series—i.e., 54 c.cm. per minute—can be expressed as 91–141 per cent. of normal. An isolated low value of 48 per cent. of normal was obtained in one test on another subject, a result which was omitted by Van Slyke in his calculation of the mean urea clearance. Apart from this the extreme ranges were 63–141 per cent. of the mean.

This great variability of the urea clearance, as calculated on the basis of the Van Slyke technique, has been generally observed, and, what is a still more serious criticism, unusually low values have often

been noted in spite of rigid adherence to the principles of the test. These failings are discussed in detail by Fowweather (1934 a, b), who was the first to advocate estimation of the kidneys' clearing capacity after the ingestion of urea. He claims that his procedure gives more accurate results, and he substantiates this by comparing the clearance values before and after urea. His figures indicate a narrower range of variation in his normal subjects and the disappearance of the apparently unjustifiably low values. It is presumed that, at the higher levels of blood-urea obtaining in his test, the kidneys are stimulated to work at about their maximal capacity. Fowweather discusses a fundamental difficulty of the clearance test—i.e., the possibility of error due to incomplete emptying of the bladder—and maintains that this is likely to be minimised by the diuretic action of the ingested urea. The technique applied by Fowweather resembles the de Wesselow and Maclean concentration test.

An ordinary light breakfast with a limited fluid intake (coffee being strictly forbidden) is permitted. A timed specimen of urine is collected during the hour immediately preceding ingestion of 15 g. of urea in 200 c.cm. of water. Afterwards accurately timed specimens of urine are collected at the end of one and two hours. Further, blood is taken just before urea is given and again shortly before the last specimen of urine is voided. This makes it possible to calculate the urea clearance before and after the ingestion of urea.

Fowweather was prompted to utilise the second hour period after urea for his test, because he observed that of thirty-three normal subjects, in whom he estimated the blood-urea nitrogen at the end of the first and second hour after urea, twenty-six showed differences of less than 5 mg., four of 5–10 mg., and three of slightly over 10 mg. per 100 c.cm. of blood. Others have followed the blood-urea response subsequent to administration of urea by mouth (King 1928, Penington 1938), but in no instance has a sufficiently detailed study been made to justify the claim that a satisfactory degree of stability of blood-urea exists during the second hour after a 15 g. dose.

The routine application of Fowweather's test during the last four years has left us with no doubts that his modification yields much more accurate indications of renal efficiency than are obtainable from the original Van Slyke technique. We thought, however, that a closer scrutiny of the changes in the blood-urea and renal output after administration of urea by mouth may yield results not only of academic interest but also of practical value.

INVESTIGATION

Fifty healthy members of the hospital staff, aged 20–35, were investigated. In no instance was there raised blood-pressure (systolic not more than 130 mm. Hg, diastolic not more than 85 mm. Hg) or any abnormality in the urine; none had any history of renal disease. The blood was analysed by a modified Van Slyke and Cullen micro method.

A light breakfast of fruit and bread and butter with one small cup of tea was allowed approximately two hours before the test was due to begin. At about 8.30 A.M. the subject was instructed to empty the bladder, to note the time carefully, and to discard the specimen. At about 9.30 A.M. a specimen of blood was obtained and the bladder again emptied; these two specimens were used for the estimation of the Van Slyke urea clearance. Immediately afterwards 15 g. of urea in 200 c.cm. of water was given, and after this samples of blood were taken at ¼ hr., ¾ hr., 1¼ hr., 1¾ hr., and 2¼ hr., and the bladder was emptied as completely as possible at ½ hr., 1 hr., 1½ hr., 2 hr., and 2½ hr.

Analysis of this material enabled us to measure the urea clearance before the ingestion of urea; to construct blood-urea curves after the ingestion of urea; to calculate the urea clearance for each half-hourly period after the ingestion of urea; and to tabulate the data of urea concentration in urine for the 2½ hr. period of the experiment.

FINDINGS

Urea clearance before the ingestion of urea by mouth was calculated from samples of urine collected in a period of approximately an hour. The time varied according to the convenience of the subject, but in each case the exact number of minutes was carefully noted. Our results are stated in percentages of the accepted Van Slyke average normal levels—i.e., standard clearance of 54 c.cm. of blood per minute, when the volume of urine is less than 2 c.cm. per minute, and maximal clearance of 75 c.cm. of blood per minute, when the volume of urine exceeds 2 c.cm. per minute. The lowest value obtained was 33 per cent. and the highest 125 per cent. of normal. That this low finding was not an isolated instance can be seen from table I, where the results are grouped in grades differing by 10 per cent.

TABLE I—UREA CLEARANCE BEFORE INGESTION OF UREA

Percentage of Van Slyke normal level	Subjects	Percentage of Van Slyke normal level	Subjects
31–40	3	81–90	5
41–50	7	91–100	4
51–60	4	101–110	4
61–70	5	111–120	8
71–80	9	121–130	1

Blood-urea curves.—The frequent sampling of blood after ingestion of urea enabled us to obtain a curve for each of our subjects. We examined these curves from the points of view of the original level of the blood-urea, the maximal elevation and the time taken for this peak to be reached, and the degree of stability or otherwise of the blood-urea. The last-named consideration was of particular import, because it would govern the choice of the period most suitable for calculation of urea clearance after urea.

The nitrogen-fasting level of the blood-urea was 17–40 mg. per 100 c.cm. and was therefore representative of the accepted normal range. This initial figure had no effect on the type of the subsequent curve. The most striking feature of the blood-urea curves was their variability both in the height reached and in the time taken before the peak was attained. In forty-nine of our fifty subjects the increase in blood-urea from the resting level was 21–54 mg. per 100 c.cm.; one isolated value of 68 mg. was found, and the average increase in the whole series was 35 mg. per 100 c.cm. It was hoped that some degree of regularity in the blood-urea—time curves would show itself if the measurements of blood-urea were taken frequently enough. Our results, however, demonstrate clearly that this is not the case (table II). The curves fell roughly into the following types, the number of subjects in each group being given in brackets: steeply rising and steeply falling (4), steeply rising and steady (13), steeply rising and slowly falling (7), steeply rising and oscillating (9), slowly rising and steady (12), slowly rising and slowly falling (3), and slowly rising throughout (2). Representative samples are plotted in figs. 1–7. In fig. 8 a

composite curve is given, based on the mean values for the fifty persons, which were as follows: resting blood-urea 28 mg. per 100 c.cm.; ¼ hr. after urea, 49 mg. per 100 c.cm.; ½ hr., 59 mg.; 1¼ hr., 59 mg.; 1½ hr., 58 mg.; and 2¼ hr., 55 mg. per 100 c.cm.

It is obviously desirable, if a routine urea-clearance technique is to be based on an investigation of this kind, to discover whether most of the subjects exhibit a period during which the blood-urea level remains relatively stable, because this would permit a reduction in the number of specimens required for the test. We have consequently examined our figures closely with this purpose in mind, and the summarised results are given in table III, in which variations of less than 5

TABLE II—TIME TAKEN BY BLOOD-UREA TO REACH MAXIMUM AFTER INGESTION OF UREA BY MOUTH

Time (hours)	Subjects	Time (hours)	Subjects
¼	4	1¼	6
½	21	1½	1
1¼	18		

mg. per 100 c.cm. in the consecutive blood-ureas are designated "steady" for the intermediate period between the two observations.

It appears that for no appreciable time during the test does the blood-urea remain stable in all the subjects, but the table suggests that this is most likely to be the case around the 1¼ hr. mark. At this point the great majority of curves are steady, and the number of those showing a moderate rise is almost equalled by the number of those showing a similarly moderate fall. The magnitude of the difference between blood-urea values at the ¾ hr. and 1¾ hr. stages of our test have been examined, and in thirty-nine out of our fifty subjects this difference does not exceed 10 mg. per 100 c.cm. Further, in every case the mean blood-urea value calculated from the ¾ hr. and 1¾ hr. analyses very closely approximates the 1¼ hr. blood-urea.

TABLE III—STABILITY OF BLOOD-UREA LEVEL

Period (hours)	Subjects showing steady blood-urea	Showing rise	Showing fall
½–1¼	29	11	10
1¼–1½	30	4	16
1½–2¼	29	3	18

Calculation of the urea clearance.—Figures were obtained for five consecutive half-hourly periods after the administration of urea by mouth and were compared with those of urea clearance before the administration of urea. In a general way it can be said that where the initial value was low there was in every instance an increase in the clearance after the ingestion of urea. Where, however, the initial clearance is already well within the van Slyke range of normal values the subsequent deviation is not so obvious, but in most cases there is some increase. The falls in clearance after the ingestion of urea are confined almost exclusively to the cases where the original clearance is approaching the upper normal limit of the Van Slyke range—e.g., a person with an initial clearance of 115 per cent. of normal gave a mean value of 102 per cent after the ingestion of urea. Of our fifty subjects ten remained steady, thirty showed a rise, and ten a fall when the mean value after

TABLE IV—DISTRIBUTION OF UREA-CLEARANCE VALUES AFTER INGESTION OF UREA

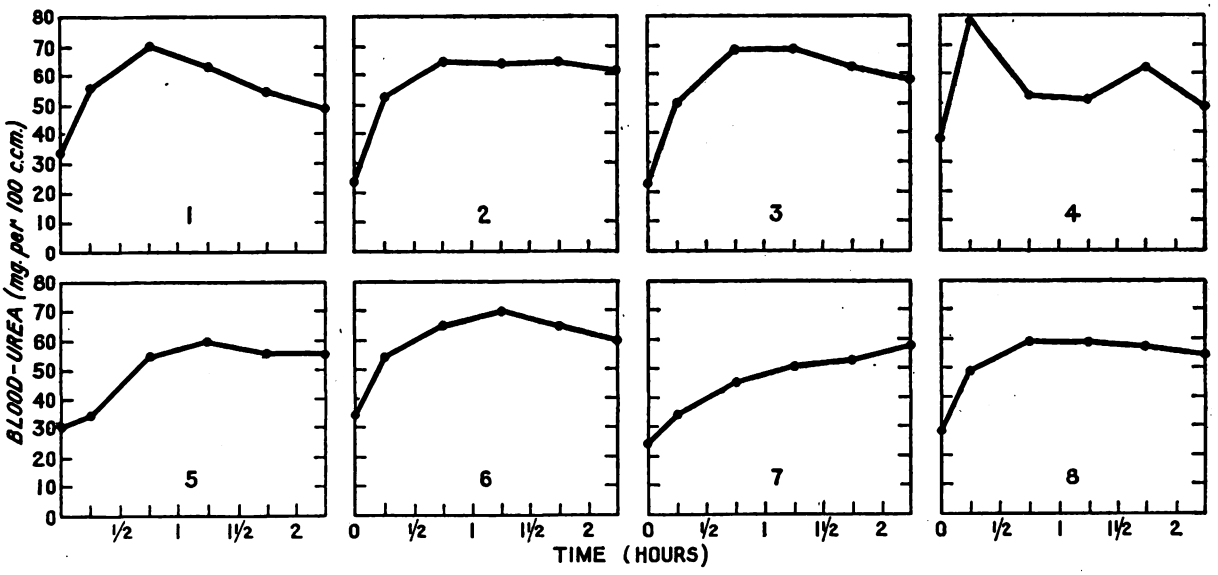
Percentage urea clearance	Subjects	Percentage of urea clearance	Subjects
Less than 70	Nil	101–110	13
71–80	10	111–120	3
81–90	10	131	1
91–100	13		

ingestion of urea was compared with that before ingestion of urea (the criterion of steadiness was a difference of not more than 10 per cent. between the two values). In computing the mean value after the ingestion of urea we have taken into account only those periods where the blood-urea might be regarded as relatively stable as judged from the successive blood analyses; on these grounds the clearance value for the first half-hour period is always excluded. Comparison of table I with table IV will demonstrate the general tendency to increase of clearance values after the ingestion of urea.

Concentration of urea in the urine.—Data of this concentration during the period of our test have only been regarded as incidental in this series of investiga-

TABLE V—UREA CLEARANCE AFTER INGESTION OF UREA IN RENAL DISEASE

Case	Percentage of urea clearance before and after ingestion of urea		Remarks
	Before	After	
1	76	74	Albuminuria, history of severe pyelitis, slight œdema of legs
2	40	88	Focal hæmorrhagic nephritis, albuminuria; urine: many red cells but no casts
3	61	72	Doubtful history of nephritis; urine: trace of albumin, many leucocytes and red cells, no casts
4	63	56	Acute nephritis; urine: albumin, few granular casts, many leucocytes and red cells; made good recovery later
5	82	63	Headaches, raised blood-pressure; urine: persistent albuminuria, many red cells and leucocytes, few hyaline and granular casts
6	65	64	Persistent albuminuria, raised blood-pressure; urine: many hyaline casts, few leucocytes
7	54	56	Urine: heavy albuminuria, few granular and epithelial casts, numerous pus cells and few red cells
8	45	65	Persistent albuminuria; urine: many red cells and leucocytes, few renal cells and epithelial casts
9	75	58	Tonsillitis followed by nephritis; urine: albuminuria, numerous red cells, no casts
10	58	41	Acute nephritis; urine: heavy albuminuria, numerous red cells and hyaline casts
11	20	69	Occasional œdema, low plasma albumin; urine: heavy albuminuria, many red cells and leucocytes; renal cells, no casts
12	22	22	Hypertension, headaches, heavy albuminuria, hæmaturia
13	40	23	Severe attack of nephritis after tonsillitis; heavy albuminuria, hæmaturia
14	13	14	Severe hypertension, bordering on uræmia
15	19	16	Bordering on uræmia



FIGS. 1–7—Representative blood-urea curves of different types: fig. 1, steeply rising and steeply falling; fig. 2, steeply rising and steady; fig. 3, steeply rising and slowly falling; fig. 4, steeply rising and oscillating; fig. 5 slowly rising and steady; fig. 6, slowly rising and slowly falling; fig. 7, slowly rising throughout.
FIG. 8—Composite blood-urea curve based on mean values of fifty persons (see text).

tions. We used the original urease method with aeration and titration (Van Slyke and Cullen 1914, 1916). Nearly all our subjects attained values generally accepted as normal after a 15 g. dose of urea. In the five instances where the concentration of urea fell below this normal level the urea-clearance values after urea showed satisfactory renal function. For example, one subject gave a maximal concentration of urea of 1·35 per cent. in 47 c.cm. of urine for one of our half-hourly periods of collection, yet his clearance before the administration of urea by mouth was 90 per cent. and afterwards 96 per cent. of normal.

THE TEST IN RENAL DISEASE

We had an opportunity of studying the behaviour of a small group of nephritics after the ingestion of 15 g. of urea. The same detailed half-hourly analysis was made as in the foregoing group. The subjects were chosen in such a way as to give examples varying from those in whom evidence of renal involvement was very slight to those bordering on uræmia. The general tendency in this small series was for the maximal elevation of blood-urea after the ingestion of urea to be somewhat greater than in the normal series, the range of increase being 25–63 mg. per 100 c.cm. above the original level. The clearance values have been again compared in table v; and, if generalisation is permissible from so small a number, it can be said that in definite renal disease there was either a fall or no change in urea clearance after the ingestion of urea, whereas in mild or doubtful nephritis a rise was recorded.

DISCUSSION

The object of this work has been to observe the effect of a large dose of urea on the clearing capacity of the kidneys. Our results have confirmed previous observations that the Van Slyke technique often yields in normal subjects clearance values well below the accepted standards. Thus reference to table I shows that nineteen of our fifty normal subjects would fail to qualify as normal even on the basis of the minimal requirement of 70 per cent. level. In all these instances normal values for urea clearance were obtained after the administration of a 15 g. dose of urea by mouth. In parallel experiments on patients with evidence of renal disease the ingestion of urea did not as a rule improve the clearance figures, and in fact a fall was often recorded in such cases. We saw no harm resulting from giving this heavy dose of urea to patients with an already high level of blood-urea, though this procedure would not commend itself as a routine in obvious cases of uræmia or in the acute phase of nephritis.

Frequent collections of specimens of urine and of blood after the ingestion of urea enabled us to follow more closely its effect on the functional capacity of the kidneys. It is obvious that any reliable calculation of the urea clearance over any particular period of time must be based on the knowledge that the blood-urea remains reasonably constant throughout. The degree of constancy or otherwise of this factor after the administration of urea by mouth will depend largely on the rate of absorption of urea from the bowel and of its disposal from the blood-stream by the kidney. A study of our blood-urea curves, based on half-hourly observations, while showing considerable individual variability, demonstrates that a relatively stable period exists in most subjects between ¾ and 1¾ hours after the administration of urea by mouth. The blood-urea observed at 1¼ hour approximates very closely in every instance to the mean calculated from the ¾ hour and 1¾ hour values. Fowweather, who first proposed the application of the Van Slyke clearance formulæ to specimens obtained after the administration of urea by mouth, utilised the second hour after for his procedure. To satisfy himself concerning the stability of the blood-urea during this period he examined the blood at the beginning and end of the second hour in a series of thirty-three normal subjects. The results are very briefly recorded, and it should be observed that the differences between the values of these two times are expressed in terms of blood-urea "nitrogen," which has the effect of minimising by a half the actual blood-urea differences. In the final form suggested for routine

application Fowweather proposes the taking of a sample of blood towards the end of the second hour period. Our more detailed observation of the blood-urea has shown that in most cases the maximal rise takes place quickly after the ingestion of urea, and that at the 1¾ hour stage many are showing a fall. In a practical clinical test it is from many points of view desirable that a collection of urine over no less than an hour period should be made, and our results support the choice of the ¾–1¾ hour period after the ingestion of urea to attain what will be most probably the maximal degree of accuracy. Despite, however, our criticism of the blood-urea data offered by Fowweather we must record that in other respects the clearance levels obtained by his technique are satisfactory. From the urine data we obtained for the two separate periods of 1 to 1½ hr. and of 1½ to 2 hr. after the ingestion of urea and the blood-urea value at 1¾ hr. we computed results comparable with those of Fowweather. His figures agreed well with ours, which represented the mean value for the period during which we knew that the blood-urea remained relatively steady. In a few instances there was a deviation of as much as 10 per cent. between the two sets of results, which is not of serious importance when results are well within the normal range. It is obvious, however, that an error of this magnitude in the border-line region of normality might be undesirable. Therefore we recommend the following slight modification of Fowweather's procedure:

The patient is allowed to have his usual meal the night before the test. On the morning of the test a light breakfast of bread, butter, and a piece of fruit, with one small cup of tea, is permitted. Approximately two hours after this the test begins. The patient empties the bladder completely, and immediately afterwards 15 g. of urea in 200 c.cm. of water is given, the time being carefully noted. The bladder is again emptied after 45 min. and the exact time recorded. This is repeated an hour later. Midway between these two collections of urine—i.e., at 1¼ hour after the administration of the urea—a specimen of blood for the determination of the urea content is obtained. For example, the following time-table might be used:

Breakfast	8 A.M.
First specimen of urine and administration of urea by mouth	10 A.M.
Second specimen of urine	10.45 A.M.
Specimen of blood	11.15 A.M.
Third (last) specimen of urine	11.45 A.M.

The urea clearance is calculated from the data obtained from analysis of the third specimen of urine.

SUMMARY

(1) The renal function of fifty normal subjects before and after taking urea by mouth was studied.

(2) The abnormally low urea-clearance values often obtained by the original Van Slyke technique were found to disappear after the ingestion of urea.

(3) In a small series of patients with evidence of renal disease, those with definite disease seemed to show a fall or no change in clearance after urea, whereas mild cases showed a rise.

(4) The blood-urea was found to be relatively stable between ¾ and 1¾ hour after taking urea.

(5) On this basis a practical test is suggested.

We wish to thank members of the nursing and medical staffs who gave their free time for the purpose of this investigation.

References at foot of next column

ACUTE MERCURIAL POISONING AFTER CYSTOSCOPY

A REPORT OF THREE CASES

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REPORTS are given on three patients who died of mercurial poisoning after cystoscopy in which mercury oxycyanide was used. In two the diagnosis was made during life, and chemical analyses of the urine and fæces were made ante mortem and of the organs post mortem. These cases suggested the cause of the death a year previously of a third patient who had died after cystoscopy.

CASE-RECORDS

CASE 1.—A male paint-sprayer, aged 18, was admitted to hospital, under Dr. R. A. Rowlands, with several weeks' history of repeated attacks of severe right-sided abdominal pain, which had been relieved with morphia by his private doctor.

The patient, a deaf mute, was coöperative and intelligent. He was well nourished and had no pain when examined. Pulse regular, apex-beat not displaced, and blood-pressure 140/60. No abnormal signs detected in lungs; no abdominal rigidity or tenderness; liver, spleen, and kidneys not felt. Apart from deaf-mutism, nothing abnormal in central nervous system.

Urine alkaline, specific gravity 1·015, no albumin, no sugar; many red blood-cells, occasional leucocytes, amorphous phosphates, and oxalates on microscopy of deposit. Culture proved sterile. Volume 26–56 oz. daily. Blood-count normal: hæmoglobin 113 per cent., leucocytes 8000. Radiography of renal tract showed a shadow near the right ischial spine, which was shown by intravenous pyelography to be in the line of the right ureter. Right renal calyces slightly dilated. Calculus in the right ureter was diagnosed.

On May 20, 1938, cystoscopy and catheterisation of the right ureter were performed under general anæsthesia (A.C.E. and ether). The bladder was washed out with a 1 in 4000 solution of mercury oxycyanide and filled with 8 oz. of the same solution. Cystoscopy showed very slight cystitis and normal ureteric orifices. A catheter was passed easily up the right ureter for 20 cm. after a momentary check at 4 cm.; 4 c.cm. of sterile liquid paraffin was injected into the lowest 5 cm. of the ureter. When the cystoscope was about to be withdrawn, it was seen that there had been slight hæmorrhage from the neck of the bladder. The solution was left in the bladder.

After the operation there was fairly severe vomiting, thought to be postanæsthetic. During the first twelve hours 20 oz. of bloodstained urine was passed; during the second twelve hours no urine; during the third 6 oz., bloodstained. On the second day the patient began to have bloody diarrhœa and vomited everything he was given. On the third day fourteen motions, consisting of blood and mucus, were passed, vomiting was severe, and there was distressing hiccup; the patient complained of thirst, and at this

MR. MORTON AND DR. NUSSEY: REFERENCES

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time the gums became purplish and swollen, with bleeding and discoloration of the alveolar margins. The condition became steadily worse, and intravenous injections of saline were given by the continuous drip method, 1000, 600, and 600 c.cm. being given on the fourth to sixth days.

There was almost complete retention of urine, the daily volumes being 1½, 3, 4, 2½, and 1 oz. of bloody urine to the end of the first week after operation. The stomatitis and gingivitis became more severe and the breath foul, and there was persistent vomiting and hiccup. The abdomen was slightly distended, and there was tenderness in the right iliac fossa; diarrhœa continued up to six motions daily, the stools consisting of blood and mucus. The blood-pressure rose from 150/76 on the fourth day to 170/100 on the tenth day; the blood-urea was 160 mg. per 100 c.cm., rising on the third day to 280 mg. per 100 c.cm. at the end of the first week.

Intravenous drip saline infusion was continued, 1000–2000 c.cm. daily, and during the second week the urinary output steadily increased, 15, 23, 35, 29, 73, 72, and 52 oz. being passed on successive days. The urine was still bloodstained but less so than formerly. The patient's general condition did not improve; he became increasingly drowsy by day and restless during the night; the stomatitis became less severe, but vomiting was still frequent. The pulse-rate, which had been about 90, increased to 120–130. The motions contained less blood than before but were more numerous, up to fourteen daily. A blood-count showed a diminution in hæmoglobin to 86 per cent. and a leucocytosis of 20,000.

Two weeks after the operation the blood-urea had risen to 650 mg. per 100 c.cm., and the plasma chloride was 540 mg. NaCl per 100 c.cm.; there was persistent hypertension about 170/100 mm. Hg. The patient gradually became more drowsy, with twitching of the muscles, and died seventeen days after the operation; the final blood-urea was 690 mg. per 100 c.cm. and the hæmoglobin 35 per cent.

Necropsy.—The body was that of a well-developed but slightly wasted man. Bladder and ureters: bladder slightly dilated; deep ulceration (6 × 5 sq. cm.), with base formed by muscularis, in lower part of posterior wall of bladder and in upper half of prostatic urethra. Superficial inflammation (7 × 4 sq. cm.) immediately above this, with necrosis, purulent inflammation, and thrombosis involving all the wall except outermost muscularis and serosa. Mucosal hæmorrhage in prostatic and penile urethra. Ureteric orifices patent in area of deep ulceration. Calculus (0·9 cm. largest diameter) impacted in lower end of right ureter, which was slightly dilated and injected, especially at its lower end. Very slight dilatation of the right renal pelvis; injection of both renal pelves.

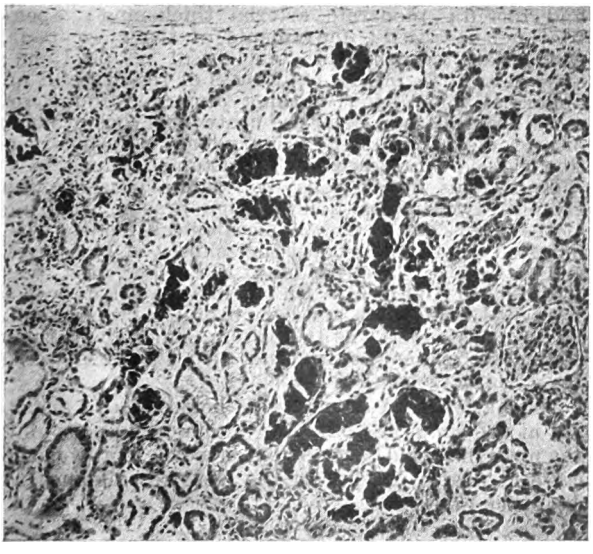


FIG. 1—Case 1: necrosis and calcification of tubular epithelium of kidney. Hæmatoxylin and eosin. (× 78.)

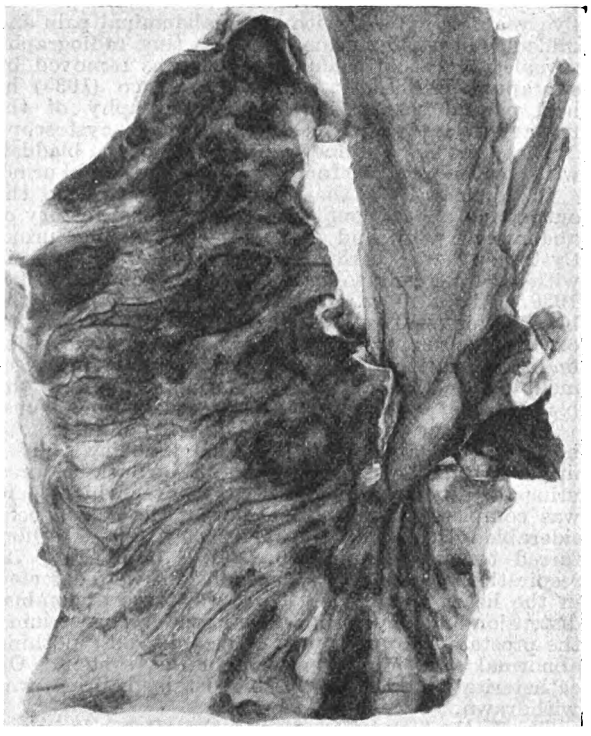


FIG. 2—Case 2: areas of necrosis and ulceration in cæcum.

Kidneys: much œdema and cloudy swelling, with extensive desquamation, calcification, fibrinoid necrosis, and regeneration of epithelium; focal, acute, chiefly leucocytic interstitial infiltration (fig. 1).

Intestine: acute focal ulceration of large intestine. Acute, usually fibrinoid, necrosis of media and thrombotic occlusion of lumen of arterioles within and beneath focal areas of necrosis and ulceration of mucosa and inner submucosa in cæcum, ascending colon, and less frequently in rest of colon and rectum. Purulent infiltration of necrosed tissue; great œdema, areas of hæmorrhage, very great infiltration with large epithelioid cells, and occasional cellular endophlebitis in subjacent mucosa. Slight enlargement of mesocolic glands.

Pancreas: "hæmorrhagic pancreatitis." Lipolysis and hæmorrhage in interstitial septa of pancreas with proteolytic digestion of a zone of adjacent parenchyma. Acute coagulative and fibrinoid necrosis of media of arteries within, at margins of, and occasionally outside the digested tissue.

Gums: gum margins of upper and lower central incisors undermined for distances up to 0·3 cm.; pus in undermined margins of lower incisors. Very slight infiltration of mucosa of gums with neutrophil leucocytes and slight perivascular infiltration of submucosa with plasma cells, lymphocytes and occasional neutrophil leucocytes. Blue discoloration of gums opposite spaces between teeth. Ulceration of mucosa on right and left margin of tongue, with masses of gram-positive and negative cocci and a few bacilli in its base, and zone of purulent infiltration and necrosis beneath base.

Lungs: inflammatory œdema and purulent, probably aspiration, bronchopneumonia containing masses of gram-positive streptococci in lower lobe of left lung; œdema of remainder of lungs. Slight fibrinous pleurisy over left lower lobe; slightly turbid right pleural effusion (10 oz.), clear hæmorrhagic left (3 oz.).

CASE 2.—A male tailor, aged 58, had been in hospital five years ago (1933) with lower abdominal pain and difficulty in passing urine. At that time radiography revealed a vesical calculus, which was removed by suprapubic lithotomy. Three years ago (1935) he had painful micturition, but radiography of the urinary tract showed nothing abnormal; cystoscopy at that time showed fine trabeculation of the bladder, with a sacculus in the fundus and much residual urine.

In August, 1938, the patient again attended the outpatient department with three weeks' history of abdominal pain and difficulty in passing urine. Cystoscopy was performed under local anæsthesia with a 0·1 per cent. solution of Percaine on August 28, 1938. About 40 oz. of urine was drawn off from the bladder and 8–10 oz. of a 1 in 4000 solution of mercury oxycyanide run in. The bladder was normal except for fine trabeculation; there was no cystitis and no enlargement of the prostate. The solution was left in the bladder after cystoscopy, and the patient went home.

Twenty-four hours later he was admitted to hospital with abdominal pain and inability to pass urine. He had passed about 4 oz. of dark-coloured urine three hours after cystoscopy, after which there was complete inability to urinate. He was in considerable distress, with sunken cheeks and a dry furred tongue; temperature 98° F., pulse-rate 72, respiration-rate 20; no abnormal signs were detected in the heart and lungs; there was lower abdominal distension and some tenderness in the hypogastrium; the prostate did not appear to be enlarged; nothing abnormal was found in the nervous system. On catheterisation, 18 oz. of bloodstained urine was withdrawn.

The patient vomited frequently after admission, and the blood-urea on the 29th was 140 mg. per 100 c.cm. On the second day bloody diarrhœa set in, motions being passed at 10 min. intervals. Intravenous drip saline infusion was started on admission, 500, 1500, 1050, 2100, and 600 c.cm. being given in the first five days. The colon was washed out on the day after admission. The symptoms did not improve; there was frequent vomiting, neither food nor fluid being retained; diarrhœa persisted, with frequent small bloodstained stools; and there was almost complete suppression of urine, the daily volumes after the initial catheterisation being nil, nil, 1, ½, and 2½ oz.

At the end of the first week the blood-urea had risen to 340 mg. per 100 c.cm. The general condition had slightly improved, dehydration being less, and the patient being able to retain fluids given by mouth. The bladder became slightly distended, and 12 oz. of bloodstained urine was obtained by catheter. The blood-pressure rose from 150/75 on the third day to 174/100 on the sixth day. During the second week continuous drip saline was resumed, and there was a progressive increase in urinary output, 14, 24, 38, 51, and 24 oz. being passed on successive days. Vomiting however, continued, though less severe, and the blood-urea rose to 430 mg. per 100 c.cm. on the tenth day; there was no improvement in the diarrhœa, the stools being frequent and containing much blood.

In spite of continued intravenous and rectal saline infusions the patient became gradually weaker, the blood-pressure fell to 98/62, and death took place on the thirteenth day. The blood-urea rose to a final value of 600 mg. per 100 c.cm.

The *necropsy* was performed outside the hospital, and the following tissues were obtained for examination: kidneys, bladder and penis, terminal ileum, cæcum, appendix, and large intestine.

Bladder and ureters: bladder hypertrophied (muscular coat 1·5 cm. thick). Mucosa and inner submucosa beset with areas of ulceration and superficial necrosis, followed by zone of purulent infiltration. Œdema, hæmorrhage, and infiltration with epithelioid cells in outer submucosa; patchy loss of muscle-fibres and apparent increase in interstitial tissue in muscularis throughout the wall; numerous gram-positive cocci on necrosed inner surface; necrosed thrombosed vessels in inner necrosed purulent zones. Slight projection of middle lobe of prostate; one small adenoma and areas of great desquamative catarrh in microscopic section of right lobe of prostate.

Kidneys: no dilatation of renal pelves; numerous petechiæ in renal pelvis of right kidney, a few in left. Cloudy swelling and slight fatty degeneration of kidneys, with desquamation, fibrinoid necrosis, occasional calcification, and conspicuous regeneration of epithelium; great œdema and focal chronic, chiefly lymphocytic, infiltration of interstitial tissue. Infiltration of left renal pelvis with lymphocytes and a few plasma cells; hæmorrhage and area of necrosis in adjacent angle of calyx.

Intestines: injection of, and a few hæmorrhages in, lower ileum. Focal areas of ulceration and necrosis in cæcum and ascending colon (fig. 2), followed by a zone of purulent inflammation in mucosa and inner submucosa; necrosis and thrombosis of vessels in necrotic and purulent zones. Great œdema and infiltration with epithelioid cells in outer submucosa; loss of muscle-fibres in inner muscularis; masses of gram-positive cocci and occasional areas of calcareous impregnation in necrosed inner zone. Larger number of such necrotic areas in proximal half of transverse colon, becoming confluent in distal half and in descending and pelvic colon; a few in rectum.

CASE 3.—A male tailor, aged 69, attended the outpatient department with three months' history of attacks of abdominal pain lasting one or two days, with frequency of micturition 1–2 hourly by day. His tongue was dry and furred and his teeth carious; blood-pressure 200/95; chest movements poor, with scattered rhonchi; abdomen obese, but nothing abnormal detected; nothing abnormal discovered per rectum.

A week later the patient passed bright red blood in his urine, this lasting one day. Cystoscopy was performed on May 23, 1938, under local anæsthesia with a 0·1 per cent. solution of percaine, and the bladder was filled with a 1 in 4000 solution of mercury oxycyanide. There were multiple small submucous hæmorrhages and œdema of the vesical mucosa, but no intravesical enlargement of the prostate. Although there is no definite record, the oxycyanide solution was presumably left in the bladder, this being the usual procedure after cystoscopy in the outpatient department. The urine obtained at cystoscopy was acid and contained no sugar or albumin: occasional leucocytes were seen on microscopy of the deposit; culture proved sterile.

After cystoscopy the patient felt ill; no urine was passed, but he had several bloodstained motions. He was admitted to hospital later in the day, looking ill, rather drowsy, pale, and cyanosed; tongue dry and furred; moderate arterial thickening; apex-beat not localised; movements of the chest poor, with scattered rhonchi and basal crepitations; abdomen obese, but no tenderness or rigidity and no abnormal mass felt; nothing abnormal found on rectal examination, or in the central nervous system, or on radiography of the urinary tract. Catheterisation yielded a few drops of bloodstained urine.

Continuous intravenous drip saline infusion was given for twenty-four hours. There was no vomiting at the onset, but there was fæcal incontinence, with repeated small stools consisting chiefly of blood and mucus. On the fourth day the blood-urea was 230 mg. per 100 c.cm. On the fifth day there was a large projectile vomit, and 6–8 oz. of urine was passed. The blood-pressure was 150/65 mm. Hg. The patient gradually became weaker and died on the seventh day. No necropsy was made.

This patient died about a year before cases 1 and 2, and at the time the possibility of mercurial poisoning was not considered. Probably, however, this was the cause of death, in view of the close resemblance to the other cases.

CHEMICAL ANALYSES

In cases 1 and 2, where the diagnosis was made during life, the urine and fæces were examined, and

mercury was found. In these cases mercury was found in kidney, liver, and intestines post mortem, the method of analysis being controlled against post-mortem material from another case where there had been no exposure to mercury. The mercury oxycyanide used in the cystoscopies was assayed and found to be HgO 20·3 per cent. and Hg $(CN)_2$ 79·6 per cent. The concentration of the solution was 1 in 4000, and 8 oz. (the usual quantity introduced into the bladder) would contain 28·6 mg. of mercury.

COMMENTS

The use of mercury solutions in cystoscopy must be very widespread and in this hospital extends back thirty years. Mercurial poisoning as a complication appears to be extremely rare, but it is possible that occasional instances in the past have escaped recognition. Recent reports suggest, in fact, that similar cases have been observed in other genito-urinary clinics (d'Abreu and Lysaght 1935, 1936). The occurrence of acute mercurial poisoning after cystoscopy might be due to one or more of three factors: the mistaken use of a highly concentrated solution; abnormal circumstances leading to excessive absorption of the mercurial salt; or idiosyncrasy of the patient. Chemical analysis of the organs was not sufficiently complete to give a conclusive answer, but, so far as it went, did not suggest that the solution of mercury was too concentrated. Moreover, other patients were cystoscoped on the same days as cases 2 and 3, the same solutions being used and no ill effects being observed. In all three cases the mercury solution was left in the bladder after cystoscopy and was not voided by the patient for some considerable time. Moreover, in cases 1 and 2 morbid changes in the bladder were unusually severe. To what extent absorption might be favoured by such factors as retention after cystoscopy, instrumental trauma, cystitis, distension of the bladder, and possible reflux of fluid into the ureters and renal pelves it is impossible to decide. In view of the rarity of this condition we suggest that idiosyncrasy to the drug, possibly combined with abnormal retention and absorption of the solution, may have caused these fatalities. Whether or not this is the correct explanation, the fact of the mercurial poisoning remains, and there is no doubt that the use of mercury oxycyanide solution in cystoscopy is dangerous.

We wish to express our thanks to Dr. R. A. Rowlands, Mr. George Neligan, and Mr. Victor Dix for permission to publish these cases; to Prof. Hubert M. Turnbull for his description of the pathological findings; and to Mr. R. G. Bowler for the chemical analyses.

References: d'Abreu, A. L. and Lysaght, A. C. (1935) *Brit. J. Urol.* 7, 338; (1936) *Ibid*, 8, 54.

Princess Mary's R.A.F. Hospital at Halton, Bucks, was opened in 1927; since then its buildings have been gradually extended and enlarged, and it now provides accommodation for 715 patients. It is organised into medical, surgical, families, and infectious disease divisions. The infectious disease division, with 278 beds, is a quarter of a mile from the main hospital, and although administered from there, has its own separate medical staff. It occupies a new block as well as numerous separate pavilions. Separate accommodation is allotted to cases of pulmonary tuberculosis, skin disease and venereal disease. This division also has its own operating-theatre. At the massage and electrotherapeutic department some 80–100 treatments are given daily, and the equipment has lately been reinforced with a portable electrotherapeutic set, a self-contained short-wave, direct current, "Rotosurge," ultraviolet, infra-red, radiant heat, hot-air douche and paraffin-wax outfit, that can be brought to the patient's bedside. The radiological department averages 600 examinations a month.

EXTRACRANIAL LIGATURE OF THE MIDDLE MENINGEAL ARTERY

By Maximilian Wassermann, M.D. Prague
FORMERLY PUBLIC-HEALTH COUNCILLOR OF BOHEMIA

In the last war many wounded died of hæmorrhage from the middle meningeal artery before reaching hospital, where the normal procedure, trephining and intracranial ligature, could be done. Ligature of the external carotid often proved disastrous. The middle meningeal artery used to be ligatured extracranially by first resecting the condyle of the mandible. This made it necessary to keep the patient, whose condition—generally intracranial hæmorrhage—was of itself serious, some weeks with his mouth closed and on liquid diet. Trephining has now lost its horror. In emergencies it is the best way in spite of the risk of having sometimes to trephine in a second place, when the bleeding branch has been missed; but, even when it is practicable and the hospital reached in time, in some cases only an extracranial ligature is advisable, even of the external carotid.

ACCESSIBILITY

Many years ago the present writer [1] discussed the accessibility of this region and suggested the ligature of the middle meningeal artery in its extracranial part without any resection of the condyle. So far as I know, the method suggested in the article was never followed. My proposed ligature of the middle meningeal artery depends on the fact that, when the mouth is opened, the condyle of the mandible, pulling with it the articular disk, glides along the articular tubercle of the temporal bone downwards and forwards. Through this movement the space between the mandible and the cartilaginous part of the external auditory meatus is enlarged by 1 cm. or more. I have never seen the surgical application of this fact mentioned. Opening the mouth to its widest extent, however, does not lead to the greatest accessibility of this region, because, as the condyle is pulled forwards as far as possible, the angle of the mandible is simultaneously drawn backwards; hence this region becomes narrower in its inferior part. Moreover, with the mouth opened to its widest extent, any lateral movement of the mandible, so suitable for better accessibility, is nearly impossible. Therefore the best accessibility is gained by opening the mouth half-way and by simultaneously pulling the mandible towards the opposite side.

OPERATION

The posterior limit of the incisions is determined by the position of the auriculotemporal nerve and of the superficial temporal artery; hence it is best to make an angular incision through the skin, with the mouth closed, the vertical part being made over the temporomandibular joint and the horizontal part just below the zygomatic arch and extending about an inch forwards. Care must be taken to avoid any injury of the trunk of the facial nerve, as it crosses the lower part of the field of operation, passing from the stylomastoid foramen, behind the stylomastoid process, and through the parotid gland in a curve, which is partly straightened by movement of the lower jaw. In the horizontal part of the incision we next dissect the insertion of the tendinous fascia into the zygomatic arch. This cannot be done without destroying

1. Wassermann, M. (1900) *Wien. klin. Rdsch.* No. 14.

some minor branches of the facial nerve and some vessels, all of minor importance. From above we dissect downwards behind the parotid gland, which is strongly adherent to the fascia, its proper cover. By blunt dissection along the temporomandibular ligament the bulk of the gland is pulled downwards as far as the level of the neck of the condyle. Next, the assistant puts his well-bandaged hand in the patient's mouth, which he opens till the incisors are not more than an inch apart, at the same time drawing the mandible as far as possible to the opposite side and holding it there. When this has been done, the vertical incision now lies over the region behind the condyle and we have to clear this space, always pulling the flap with the parotid downwards and using blunt dissection through the loose connective tissue and through the projecting part of the parotid gland as far as the level of the neck of the condyle. There, immediately behind the bone, begins the horizontal part of the internal maxillary artery. By isolating this vessel, we find proximally the origin of the deep auricular artery and, further on, that of the tympanic artery, both of them running through the loose tissue, some dispersed lobules of the parotid gland, and, between occasional strands of dense fibres, parts of the deep layer of the fascia which envelops the gland externally and internally. The backward direction of both of these arteries makes it impossible to mistake one of them for the middle meningeal artery, because this vessel, besides running upwards and inwards, runs forwards. When the mouth is closed or, as in speaking, only slightly opened, the origin of the middle meningeal artery lies close to the medial surface of the neck of the condyle, sometimes nearer the posterior, sometimes nearer the anterior, margin of this surface. Then the artery ascends, with the mandibular insertion and, further on, the internal margin of the external pterygoid muscle on the lateral side, and the sphenomandibular ligament on the medial side. It passes between the two roots of the auriculotemporal nerve —when there are two roots—before it enters the cranial cavity through the foramen spinosum. This foramen is placed about an inch medial to the zygomatic arch.

All the other important foramina of the cranial base in this region—ovale, rotundum and lacerum—are placed more medially, with the important vessels and nerves that enter the cranial cavity through them, such as the mandibular part of the trigeminal nerve, the internal jugular vein, the hypoglossal nerve, the accessory nerve, and the internal carotid artery; hence injury of these structures can easily be avoided. On the other hand, it is sometimes impossible to avoid injuring the auriculotemporal nerve, which for part of its course accompanies the middle meningeal artery, till—after sending some small branches to the ear—it runs upwards round the zygomatic arch with the superficial temporal artery.

The lower part of the middle meningeal artery participates in every movement of the mandible but does not move to the same extent. When, with the mouth half-open, the jaw is drawn towards the opposite side and the neck of the condyle advances half an inch, the origin of the middle meningeal artery is drawn forwards a quarter of an inch. So we can make—at least in most cases—the middle meningeal artery visible and ready for ligature by pulling on the isolated internal maxillary artery. If in an abnormal case this is impossible, we can then always ligature the internal maxillary artery and so stop the hæmorrhage. The subdural hæmatoma could be removed by a second operation at a later date if necessary.

TREATMENT OF GAS GANGRENE

By Emidio da C. Afonso, M.D.

It is commonly taught that all tissues affected by gas gangrene should be immediately excised. Excision, however, with or without cauterisation, can be done only when the gangrene is not far advanced; in most cases the affected area is already so large that excision is clearly contra-indicated by shock and toxæmia. For this reason I have substituted for excision extensive cauterisation, which checks the spread of the gangrene and eliminates the gangrenous tissues. Cauterisation further stimulates the neighbouring healthy tissues besides transforming the necrotic tissues into a mass of products of combustion in which the development of anaerobic microorganisms is impossible.

In gas gangrene affecting an area large enough to contra-indicate excision the following treatment has been successfully employed:—

(1) Careful delimitation of the necrotic zone. The necrosis begins with the destruction of the albuminoid molecule; the bubbles of gas are liberated later. Loss of sensibility is an earlier symptom of gas gangrene than is crepitation, which extends far less widely than the necrosis.

(2) Thorough washing of cavities, removal of foreign bodies and blood-clots, and excision of muscle debris.

(3) Cauterisation of the neighbouring healthy tissues with a sharp-pointed cautery, encircling the gangrenous area with a line of superficial ignipunctures 1 cm. apart, 3 cm. outside the necrotic area.

(4) Incision of the necrotic tissues in several places, followed by insertion of the cautery into each incision, the cautery being moved to and fro in every possible direction, especially into the deeper tissues. If the patient is not anæsthetised, the cautery should be pushed in until it causes pain. No necrotic tissue should escape the cautery. If complete cauterisation is not possible at the first attempt, it should be finished next day. Some discrimination in the amount of cauterisation is necessary in the presence of nephritis; but apparently there is not much danger from absorption of the products of combustion due to the cautery.

(5) Intravenous injection of anti-gas-gangrene serum, one or two injections being given of 80–100 c.cm. of serum in 1000 c.cm. of normal saline. These injections have to be given after desensitisation and so slowly that they take 1–1½ hours to finish. Detoxication by the serum takes place rapidly.

Two days after cauterisation most of the necrotic tissue will be found dry and shrivelled, like smoked meat. It can be easily removed with scissors. The underlying tissues, purulent at first, will gradually develop a rosy appearance with healthy granulations. With this treatment we have been able to transform a gangrenous into a granulating wound, ready for autoplastic grafts if desired. This simple treatment is solely based upon the efficacy of cauterisation as opposed to excision, and I publish it in the hope of minimising the otherwise terrible prognosis of gas gangrene.

Nova Goa, Portuguese India.

MEDICAL SOCIETIES

BRITISH INSTITUTE OF RADIOLOGY

AT a joint meeting of this institute with the Faculty of Radiologists and the section of radiology of the Royal Society of Medicine held on March 16 with Mr. G. F. STEBBING in the chair, a discussion on the practice of

Radiotherapy in War-time

was opened by Mr. B. W. WINDEYER. He said that a month or six weeks after the outbreak of war the Ministry of Health began to take an interest again in radiotherapy, and the officers of that department at the Middlesex Hospital were able to reopen it. The work was now slightly below the normal peace-time level. One of the greatest difficulties was that the hospital had been taken over as an emergency hospital and it was therefore difficult to get beds opened. The department now had 32 beds, half what it had before the war. A greater proportion of patients had to be treated as outpatients. The medical staff had lost two assistants, and they had therefore less chance of doing reading or clinical research. It would soon be difficult to find laboratory assistants and technicians, who are now being called up for military service. An entirely different type of patients was coming to the department. Carcinoma of the cervix was three times as frequent, because other hospitals have closed down; the number of cases of carcinoma of the breast had, however, dropped considerably, perhaps because such patients are being sent to outlying hospitals. A large number of small, simple conditions were seen, and many soldiers were sent with rodent ulcers, plantar warts and the like.

The necessity for treating nearly all the superficial skin conditions by X rays instead of radium, he said, may not be a disadvantage. More use has been made of intrabuccal X rays, which are a valuable adjunct to radium. Four Metropolitan-Vickers tubes are giving excellent service, but it is practically impossible to obtain sealed-off glass tubes of the Siemens type. A British-made valve has been quite satisfactory, and he hoped the shortage and costliness of foreign apparatus would be a stimulus to British manufacturers. Dosimeters are now made by a new firm who employ a number of refugee experts. There is a shortage of radiotherapists, many of whom have gone into the army. If a proper war breaks out, the hardships associated with radiotherapy will be much worse and therapists must be careful not to let their technique deteriorate. If this happens, some grave accident will occur and radiotherapy will be retarded for several years. He thought decentralisation had more to be said against it than for it. Many hospitals cannot afford the expense of sending their machines out or of providing hospital and laboratory services in the country. Several hospitals, moreover, would object to losing their identity.

Dr. FRANK ELLIS outlined the precautions recommended by the National Commission—burying the radium in deep holes, or enclosing it in steel containers with a wall-thickness of not less than 3 in. Surface treatment can be carried out in such a way, he said, that the radium can easily be removed and put into a safe as soon as an air-raid warning is received. Radium used inside cavities or implanted could not, however, be removed so easily. The treatment of carcinoma of the cervix is one of the most hopeful branches of radium therapy, but should not be interrupted too much. Organisation and drill could ensure the radium being removed quickly. It is difficult, however, to keep these preparations at a sufficiently high level of efficiency, and intracavitary treatment should therefore be carried out in non-vulnerable areas. Implants are even more difficult to remove, and treatment that may be interrupted day after day will not be sound and accurate. The use of radon avoids many of the dangers, but the gas has disadvantages in treatment which were making its use less popular even before the war. Its intensity falls off quickly, and pumping is difficult to arrange at suitable times. The Holt Radium Institute at Manchester arranged for pumping to be carried out in a mine in the Peak district twenty-five miles from Manchester and seventeen from Sheffield. Radium therapy at country hospitals may be safe and continuous, but it is inconvenient to most of the patients and staff. Such hospitals are usually not big enough to accommodate their nursing staff or to arrange for frequent changes of probationers. The expense of equipment and running is, moreover, considerably greater than in the parent hospital. The Royal Sheffield Hospital and Infirmary had put all their radium down a borehole at the beginning of the war. After about a week the staff started again to treat carcinoma of the cervix and built up an organisation for instantly putting the radium into safety if an air-raid were signalled. This organisation, however, has fallen into decay. Grouping of areas is impracticable because of distance, but centres have been established for Sheffield and its district.

Dr. CONSTANCE WOOD dealt with radium-beam treatment in war-time. The Radium Commission, she said, regarded the breathing of radium dust as a real danger and drew attention to the incidence of lung cancer among pitchblende workers and watch-dial painters. If radium were dispersed by a bomb the whole site would have to be abandoned or carefully cleared of all debris, which, with some of the earth, would have to be carted away and buried by suitably protected workers. To recover the radium would be as expensive as mining an equivalent quantity. The commission, advised by its experts, therefore recommended that all the radium in the country should be placed at the bottom of fifty-foot shafts until the conditions of radiotherapy in war-time had been established. Four of these boreholes have been provided in London and about twenty others throughout the country, fitted with raising and lowering gear. Teleradiotherapy is the simplest form of radium treatment in war-time, for all the radium is stored in one container and, if a raid is signalled, the radium can be quickly lowered down the borehole. The small steel safe recently described by Prof. Sydney Russ (THE LANCET, Jan. 13, 1940, p. 98) is much cheaper and the wall is thick enough to prevent damage by high explosives. It weighs 120 lb. and will house a container holding 10 g. but not the applicators. In France radium treatment is being continued without interruption, and the Strasbourg centre is the only one that has been transferred. There is urgent need in this country for radium therapy to be continued. Many deaths caused by cancer could probably have been averted if emergency precautions had not interfered with treatment, and these would have to be added to the road deaths due to the blackout. As many radiotherapists as can be spared from the services ought to be sent back to their primary duty of treating cancer.

Dr. N. S. FINZI dealt with the treatment of war wounds by X rays. The irradiation of infected

injuries dates back, he said, to 1905, but it was not systematised until about 1926. Convincing evidence has been published by American and other foreign workers that the healing of clean wounds can be accelerated and keloid prevented. Infected wounds can be stimulated to heal more rapidly. Small doses are more effective; with large doses the healing is slower and more fibrous tissue is formed. The hardness of the rays seems to be immaterial provided that they can penetrate to the depth of the wound. No harmful effects can be caused by the best doses for this purpose. If treatment is given at the proper time—i.e., either immediately before or immediately after operation, 50 r is sufficient. The use of X rays in hospitals near the line may not be practicable, but in quiet hospitals they might be used as a routine. It would help to return many men to the line more quickly with better or softer scars. X rays are also valuable for wounds that will not heal, or heal slowly. A dose of 50 or 60 r with soft X rays, or 100–120 r with the γ rays of radium, may be repeated in four or five days and again in six or seven days. The resulting skin is generally soft and pliable. A zone of two or three centimetres round the wound should be irradiated as well. Ultraviolet rays have been used for the same purpose, but have little value in preventing keloid or in accelerating healing.

Dr. D. W. SMITHERS said that before the war the authorities were not prepared to use radiotherapy for war wounds. Its value in treating and preventing gas gangrene has hardly been realised in this country. It may have a place even though the army, to quote a War Office letter, "does not recognise the X-ray treatment of wounds." At his hospital 167 patients with injuries in various stages of infection have now been treated, with 16 deaths. These figures are encouraging. The true value of the treatment cannot yet be judged. It might perhaps not justifiably be made the first line of attack or used in all casualty clearing stations and hospitals on lines of communication, but in those cases where amputation is considered advisable because of infection, X-ray therapy has been most successful. The method should not be dismissed because some of the evidence is unsatisfactory. The evidence is better than that in favour of chemotherapy, and X rays do not produce agranulocytosis.

Lieut.-Colonel D. B. MCGRIGOR said that the War Office had given facilities for research in the X-ray therapy of gas gangrene.

Dr. A. E. BARCLAY ridiculed the panic which overtook the authorities at the beginning of the war and made them invent precautions against hypothetical emergencies to the complete neglect of real and urgent needs. There is, he said, no real evidence that a single inhalation of radium dust ever did any harm. A few workers with radium have been near tubes which have exploded, but they suffered no ill effect. The few cases in the literature were all in persons who had been subjected to chronic exposure. The belief in the ill effects of a single accident rests on physical and not on biological evidence, and takes no account of the very thorough excretion of radium. He would be perfectly willing to live on a plot of land over which radium had been exploded.

Dr. G. B. BATTEN said that as a general practitioner he now did not know what to do with a patient who required X-ray treatment; nor did he know who could tell him the best place to which to send the patient.

Dr. R. E. ROBERTS pointed to the necessity for leaving intact the band of experts who are now investigating radiotherapy. He would like assurance that there exists a pool of radiotherapists upon which large centres can draw. One of the disadvantages of radon is, he said, that surgeons who have already learnt how to use radium must now acquire a new technique.

Mr. T. A. GREEN said that radon could hardly be used with effect unless large centres existed to supply several hospitals.

Dr. R. R. MORRISON declared that interstitial treatment should only be carried out in safe areas. He had had some difficulty in convincing his colleagues of the seriousness of the danger.

REVIEWS OF BOOKS

Surgery of the Hand

By JOHN HAROLD COUCH, M.B. Toronto, F.R.C.S.E., department of surgery, University of Toronto and Toronto General Hospital. London: Humphrey Milford, Oxford University Press. 1939. Pp. 147. 7*s*.

THIS is not intended to be a textbook but rather a "manual discussing everyday problems which have been found troublesome" by the author in his extensive experience. The first part deals with injuries of the hand, and points out the immense value of proper early treatment, with cleansing, debridement and repair, but only after proper and detailed examination to exclude nerve and tendon damage. Early tendon suture is recommended if the operation can be performed under perfect conditions within four hours. Otherwise skin closure is advised, with tendon suture performed ten days later if there is no infection. The correct levels for amputations are described. The second part deals with infections. The general principles of treatment are laid down, with detailed discussion of the four main types of infection and their treatment. For tenosynovitis long lateral skin incisions are advised, with interrupted incisions in the sheath. It is doubtful if this is preferable to interrupted incisions in skin and sheath opposite the joints.

The book is profusely illustrated with excellent line drawings, each occupying a page, and the type is large and clear. It is easy to read, and the author has succeeded in squeezing a great deal of important information into a small compass without any impression of overcrowding. It can be recommended to students, practitioners and surgeons alike.

Atlas of the Commoner Skin Diseases

(2nd ed.) By HENRY C. G. SEMON, M.A., D.M. Oxfd, F.R.C.P., physician for diseases of the skin, and lecturer to postgraduates, Royal Northern and Hampstead General Hospitals. Photography under the direction of Arnold Moritz, M.B. Camb. Bristol: John Wright and Sons. 1940. Pp. 272. 42*s*.

IT is difficult to see how any practitioner can afford to be without this atlas. True colour photography is obviously the proper medium for illustrating dermatological subjects and anyone unfamiliar with the technique cannot appreciate the difficulties that photographer and the block-maker must have overcome to produce this magnificent set of pictures. The series of illustrations of syphilitic lesions are particularly interesting, but it is a pity that a plate showing a primary chancre could not have been included. Although the text which faces each illustration is brief, it is very readable and contains a great deal of valuable information. Particularly helpful are the many excellent suggestions

for treatment. In dealing with varicose dermatitis Dr. Semon does signal service by pointing out the untoward results that may arise if a varicose ulcer associated with dermatitis is treated with an elastic plaster bandage. No mention is made of the rapid response to M. & B. 693 of attacks of recurrent streptococcal dermatitis, or to the fact that pet birds may be a source of infection of molluscum contagiosum. Several diet regimes are given in connexion with the treatment of psoriasis, but there is no note of the low cholesterol diet which has proved useful in the hands of several authorities. Krysolgan, which is mentioned in the treatment of parapsoriasis, has not been manufactured for several years now. These omissions are, however, of trivial importance in a work of outstanding merit.

Les perforations digestives de la fièvre typhoïde

By JACQUES DOR, chirurgien des Hôpitaux de Marseille. Paris: Masson et Cie. 1939. Pp. 134. Frs.24.

THIS monograph gives a concise and practical account of the pathology, diagnosis and treatment of typhoid perforations of the intestine, which, though not so common in France as in England and the United States, are the cause nevertheless of "appréciables ravages." Early recognition and prompt surgical treatment are essential to success, for the case-mortality increases from 15 per cent. if the operation is done within twelve hours to 80 per cent. if it is delayed until the fourth day. Radiography may be helpful in diagnosis, but this is not difficult except in "chronic" perforation and in the perforation of a second ulcer after an operation has already been done. The best operation is simple suture, but enterostomy through the perforation, or exteriorisation of the perforated segment of gut may be desirable on occasion. Simple drainage, resection or short circuit are not on the whole to be recommended. The book contains a few well-chosen illustrations, and a useful bibliography.

Vade Mecum of Medical Treatment

(2nd ed.) By W. GORDON SEARS, M.D. Lond., M.R.C.P., medical superintendent, Mile End Hospital. London: Edward Arnold. 1939. Pp. 376. 10*s*. 6*d*.

FOR a small book this is remarkably complete, with a valuable selection of tables. One important condition alone seems to have escaped the author's attention—namely, empyema. On the whole Dr. Sears is a sound and valuable guide, for in addition to giving the didactic help needed he indicates the relative efficiency of the measures suggested and in a small compass shows the principles on which treatment is based.

An Introduction to Medical Genetics

By J. A. FRASER ROBERTS, M.B., D.Sc. Edin., F.R.S.E., principal investigator to the Burden Mental Research Trust, Stoke Park Colony, Stapleton, Bristol; special lecturer on human genetics, University of Bristol. London: Humphrey Milford, Oxford University Press. 1940. Pp. 266. 15*s*.

THIS excellent introduction provides an account of all forms of inheritance known to occur in man and a survey of the principal problems. From it the student will obtain a good working knowledge of the theory of inheritance, and, unless he is dull indeed, an interest in the subject and a wish to explore the genetic aspects of the medical questions which face him in his daily life. Each theoretical point is amply illustrated by examples of morbid conditions of known heredity found in man, so that the reader will be equipped with a knowledge of the part played by heredity in a great variety of abnormal conditions. A sensible feature of the book is the exclusion of all reference to the history of genetics and to plant and animal genetics. Our knowledge of human genetics has now advanced so far that this omission does not impair the completeness of the presentation of the theory of inheritance. Human genetics can never be divorced from general and experimental genetics, but it has now become a largely independent science with a wide and systematic body of knowledge. The only expansion one would wish to see in later editions would be a more detailed discussion of the hereditary aspects of some of the commoner morbid conditions. For this to be possible, however, further advances in research will have to be made. This book should do much to stimulate such research.

Yearbook of Obstetrics and Gynecology

Edited by JOSEPH B. DELEE, M.D., professor of obstetrics, University of Chicago medical school; and J. P. GREENHILL, M.D., F.A.C.S., professor of obstetrics and gynecology, Loyola University medical school. Chicago: The Year Book Publishers; London: H. K. Lewis and Co. 1940. Pp. 736. 12*s*. 6*d*.

THIS edition does not fall behind the high standard of its predecessors. As valuable as the synopses themselves are the pithy and considered comments of the two editors, which must represent a great deal of hard labour. For the most part the articles selected are taken from the American literature, but they represent a fair cross-section of work done in other parts of the world. No-one who practises the art of obstetrics or gynæcology should fail to read this book and keep it handy for reference.

Bacteriology

By WILLIAM W. FORD, M.D., D.P.H., emeritus professor of bacteriology, school of hygiene and public health, Johns Hopkins University. London: Paul B. Hoeber. 1939. Pp. 207. $2.50.

IT is curious that despite its recent and rapid development so little has been written on the history of bacteriology. Professor Bulloch's chapter in the "System of Bacteriology," later enlarged to book form as the Heath Clark lectures, filled this gap. Now from America comes what may be termed a popular abridged edition of Bulloch; for it is obvious, as the author acknowledges, that much of the information has been derived from Bulloch's classical researches. There are few inaccuracies; the acid-fast staining of the tubercle bacillus is attributed to Koch instead of Ehrlich, and there is the common error of tacking on an extra "s" to the name of Semmelweis. The merits of the book, which is one of a series on the history of medicine, are its pocket size and pleasant style, so that it can be recommended as a week-end book for the interested layman or as a primer for the medical graduate and undergraduate.

Seelischer Gesundheitsschutz

Eine Einführung in Diagnostik, Forschung und Nutzanwendung der Psychohygiene. By HENRICH MENG. Basel: Benno Schwabe and Co. 1939. Pp. 223. Swiss Frs.8.

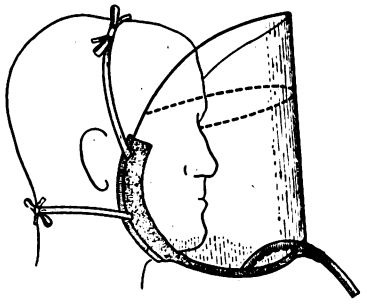
No-one who writes a textbook of mental hygiene can hope to be precise: he can indicate important general principles, point to the damage done by ignorance or flouting of these principles and include details of psychiatric diagnosis and treatment. But the major issues—how to forestall mental illness, whether neurotic or certifiable, and how to lessen its severity and frequency—cannot be dealt with by such definite

measures as can be advocated say for infectious diseases or those due to malnutrition. The writer on mental hygiene must tend, therefore, to express either unexceptionable and often woolly platitudes or optimistically confident assertions about the benefit to be obtained by applying to prophylaxis the methods of psycho-analysis, child guidance or other therapeutic procedure. Dr. Meng has done his best to put the opportunities and achievements of mental hygiene honestly. He is disposed to accept Freudian views but does not omit reference to alternative theories and treatment. The chapter on alcoholism is in some respects typical of the book. It contains undeniable statements on matters which are unfortunately often overlooked by those without psychiatric training; it gives lengthy and interesting—but quite deniable—psycho-analytic formulations; and it leaves the reader in the dark as to what chance he or anybody else has of curing a bad alcoholic or of stopping an occasional drunkard from becoming an inveterate one. Dr. Meng does not make sufficiently clear how ineffectual our therapeutic resources often turn out to be in cases of alcoholism. In short, he tells a rosy, prosy, Freudian tale which is of little practical value. But not all the subjects discussed are as difficult to cope with as alcoholism. The three parts of the book deal respectively with general questions of diagnosis and treatment (as well as the scientific status of mental hygiene), observations on the sick, and the application of the foregoing to education and the problems of later life, and much of these are of practical value, especially to psycho-analysts.

NEW INVENTIONS

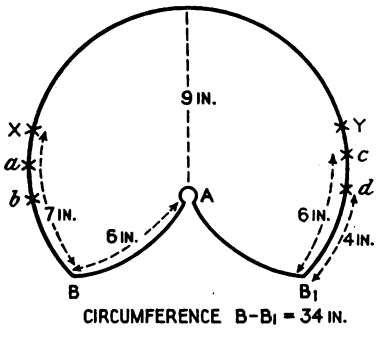
AN IMPROVISED MASK FOR ADMINISTERING OXYGEN

IN view of possible difficulties in obtaining adequate supplies of apparatus for administering oxygen, details of a mask invented and made by us for use at Claybury Emergency Hospital may be useful. Its cost is negligible, and it is easily and quickly made by an unskilled person out of ordinary hospital materials. It consists essentially of an irregular cone of light transparent plastic material, part of its base fitting closely from under the chin up to in front of the ear on each side, and the part above standing well away from the forehead (fig. 1). Oxygen is delivered through rubber tubing at the bottom of the mask, where the patient's nose and mouth rest virtually in a pool of oxygen; expired air passes out freely through the open space above.



The mask is made from a discarded non-inflammable X-ray film (15 × 12 sq. in.) from which the emulsion has been sponged off after soaking in warm water. (Transparent Rhodoid, 3/10 mm. thick, or any similar cellulose-acetate fabric can be used; these materials are only slightly inflammable and can be cleansed by sponging with warm water.) The film is cut according to the pattern shown (fig. 2). The edges AB and AB_1 are sewn together with strong linen thread, a straight cutting needle and a "cat's-tooth" stitch being used preferably. The points B and B_1 being now in apposition and the film being moulded into a rough cone, a copper wire, gauge 20, is oversewn along the edge XBY, and strong tapes, 15 in. long, are stitched to this wired edge at the points *a*, *b*, *c*, and *d*. At the end of a yard length 3/16 in. rubber tubing four holes are cut at intervals of 1/3 in.; this end is drawn into the mask through the aperture at the apex of the cone, and fixed with two stitches to the seam AB in such a position that it arches upwards inside the mask, its holes facing the seam. A strip of lint, 14 × 2 sq. in., folded lengthwise into three, is fitted as padding along the inner surface of the wired edge XBY, projecting about ½ in. beyond the edge, and held in position by inch-wide adhesive strapping, one strip on the inner and one on the outer surface. (The lint and strapping can be stripped off and renewed when soiled.) Finally, the seam AB and the place of entry of the tubing are made airtight with adhesive strapping applied to the outer surface.

The mask is put on with the point B under the chin and X and Y in front of the ears, the wired edge being moulded to fit the contours of the face and chin. The upper tapes are drawn vertically upwards and tied well forwards on top of the head, while the lower tapes pass back horizontally below the ears. If the wired edge is properly moulded, the mask will lie easily in position without causing uncomfortable pressure or tightness. The draught of oxygen generally prevents any feeling of stuffiness at delivery-rates of over 3 litres a minute. If, however, the mask is stuffy and hot, its upper edge may be cut down to the level of the forehead (fig. 1, dotted line), this giving increased ventilation without much loss of efficiency. To prevent condensation on the inside of the mask, it should be treated with an anti-mist preparation or simply with soap.



The concentrations of oxygen in the lower part of the mask and in the alveolar air at different speeds of delivery and in different subjects were estimated for us by Mr. Juby, of Messrs. Charles King Ltd., as follows:—

Rate of flow of oxygen	Percentage of oxygen in—	
	Inspired air	Alveolar air
3 litres a minute	40–45	35–40
4 ,, ,, ...	50	40–45
6 ,, ,, ...	55–60	50

A more finished pattern of mask is being made by Messrs. Charles King Ltd., of Devonshire Street, W.1, with rhodoid and a padded rubber fitting for the face.

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Claybury Emergency Hospital.

THE LANCET

LONDON: SATURDAY, APRIL 6, 1940

THE ACUTE SINUS

THE papers read before the clinical congress of the American College of Surgeons at Philadelphia [1] illustrate how the attitude towards acute sinus infection has changed as knowledge of its natural history has become more exact. The advances in physiology for which PROETZ of St. Louis has been largely responsible have led to a growing respect for the natural defences and more particularly for the cilia. The nasal cavities and accessory sinuses are lined by a ciliated and mucus-secreting membrane, and the cilia are so arranged that they carry the mucus from the sinuses out through the openings into the nose and thence into the nasopharynx where it is swallowed. Thus dust and bacteria in the inhaled air are caught by the mucus like midges on a fly-paper and carried away to face the destructive action of the intestinal ferments. This is the first line of defence for the air-passages. Excessive secretion or pus in the nose or sinuses is removed in the same way. A good current of air through the nose is an important accessory mechanism. It is essential to preserve these activities as far as possible and not to hinder them by over-energetic therapeutic measures.

General conditions predisposing towards sinus disease are lowered resistance, improper hygiene, faulty diet and allergy. Each to some extent interferes with ventilation and drainage by producing congestion and swelling of the nasal mucous membrane or drying of the nasal secretions. Local factors are anatomical abnormalities such as a badly deviated septum or adenoid overgrowth, sepsis in neighbouring organs, especially the tonsils, and narrowed anterior nares hindering the flow of air. The organisms responsible for the condition are those commonly present in the nose or throat either as primary invaders or secondary to a virus infection such as influenza or measles. The commonest is the streptococcus. The inflammatory process causes vascular engorgement of the mucous membrane and excessive secretion. The swelling reduces the circulation of air both in the nasal cavities and sinuses, and the cilia, partly disorganised by the catarrh of the cells from which they arise, are now faced with the task of removing an extra amount of secretion in unfavourable conditions. The catarrhal phase becomes a purulent one, but pus does not of itself inhibit ciliary action. The frontal sinus, anterior ethmoidal cells and maxillary sinus drain into the middle meatus by small and easily obstructed openings separated only by a centimetre or so. Swelling of the mucous membrane of this area of the middle meatus may result from the drainage of pus from any one of the sinuses. Partial or complete occlusion may also be caused by inspissated pus. By whatever method the obstruction is produced headache may follow, for if there is active infection the secretion formed cannot be removed by the cilia and intrasinous pressure rises. If, on the other hand, there is only slight infection, the air in the sinus is absorbed and a negative pressure is set up giving rise to the "vacuum headache" described by SLUDER. A frontal headache is thus not always due to an infection of that sinus. However it arises the headache typically has some peculiar characters. It comes on in the morning when the patient awakes, reaches a maximum about noon, and gradually disappears in the early afternoon. It is an unpleasant nauseating pain and very incapacitating. In addition, neuralgic pains may be felt in any part of the distribution of the trigeminal nerve and even referred to some of the cervical nerves.

The patient with acute sinusitis will get well most certainly and rapidly if he stays in bed. Unfortunately he is rarely willing to do this unless forced by headache or severe constitutional symptoms. As well as the usual general methods employed in dealing with acute sepsis sulphanilamide is valuable in streptococcal infections. It must be given in full doses from the outset for a maximum effect, and its possible toxic action should always be remembered. Vitamins A, B, C and D are useful and many preparations are now on the market containing all four. Alkalis are supposed to be helpful. Allergy should be suspected when a large number of eosinophils are present in the nasal secretions. If the allergen can be discovered specific treatment may reduce the turgescence of the nasal mucosa and by improving aeration may assist the natural processes of cure. Finally, the patient should avoid badly ventilated rooms. In prescribing local measures the utmost care must be taken to avoid damage to the cilia. Ventilation and drainage of the sinuses must be secured and the inflammation treated by heat. Diathermy or short-wave irradiation are convenient ways of applying heat —claims of a more specific action have not yet been proved. Ephedrine and cocaine in weak solutions have been shown to do no harm to the cilia. A spray of ephedrine sulphate 0·5 per cent. in isotonic saline has a prolonged astringent action and can be used every four hours together with a steam inhalation containing not more than a grain of menthol in a pint of water. Patients often find the local application of chloretone in liquid paraffin soothing, but the cilia do not work well in this medium. If pus is still present in the maxillary sinus after three or four days of conservative treatment, especially if there is much pain, antral puncture and lavage should be

1. Hill, F. T. *Surg. Gynec. Obstet.* Feb. 15, 1940, p. 531; Orton, H. B. *Ibid*, p. 534.

performed under a local anæsthetic. With care this should not be painful, and most patients are so relieved by the operation that they do not object to its repetition. It is sometimes necessary to catheterise and wash out the frontal or sphenoidal sinuses but these are manipulations for the specialist. The fundamental principle is to assure free ventilation and drainage but to treat the mucous membranes gently.

POTABLE WATER FROM THE THAMES

NEARLY two-thirds of London's water comes from the Thames and it is well from time to time to consider the facts which justify the confidence with which Londoners drink river water. These are set out by Lieut.-Colonel E. F. W. MACKENZIE in a chapter entitled The River Thames as a Source of Potable Water contained in his first report [1] as director of water examination. The custom of drinking Thames water is very old-established and when Tobias Smollett wrote "Humphrey Clinker" he was aware of the gross pollution of the tidal water which was then used for supply. Even after the intake was transferred to a site above Teddington lock the insanitary habits of up-stream communities still led to suspicion of the Thames-derived supplies to the metropolis. It was in fact the proposal to bring water from Wales which led to the formation of the Metropolitan Water Board. But the Thames prevailed and while it is amazing that the river should still be used as a source of potable water for such a city as London it is a still more amazing testimony to the self-purification of natural water and to the skill and judgment of those who add the finishing touches to Nature's work. Since 1934 monthly chemical and bacteriological examinations have been made of samples of water taken at eight stations from Tilehurst, a mile or so above Reading, down to the Littleton intake. These show that the quality of the river water is much the same throughout despite the contributions, visible and invisible, of land water and sewage effluent from five thousand square miles of watershed above the intakes. Taking the total hardness as a measure of mineral content the average for each of the eight stations varied only from 22·7 at Hambledon lock to 23·0 at the two highest and the lowest station on the stretch examined. The only inorganic evidence of concentration of pollution was the rise in chlorions from 1·71 parts per 100,000 at Tilehurst to 2·09 at the intake. Evidence of organic pollution was on the whole greater at the lower stations, but the results were of the same order as at the highest. The bacterial flora remains constant. There may be some indication of a fall in purity at Sonning bridge, followed by improvement at Hambledon lock and Bourne End, with a second deterioration at Ruddle's pool which is maintained down to the intakes, but this cannot be seen in the chemical results. Seasonal changes are in fact much more pronounced than regional changes and the degree of pollution closely follows the natural flow of the river as recorded at Teddington weir. This has its explanation in the fact that the Thames throughout its course flows through and drains, directly or by means of its tributaries, land which is entirely covered with soil. Activated silt, like activated sludge, converts much of the organic matter in solution into insoluble matter and into nitrates. Bacteria find conditions less favourable than in relatively concentrated sewage, and light is unfavourable to their growth. In a slowly flowing river the conditions of equilibrium for both chemical compounds and living organisms are much the same all along its fresh-water course.

1. Metropolitan Water Board. 33rd annual report of water examination. London: P. S. King and Son. 10*s*. 6*d*.

HÆMORRHAGE IN THE NEWBORN

SEVERE bleeding in a newborn baby is one of the emergencies which sooner or later everyone who practises obstetrics must face, and he must be in no doubt about the right course to pursue. The recent work on vitamin K [1] may have done more to complicate than simplify his decision. Some degree of bleeding is not uncommon—SALMONSEN [2] encountered it in 66 of 9748 infants born alive in the Oslo University Clinic, and of these 14 died. It is probable that the bleeding may start directly after birth, but the condition only becomes manifest on the second or third day; at this time the coagulation-time of even the normal child rises to a maximum, to fall again to normal by the tenth day. The commonest first symptom is the passage of a large tarry stool, but the onset may be ushered in by hæmatemesis or bleeding from the umbilicus, extreme pallor, or the rapid enlargement of a cephalhæmatoma. Some say that intracranial hæmorrhage may also be a manifestation of the disease. In severe cases the bleeding continues—the quantity of tarry or red blood passed in the stools may be almost unbelievable—the pallor becomes intense and the child dies on the fourth or fifth day. In mild cases recovery is rapid, but unfortunately it is impossible to say in any given case that severe symptoms will not develop later. Hence even slight bleeding calls for prompt and energetic treatment.

Recent observations have related the increased coagulation-time which is associated with most cases of hæmorrhagic disease (though apparently not in all) to deficiency of prothrombin, the result of inadequate storage of vitamin K, and the administration of that vitamin promptly raises the prothrombin level to normal. Moreover, the fall in prothrombin can be prevented by giving the baby vitamin-K concentrate by mouth or even by giving it to the mother for not less than 24 hours before delivery. The return to normal of the coagulation-time by the tenth day cannot however be explained by the vitamin K ingested in the baby's feeds, for they do not ordinarily contain enough for that purpose. ALMQUIST and his

1. See *Lancet*, 1939, **2**, 1178.
2. Salmonsen, L. *Acta pædiatr., Stockh.* 1939, **27**, suppl. 1, p. 1.

colleagues [3] have shown that bacteria readily synthesise vitamin K and SALMONSEN [4] and DAM and others [5] have suggested that the prothrombin deficiency is related to delay in the production of vitamin K by bacteria in the intestine. This might explain JAVERT'S [6] observation that hæmorrhagic disease is twice as common in babies born in the New York Hospital, where feeding would be according to the most sanitary methods, as in babies born at home. This view is supported by SALMONSEN and NYGAARD'S [7] finding that supplementary feeds of cow's milk in addition to the breast prevent the normal fall in prothrombin level. The early feeding of the newborn infant may therefore play a part in preventing the hæmorrhagic disease.

Since infants have been cured of their hæmorrhagic tendency within a few hours by the administration of vitamin K [8] or 2-methyl-1 : 4-naphthoquinone [9] the question arises whether the practitioner faced with a case should adopt this treatment, since supplies of vitamin K are now on the market. The answer seems to be that he should not. Our experience is not yet sufficient to justify dropping the simple remedy that has proved its efficiency—namely, the administration of blood. The results of this measure are among the most striking in therapeutics. The best way of giving the blood is the intravenous injection of 50 c.cm., but 20 c.cm. injected into the buttocks, when no typing is required, each day for two or three days is almost equally successful and can be relied on in all but the worst cases. Vitamin K may, of course, justifiably be used in hospital, where it can be rapidly followed by blood-transfusion if necessary. And by way of prophylaxis there is evidence to support the routine administration of the vitamin to the mother for a short time before and after labour, the early commencement of feeding, and the intramuscular injection of 5 mg. of 2-methyl-1 : 4-naphthoquinone to the infant.

3. Almquist, H. J. and Stokstad, E. L. R. *J. Nutrit.* 1936, **12**, 329. Almquist, Pentler, C. F. and Mecchi, E. *Proc. Soc. exp. Biol., N.Y.* 1938, **38**, 336.
4. Salmonsen, *Acta pædiatr., Stockh.* 1939, **32**, suppl. 1.
5. Dam, H., Tage-Hansen, E. and Plum, P. *Lancet*, 1939, **2**, 1157.
6. Javert, C. T. *Amer. J. Obstet. Gynec.* 1938, **35**, 200.
7. Salmonsen and Nygaard, K. K. *Acta pædiatr., Stockh.* 1939, **27**, 209.
8. Nygaard, *Acta Obstet. Gynæc., Scand.* 1939, **19**, 361.
9. Macfie, J. M., Bacharach, A. L. and Chance, M. R. A. *Brit. med. J.* 1939, **2**, 1220.

ANNOTATIONS

THE CHILD'S HOME BACKGROUND

WITHOUT happy and affectionate home-ties children feel insecure and the stability of their future emotional relations is endangered. In recent years child psychiatrists have shown that the key to the understanding of difficult and neurotic children lies in the home, and particularly in how the members of the family feel towards each other. Thus D. R. MacCalman,[1] amongst others, has found that a large number of difficult children are hated by their parents. This hatred is far more often unconscious than conscious, and the parents are neurotic. But even when unconscious, hatred and rejection have a very damaging effect on the character of the small child whose need for affection is urgent. The jealousy which they engender, although a normal emotion in children, is apt to be misunderstood and intolerantly handled. There are in fact powerful emotional forces at work and unless they are understood far-reaching mistakes can be made in these days of evacuation, when 400,000 school-children have been reft from their homes and placed in those of strangers. In a booklet recently published,[2] an attempt has been made to elucidate these problems for the benefit of all those, medical and lay, who have suddenly found themselves faced with the difficulties of uprooted children, deprived parents and harassed foster-parents. How does it feel to a child to be suddenly removed from familiar faces and familiar places for an indefinite time? How does it feel to have someone else's children billeted in one's house? How does it feel suddenly to find the house empty and silent, with no children to put to bed and get off to school next morning? Unless we can answer these questions, we cannot understand the nature of the problems of evacuation and billeting.

Children are excellent dissemblers, and the extent to which they miss their parents and homes is apt to be under-estimated. Some years ago D. W. Winnicott [3] drew attention to bedwetting as a symptom of depression. Much, though by no means all, of the bedwetting of the early days of the evacuation was an expression of the child's apprehension at leaving home, which was often increased by the child's distressing habit of misinterpreting events. From all areas have come reports of children fearing that their homes and parents were being bombed and of younger children jumping to the conclusion that their mothers had sent them away for being naughty. It is misconceptions of this kind which, added to loneliness, account for the excessive anxiety and often hidden depression felt by some of the children. Recent research, moreover, has demonstrated the great importance of home ties to even very small children, and in a letter in our columns J. Rickman [4] drew attention to the disturbing effect which being sent away from home may have on the development of the small child's personality. J. Bowlby [5] found such interruptions and separations in the histories of more than half of a group of persistent juvenile offenders. When compared with a group of non-offenders, the difference was statistically significant.

The scientific study of family life is still in its infancy, but it should already be recognised that no worker, whether medical or lay, is properly equipped to deal with these problems without training. Evacuation is essentially a family matter, yet no attempt has been made to enlist the help of workers who have specialised in this field, while child psychiatrists are manning blood-transfusion stations, and professional social workers standing by practically idle. Nor is it reassuring to find that on the newly appointed Advisory Committee on Evacuation there is no representative of pædiatrics, of child psychiatry or of the professional social workers. It is to be hoped that before further plans are made these omissions will be remedied.

1. *J. R. sanit. Inst.* February, 1940, p. 301.
2. Children in Wartime, obtainable from A. Brown and Sons, Perth Street West, Hull, or from the *New Era*, 29, Tavistock Square, London, W.C.1. 7*d*.
3. *Proc. R. Soc. Med.* 1936, **29**, 1515.
4. *Lancet*, 1932, **2**, 1192.
5. *Brit. med. J.* 1939, **2**, 1202.

BODY-FLUIDS IN EPILEPSY

THERE has been a good deal of discussion about the relation of the water and acid-base balance of epileptic patients to their fits. Lately the observation that antidiuretics and a large fluid intake increase while diuretics and restricted fluids decrease the number of fits has supported an earlier finding. One of the characteristic changes previously described is that body-weight rises before a fit and falls after it. Greville, Jones and Hughes[1] have worked out the relations between body-weight, fluid intake and output, gain and loss of metabolic water, variations of insensible water loss and such like in detail for three patients and a normal control over a period of months, during which all four were kept on standard diets. They suggest that the weight changes observed are due to changes in the water content of the body, and that the retention is most probably in the blood-stream, because the total nitrogen and total solids of the blood fall as the water excretion rises and vice versa. The rise and fall in weight before and after a fit occurred however in rather less than half the fits observed; in the remainder there was a negative water balance. This inquiry settles the relation between weight changes and body hydration, but it does not explain the relation between hydration and seizure frequency.

Gibbs, Lennox and Gibbs[2] have investigated the carbon-dioxide content of arterial and venous blood in epileptics. They divide their case material into three classes—the grand-mal type, the petit-mal type, and a mixed type, in which there are both grand- and petit-mal fits. They found that the grand-mal type have a high carbon-dioxide content in the blood, the petit-mal type a low one, and the mixed type a range similar to that of the normal controls. There is also an abnormal fluctuation in the carbon-dioxide of the blood in epileptics. A simultaneous study of the oxygen content shows that the abnormally low level of carbon-dioxide before a petit-mal fit and the rise after it do not depend on changes in blood-flow or in tissue oxidation in the brain. With grand mal there is a steady rise for several days before a fit when there is a fall; they could not determine whether the fall takes place with or before the fit. The carbon-dioxide level then rises again until another fit occurs and so on. The grand-mal picture is thus the converse of the petit-mal, and this is strikingly borne out by the electroencephalograph. The records from this instrument are distinct for the two types of seizure. In the grand-mal type there is a train of fast waves, while the energy in the petit-mal encephalogram lies in the slow waves. Moreover, raising the carbon-dioxide content of alveolar air or internal jugular blood increases the frequency of the brain waves, and lowering it reduces their frequency, whether the wave pattern is normal or abnormal. The fluctuation in carbon-dioxide content is elaborated by Nims and his colleagues[3] who have demonstrated that on over-breathing the carbon-dioxide level of the blood drops further and stays low longer in the epileptic than in the normal person. Overbreathing is known to be a factor in precipitating petit mal, and they have traced the course of the three variables, base bicarbonate, pH, and carbon-dioxide tension, by plotting them triaxially (using the method of Shock and Hastings) after a period of overbreathing. Blood samples were taken at short intervals, and the course of the three variables was found to be typical. The normal traces out a loop which is small and narrow, showing relatively little alteration in the acid-base balance, while the petit-mal epileptic produces a loop which is large and wide, indicating a shift toward a fixed acid acidosis. The mechanisms which regulate the physico-chemical state of the fluids of the body, and hence of the brain, are thus impaired in petit mal so that they are not able quickly and adequately to adjust the acid-base balance when it is disturbed. These two papers make it clear that in epilepsy there is an instability of the acid-base balance, with different pictures for the two types of epileptic fit. Moreover, they have established that there is some inherent difference in the reaction of the epileptic since the physico-chemical changes produced by overbreathing will precipitate an attack of petiti mal in an epileptic but not in a normal person. Finally, artificial changes in carbon-dioxide content will not precipitate a fit unless they are more extensive than those observed in a spontaneous fit.

1. Greville, G. D., Jones, T. S. G. and Hughes, W. F. G. *J. ment. Sci.* 1940, **86**, 195.
2. Gibbs, E. L., Lennox, W. G. and Gibbs, F. A. *Arch. Neurol. Psychiat.* February, 1940, p. 223.
3. Nims, L. F., Gibbs, E. L., Lennox, W. G., Gibbs, F. A. and Williams, D. *Ibid*, p. 262.

EYESTRAIN IN INDUSTRY

THE illumination of factories and workshops is at last receiving the attention it deserves from industrial welfare officers, and it formed the subject of a leading article in the February number of *Aircraft Production*, the journal of the aircraft manufacturing industry. The lighting requirements of various types of work are very variable and it is essential that engineers and architects planning the lighting of workshops and offices should be guided by the need of individual workers or teams of workers rather than by the claims of symmetry. For instance, the intensity, quality and background of the lighting required are quite different for workers who are painting aeroplane wings and for those engaged on fine adjustments of parts of an engine against a micrometer. For the former a diffuse even illumination of moderate intensity is adequate, whereas the latter need powerful focal illumination from an appropriate source near the work but not shining directly into the worker's eyes, with a subdued background. For work requiring concentrated visual attention to detail careful photometric readings should be taken of the intensity and quality of light that allows the workman to do his job efficiently with the least fatigue. Glare and too great an intensity of illumination as well as insufficient lighting are causes of retinal fatigue. Laymen often express concern about the possibility of causing progressive and permanent damage to eyesight by working under artificial light. It is true that some adult myopes may have their refractive disorder increased by long hours of close work under insufficient illumination when their general health is below normal, but in the case of low and moderate degrees of myopia this does not impair their sight when corrected by appropriate glasses. It is also a fact that people with unstable binocular muscle balance and convergence and accommodation weakness who have had no symptoms when employed out of doors may suffer from headaches, eyestrain and inability to concentrate when their occupation is changed to close work. These muscular deficiencies do not lead to impairment of vision but are the cause of a breakdown and inability to continue close work. The worker's general health, in particular his opportunities for outdoor exercise, regular meals of good food, relaxation, sleep, interest in his work and his psychological make-up, as well as the air and lighting of his workshop, are factors in causing an ocular breakdown. Certain ocular aids such as polaroid glasses, for use on highly polished surfaces, binocular magnifiers, tinted lenses and other protective devices serve

a useful purpose in industry. The ideal could be realised by a thorough and careful preliminary eye examination of all workers to detect refractive errors and muscle imbalances and insufficiencies as well as ocular disease. Workpeople could then be grouped according to their ocular fitness for certain types of work. Industrial investigations should be made on the optimum conditions of lighting and posture for the workman. Many data would have to be collected before any definite opinion could be passed about the effect of certain forms of work on the eyes and the incidence of industrial ocular fatigue. Such a study would require the coöperation of the physiologist, physician, psychologist, ophthalmologist and social-welfare worker.

SHAPE OF THE FEMALE PELVIS

FOR some years there has been a growing realisation that all was not well with the accepted classification of pelvic deformity in women. Certainly knowledge was lacking about the effect of the bony pelvis on the course of labour. For practical purposes the pelvis has been looked upon as consisting of an inlet and an outlet. Any variation in the size and shape of the former has commanded attention, especially in regard to its measurement and relationship to the position of the fœtal head, and a special but rarely seen mechanism was devised for the passage of the fœtal skull through the flat pelvic brim. The contracted pelvic outlet received less attention, probably because it was more difficult to detect. Usually the diagnosis was made at the time of an obstructed labour. For some reason it was thought to be associated for the most part with a kyphosis of the spine, an entirely erroneous supposition. This was the state of affairs in the majority of teaching centres before Caldwell and Moloy[1] began to publish their papers on the subject. Their investigation was aided by pelvic radiography and they made use of the precision stereoscope, whose value is now established wherever it has been employed. The variations of the female pelvis, they suggest, should be classified into four main types, the anthropoid, gynecoid, platypelloid and android, intermediate types being common. This classification in itself is important, but Caldwell and Moloy next direct attention to the necessity for considering the pelvis not merely as an inlet and an outlet but as a bony birth-canal, in which deformities or obstructions may be met with at any level or plane. They put forward a plan for the accurate analysis and assessment of information obtained by radiography of the shape and capacity of the whole bony canal. Lastly they consider the influence of the pelvic shape on the course of labour and any obstetrical manipulations that may be necessary to assist delivery. Their views provide an explanation, hitherto absent in textbooks of obstetrics, of phenomena that have been observed times without number. For example, it has been accepted that the fœtal skull only assumes the persistent occipito-posterior position if it is poorly flexed when it reaches the pelvic floor. Yet all who practise obstetrics have constantly had to examine and deliver the fœtus in that position when the head was most certainly fully flexed. This has not been an error in judgment or diagnosis. The explanation is forthcoming in a study of the bony birth-canal in the android pelvis. Caldwell and Moloy have made a useful contribution to our knowledge of pelvic variations and have also brought out the necessity for a thorough and intelligent investigation of each bony pelvis. Nevertheless they have made it clear that too much attention need not be directed to minor deformities. These will usually give rise to no trouble, provided that strong physiological uterine action is not replaced by the feeble, irregular contractions that are often the products of misguided attempts at the induction of premature labour.

1. Caldwell, W. E. and Moloy, H. C. *Edinb. med. J.* 1939, **46**, Transactions 1, 37.

LIGATURE OF THE PATENT DUCTUS ARTERIOSUS

CONGENITAL deformities supply an obvious field for constructive surgery, and much has been achieved in it, especially by plastic and orthopædic surgeons. But the problems of cardiac malformation have remained without a single solution until Gross[1] announced successful ligature of the patent ductus arteriosus in 4 cases, more than thirty years after Munro[2] first suggested its possibility. The ductus Botalli commonly remains patent to compensate for some more serious abnormality, and then its surgical obliteration would clearly be undesirable, but in 92 of the 242 cases reviewed by Abbott[3] it was the sole cardiovascular lesion. As many as 28 of these patients died of infective endocarditis, 40 of heart failure and 2 of rupture of the ductus, and their average age at death was twenty-four years. Apart from its threat to life the lesion may shunt enough blood from the aortic circuit seriously to impair a child's nutrition. From these considerations Gross formulates his criteria for operation, and rightly insists that the mere diagnosis of an uncomplicated patent ductus is not enough to warrant intervention. In short, he requires evidence that the ductus is enlarging, that a child is not developing properly or that the heart is carrying an increased burden. The threat of infective endocarditis always remains to be thrown into the scale against delay.

Gross worked out his method of approach by study of the human cadaver and experiments on living dogs. He found that a good view of the ductus was obtained by entering the thorax through the left pleural cavity and temporarily collapsing the lung. The mediastinal pleura is then incised to expose the pulmonary artery and aortic arch, and dissection of the fat and areolar tissue filling the sulcus between them follows, a procedure requiring great care and patience which in one case took nearly two hours. It was found crucial here to isolate the recurrent laryngeal nerve, not only to avoid injuring it but also because it leads surely to the ductus. Added difficulty may be caused by a high reflection of the pericardium or by the ductus being unusually thin-walled. In one case the wall tore, and death was only averted by superb nerve and skill and by an immediate blood-transfusion. Before actual ligature a temporary occlusion for two or three minutes was practised in order to gauge its effect on the circulation. Gross's four patients, who were aged seven, eleven, seven and seventeen years, all recovered rapidly, and there were no postoperative complications. The thrill disappeared in every case. In the first two a faint to and fro murmur persisted, but in the second two, with a change in technique from single to double ligature, the murmurs were abolished. In every case the low preoperative diastolic pressure was restored to normal, and the heart lost its tumultuous action. In two cases blood-flow studies were made by taking samples of blood for oxygen content from the aorta, the ductus, the main pulmonary artery and the left pulmonary artery before and after ligature of the

1. Gross, R. E. *Trans. Amer. surg. Ass.* 1939, **57**, 8.
2. Munro, J. C. *Ann. Surg.* 1907, **46**, 335.
3. Abbott, M. E. Congenital Heart Disease. Nelson's Loose Leaf Living Medicine, vol. iv, p. 207.

ductus. In one of these a left ventricular output of 24·6 litres a minute, of which no less than 18·8 litres was found to be lost through the ductus, was reduced to 5·08 litres by the operation, figures which show clearly how greatly it can increase cardiac efficiency. Those who follow Gross's lead will be wise to keep to his cautious criteria of operability until further experience justifies their modification.

ON LEAVING THE MENTAL HOSPITAL

A USEFUL start towards the systematic rehabilitation of patients discharged recovered from mental hospitals is reported by Wootton and Minski[1] from St. Ebba's Hospital. They found that the difficulty of finding employment was, in many cases, the chief factor in bringing about a relapse and conversely that patients who could be helped to obtain suitable jobs after discharge did well. A certain number of patients can be discharged home and find employment for themselves; others, because of prejudice against them or because the competition in their particular trades is too great, cannot get work and many of them have no home or resources of their own. For these a scheme was started in 1935 towards which a grant was obtained from the mental hospitals committee of the London County Council. The patients discharged home are followed up at an outpatient clinic and those who have difficulty in getting work are referred to a social worker of the Mental After-Care Association which is collaborating in the scheme and has a special department for employment finding. Other patients are boarded out either at mental aftercare hostels which are specially suitable for the social rehabilitation of the convalescent patient, at Church Army or similar hostels, or in selected lodgings until a job is found. In only a few cases has it been possible for a patient to find a job before leaving the hospital, partly again on account of public prejudice. For patients whose trades are overcrowded, or whose former jobs were unsuitable from a psychiatric point of view, training for different work is arranged. Suitable patients are picked out and before he is sent for training the potentialities and experience of each patient are considered at a conference between the medical staff of the hospital and an education expert. The training is carried out at various polytechnics and training centres; some patients attend from their homes, some from hostels, and some from the hospital itself. Thirty-one patients have so far been placed in jobs, of whom twenty were men and eleven women. There were among them schizophrenics, depressives, epileptics and alcoholic psychopaths, and the jobs for which training has been given include shoemaking, electrical engineering, nursing and secretarial work. Nine of the thirty-one were trained in new trades; twenty-five of the total number remain well and in work, four have relapsed, one committed suicide and one is in the hands of the police. Such a scheme makes new demands on the hospital staff and the social worker and calls for a certain financial outlay, but it is the logical development of the occupational-therapy department in the hospital and it should help a great deal towards the restoration of the patient's self-respect and confidence. As Wootton and Minski point out it is a more profitable investment to maintain these patients in hostels, and to give them a training which will eventually make them self-supporting, than to send them out to face conditions for which they are unfitted and which will probably bring about another breakdown entailing a further long stay in a mental hospital.

1. Wootton, L. H. and Minski, L. *J. ment. Sci.* 1940, **86**, 60.

EXPERIMENTAL DISSEMINATED ENCEPHALITIS

FIVE years ago Rivers and Schwentker[1] produced a disseminated encephalomyelitis in monkeys by the repeated intramuscular injection of heterologous brain material. The resemblance claimed between this experimental encephalitis and the postexanthematous encephalitis of human subjects was supported by the distribution of the lesions and the focal perivascular demyelination. On the other hand the heavy infiltration of these areas with hæmatogenous cells and with conspicuous giant cells constituted a difference. From the histological standpoint a more convincing claim is now made by Ferraro and Jervis,[2] who, repeating the technique of Rivers and Schwentker, have again produced an encephalitis in seven monkeys. The animals received about two injections a week for periods ranging from 112 to 405 days. Clinical signs of the disease did not appear until after 100 days; the monkeys then show forced position of the head, ataxia, coarse tremors, nystagmus, ptosis of the eyelids and spastic paresis. In all of them circumscribed disseminated perivascular lesions were found in the brain, the central white matter being usually affected. Demyelination and aggregation of fat-granule cells were the commonest features in the foci. More rarely the perivascular spaces contained hæmatogenous cells. Multinucleate giant cells were a striking feature in some of the more intensely inflamed areas; sometimes they appeared to be conglomerate foam-cells and sometimes they were thought to be of macroglial origin. An interesting link with disseminated sclerosis was the occasional finding of lesions in which macroglial proliferation had resulted in a tangle of closely interwoven glial fibrils. On the whole there is undoubtedly a close resemblance between this experimental encephalitis and the postvaccinal and exanthematic type of manifestation. When it is recalled that a similar encephalitis has also been recorded as a complication of antirabic treatment, in which again injections of heterologous brain material are given, it will be seen that the theory which holds a neurotoxin to be responsible cannot lightly be dismissed. According to this the lesions result from an antigen-antibody reaction. Specific antibodies have indeed been demonstrated in rabbits by Schwentker and Rivers either by complement-fixation tests or by precipitin reactions after repeated injections of heterologous brain material and they have also shown that homologous brain may display antigenic properties when altered by autolysis or infected by vaccine virus. It thus becomes possible to trace the steps by which this peculiar encephalopathy develops as a sequel to the invasion of the central nervous system by a virus. It is not however clear why if this is the mechanism the incidence of the disease is not considerably greater, or why foci of perivascular demyelination are not a characteristic feature of virus diseases of the brain as a whole.

1. Rivers, T. M. and Schwentker, F. F. *J. exper. med.* 1935, **61**, 689.
2. Ferraro, A. and Jervis, G. A. *Arch. Neurol. Psychiat.* 1940, **43**, 195.

UNIVERSITY OF OXFORD.—An election to the Philip Walker studentship in pathology will be held during Trinity term. It is tenable for three years and the stipend will be between £300 and £350 per annum. The student will be expected to devote his full time to pathological research but he may be permitted to hold a departmental demonstratorship in the Sir William Dunn school of pathology. The studentship is open to both sexes and candidates need not be qualified medical practitioners. Further particulars may be had from the registrar, University Registry, Oxford, to whom applications should be sent not later than June 1.

PREVENTION AND TREATMENT OF WOUND INFECTION

II.—BIOLOGICAL ASPECT OF INFECTED WOUNDS

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In wounds under war conditions healing by first intention can never be anticipated unless measures are taken to render the wound in a fit state for such healing, for this ideal method of repair only takes place in clean wounds. In looking at the subject of wound repair from the biological aspect it is worth while to review briefly the fundamental pathology of ideal healing and the factors which prohibit it. By so doing, an opinion can be formed as to what steps should be taken to convert non-ideal conditions into ideal, and in particular to prevent the disasters and dangers associated with implanted infections, especially the tendency to spread locally as well as to penetrate into the blood-stream.

The conditions required for healing by first intention are apposition of the cleanly divided tissues with efficient nutrition of the part—a good blood-supply is the fundamental requirement. A wound then heals with the minimum of reaction and with the least demand for new cell formation because only the cells on the immediate line of the divided tissue are killed. When the wound is made the blood that escapes into it forms a fibrin framework cementing the surfaces together; blood-vessels, accompanied by fibroblasts, grow out from the tissues on either side to vascularise the framework; epithelium grows in from the sides to cover the surface; and finally a scar is formed by contraction of the fibrous tissue.

A number of factors, singly or in combination, may interfere with this simple process, the most important being the impossibility of bringing the divided tissues into apposition, defective nutrition and infection. The process of healing by second intention is essentially the same as by first intention, but the task is far more formidable, takes much more time and is beset with dangers. A good blood-supply is again the fundamental requirement. When there is nothing more serious than mere lack of apposition, simple healing by second intention takes place. A vascularised, fibrinous and later a fibroblastic framework is gradually formed from the bottom of the wound upwards to the surface until the tissue gap is filled and epithelium can grow in from the side. This is the familiar highly vascular granulation tissue; it is the local protective barrier which walls off the exposed and injured tissue from the rest of the body. Were it not for the activity of the phagocytic cells present in such tissue and in the blood, combined with the natural bactericidal action of the blood and tissue fluids, everyone suffering an open wound would quickly die from infection. Granulation tissue has ample power to deal with small numbers of bacteria unless they are highly invasive.

When the wound is extensive, deep, contused, torn or lacerated there must necessarily be considerable interference with the blood-supply to much of the injured tissue. This part then becomes devitalised and cannot recover, nor can it be incorporated in the healing tissue; it becomes necrotic, constitutes a foreign body, invites infection, and holds up healing until digestion and liquefaction by ferments and phagocytic activity have removed it from the sphere of healing. Blood-clot and foreign bodies have the same effect.

THE MECHANISM OF INFECTION

If a wound is infected, either at the time of wounding or afterwards, the whole process of healing is complicated by the occurrence of inflammation. The reaction of inflammation in the acute phase consists in the outpouring of lymph, leucocytes and blood-cells into the infected area with the formation of pus, all with a view to localising and eventually eliminating the infection, cleansing the area, and restoring it to a condition in which it is ready for repair by simple second intention. The whole mechanism is designed to soak the infected site with fluid and cells that are rich in neutralising and bactericidal substances as well as digestive ferments, all of which tend to destroy the bacteria and liquefy necrotic tissue and debris. An important systemic part of the reaction of inflammation is fever, which again is protective; unless dangerously high the fever should not be interfered with, and then only by sponging, never with antipyretic drugs. Some repair, which is also protective—the formation of granulation tissue—goes on at the same time as the reaction of inflammation, but the repair is irregular and in most cases only small in amount. It is not until the infection is removed that the full effort of repair can come into action. Inflammation from bacterial infection favours thrombosis, and this, by reducing the blood-supply and increasing the amount of blood-clot, encourages the spread of infection and hinders healing. When an acute inflammatory reaction fails to overcome an infection and the condition becomes chronic, the œdema, vascular congestion and other obvious signs of inflammation tend to subside, but the tissue will not heal permanently until everything is clean. Whenever there is a residue of infection or a relic of necrotic tissue, the wound will always break down.

Once the protective skin has been injured any organism may be found in a wound. When deeper structures such as the gut are penetrated infection from the natural flora of these structures is an additional complication, while injury to a hollow viscus such as the bladder may encourage infection by reason of the dissemination of an irritating fluid. Under war conditions, the commonest aerobes (and these are also facultative anaerobes) are the pyogenic cocci, of which the β hæmolytic streptococci and *Staphylococcus aureus* are the most invasive. War wounds, especially when they are contracted in countries where the soil is damp and highly cultivated, are notorious for the frequency with which anaerobic bacterial infections become implanted in them. In the torrid sands of Africa, India or Egypt spreading infection is rare because the soil does not readily support bacteria, especially anaerobes. The very nature of a war wound, by reason of the tissues which it opens up as well as the substances which, apart from bacteria themselves, it may implant, gives every opportunity for an infection to flourish. The opening up of muscle tissue presents a bacteriological medium rich in carbohydrates which is extremely favourable to the saccharolytic gas-forming anaerobes; laceration of tissue with consequent devitalisation and necrosis provides a pabulum eminently suitable for all anaerobes. Foreign bodies in the wound may themselves be heavily infected. Thus, bits of clothing have a considerable flora, while soil itself not only may be rich in bacteria and spores but also has the power of activating spores. Experimentally the inoculation

of spores of the gas-forming anaerobes into animals usually has no effect, but if a small amount of sterile soil is included in the inoculum active infection rapidly takes place. Calcium salts are also extremely potent in activating infection and most soils contain such salts.

RESISTANCE AND THE SPREAD OF INFECTION

Whether an implanted infection remains local, spreads extensively or enters the blood-stream to cause septicæmia depends on many factors. There is, in the first place, the nature and the amount of the tissue wounded, for some tissues have more power of localising an infection than others. The resisting power of the peritoneum is common knowledge, as is the ability of this tissue to wall off and localise an infection; in effecting this, the mobile and vascular omentum is an invaluable ally. The strength of the peritoneum lies in the rapid reaction of inflammation which the tissue is able to exhibit. Normally it does not appear to be highly vascular, but it possesses a tremendous potential capacity for rapid vasodilation and for exudation of protective antibacterial cells and fluid. Every surgeon knows that a mere stitching together of the parietal peritoneum will prevent most infections spreading from the abdominal parietes into the abdomen. Muscle tissue, in striking contrast, is highly vulnerable. A very slight injury will interfere with the vital blood-supply to a single muscle segment, while muscle itself is an excellent bacterial medium and infection rapidly spreads along a muscle sheath. Muscle tissue damaged by gas-forming anaerobes is rarely capable of recovery. The longer a local bacterial implant can be kept from multiplying or from invading the blood-stream the greater is the body's opportunity for exerting its protective reaction and successfully resisting the infection. It is in accomplishing this retardation of infection that much is hoped from the wise prophylactic use of drugs with bacteriostatic action—namely, the sulphonamide group.

Of other factors which influence the localisation or dissemination of an infection, there is the invasive power of the organism implanted as well as the amount of the implant; there is the amount of clothing, soil and other foreign matter which finds its way into the wound; and there is the general resistance of the subject, which may be greatly influenced by the rigours to which he has been subjected and the time that has elapsed before his wound can be treated. Thus the element of luck figures largely in determining whether extensive spread of the infection or septicæmia develop. Against coccal septicæmia the immediate protection is the reaction of inflammation; the late protection is the formation of granulation tissue. This protection is less efficient against the anaerobes. Once implanted, the gas-forming anaerobes tend to spread rapidly and blood-stream invasion is as great if not a greater danger in the late phases than in the early. A man who is in poor general condition is not only a "bad surgical risk" from the operative aspect but is also incapable of a good reaction of inflammation, and this is the key to his successful recovery if infection cannot be eliminated or avoided.

Large numbers of those who suffer war injuries arrive at the first point where adequate surgery can be applied in no fit state for either immediate or early operation because of the condition commonly referred to as shock. Shock is caused primarily by injury to body tissues and the most striking and serious clinical feature of the condition is circulatory failure manifested by a fall in blood-pressure, which is progressive unless arrested by treatment. The physiological mechanisms involved in the production of shock are not clearly understood but it is known that a number of factors, singly or in combination, may produce it or contribute to its production. Of these the most important are: loss of blood, extensive tissue injury, not necessarily with loss of blood, burns, pain, cold, fatigue, exhaustion, shortage of food and drink and rapid onset of infection, especially gas gangrene.

The necessity for dealing with obvious bodily deficiencies at the very first opportunity must be appreciated by all who have to deal with wounded men. Resuscitation of the patient is an essential preliminary to surgical procedures. Quiet, rest, relief of pain, application of warmth, the administration of fluids by mouth, per rectum or intravenously; all have their place in such treatment. It is generally agreed that the most serious symptoms of shock are due to a reduction in the amount of *effective* circulating fluid. To combat this, blood-transfusion is of proved efficiency and is especially valuable when there has been severe hæmorrhage. But evidence is accumulating that either plasma or serum may be as effective, if not more so, in cases where the reduction in blood-volume is due not simply to hæmorrhage but to the passage of plasma from the circulation into the injured tissues.

CONCLUSIONS

Except in violent and fulminating infections, there is ordinarily a lag period of five to twelve hours between the time of wounding and the time when the implanted infection assumes a dominating and often uncontrollable position; this lag can doubtless be increased by prophylactic chemotherapy. Lucky is the man who has his wounds attended early. The lag period gives the surgeon opportunity for action. Having first of all resuscitated the patient from the general aspect, he will bear in mind that the fundamental requirement both for healing and for protection against infection is a good blood-supply, and that lacerated, devitalised tissue, blood-clot and foreign bodies encourage both aerobic and anaerobic infection. Clearly all tissue likely to become necrotic should be removed at the earliest opportunity and it is safer to do this drastically at the first operation than later when protective granulation tissue has been formed. Interference with granulation tissue is always fraught with danger, and may readily let loose virulent and invasive bacteria into the circulation. Once the surgical clearing of the wounded tissue has been successfully completed, immobilisation of the part is obviously required, for it both encourages healing and discourages the spread of infection.

When a wound has become infected in spite of all possible precautions, judicious surgery needs to be supplemented by a number of general measures. Every effort should be made to cut any vicious circle which tends to lower general resistance. Good food, adequate fluids, nursing in the open air when practicable are all required, as well as the judicious use of transfusion of fresh blood if long-continued toxæmia is making the patient anæmic. When the infecting organism is appropriate, and it usually is, chemotherapy properly applied is a valuable adjuvant provided the surgeon realises how ineffective are the sulphonamide drugs when pus is present and is not draining freely. As to local applications, care should be taken that the antiseptics, or irrigating fluids if such are employed, are more injurious to bacteria than to the tissues themselves and especially to the cells involved in the reaction of inflammation. For this reason there is much to be said for the reasonable employment as irrigating fluids of so-called "lymphagogues" which encourage the exudation of natural lymph and

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SPECIAL ARTICLES

MEDICINE AND THE LAW

Unqualified Treatment of Disseminated Sclerosis

A Devon coroner expressed surprise last week that any inexperienced person, totally unable to diagnose disease, should be allowed by law to practise as an electrical masseur and to administer infra-red and ultraviolet ray treatment. The deceased, Miss Winifred Snell, had suffered from disseminated sclerosis for some 16 years. She had been attended by a qualified practitioner who, according to her mother's evidence, had been unable to do much for her and who was called in only when the patient's health was specially bad. Through attending a "prayer circle" last year, the mother was advised to take her daughter to Mr. George William Carter of Mutley, an electrical masseur. After a second visit to Mr. Carter, who had switched on various lamps and had massaged the patient's back with certain oils, the skin of the back was found to have been stripped off across the loins. The qualified doctor was summoned and found her suffering from two large gangrenous areas due to burning.

In his evidence at the inquest the doctor attributed the burns to the treatment with light rays on two successive days. He explained that it was one of the symptoms of the patient's disease that the skin became insensitive to heat; while the lamp treatment was proceeding she would have felt no discomfort. In answer to the coroner he expressed the opinion that the lamp treatment was useless and harmful. Mr. Carter stated that no diplomas or degrees were necessary for the treatment which he gave. He had begun to practise electrical massage after being master of a merchant ship. He had practised in Australia and had charge of an institute in Tasmania. He was told by Miss Snell's mother that the patient had suffered from shock some years before. He did not know what she was suffering from, but he thought a course of electrical massage would prove beneficial. He did not think his treatment could burn people without their being aware of it. There would be blisters. He had treated over 1000 people and had never had a burn; he had been 12 years in practice and there had never been any complaint. The coroner found that death was due to disseminated sclerosis, toxæmia resulting from prolonged sepsis possibly caused by burning following treatment by infra-red lamp and ultraviolet rays. He was obliged to conclude that Mr. Carter's treatment started the physical condition which accelerated the death. He could not entirely exonerate Mr. Carter. The coroner suggested that perhaps the legislature would in time require some diploma or other qualification before allowing electrical treatment to be given by persons incapable of diagnosing disease.

No mention, apparently, was made of the fact that in London and other large towns restrictions are imposed by local act on electrical establishments. A system of registration and licensing ensures a wholesome check. Parliament would evidently be justified in extending these local provisions to the whole country. One must have sympathy with parents who naturally try any remedy in a case described as incurable; but it is no kindness to encourage false hopes and the waste of money on such treatment as a so-called electrical masseur does not hesitate to offer for conditions of which he is unaware.

Continued from preceding page

other protective body fluids. But even lymphogogues have the disadvantage of tending to cause local œdema if they are used continuously over a long period.

In dealing with infection, the surgeon is the handmaiden not the master of nature. His task must be to coöperate with nature and direct his actions so as to imitate nature's own methods of protection.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

THE CARE OF CHILDREN

IN his Honyman Gillespie lecture in Edinburgh last week on the care of children during war-time and afterwards Dr. Lewis Thatcher commented on the improvement that has taken place in the national dietary since the beginning of the century and the consequent improvement in the health of the population, but he recalled that there is still much ill health due essentially to faulty dietary habits. The "Drink More Milk" campaign has been fairly successful in stimulating the consumption of this valuable food and in improving the physique of the children. The main deficiency nowadays in the diet of the average person is the lack of wholemeal bread. Bread has been steadily worsening in value during the last 70 years since the introduction of the steel roller mill. Not only has there been virtual removal of the vitamin-B complex but there has also been great reduction in protein and mineral content, while it is likely that all vitamin E is removed in the milling. White bread, he said, possesses no single compensating virtue except the keeping quality of the flour. Any change for the better requires the establishment of a national food policy and an intensive campaign to bring matters before the attention of the public. Under-nutrition is largely due to ignorance although the factors of thriftlessness, carelessness and poverty are undoubtedly significant also.

In considering nutrition in relation to child-bearing Dr. Thatcher urged that provision must be made for the pregnant woman. It is well known that the addition of even a little milk to the diet of children can produce improvement in physique but the addition of milk to the diet of the mother before her child is born has an important effect on neonatal mortality and on the health of the children who live. Stillbirths are more common now than formerly but the reason for this has not been satisfactorily elucidated. Dr. Thatcher suggested that the use of narcotics and a tendency to hurry labour may be involved. He stressed the importance of breast-feeding in relation to infantile mortality and quoted statistics to show that the institution of artificial feeding undoubtedly carries danger. There is a dangerous feeling abroad that hand-feeding is just as good and mothers are too liable to let their babies slip away from breast-feeding. There is no reason why lactation should fail if women are properly fed and properly advised. Failure in the secretion of breast milk is usually due either to failure to empty the breast; manually if necessary in the case of weakly babies, or to unsatisfactory emotional states. If artificial feeding must be used in the early days of the child's life he recommended modified cow's milk diluted 1 to 5. The concentration should

be increased to 1 to 1 at the end of a week, and by the age of 2–2½ months the child should be able to take undiluted cow's milk. The widespread use of cow's milk for feeding human babies means that everyone should be interested in the production of a safe and clean milk supply. Pasteurisation has been fairly effective so far as city populations are concerned but too often the country child cannot be given pasteurised milk and only raw milk which must be boiled is available. The eradication of tuberculous cattle, already making rapid progress, is more important in the long run than the extension of pasteurisation since it will result in the provision of safe milk for country as well as city children. Dr. Thatcher said that the recent evacuation showed that too many children are still being brought up in homes with an inadequate standard of cleanliness and that too many are inadequately trained in decent personal habits. He pointed out, however, that the experience of the Edinburgh Holiday Fund is more gratifying. The fund sends some 5000 children to the country for a fortnight's holiday every summer and complaints from their hostesses about habits and cleanliness are extremely few.

VENEREAL DISEASE IN GLASGOW

The directors of the Glasgow Lock Hospital, which was founded in 1805, have reached the conclusion that the usefulness of the hospital is coming to an end and it will probably be closed in the near future, at least so far as the treatment of disease is concerned. It will, however, continue to be used for research, propaganda work and for prevention. This decision has been reached as the result of the great fall in the number of inpatients and the consequent diminution in the funds derived from Government and local-authority grants. Between 1932 and 1937 there was a 24 per cent. fall in inpatients; in 1938 there was a further fall of 28 per cent.; and last year the fall was 18 per cent. At the moment there are only 9 patients in the hospital. A regularly recurring deficit has been experienced during the past four years. It is pointed out that the drop in the number of patients has been no greater than that experienced by the corporation clinics.

SURGEON'S APPOINTMENT TERMINATED ON MARRIAGE

There has been a good deal of discussion in Glasgow medical circles about the decision of the governors of the Royal Samaritan Hospital for Women not to renew the appointment of Dr. Ellen Douglas Morton as visiting surgeon to the hospital. At the annual meeting it was announced that Dr. Morton had been unanimously elected consulting surgeon in appreciation of her services. Dr. Morton recently married Dr. John Hewitt, one of her colleagues on the visiting staff of the hospital. A representative of the governors has explained that the board has never put any bar on the appointment of women, or even married women, to the medical staff, but on this occasion, which is the first of its kind, they considered that it was not in the interests of the hospital that a husband and wife should hold two out of three senior posts as visiting surgeons. The decision, it was explained, was purely one of policy and not in any way personal.

GLASGOW CANCER HOSPITAL

It was announced at the annual meeting that the results of treatment at the Glasgow Royal Cancer Hospital during the last ten years are now being analysed. Since the war began the work of the hospital has been somewhat curtailed particularly in regard to the radium department. Last year the total number of patients referred to this department was 116 of whom 85 were treated before September, The hospital's own supply of radium, 1359 mg., partly on loan to other institutions, has been recalled, and in view of the danger of its dispersal during an air-raid a bomb-proof bore-hole of special design has been constructed in which the radium can be stored in safety immediately an alarm is given. The cost of the precautions for the safety of the radium has had to be met by the hospital although some feel that this should have been a Government charge. Apart from the radium department, the services of the hospital have been maintained almost undiminished, in spite of the depletion of the staff resulting from the calls of the fighting services.

SWEDEN

(FROM AN OCCASIONAL CORRESPONDENT)

CHILDREN IN HOSPITAL

Professor Gyllenswärd of Stockholm has studied the change in clientele at children's hospitals during the last few decades. In only ten years, the claims on hospital beds for children in Stockholm have risen by about 50 per cent. although in the same period there has been a fall in the number of children in the city. The children in hospital are also much younger. Today most children in hospital in Stockholm are under the age of three years. Conscious of the wonderful opportunities offered by this malleable material, Professor Gyllenswärd is evolving a new and more human type of children's nurse and social worker. There is, for example, a games nurse who finds occupation for the sick child appropriate to his special needs, and who smooths the path of the problem child.

A CROSS SECTION OF GENERAL PRACTICE

A painstaking and information-seeking Swedish doctor has analysed 1000 consecutive cases seen in the course of eight months in a typical general practice. In 130 cases the patient had to be sent to hospital or to a specialist; as many as 200 cases concerned colds in the head, sore throat and the like; 50 cases were recognised as neuroses, and 10 as psychoses; and 160 cases came under the general heading of nervous disturbances. The impression gained by this study is that the most formidable task the general practitioner has to face is to distinguish between the banal and the urgently important.

TUBERCULOSIS AMONG SWEDISH DOCTORS

In *Svenska Läkartidningen* for March 8, Dr. Gunnar Biörck has published a study of Swedish doctors examined for army medical service. In October, 1939, a census was taken of the doctors available for service in war. A card-index system provided for three main groups. It was found that 71 per cent. were fit for military service; 11 per cent. were women; and 18 per cent. were men exempt from military service. The most important reason for exemption was tuberculosis, which was responsible for 43·5 per cent. of the exemptions for doctors, and 24 per cent. of the exemptions for medical students. In other words, 8·9 per cent. of all the male doctors were exempt from military service on account of tuberculosis.

A TIME-SAVING DEVICE

The Swedish Society of Apothecaries has lifted up its voice in more or less genuine lamentation over a custom whose origin can be traced back to a chemist

imbued with the traditions of dog Latin. The trouble began when a doctor wished to save his patient the cost of a well-known proprietary remedy. The doctor would like, had he the necessary time and knowledge, to write out the chemical constituents of the remedy. But boggling at the task of prescribing ethylmorphini hydrochloridi he took his pen and wrote down quickly: "Dionin loco." This short cut has now become so popular as to be almost general. No ordinarily intelligent chemist could miss the point, or what the doctor meant to be the point of his prescription. But is not the very clarity a mistake? For if anything has for centuries preserved the sanctity and omnipotence of medical prescriptions, it must have been their illegibility.

PARIS

(FROM AN OCCASIONAL CORRESPONDENT)

PARIS AS AN INTERNATIONAL MEDICAL CENTRE

EARLY this year, without any splash of publicity, the annual meeting of the A.D.R.M. (Association pour le développement des relations médicales) was held at the Faculty of Medicine. This body was founded by Professor Hartmann, the surgeon, who continues to be its mainspring. Professor Achard, prevented by an attack of influenza from presiding at this meeting, sent his greetings and an address which was delivered by one of his colleagues. In this he stressed the importance of travelling and international medical conferences as means to the development of better relations between doctors in different parts of the world. Professor Achard himself has recently visited Japan. Professor Hartmann gave an account of the visits to Paris of distinguished medical foreigners, and of visits paid abroad by French members of the profession. Appreciative references were made to the work of the secretary of this association, Mademoiselle Huré, who has endeared herself to many foreign visitors by acting as their guide, philosopher and friend.

CERTIFICATS DE COMPLAISANCE

A "certificat de complaisance" is the document you sign with a more or less uneasy conscience when you state, without being quite sure, that so-and-so is seriously ill and urgently in need of the presence of some relation serving with the forces. Correspondence in the medical press over this conflict in loyalties shows how difficult it is to play fair and yet not alienate the goodwill of influential people. There are several ways in which the difficulty may be met. You may get someone else in an official position to countersign your certificate and thus share responsibility with you, or if you smell a rat you may point out to the person asking for such a certificate that, in the event of a prosecution, he or she as well as you may get into trouble. Article 160 of the penal code now runs as follows: "Every doctor, surgeon or other medical officer who, to show some one a favour, certifies falsely the existence of diseases qualifying for dispensation from some public service or in order to obtain a pension or grant from the state or some public body is to be detained in prison for at least one year and at most three years." The prosecution must, however, show that a doctor has acted in bad faith; he is exonerated, however mistaken his diagnosis, if he has acted in good faith. Considering how nebulous the quality of faith may be it evidently behoves every doctor to be quite sure of his diagnosis before he puts pen to paper, never committing himself to a hear-say diagnosis emanating from some person whose yearning for an absent relative at the front conjures up morbid visions apt to be dispelled in the dispassionate atmosphere of a military tribunal.

MUFTI FOR ARMY DOCTORS ON LEAVE

An army order dated Jan. 10 assures a much appreciated relaxation of the regulations concerning the wearing of uniform when on leave. Officers and soldiers on leave may now don mufti and attend to certain civilian duties of a remunerative character provided uniform is still worn when travelling and when dealing with certain authorities. This concession is particularly welcome to medical men, not least because of the distinction drawn by the public between uniform and mufti in the matter of fees. In uniform you are obviously the servant of the state, and the public shrink from hurting your feelings by asking you what your fee is. Mufti, on the other hand, suggests that you are dependent for a living on remuneration for your services.

IRELAND

(FROM OUR OWN CORRESPONDENT)

HOSPITALS TRUST FUND

IN the Dáil last week the Parliamentary Secretary to the Minister for Local Government and Public Health stated that there was at present £8,500,000 in the Sweepstake Fund. He added that £3,500,000 would be required for the endowment of voluntary hospitals, and this amount would have to be increased if the upward trend of the deficits of the voluntary hospitals was not checked. About £1,000,000, he said, was required for the completion of works in progress, including voluntary hospitals. The balance was earmarked for new voluntary hospitals in Dublin and for the provision of institutions in counties where the need was most urgent.

HONOUR FOR DR. DENIS COFFEY

The Pope has conferred on Dr. Denis Coffey, president of University College, Dublin, the Grand Cross of the Equestrian Order of St. Sylvester, at the same time expressing his high appreciation of Dr. Coffey's work in promoting education, of his long and distinguished career, and of his personal character.

ST. LAURENCE O'TOOLE HOSPITAL

The board of governors of this new hospital, which has been named after Dublin's first archbishop, is, according to a bill published last week, to be set up by the Minister for Local Government and Public Health. The board is to prepare and submit to the minister a scheme for the erection of the new hospital, which the minister will have power to accept, modify or reject. The board's powers of appointing staff and fixing rates of pay are also subject to the minister's consent. The extensive powers to be granted to the minister seem to cut deep into the powers of the board. But there is a proverb which says that "Who pays the piper calls the tune," and as the minister has the power of making the necessary disbursements from the Hospitals Trust Fund his power is supreme.

BOARD OF TRADE.—The following articles will continue to be exempt from key-industry duty until June 30 :—

Barbitone (Veronal; Malonal; Malonurea; diethylbarbituric acid; diethylmalonylurea; Hypnogen; Deba).
Glycol ethers.

ECONOMY IN PRESCRIBING

Official Recommendations

THE Therapeutic Requirements Subcommittee of the Medical Research Council has prepared the following statement on the need for economy in certain ingredients of medicines. The recommendations have been agreed by the Ministry of Food and are now issued by the Ministry of Health for the consideration of all medical practitioners and pharmacists.

SUGAR

The situation in relation to supplies of sugar was recently reviewed by the Minister of Food, who gave reasons for the control of this commodity and for restrictions on the amount to be used. The present position requires that the supplies of sugar should be directed into the forms in which they are most useful as foods. The quantities of sugar used annually in preparing medicines are considerable and a definite restriction in this way would be helpful to the country. The Ministry of Food has allowed, for the time being, a full ration of sugar for medicinal purposes but has made the concession on the understanding that economies will be made voluntarily by the medical and pharmaceutical professions. Otherwise rationing will have to be introduced. This being the case, members of the medical profession are urgently requested to restrict their prescriptions, for preparations containing sugar, to those cases in which such preparations are essential.

A survey of official preparations and standard prescriptions shows that the prescribing of preparations containing sugar could be restricted almost entirely to medicines for children without any serious loss of therapeutic efficiency. An appeal is made to the medical profession generally to bear the difficulties of the situation in mind when writing their prescriptions. It is to be hoped that by voluntary effort in this way the quantity of sugar used in making medicines may be reduced, so that it will be possible to maintain the present formulæ for pharmaceutical preparations. The alternative is rationing of pharmaceutical manufacturers with the consequent necessity for altering the formulæ of the British Pharmacopœia and the British Pharmaceutical Codex by removing sugar and substituting some other sweetening agent. The alteration of official formulæ is undesirable. Syrups which are used merely for flavouring purposes —orange, lemon, ginger, and possibly tolu—might well be omitted from prescriptions. Certain tonic syrups such as Easton's, compound glycerophosphates and compound hypophosphites, could be prescribed in the form of the equivalent tablets, which are readily available.

CITRATES

Citric acid is now manufactured chiefly from sucrose by a biological method and the necessity for the conservation of stocks of sugar has given rise to difficulty in regard to supplies of citric acid and citrates. Prescribers would be wise to restrict their use of citric acid and citrates to cases in which they are essential.

COD-LIVER OIL

While it is understood that sufficient cod-liver oil is at present available to meet all reasonable medical requirements, it cannot be stated with certainty that this position will be maintained, and in order to conserve supplies it is clearly desirable that the strictest economy should be observed in its prescription and administration. The maximum effective daily dose of vitamins A and D is contained in about three teaspoonsful of the oil and no useful therapeutic purpose will be served by exceeding that dose. In most cases it is found more satisfactory and economical to administer the oil without admixture rather than in the form of an emulsion or in combination with malt extract.

Cod-liver oil provides a convenient way of administering vitamins A and D, but any edible oil containing the necessary vitamins would be satisfactory as a source of these vitamins if it were required to conform to a recognised specification. In this connexion it is understood that the British Pharmacopœia Commission have in course of preparation, and purpose shortly to make official, a specification for a vitaminised oil containing vitamins A and D in a suitable edible oil.

STARCH AND FATS

Starch, animal fats, and vegetable oils and fats are controlled by various orders and departments of the Ministry of Food, but special privileges have been extended to the medical and pharmaceutical professions to allow of the use of these substances for therapeutic purposes. Efforts will be made to ensure that sufficient pure leaf lard will be available for all legitimate medical purposes but it is desirable that substitutes should be used wherever possible. Moreover, whereas early orders prohibited the use of vegetable oils and fats for any purpose except food, permission has now been given to allow the use of any of the following oils for the purpose of the preparation of any medicine or medicament for internal and external use—coconut oil, cotton-seed oil, gingelly (sesame) oil, ground-nut (arachis) oil, linseed oil, maize oil, olive oil, palm oil and soya-bean oil. Liquid paraffin, soft paraffin both white and yellow, and hard paraffin or paraffin wax are governed by the various rules and orders issued by the Petroleum Board, but for the present sufficient supplies are available for medical purposes. The medical and pharmaceutical professions, having been spared the burdensome procedures associated with rationing, should exercise every economy in all the articles referred to in this paragraph. There are few large hospitals and dispensaries, for example, in which it would not be possible to reduce greatly the consumption of liquid paraffin, without detriment to the patients.

Hints for Prescribers

Doctors will not find it easy to apply these recommendations to their practice, and more detailed suggestions may be helpful. The need for economy in imported drugs has also to be borne in mind, and here the prescriber will need specific information, some of which is set out below.

Sugar is largely prescribed as an ingredient of medicinal syrups, and reducing the concentration of sugar in these would render them liable to fermentation. Syrups should, however, be mainly reserved for children's medicines. The adult tonic syrups, Easton's and Syrup of Hypophosphites, may be replaced by Tab. Eastonii B.P.C. and Tab. Hypophosphitum Co. B.P.C. If a sweetening agent is essential use Elixir of Saccharin B.P.C., dose 5–20 minims. This preparation is not as popular as it deserves to be. It may be used along with the tinctures of orange or lemon if required. Five minims of Tincture of Orange and five minims of Elixir of Saccharin is a satisfactory substitute for one drachm of Syrup of Orange. Note, however, that the tinctures of orange and lemon are expensive owing to the full alcohol duty on both. Do not substitute glycerin for syrup because glycerin is wanted for other purposes. The

prescribing of potassium chlorate in tablets instead of Troch. Pot. Chlorat. also leads to a saving in sugar. The important motto is: Think before prescribing any syrup.

Extract of Malt is of doubtful therapeutic value. Barley is used in its manufacture and supplies of barley must be conserved for more important purposes. Palatable emulsions of cod-liver oil may be used if there are objections to the administration of the pure oil.

Alcohol is an essential ingredient of all tinctures. Liquid extracts are efficient substitutes for some of these and besides saving alcohol are very much cheaper.

1 minim	ext. bellad. liq.	is equivalent to	25 minims	tinct. bellad.
1 ,,	ext. hyoscy. liq.		10 ,,	tinct. hyoscy.
1 ,,	ext. ipecac. liq.		20 ,,	tinct. ipecac.
1 ,,	ext. nucis vom. liq.		12 ,,	tinct. nuc. vom.

The prescribing of standardised powders is even better. These will save in cost, storage space and containers, and in alcohol. In addition, Digitalis Pulverata and Ergota Præparata are the most stable and effective preparations of these two drugs.

1 grain	bellad. pulv.	is equivalent to	10 minims	tinct. bellad.
1 ,,	digit. pulv.		10 ,,	tinct. digit.
1 ,,	ergota pulv.		2 ,,	ext. ergotæ liq.
1 ,,	nux vom. pulv.		10 ,,	tinct. nuc. vom.
1 ,,	ipecac. pulv.		20 ,,	tinct. ipecac.

Concentrated medicinal waters are alcoholic solutions of volatile oils. They are expensive and in most cases no spirit rebate is obtainable on them. One or two minims per ounce of the corresponding volatile oils makes a satisfactory substitute.

Mercurials.—The price of mercury has increased enormously since the outbreak of war. Few mercurials are essential. Mercuric chloride is dangerous to handle and can usually be replaced by some of the modern powerful phenolic disinfectants.

Liver extracts.—Use the parenteral preparations wherever possible; they are cheaper and less raw liver is required with them to supply an effective dosage. Liver preparations should not be used as general tonics or for the treatment of secondary anæmias.

The sulphonamides.—Sulphapyridine is much more expensive than sulphanilamide. It seems that the additional outlay is justified in the treatment of pneumococcal and gonococcal infections but not in streptococcal infections. There has been a tendency to substitute sulphapyridine for sulphanilamide in all cases. Do not give sulphonamide preparations by injection without good reason, for treatment by mouth is cheaper.

IMPORTED DRUGS

In prescribing proprietary drugs, consider the country of origin. Does their use entail the outlay of foreign currency? Are they essential? Or is there an equivalent preparation in the B.P. or B.P.C.? Over and above these the following widely used drugs come from abroad and should be prescribed with care.

Borax and boric acid, caffeine, theobromine, theophylline, emetine, ephedrine, mercurials, ergot, ipecacuanha, menthol, natural camphor, balsams of Peru and tolu, benzoin, belladonna, cinchona, gentian, liquorice, castor oil, turpentine, rhubarb, hyoscine.

Purgatives and laxatives.—These tend to be prescribed indiscriminately. The following require foreign currency for their purchase: cascara sagrada, liquid paraffin, olive oil, jalap, scammony. Most of the saline purges—e.g., magnesium sulphate and sodium sulphate—and aloes and phenolphthalein do not. Supplies of liquid paraffin are somewhat restricted and the price has advanced considerably. The large quantities handed to outpatients at many hospitals could certainly be reduced.

Bismuth salts.—Bismuth carbonate is used in enormous quantities in alkaline powders and mixtures, but its therapeutic value is doubtful. In the treatment of duodenal ulcer various combinations of calcium carbonate, sodium bicarbonate, kaolin and magnesium oxide have been successfully used in place of the more expensive compound bismuth powders. Bismuth carbonate cannot be regarded as an essential ingredient of every indigestion mixture. The following substitutes are suggested; a and b are modified from the U.C.H. pharmacopœia and c and d from the pharmacopœia of St. Thomas's Hospital.

(*a*) Calc. carbonat.
Mag. carb. Pond.
Sodii bicarb.
Kaolin. Equal parts.

(*b*) Kaolin. 1 part.
Mag. oxid. Pond. 1 part.
Sod. bicarb. 2 parts.

(*b*) Mag. carb. Pond. 8 parts.
Sod. bicarb. 3 parts.
Calc. carb. 12 parts.

(*c*) Kaolin. 3 parts.
Mag. carb. Pond. 6 parts.
Calc. carb. 12 parts.

Edible oils.—Olive oil is expensive and comes from foreign countries. Arachis oil (nut oil) is a colonial product, is cheaper, and is a satisfactory substitute in most preparations.

Bitters.—Quinine has to be bought with foreign currency. It should not be used merely as a bitter tonic. Other bitters are available and large quantities of quinine are needed for the treatment of malaria. Gentian comes from Central Europe, whereas quassia and calumba are colonial products. Therefore use Inf. Quassiæ or Inf. Calumbæ in preference to Inf. Gent. Co.

Hypnotics and analgesics.—The bulk of the barbiturates formerly came from abroad, but this situation is now being rectified. For economy's sake do not use more trade names than you must. Before prescribing soluble barbitone consider whether phenobarbitone will give the required hypnotic effect. Although phenobarbitone is about half as dear again as soluble barbitone, a much smaller dose is needed (from a fifth to a tenth). Aspirin and phenacetin are manufactured here and are relatively cheap. Phenazone and amidopyrin come from abroad, are expensive, and are rarely essential.

The Lancet 100 Years Ago

April 4, 1840, p. 64.

From the Table of Mortality for the Metropolis for the 5 weeks ending March 21, 1840

Causes of death	Feb. 16 to 22	Feb. 23 to 29	March 1 to 7	March 8 to 14	March 15 to 21	Weekly av. 1838 (corrected)
Small-pox	9	4	9	8	13	76
Measles	12	11	15	19	14	12
Scarlatina	44	45	36	24	47	30
Hooping-cough	22	27	26	17	26	42
Croup	6	11	9	10	8	7
Thrush	6	5	8	2	3	6
Diarrhœa	3	5	3	6	5	8
Dysentery	2	1	—	1	—	2
Cholera	—	—	—	—	—	0·3
Influenza	4	—	1	2	3	1
Typhus	20	21	26	26	29	82
Erysipelas	1	5	5	3	3	8
Syphilis	—	1	1	2	1	1
Hydrophobia	—	—	—	—	—	0·2
TOTAL	129	136	139	120	152	276
Deaths, all causes	855	916	969	908	946	1051

IN ENGLAND NOW

A running commentary from our Peripatetic Correspondents

THE longer one studies the policy of evacuation, the more doubtful one becomes as to its wisdom or folly. But last September at any rate it seemed to be right and inevitable, and if that be admitted the actual carrying out of the enterprise is worthy of admiration. Not perhaps in all its details, for there were obvious precautions, especially on the medical and welfare sides which were overlooked. But as time goes on other aspects of the problem have been forced to the front, especially the almost complete abandonment of the educational and disciplinary value of an elementary-school training. It was an unexpected and terrifying discovery that for a large number of children left in London evacuation meant the cessation of the chief civilising influence in their lives, and their relegation to the life of the streets with no interests, no control other than that of the police, and often with inadequate nutrition. The situation evoked the memory of the child-brigand bands of Moscow in the days of the Russian revolution. Fortunately we have realised the dangers fairly early, but not, I am afraid, soon enough. In the reception areas the results of evacuation are more hopeful. Where the children have been allowed by their parents to settle down there has been on balance a gain both to the children and to their hosts, though the inadequacy of school buildings to accommodate the additional numbers has been a strain on the billeting housewives which can only be appreciated by those who know the relief which the normal school hours afford to the hard-worked mother. In my own area comparatively few of the evacuees have gone home and those who have stayed have settled down to the satisfaction of the parents and of the hostesses—though this does not mean that we contemplate with any enthusiasm a further evacuation and a further strain on hospitality.

Today with all the pros and cons in mind one is compelled to question the wisdom of the original evacuation: whether in fact it would not have been wiser in the long run to have faced the possible deaths of *x* school-children, rather than disturb the social and above all the educational order. I am inclined to think that evacuation was not merely sentimentally but also politically correct; I cannot agree that the experiment has been, as some would have us believe, a triumphant success.

* * *

The Abbatt exhibition at 94, Wimpole Street was well worth a visit, if only because evacuation is a fact. For better or for worse it has happened, and more will happen. No attempt to make it successful and constructive, rather than merely obligatory, should be taken lightly. The exhibition arose out of a competition, sponsored by the Building Centre in Bond Street, for plans of evacuation centres and holiday camps. The promoters hoped the Government might be interested. I was told that nearly all of the Government projected plans are already finished and up. I hope this is not true, for the point of the exhibition is to give publicity to other plans and to put forward a positive policy for evacuation. These plans are based on alternative use: (a) in peace-time as holiday centres throughout the year, and (b) in war-time by simple adaptation to hold double the number of children. They show three types of centre: (1) for small units of evacuated mothers and young children; (2) for nursery schools en bloc with staff and with some parents; (3) for evacuated children in camp blocks with supervisors—what is virtually a boarding-school for older children. Planned before the war, the buildings are constructed largely of timber. Obviously their design would now have to be modified because of shortage of material, but they could still, it was maintained, be made more cheaply than the orthodox huts. I could believe this having seen something of municipal contracts which made a place cost as much as if it were constructed of mother of pearl. I hope I am wrong, but I did just wonder if the Government could have succeeded in getting them put up at the estimated figure.

The whole exhibition at first struck me as a bit hypothetical—all very well, you know, if there were not a war on. But when I went into it, if what the designers say is true there is no reason why such buildings should not be put up. The camps would then be permanent and lovely buildings, harmonised externally to their surroundings and internally to their function. Anyone working with children knows how work can be made easier or more difficult by the building they are housed in. These plans had obviously in mind both the educational and recreational needs of a group of lively children, and the human limitations of the staff. Bunks take the place of long and crowded dormitories for the older children, leaving enough floor-space for each child to house personal belongings in a recess similar to a cubicle. There is a bed-sitting-room apiece for the staff and a central block for domestic and official use. The children sleep and spend the day in small separate units. The nursery school is in effect a residential nursery school with a similar plan for sleeping the children in small units. Each block has a washing-room planned for economical plumbing, and everywhere narrow and cramped spacing has been avoided. The designs provide for the needs of the individual child, in space and room for his things, as well as for the communal nature of the settlement as a whole—a matter of paramount importance in buildings to be used later as holiday camps.

The exhibition was an eye-opener to me, and I hope they were right about the price. I have no reason to doubt except that their plans were so nice—and nice things are never cheap. The buildings, by the way, are flat-roofed. I am not clear why except that it is modern.

* * *

My husband is a member of the Royal College of Physicians, so is the friend who came here the afternoon I noticed my rash. "Do you think I've got it?" I asked. "You might have," said my husband. "I've only seen one case." His friend examined me. After some time he said, "Menstrual scurf." As they are both psychiatrists I decided to go and look up German measles in the nearest copy of "Price." Outside the village inn we stopped to inspect the rash in a better light. The landlady and her daughters leaning from a window twenty yards away made their diagnosis without hesitation. "She's got it," they said. They were quite right. And don't let anybody underrate German measles as a disease.

* * *

"Treatment with antitoxic serum was also effective in the case of a strain of high toxigenicity, but failed against a strain of low toxigenicity but probably of higher invasiveness." The English language, especially in the hands of scientific workers, is "a fearful and wonderful wildfowl." But this sentence will convince

the most ardent pessimist that it is still very much alive, for such a collocation of neologisms is barely intelligible to men of the last generation, and yet to his contemporaries it expresses succinctly what its author desired to convey. "Aggressiveness," which he could find in a dictionary, would perhaps express in part his thought, but it fails to convey the exact meaning of the behaviour of the organism, so that without more ado he coins the word "invasiveness." It is an interesting example of the growth of language, and sheds a flood of light on the folly of those who inveigh against neologisms which they personally dislike. When a language is alive and kicking it is well to remember the apophthegm of Montaigne: "They that will fight custom with grammar are fools." "The world is ever moving," says Trench, "and language has no choice but to move with it." Yes, I approve of "invasiveness," though there are other scientific terms which hardly carry their warranty with them.

* * *

I lately made a sentimental journey to a certain drill hall where six months ago I was "embodied" as M.O. of a Territorial unit to which I had been attached for several years. Now that I have become a civilian again it is comforting to reflect that, so far, no member of that unit has become a casualty from enemy action. The deserted drill hall, in charge of a decrepit billet-warden, is a melancholy spectacle. The mess is bare and dusty; I remember it full of inwardly tense but outwardly care-free officers smoking and drinking beer or gin-and-lime while waiting for news during those warm days in early September. Over there by the window had stood the small rickety table where the C.R.A. and C.O. had sat with a newspaper map of the war-zone in front of them. The C.R.A. had picked up a ruler, borrowed a pencil and solemnly divided Germany into a dozen segments. "There you are, gentlemen," said he, "that's what's got to be done this time. I shall put one officer in charge of each of these segments. The segment-commander will be personally responsible to me that all the people in his segment have enough work to do, decent facilities for recreation and plenty of good grub. What's more, nobody in the whole place is to be allowed to make or carry a weapon of any kind, not even a walking stick. You'll come with me, doctor, and we'll visit 'em all in turn, staying a month in each segment. And they'll have to entertain us in slap-up style." No more benevolent dictatorship could be imagined.

I wandered down the echoing corridor to the lecture-room in which I had "examined" the troops on embodiment; a fine, eager collection of men mostly young, the rest not so young and perhaps a shade less eager, but all bluffing well. I looked in on the gun park where I had delivered my celebrated flesh-creeping lectures on V.D. Next, I inspected the skeleton of the open-air cookhouse where I had scarified the sergeant-cook (who ought to have known better) for harbouring his spare pair of boots and none too hygienic socks in the meat-safe. Finally I walked across to that small cell in which I had carried out inoculations and seen the sick. I was reminded of that red-headed reservist who looked like a hardened criminal, a tough egg if ever there was one. "You look as if you've never done anything wrong in your life," I said facetiously. He pondered the remark for some time. "I 'ave, sir—lots," he sadly replied. I bethought me also of the superior young man who had reported sick, and when asked what was troubling him had answered: "I appear to have a continual desire to defæcate, Sir"—a statement which had made the sergeant-major feel quite faint. It is odd how these disconnected incidents stick in the memory.

* * *

"What are those three men over there?" asked an old lady in a teashop in Bristol. "Those are three senior medical officers in the R.N.V.R.," said her companion. "Oh dear," said the old lady, "I thought they were B.B.C. bandsmen." So now they call the neuropsychiatric unit Des — and his Psychics.

PUBLIC HEALTH

Paratyphoid on the Clyde

DURING last month there was a rather extensive outbreak of paratyphoid B in Glasgow and at the same time in certain of the adjacent burghs and county areas. Up to March 27 the number of cases in Glasgow itself reached 250 with a further 140 in the burghs of Paisley, Clydebank and Coatbridge and in the counties of Lanark and Renfrew. In Glasgow several cases of continued fever were notified on the 5th, 6th and 7th and on the 7th and 8th a few isolated cases of paratyphoid. These were all closely investigated but nothing suggestive of any connexion between them was apparent, except perhaps in one family grouping. Notifications in the city averaged 14 per day during the week ending March 16.

It was early apparent that the onset of the disease could in a very large proportion of cases be allocated to the first seven days of March, and it seemed probable that the infection had been disseminated during a restricted period from about Feb. 17 onwards. The family grouping already mentioned suggested Feb. 25.

The cases were widely scattered over the city, although when plotted on a map there were certain geographical concentrations. The distribution of the cases, however, bore no relationship to any known distribution of water, milk or other food-supply, and epidemiological investigation has so far failed to locate the source of the infection or the vehicle by which it was spread. The appearance of the disease in other areas where many of the cases had no apparent connexion with Glasgow makes the theory of a common origin difficult to establish. Early in the outbreak the altered distribution of certain common foodstuffs arising out of food control was discussed and investigated. Also there had been extensive interference with domestic water-supply and drainage during the severe frost and the subsequent thaw in February. The genesis of the outbreak can hardly be determined until all these data have been collated. The sickening dates of the Glasgow cases were as follows:—

Week ending March 2 ..	55	Week ending 16 ..	30
,, ,, ,, 9 ..	119	,, ,, 23 ..	7

Early in the epidemic most of the cases set in rather suddenly, usually with vomiting and diarrhœa as the major complaints. The dejecta varied between the typical pea-soup of the enteric group and a green, somewhat offensive stool. A review of 100 cases showed some 50 per cent. mild, 30 moderately severe, and the remaining 20 ran a rather severe course. Hæmorrhage has not been a marked feature. Many showed the characteristic rose spots which in some instances were profuse. Of the three deaths two occurred from perforation in cases diagnosed shortly after admission to hospital.

Points from Annual Reports

A FEATURE of the annual reports of the county borough of *Ipswich* is a series of tables giving the vital statistics of the town, compared with those of England and Wales, since 1841. Naturally a century in the health of a population reveals many curious changes in its records. In 1801 the population of Ipswich was 11,277. This increased without a break to 95,070 in 1938, though the rate of increase varied from 29·6 per cent. in the decade 1841–51 to 7·4 per cent. in the decade 1911–21. The birth-rate from 1841 to 1938 closely followed that for the whole country, but the crude death-rate, except for the first decade of the period, was always below that for the whole county by an average of 1·0 per thousand. The percentage of total deaths in persons over 70 years of age rose from 14·67 in 1841–51 to 46·85 in 1937, but in 1938 it fell again to 45·30. The fall in the death-rate of respiratory disease from 3·39 in 1871–80 to 0·91 in 1938 is the most important factor in the increase of longevity. The death-rate from circulatory disease rose from 1·074 to 3·328 in the same period. A table of great interest is that of infantile mortality in which the sexes are differentiated. Generally the mortality of female infants is 70 per cent. of male, but in 1932 it was 182 per cent. and in 1938 it was 49 per cent. Higher vulnerability of the male is a well-known but unexplained natural phenomenon. It now operates at all ages and for all causes of death, save those peculiar to each sex, and so cannot be explained by environment. A satisfactory feature of the 1938 statistics was the fall of maternal mortality to 1·32, the lowest rate recorded, for in the past maternal mortality has been high in Ipswich. In 1936 it was 5·80 and in the following year 5·02.

Dr. B. Wood-White, county medical officer of *East Suffolk*, introduced in 1926 a method of estimating the economic effect of changes in the causes of death by giving to each age a figure of value and assessing the damage done by any disease as the number of deaths from that particular cause multiplied by the figure of value. This figure is 0 for those over seventy-five years of age, 5 for infants below one year and 25, the highest value, for those between twenty-five and forty-five. In 1938 the four chief causes of death in East Suffolk were: heart disease responsible for 702 deaths; cancer for 400; tuberculosis for 78; and bronchitis for 56. The comparative damage to the community worked out at: cancer 2800; heart disease 2789; tuberculosis 1376; bronchitis 104. So, though heart disease killed nine times as many people as tuberculosis the damage done by it was only twice as great. Dr. Wood-White's figures of value may be open to argument, but the assessment of the damage done by disease is of growing importance to public health, the main business of which is the elimination of what interferes with the value of life. The Americans work their public-health system on "the purchasing power of the public health dollar" and have worked out the "market value" of their citizens so that they can decide the value of measures for the relief and suppression of disease. Dr. Wood-White's figure of value sounds less mercenary than value in dollars, but it comes to the same thing.

East Suffolk is a rural county, its main industries being agriculture, fishing and coastal trade. Its population is almost stationary round about 206,000 and for the last five years its corrected death-rate has been absolutely stationary at 10·3. The vaccination rate for the whole county in 1938 was 39·9 per cent., but it varied greatly in the different districts from 69·9 in Wickham to 8·4 in Lowestoft. Excluding Lowestoft, the rate for the county was 50·6.

Darlington is one of a small group of British towns with stable populations and the nearest we possess to a semi-closed community. In mid 1938 it had 75,930 inhabitants, a rise of 430 since 1936, of which the excess of births over deaths in the two years accounted for 390. This gives to its health reports a value in history absent from those of communities distributed by migration. In 1921 the average size of families was 4·39, in 1931 it had sunk to 3·82, clearly showing the influence of the declining birth-rate. In his report Dr. G. A. Dawson gives two tables of blind people which are highly instructive. The total number of registered blind persons was 92, of whom only 1 was under five years old, 4 under twenty-one years old and exactly half (46) over sixty-five. The ages at which these persons became blind were: 13 under one year old, 21 under twenty-one years old and 31 over sixty. The school ophthalmologist, Dr. A. T. Paterson, draws attention to the smallness of the number of minor eye diseases that had been under observation. He attributes this to the better nourishment provided for necessitous children.

Dr. Stuart F. Allison, of *Warrington*, in his school report records an unusually healthy state of the children routine-inspected, for of 3247 inspected only 229, or 7·05 per cent., were found to require treatment (excluding uncleanliness and dental diseases). Only 3, or 0·09 per cent., were found by the doctor to have verminous heads. This must mean that the doctor's standard was low, or that the children are specially cleansed for the inspection, for the surprise visits of nurses for the detection of uncleanliness found 2496 children with unclean heads, of which 47 were in such a state as to warrant exclusion from school.

Infectious Disease in England and Wales

DURING THE WEEK ENDED MARCH 16, 1940

Notifications.—The following cases of infectious disease were notified during the week: Smallpox, 0; scarlet fever, 984; whooping-cough, 565; diphtheria, 747; enteric fever, 17; measles (excluding rubella), 4332; pneumonia (primary or influenzal), 1588; puerperal pyrexia, 193; cerebrospinal fever, 543; poliomyelitis, 12; polio-encephalitis, 2; encephalitis lethargica, 4; dysentery, 29; ophthalmia neonatorum, 95. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on March 15 was 1226 made up of: scarlet fever, 120; diphtheria, 179; measles, 3; whooping-cough, 57; enteritis, 52; chicken-pox, 52; erysipelas, 33; mumps, 6; poliomyelitis, 2; dysentery, 7; cerebrospinal fever, 93; puerperal sepsis, 17; enteric fevers, 8; german measles, 379; other diseases (non-infectious), 67; not yet diagnosed, 151.

Deaths.—In 126 great towns, including London, there was no death from smallpox or from enteric fever, 1 (1) from scarlet fever, 4 (0) from measles, 5 (0) from whooping-cough, 22 (1) from diphtheria, 33 (2) from diarrhœa and enteritis under 2 years, and 315 (28) from influenza. The figures in parentheses are those for London itself.

Sheffield reported 21 deaths from influenza, Stoke-on-Trent 11, and Birmingham 10, no other great town reporting more than 8. There were 6 deaths from diarrhœa at Birmingham and 3 each at Wolverhampton and Liverpool. Fatal cases of diphtheria were scattered over 15 great towns, Liverpool reporting 4. There were 15 deaths from cerebrospinal fever in London, and 3 each in Glasgow and Dundee.

To the 543 cases of cerebrospinal fever Berks contributed 12 (Reading 9), Chester 11, Derby 15, Durham 11, Essex 19 (Colchester 6), Gloucester 16 (Bristol 13), Kent 22 (Canterbury 5), Lancaster 45 (Liverpool 15, Manchester 8), county of Leicester 14 (Leicester 8), County of London 51 (Wandsworth and Lambeth each 6, Southwark 5), Somerset 16, Southampton 19 (Bournemouth 5), Stafford 23, Surrey 22 (Frimley and Camberley 5), Warwick 21 (Birmingham 16), Yorks (West Riding) 28 (Leeds 6, Sheffield 9), Glamorgan 33 (Cardiff 10), Monmouth 13.

LETTERS TO THE EDITOR

PEPTIC ULCER IN THE SERVICES

SIR,—While it is of course happily true, as Professor Pannett says, that many patients who have undergone operative treatment for peptic ulcer suffer no apparent subsequent handicap, it is certainly not true of a very considerable proportion. Probably any long-distance follow-up of any large industrial group of workers, under accurate sick-record conditions, would make this clear. In such a follow-up, reported by Dr. W. L. Scott and myself in your columns (*Lancet*, 1935, **2**, 710) of a group of cases observed for not less than 3 and up to 20 years, the following facts emerged.

Of 200 manual and non-manual workers who had been operated upon for duodenal ulcer 33 per cent. subsequently incurred an average annual sick absence, for digestive and other disorders, amounting to a month or more, and 26 per cent. an average absence of 14 to 28 days. The subsequent average annual sick absence of the manual, more physically active, workers was substantially the higher.

Of 150 manual and non-manual workers, who had been operated upon for gastric ulcers 30 per cent. subsequently incurred an average annual sick absence of a month or more, and 29 per cent. of 14 to 28 days; and here again the average yearly sick absence of the manual workers was considerably higher than that of the non-manual workers. Nine of the duodenal ulcer group and 15 of the gastric ulcer group underwent further operative treatment for ulcer recurrence, at periods varying from eight months to eleven years after the first operation. Subsequent observations since 1935 have confirmed this general after-history picture as far as working capacity in industry is concerned.

The recruit for the rough-and-tumble life of the Army, with a previous history of duodenal or gastric ulcer, must therefore, as Dr. Izod Bennett suggested, be regarded as an extremely doubtful proposition. Unless there has been a well-attested history of complete freedom from signs and symptoms for at least 3 or 4 years the bias should probably be against acceptance, both in the interests of the Army and the recruit himself.

I am, Sir, yours faithfully,

London, E.C.1. H. H. BASHFORD.

SIR,—Between 1920 and 1930, when most surgeons claimed that not more than 1 or 2 per cent. of their gastro-jejunostomies developed anastomotic ulcers, I was seeing more patients suffering from the ill effects of the operation than primary cases of gastric ulcer, and disconnecting gastro-jejunostomies became for a time the gastric operation I had most frequent cause to recommend. Now after another ten years many British surgeons have at last come to the conclusion their American and continental colleagues reached long ago that gastro-jejunostomy for uncomplicated duodenal ulcer is an unsatisfactory operation. Meanwhile the advocates of partial gastrectomy for duodenal ulcer are as pleased with this operation as their predecessors were with gastro-jejunostomy. It is true, as Professor Pannett remarks, that their successful cases are so well that they are not often seen by physicians, but it is equally true that their many failures, which we do see, are so ill that they are generally afraid to revisit the surgeon who performed the operation. I have myself seen about thirty such failures, in which severe symptoms caused by gastro-jejunitis, with or without acute or chronic ulcers, have followed partial gastrectomy performed for peptic ulcers.

Unfortunately it is often impossible to cure these cases by medical treatment. But the surgery for unsuccessful partial gastrectomy is much more difficult than the already difficult surgery for unsuccessful gastro-jejunostomies. Occasionally nothing short of complete gastrectomy is of any use; this formidable operation has been performed on two of my patients by Mr. Gaymer Jones with excellent results. I should none the less hesitate to send them on active service, although, having no stomach, they secrete no gastric juice, so that recurrence is impossible. They are thus much safer than the victims of partial gastrectomy, who would be cheerfully encouraged by Professor Pannett to expose themselves to the rigours of a winter campaign. I gather that he even advocates the performance of partial gastrectomy or gastro-duodenectomy on serving soldiers, advice which would certainly lead to many deaths and much needless suffering at a time when unavoidable casualties are happily very few in the British Expeditionary Force. As Dr. Izod Bennett remarks in his letter to THE LANCET of March 16, the suggestion seems so absurd as to be almost incredible.

I am, Sir, yours faithfully,

Oxford. ARTHUR F. HURST.

SIR,—In his letter of March 16 Dr. Izod Bennett quoted anonymous high authority as having spread a claim that many young recruits with peptic ulceration could be made fit for service by gastrectomy in some form. Most of his letter is concerned with his experience of officer patients. He draws no distinction between the clinical problem of the officer and that of the other ranks. The dyspeptic officer, with or without gastrectomy, can always select the food that is best for him, and regulate the strength of his tea. The sailor, soldier or airman, however, has to eat what is put before him. A "chit" to the cookhouse from the M.O. is an ineffective nuisance.

Professor Pannett supports the well-founded surgeons' claim that many a patient who has had part of his stomach extirpated can undertake full manual labour. There are many service occupations which entail little manual labour and the real criterion is diet. Professor Pannett fails to point out the difficulties of diet for the man in the ranks. Even the most optimistic gastrectomist will require three to six months for his patient on a diet somewhat lighter that "rations." The symptoms of gastric distress after operation are hard to refute, and it has to be remembered that some at least of the very few men in the ranks suitable on other grounds for gastrectomy will decide after sick leave that civil life is best, and they will finally be discharged. Though many civilians recover completely and return to heavy work, before a surgeon undertakes an assault on the stomach of a soldier he should consider, in fairness to his patient, whether that man can be guaranteed the necessary post-operative regime, and whether should this period be prolonged the resulting burden to the state really justifies the initial operation being done in the service.

In selecting men from the ranks for gastrectomy I would suggest that the following points should be ascertained, possibly in consultation with non-medical officers:

(*a*) Is the man's previous training of such length and degree that he could rightly be maintained on the service strength as "non-effective sick" for at least six months?

(*b*) Will retention in the service after operation jeopardise his chance of complete recovery, or is it likely to lead to a claim that his condition has been aggravated by service conditions? If discomfort does persist, it is hard to deny the man's right to such a claim.

(*c*) Is posting to a unit where the patient can "live out" (in a home of his own, regulating his own diet) possible? Compassionate posting in war-time may be difficult, but may also be the deciding factor.

(*d*) Does the man genuinely want to remain in the service?

I have already met men who will gladly use the service facilities to obtain their operative treatment and convalescence on full pay, but whose persistent doubtful symptoms lead to the "invaliding" they have desired. Malingering still exists and half a stomach makes a good start. Many of the ulcer cases we are seeing now are men who failed to disclose the condition of which they were fully aware when, before war overtook them, they enlisted in the reserves. They believed their stomachs could answer a call that might never come. They belong to the middle-age group of which Professor Pannett speaks. Very few would be good investment for the state if they submitted to gastrectomy. It is fairer to all concerned to release them from service. They can still receive operative treatment as civilians.

The formation of a "gastric" company, command or crew for dyspeptic officers and men, might solve the question of diet, but the nervous element in the excitation of peptic ulceration is difficult to control under conditions of active service.

I am, Sir, yours faithfully,

Cranwell. D. F. ELLISON NASH.

FRACTURED FEMUR IN CONVULSION THERAPY

SIR,—The subject of Dr. Good's letter in your issue of March 23 is one of topical interest in practical psychiatry of to-day and deserves a fuller discussion in which not only psychiatrists but also surgeons and radiologists should take part. All points raised by Dr. Good are controversial. With regard to his statement that "age or prolonged inactivity bear no relation to the incidence of fractures" we would point out that in a series of 144 cases treated at the Crichton Royal, of whom 25 were over fifty years of age, fracture of a long bone occurred in 3 patients. All were females in the 6th decade of life who had been hospitalised for several years. Dr. Good thinks the incidence of fractures in his series, 2 in 160 cases treated—i.e., 1·25 per cent.—exceptionally low. One of us (A. M. W., *J. ment. Sci.* March, 1940, p. 248) has made a study of the literature and found that in the series where the fractures were actually reported, there were 28 fractures in 2342 cases—i.e., 1·20 per cent. If therefore the incidence of fractures in Dr. Good's series is not less than in the general experience his argument that restraint is the principal cause of these fractures loses most of its ground. As a matter of fact no worker advocates forcible restraint of the patient during the tonic phase of the fit—i.e., at the time when in our experience fractures occur. During the initial phase of clonic jerkings our nurses are instructed gently to support the arms and to keep the elbows close to the sides, preventing abduction at the shoulders in order to minimise the risk of dislocation. It is improbable that this procedure can have the effect of causing fractures.

We agree with Dr. Good that there is no essential difference between the fits of idiopathic epilepsy and those induced by Cardiazol, although the latter seem to be of shorter duration and greater intensity than the former. Great variations exist in the character and intensity of grand-mal attacks, not only of different epileptics but also of the same epileptic. This is also true of convulsions induced by drugs and the aim of course is to induce the mildest complete convulsion. The infrequent occurrence of fractures in epileptics is probably due to the fact that in most cases their bones have been habituated to the strain of fits from youth.

We are, Sir, yours faithfully,

ANDREW M. WYLLIE,
Crichton Royal, Dumfries. W. MAYER-GROSS.

THE E.M.S. TODAY AND TOMORROW

SIR,—Many must have read with great interest the article by Sir James Walton in your issue of March 16. Sir James has learnt something from the war and is frank enough to admit it. Like a good many other members of the E.M.S. he has for the first time made personal contact with the municipal hospital service that provides accommodation for three out of every four of the citizens of London, when they need hospital treatment. He has found that in personnel, in elasticity and in capacity for getting things done this service is a very different thing from what he had imagined and he is honest enough to say so.

So far I am in entire agreement. I agree also in what may be assumed from this article, although it is not perhaps definitely stated, namely, that it is wasteful and absurd to have two hospital systems doing the same sort of work and yet more or less in competition with each other. There is one minor inaccuracy in the article. It is not strictly true to say "In the permanent state hospitals the great drawback to the medical man is that as he advances in his profession he ceases to be a doctor and becomes a pure administrator," for the London County Council has a few clinical appointments with salaries of £1500 a year and the Middlesex county council several. Moreover, in so far as the statement is correct at all, it is merely an indication that the evolution of these hospitals, taking origin as they have done but a few years since from poor-law institutions, is not yet complete.

Sir James goes on to say "It is now that a definite plan should be formulated so that if there be a union between the state and voluntary systems the good that is in each system may be retained and the bad eliminated." He proposes the formation of a committee to formulate such a scheme. When, however, he suggests that such a committee "should indeed be a British medical association of all consultants participating in hospital work," I think he is wanting to restrict the membership too much. Surely those who are actually engaged in the work of the municipal hospitals will have something to contribute. Moreover, could not something be learned from laymen who have had experience in hospital administration and are also able to speak from the consumer's point of view?

Sir James then sets out three essential provisos for the new service. "(1) The surgeon or physician in charge would have to remain a doctor with complete control of his unit and would be freed of all administrative work. (2) He would have to be provided with private rooms and consulting-rooms where he could treat better-off patients at moderate fees, so that he could mix with all grades and could obtain some added reward for his labour and reputation. (3) He would be given full facilities for undergraduate and post-graduate teaching." With the first and third of these I am in entire agreement; with the second I profoundly disagree.

After a good many years in private practice I have come to the regrettable conclusion that I have learned nothing from my private patients that I could not have learned much better from those seen in hospital. Admittedly, I have met interesting people and made many friends, but professionally I have little doubt that I should be a better man today had I never seen a private patient. Sir James takes the view that the consultants' "private relationships guard them from the danger of coming to regard all patients merely as cases." The very reverse of this appears to me to be the truth. I think it was Mr. T. B. Layton who pointed out that the consultant who makes his living from fees paid by about 10 per cent. of the population may easily fail to realise the importance of the other 90 per cent. If he does not regard these "merely as cases" he may easily look upon them as creatures very different from his private patients.

But however that may be, it must inevitably happen that where two sorts of patients are seen there will be a tendency to provide two sorts of treatment. Conflicts between hospital and private practice are bound to arise, and it is all too easy to fail to give adequate consideration to hospital patients when there are private cases clamouring to be seen and willing to pay large fees. How easy it is for the busy consulting surgeon to leave his registrar to undertake alone operations which he knows quite well he is hardly capable of performing. Sir James may recall that not so many years ago a surgeon of a large London voluntary hospital was made to resign because he had so frequently put off hospital operations in favour of private work.

The alleged danger of a whole-time system with a set salary and pension leaves me cold, because I know that in the municipal services the salary is not set but depends on progress in the service, which again is determined not merely by the whim of patients as in private practice but by those able to assess the individual's real value. No-one will deny that the hospital service of the future should conserve the best of both the voluntary and state systems. I am not convinced, however, that the part-time employment characteristic of the former is worthy of retention.

I am, Sir, yours faithfully,

London. SOMERVILLE HASTINGS.

THE BIRTH OF THE E.M.S.

SIR,—I am attracted by the letter from Sir Charles Wilson in your last issue in which he says that after July, 1938, he was only a pawn in the game and could no longer influence policies. We must be fair to the Ministry of Health whose policy was guided by professional advice which they took pains to get. Thus we have been told by the Secretary of the British Medical Association (*Lancet*, Feb. 10, p. 292) that it was the Central Medical War Committee which advised the ministry in July, 1939. Dr. Anderson also said that the ministry decided before the war that the majority of London consultants should be recruited on a whole-time basis and that this decision was based on the advice given by its Group Officers. Sir Charles Wilson, being a group officer, must have had a finger in this pie. Will he tell us that he was a member of the Group Officers' Committee and not responsible for the advice they gave? It would be interesting to see the minutes of the meeting at which this decision was taken.

But there is a broader issue involved. The Emergency Medical Service as originally constituted has already had to be considerably modified. In the near future further considerable modification of its structure and of the terms of service of its personnel will be made. Now is the time to determine that the voice of those who advised the Ministry of Health in the building of this service is not heard again.

I am, Sir, yours faithfully,

Mansfield Street, W.1. GEOFFREY EVANS.

SIR,—One had hoped after Dr. Anderson's letter in your issue of Feb. 10 that one had at last assigned responsibility authoritatively for the "birth of the E.M.S." The secretary of the Central Medical War Committee, it will be remembered, arrogating to himself supreme authority to speak for the E.M.S., placed the responsibility squarely on Sir Charles Wilson's committee. Sir Charles is able to show, and I accept his correction unreservedly, that Dr. Anderson was mistaken both in the date of formation and in the activities he ascribed to Sir Charles's committee, and one is thrown back, therefore, until one receives more authoritative information, on the explanation given by the minister to Parliament on Oct. 26 when he indicated very clearly that the operative accoucheurs at the delivery of this ill-conceived infant the E.M.S. were:—

(i) The Central Emergency Committee of the B.M.A., later called the Central Medical War Committee.

(ii) The group officers of the sectors, constituting a committee of some 19 consultants receiving whole-time salaries of £1300 a year.

It follows from this statement that Sir Charles Wilson is much too modest in representing himself, after the unaccountably swift demise of his committee (which seems to have died, like the drones, in the act of fecundation), as a mere "pawn," unable to influence subsequent policies. Sir Charles, as a member of both bodies referred to by the Minister, would be more properly described as a "major piece" on that particular chess-board; indeed in view of the catholicity of his committees, he might be compared to the most ubiquitous protagonist in the chess-team, the queen herself.

I find some difficulty in reconciling Sir Charles Wilson's present obvious reluctance to acknowledge his inescapable share of responsibility for the E.M.S. with his eulogy of that service in his letter to the *Times* of Dec. 6 which ended with the pontifical pronouncement: "The physicians and surgeons of the Emergency Medical Service have built better than they knew." In that letter, dated by an unfortunate inadvertence from the Ministry of Health, and thereby implying a sanction which was in fact wholly unauthorised, he argued at great length the surprising thesis that medical education, far from being disorganised, was being actually conducted in the outlying sector-hospitals better than in the London medical schools. In an answering letter in the *Times* Lord Dawson pointed out the obvious danger to those schools if such a thesis were admitted and I may mention in support of that warning that in 1937–38 the court of London University distributed to its twelve medical schools no less a sum than £118,000 in respect only of their teaching, apart from large sums for other purposes. This expenditure may very well come to be questioned if the value of the teaching were impugned.

But consideration of the genesis of the E.M.S., while important historically, is less urgent than consideration of its continuance, under present conditions, so contrary to expectation. The radical reorganisation of that service as regards the honorary staffs of voluntary hospitals carried out by the Minister of Health last November makes the return of medical students to London, at least in their clinical years, an immediate and pressing question which is engaging

the anxious attention of London University. In other faculties as well as in medicine the advisability of the return of its schools to London is being actively discussed; but I shall deal here only with the medical situation. Will it be possible, to take only one aspect of the problem, to satisfy the university that adequate clinical material for teaching the full complement of students will be available while the present restrictions are enforced on the use of the beds for teaching at the schools? I recall in this connexion a debate at the senate in 1916, when the proportion of beds to students at a certain school had shrunk so seriously that a proposition to discontinue recognition of the school was only narrowly defeated. The latest information from the King's Fund regarding the present allocation of beds at the teaching hospitals shows that rather less than a third of the total are assigned to the civilian sick and therefore available for teaching purposes; about a third are retained for casualties by the Ministry of Health and the remainder are out of action for various reasons. But probably some three quarters of the teachers in the clinical subjects have now been released from whole-time service so that it is the paucity of beds that makes the present principal difficulty.

The question and conditions of maintenance of the Emergency Medical Service must shortly come up for decision; a debate in Parliament on the war-time measures of the Ministry of Health is imminent. The medical profession was, I submit, caught napping in the formative period of 1938–39 when so many disastrous decisions were taken. It has paid very dearly for its indolence and apathy. Will it allow the costly blunders of the past to be perpetuated, or will it now bestir itself to retrieve the position as far as may be possible?

I am, Sir, yours faithfully,

House of Commons. E. GRAHAM-LITTLE.

BREECH PRESENTATION

SIR,—We strongly welcome the article by Mr. Vartan as a fresh attack on those unproved assumptions that are copied from one textbook on midwifery to another until, by mere repetition, they come to be accepted as true. It is, then, all the more to be regretted that, although his conclusions may be true, his argument is quite unsound. He has shown that extended legs are present in a large proportion of breech presentations, but before he can argue that this is one of the causes of the presentation he must show that a similar extension of the legs is absent or at any rate less common in vertex presentations. Radiograms show that the legs of the fœtus, whatever the lie, do assume any degree of flexion at the knee and that the complete flexion which is illustrated as the normal in textbooks is as uncommon as complete extension. From an examination of over 100 radiograms of pregnancy the following figures have been collected, discarding films in which the position of the legs was not clear or where abnormalities of the fœtus were present:—

	Legs flexed	Legs extended	Total
Vertex	23	14	37
Breech	4	24	28
Total	27	38	65

The value of Yule's coefficient of association for this table is 0·816, so that there is certainly a high degree of association between extension of the legs and breech presentation; we have not, however, proved that this association is necessarily due to cause and effect.

It is surely time that the writers of textbooks on midwifery made use of the facts disclosed by X rays; to take two obvious examples, the fœtal head engages, not in one of the diagonals, but in the transverse diameter in more than 80 per cent. of all cases, and various degrees of extension of the head producing face or brow presentations are not very uncommon before labour begins, and may be altered to complete flexion by labour itself.

We are, Sir, yours faithfully,

CLARK NICHOLSON,
J. E. JAMESON.

District Hospital, Moreton-in-Marsh.

MINERS' NYSTAGMUS

SIR,—In his letter in your issue of March 23 Mr. D. Leighton Davies says: "During the past 15 years or more the lighting in coal mines has been vastly improved by the substitution of electric lamps for the old safety oil lamps: yet there has been no decrease in the incidence of the disease." The following figures may therefore interest him.

Nystagmus at Mines under the Coal Mines Act in Great Britain. Number of New Cases for which compensation was paid.

Year	Number of new cases	Rate per 1000 persons employed underground	Year	Number of new cases	Rate per 1000 persons employed underground
1923	3872	4·01	1932	1962	3·04
1924	3271	3·39	1933	1535	2·48
*1925	3444	3·92	1934	1745	2·83
1927	1801	2·21	1935	1839	3·06
1928	2554	3·43	1936	1522	2·55
1929	2577	3·38	1937	1165	1·89
1930	3066	4·15	1938	†1019	1·66
1931	2729	3·98			

* 1926 omitted owing to prolonged stoppage.
† Provisional figures.

Information given me during my numerous visits to mines indicates that this decrease in the number of new cases is being maintained.

With regard to various theories put forward about gases, posture, bacteria, psychoneurosis, &c., it seems often to be overlooked by those who discuss the subject that miners' nystagmus does not occur among men who have worked only in naked-light mines.

I am, Sir, yours faithfully,

S. W. FISHER,
H.M. Medical Inspector of Mines.

Mines Department, London, W.1.

"ARMY WANTS LAMBETH'S DOCTOR"

SIR,—The annotation on page 606 of your issue of March 30 appears to reflect on the individual concerned where it says "It is a matter of surprise that Major Thompson . . . has not yet joined the British Army." The question of Dr. Thompson's war-time service has been largely outside his own volition, and was in fact decided in the end by private discussion between the Secretary of State for War and the Ministry of Health. The suggestion, however unintentional, that a M.O.H., who after serving in the last war has been for seventeen years actively engaged in public-health work and is now responsible for the A.R.P. casualty services of a vulnerable area, has personally evaded his duty in another direction should be instantly rebutted. Moreover, there are already

medical officers of health, of equal experience with Dr. Thompson, serving in the R.A.M.C. in positions not particularly fitted to their special experience; the War Office could presumably have transferred one of these to the kind of work which you mention.

The general question of the release or retention of public-health-service personnel is a difficult one which is better kept out of the sphere of public controversy, and should be decided between the local authorities and the Local and Central Medical War Committees, or by reference to higher authority. There is no unwillingness on the part of the public-health medical officers to undertake their full share of military service proportionate to that of other sections of the profession, but it should be remembered that, unlike their colleagues, they are not their own masters in this matter.

I am, Sir, yours faithfully,

G. L. C. ELLISTON,
Executive Secretary.

Society of Medical Officers of Health, London, W.C.1.

*** We understand that the Ministry of Health have informed the Lambeth borough council that Dr. Thompson is not to be released for military service. —ED. L.

QUININE INJECTIONS

SIR,—I have read the article in your issue of March 9 on clinical malaria in children with great interest. I hope, however, Dr. Cicely D. Williams will permit me to differ from her in one instance—regarding the technique for intramuscular injection of quinine. I should like to point out the advisability of discarding the use of quinine bihydrochloride for that purpose, as its solution is too acid (pH = 3·5). The disadvantages of this (pain, local necrosis and thereby danger of infection) can entirely be avoided by using one of the newer preparations. For injection purposes quinine hydrochloride is much better suited, when combined with urethane or with antipyrin to increase the solubility :—

℞ Quin. hydrochlor. .. .. gr. 10
Urethani .. .. .. gr. 5
Aq. dest. .. .. .. ad 2 c.cm.
f. sol. steril. (pH = 6·1)

or : ℞ Quin. hydrochlor. .. .. gr. 10
Antipyrini .. .. .. gr. 5
Aq. dest. .. .. .. ad 2 c.cm.
f. sol. steril. (pH = 6·5)

I am, Sir, yours faithfully,

C. W. F. WINCKEL,
Malaria Adviser to the Amsterdam Psychiatric Clinics.

COÖRDINATION IN EXCELSIS

SIR,—The regional office of the Ministry of Health has asked for returns in triplicate showing the strength of the first-aid posts and ambulance units, the return to be made up to March 31 and thereafter quarterly. Pink and yellow forms have been supplied for the purpose and no doubt it was fascinating work to the civil servants in the regional office devising the forms and selecting the colours.

It so happens in this district that the regional office of the Ministry of Home Security is housed next door to the regional office of the Ministry of Health. Also it so happens that the regional office of the Ministry of Home Security receives exactly the same information every month, but of course on quite different forms. This is one of many instances where the energy of local authorities in a so-called total war is being dissipated by the total absence of common sense on the part of government officials. Obviously it is impossible for officials in the same region, in the same road, and almost in the same house to pool their information in the interests of economy and efficiency. On the contrary, it would be against all the traditions of our great civil service whose object appears to be to create the maximum amount of work with the minimum of progress.

I am, Sir, yours faithfully,

MEDICAL OFFICER OF HEALTH.

THE YOUNG OFFICER

SIR,—In your issue of March 30 (p. 628) you castigate the youthful house-officer for imagining himself entitled to be a specialist in the Services. The fact is that this person imagines nothing of the sort. Many, however, were hoping one day to become specialists and were working hard to that end. Their day-dreams have been shattered. There is room in the Services for specialists, but not for training them. This may be a war-time necessity but it is scarcely a matter for congratulation nor for the complacent damper you administer to the enthusiastic young. I am in no position to criticise the R.A.M.C. but its professional reputation is not as high as it should be among many, both inside and outside the profession. A small voice suggests that this may be due to the policy of requiring the budding clinician to be a soldier first and a doctor last.

I am, Sir, yours faithfully,

Reading. T. L. STOATE.

PRIMARY SUTURE OF WAR WOUNDS

THE practice employed in the Spanish civil war of treating war wounds by primary suture and the application of plaster, without any attempt to remove splinters of bone and other foreign bodies at the first operation, came in for criticism at the meeting of the French Academy of Surgery on Jan. 17. Dr. Roux-Berger painted a gloomy picture of the patients thus treated when they arrive at a base hospital with fœtid suppuration under the plaster and no alternative to a radical operation. Dr. Chevassu pointed out that in the last war the surgeons who ventured on primary suture were men of great experience and were entitled to take big risks. Primary suture, he said, is permissible only in the hands of surgeons who have learnt to appreciate all its implications and possibilities for mischief. Professor Gosset joined in the chorus of condemnation of primary suture as a short-cut to be practised wholesale, more particularly in wounds of the muscles, because of their liability to gas gangrene. Wounds of the joints may end in arthritis as a sequel to primary suture, but there is not the same tendency to the development of gas gangrene. The general sense of this discussion seems to be that it is well to remove as completely as possible all splinters of bone and other foreign bodies at the earliest opportunity. One speaker even went so far in defence of esquillectomy (*esquille* a splinter) as to record a case in which two hours had been spent over this procedure.

MAIDA VALE HOSPITAL FOR NERVOUS DISEASES.—In order to reduce overcrowding and waiting this hospital has arranged that after April 15 new outpatients will be seen by appointment only. Practitioners who refer patients to the hospital are asked to coöperate. Appointments may be made by telephone, letter, or personal application.

OBITUARY

JOHN DOUGLAS CAMPBELL WHITE

M.D. CAMB.

Dr. White, who died at Harrow-on-the-Hill on March 25, was a practical idealist and one of the pioneers in the campaign against venereal diseases, which took effect at the beginning of the last war. Born at Rutherglen, Glasgow in 1871, he was educated at Charterhouse and Trinity College, Cambridge, qualifying in 1904 from the London Hospital where he held house appointments. Later he became assistant in the inoculation department there and at the Lister Institute. At this time he was already interested in economic problems, contributing articles to the weeklies on income-tax reform and the future of venereal disease. When the National Council for combating venereal diseases was founded he became its hon. secretary and in 1916 was responsible for a synopsis of the final report of the Royal Commission which had a wide circulation. During that war he served in various capacities, as president of a pension board and acting commissioner of medical services, but his great service was as lecturer on venereal disease; his appeal must have reached an aggregate of 100,000 soldiers. After the war he visited Istanbul at the invitation of the Y.M.C.A. and lectured to troops there, and later Singapore and Malaya. All his professional life he lived in Harrow, where he was a member of the urban district council and its chairman for two years. On the death of his uncle, Lord Overtoun, he succeeded to the property in Dunbartonshire and last year presented the mansion and its holding of 90 acres to the burgh of Dumbarton. In 1898 he married Lucy Agnes, daughter of I. H. M'Clure, writer, of Glasgow, and their son is at present serving with the R.A.F.

ARTHUR CORRIE KEEP

M.C., M.D. EDIN.

Mr. Corrie Keep, consulting surgeon to the Samaritan Hospital, died on March 26 at the age of 79. Born at Wollaston, near Wellingborough, where his father owned property he retained his love of the country and field sports, becoming himself lord of the manor of Kilby in the same county. Later in life he bought an estate in Kent. He took his schooling at Caius House, Cambridge and Tettenhall, studying medicine at Edinburgh University where he qualified in 1882 taking his M.D. three years later. As a student he played rugby for the university and was reserve for Scotland. After leaving Edinburgh he was house-surgeon to the Guest Hospital, Dudley, and assistant in the anatomy department of the Middlesex Hospital. His first honorary appointment was to St. Saviour's Hospital. Later when he was elected to the staff of the Samaritan Hospital he was junior to W. A. Meredith who had worked with Spencer Wells. Keep was a first-class operator and by no means confined himself to gynæcological surgery. During the late war he joined the R.A.M.C. at the age of 54, was awarded the military cross for attending the wounded under fire, and retired with the rank of major. These years, writes a colleague, were among the happiest of his life, as he fitted in well with his battery in France; if he had not got everything he desired in the way of surgical equipment he would purchase what he wanted when on leave rather than wait for things to arrive through official channels. After the battle of the Somme he had symptoms of cardiac dilatation and on his return to England gave up both his hospital and his private practice. He settled on his country estate near Woodchurch, Kent, spending a few months each year in London. His hobbies were shooting, which he kept up till recently, and the collection of old furniture on which he was expert. He was unmarried.

CHARLES MILTON FEGEN

M.R.C.S., L.R.C.P.E., D.P.H.

Dr. Fegen was born at Harwich in 1861, educated at Bedford Grammar School and studied medicine at St. George's Hospital from which he qualified in 1885. After some years in general practice during the latter part of which he was adviser to the Ampthill rural district council he was appointed medical officer of health to the Croydon rural district with charge of the isolation hospital at Mitcham and the joint small-pox hospital. Having obtained the D.P.H. in Dublin he began to take a prominent part in public-health activities and became Edward Jenner lecturer in public health and epidemiology at his old hospital. One who worked under him as sanitary inspector speaks of his gift for handling people in all walks of life. He expected good work from his subordinates and the confidence he placed in them ensured his getting it. "As a chief," she adds, "he was without equal, just, helpful and above all trustful. The spectacle of life, I think, amused him but what amused him even more perhaps was himself in the leading part upon his own stage." When war broke out in 1914, although then over 50 years of age, he joined the R.A.M.C. with the rank of major, saw active service in Salonika, and was mentioned in dispatches. His association with the London and Counties Medical Protection Society began with membership of the original council when the society was registered in March, 1892. He became treasurer in 1914 and from 1913 was chairman of council, resigning this position in 1931 to serve the society in the capacity of secretary for another six years. His shrewd common sense enabled him to see a way out of the many baffling difficulties on which he was consulted and he was often successful in healing the quarrels between medical men. In this he was helped by a transparent honesty and friendliness that made him an agreeable colleague in office or council chamber. But this was only one of his many-sided public activities; he excelled as a chairman and was often asked to preside at meetings. He was on the executive of the National Society for the Prevention of Cruelty to Children, a rotarian, a keen supporter of the British Legion and a chairman of school managers. His long illness was borne with a patience surprising in a man with so vigorous a mind. He retired to Dunsford, Surrey, where he died on Easter Monday.

Sir Cuthbert Wallace writes: My association with Fegen was of comparatively short duration and it was naturally some time before I as a newcomer was able to grasp the business and appreciate his qualities. When I did I recognised that in Fegen the L.C.M.P.S. had a wise and experienced servant. To know what to do and what advice to offer to a doctor in distress demanded not only a calm and wise head, but a knowledge of all the circumstances of medical practice, of the rules of ethics, and of all the legal enactments that govern the doctor's life. I know well that many who consulted him in worry and anxiety went away relieved in mind, convinced that they had received sound advice and been put in the way of overcoming their trouble. The effect of good advice offered to

any of us depends in great degree on the way that that advice is put to us and Fegen had the knack of putting it in such a way that it went well even if not altogether palatable—a very great achievement. He was liked and esteemed by us all.

Prof. AUGUST BORCHARD

AFTER a long illness Professor Borchard of Posen died on Feb. 19 in his 76th year. A pupil of Marchand and Braun, Borchard proved himself an all-round surgeon with an eminently international outlook. He made several contributions to the study of syringomyelia and abdominal surgery, and published a valuable textbook of surgery in association with Garré and one on war surgery with Schmieden. He threw himself heart and soul into editing the *Zentralblatt für Chirurgie*, and was the mainspring in several respects of the annual meetings of the Deutsche Gesellschaft für Chirurgie. His genius for organisation made him invaluable when international meetings were to be held. His literary and social activities did not, however, prevent his taking an active part in the last war as a consultant surgeon. He was honorary member of various learned societies in different parts of the world.

Dr. MAPOTHER

Two pupils now serving in the Royal Navy write: Mapother was an ideal chief to work under. While he had little use for uncontrolled speculation in the young—or, for that matter, in the old—he was always ready to help forward any project which held out a reasonable hope of advancing the science of psychiatry. His own views have been set out with brief precision in the section on psychological medicine of Price's textbook. Here his teaching is epitomised. Its key-note is to be found in his own words in an early report—"enthusiasm without illusions." No-one can think of Mapother's teaching without thinking also of his quick Irish wit, for the two were so closely linked. "What did you think of that presidential address, Sir?" one of us asked him. "Pontifical superficiality," he replied. He gave great credit to Freud, but his over-enthusiastic followers sometimes got short shrift. He did not belittle the sexual side of life. Indeed he had no use for those who, as he said, "wore fig leaves over their minds." But he refused to accept the view that sex and life were synonymous. Psycho-analysis he once described as a system of selective retrospection based on the principle that nothing is too banal to be important provided it is sufficiently remote. He had little patience with "psychological ferreting" after problematically existent rabbits. Such activities he felt were best left to the "therapeutic chanticleers." His clinical judgment was of the highest order and his descriptions of patients were as witty as they were accurate. What could be a better summing up of a certain type of hysterical activity than "scintillating futility"? He had too an endearing absent-mindedness as when he joined in the clapping of his own speech on sitting down at a medical meeting.

He was the bravest of men and would willingly sacrifice himself for his ideals if it would serve a useful purpose. When psychiatric demonstrations were being started at St. George's Hospital he did not hesitate to come himself to initiate them, in spite of severe dyspnœa and two other public engagements earlier in the day. He could easily have deputed the work, but his psychiatric conscience was such that he would spare no effort in the furthering of his science. Knowing himself to be dying he spent the last months of his life at work on plans whereby his special experience might best serve his country. On a visit to him a few months ago when he was breathless and unable to walk, one of us asked him about his health. He replied "My heart has let me down. Now let us talk about psychiatry in the Navy." And at the end of the visit he rather shyly enquired whether he might be of any help abroad; for he knew he would not live through another winter in England.

EDWARD GEORGE REYNOLDS

M.B. LOND., LIEUTENANT, R.A.M.C.

Lieutenant Edward Reynolds died on March 4 after an illness of only 24 hours. He had been treating a case of cerebrospinal fever and had himself contracted the disease.

He was born on Jan. 13, 1913, the son of Mr. R. G. Reynolds of Beadon Prior, Salcombe. He took the first M.B. examination at University College, Swansea, in 1931. The following autumn he went to London where he studied anatomy under Mr. John Kirk. He entered St. Bartholomew's Hospital in 1934 and three years later qualified M.R.C.S. He took his M.B. Lond. in 1938. After acting as casualty house-physician for three months at Bart's he was appointed house-physician to Dr. Geoffrey Evans. This appointment finished in November and in January of this year he joined the R.A.M.C. and was appointed medical officer to the 28th (Essex) A.A. Battalion, R.E.

Dr. Geoffrey Evans writes: When the hospital was partially evacuated at the outbreak of war Reynolds became senior resident medical officer at Cell Barnes Hospital, near St. Albans. We lived and worked together there for the first two months of the war, and during this time my previous impression of him as a man of character and understanding strengthened. It was evident that he had the best influence on his patients that a doctor can have. They trusted him. His presence and understanding helped them. His clinical work was of a high order. He had a hunger for knowledge, not only as a means of helping his patients, but also for its own sake. Reynolds had already developed many satisfying interests in life. He loved the country, and on one of our walks he told me of two fields at home that belonged to him with a stream running through them. He had a vivid picture of them in his mind. His untimely death is a sad loss to all who knew him.

Dr. LOUISA ROSA COOKE, who died at Hunstanton on March 23 at the age of 90, was for fifteen years physician to the household of the Emperor of Korea. She qualified L.R.C.P.E. in 1890 and after a period as resident medical officer at Babies Castle, Hawkhurst, Kent, she left for Seoul, the capital of Korea, about the turn of the century. Besides her imperial appointment she acted as physician and surgeon to the Dispensary for Women and Children at Seoul. Dr. Cooke also worked among women and children in India and for many years she served the dispensary for women and children belonging to the Jasidin East India Railway Company at Behar. On her retirement at the age of 80 she returned to England where she was an associate of the sisterhood of Ditchingham.

PARLIAMENT

ON THE FLOOR OF THE HOUSE

By MEDICUS, M.P.

THE House has returned after the Easter recess in the mood to support the Government in any measures, even drastic measures, which it may feel obliged to take to tighten up the blockade of Germany. The Prime Minister found no voice raised against him when he indicated that the blockade procedure might have to be considerably tightened up. Mr. Attlee, for the Opposition, had no criticism to make nor had the Labour back benches. A realisation of the gravity of the task before us is become deeper.

After Mr. Chamberlain's speech the House turned to the estimates on which the question of food prices was debated. Mr. John Morgan, who is Labour member for Doncaster, opened the debate with an indictment of the methods of food control and a denunciation of the rise of prices. Prices of food have risen more steeply since the beginning of the war than they did at the beginning of the other war of 1914–18. Mr. Lennox Boyd in his reply defended the employment of trade experts to help in the work of food control in departments dealing with the commodities in which they themselves were interested. Their service, he said, was a disinterested public service and there seems every reason to think that this is true. The margarine expert pools his knowledge with that of civil servants and his views are of course subject to check and control by the minister. And this pooling of ideas has produced some better brands of control than the pooling of some other commodities. Mr. Lennox Boyd was able to point to the fact that while the rise in the prices of the two higher-priced grades of margarine had been made to meet the extra cost of raw material the lowest-priced margarine had remained stable at 5*d*. To those who demanded a decrease in the price of butter Mr. Lennox Boyd presented the fact that a subsidy to enable the price to be reduced by 3*d*. a pound would cost about £17,000,000 a year. In view of the fact that all margarines were now vitaminised he did not think that this expensive reduction of price in the "luxury" butter could be justified.

And so at about 9 P.M. to the vote For the Government 160, Against 117—and then "Who goes home?"

QUESTION TIME

Mental Capacity of Recruits

Mr. WILSON asked the Secretary of State for War whether he had considered representations that tests are available which gauged the mental capacity of recruits; whether any such tests had been carried out; and, if so, how many recruits had been found to be defective and what proportion these bore to the numbers examined.—Mr. OLIVER STANLEY replied: it is not considered practicable, in present conditions, to adopt a system of tests for gauging the mental capacity of recruits, and no such tests have been carried out.

Army Medical Appointments

Mr. GROVES asked the Secretary of State for War if he would state the constitution, personnel, and functions, of the committee of reference which was working in conjunction with the Central Medical War Committee in connexion with appointments of medical practitioners as surgeons in charge of divisions; and why, as such appointments carried the rank of lieutenant-colonel, they were not made by way of promotions from the R.A.M.C. instead of by the Central Medical War Committee.—Mr. STANLEY replied: The committee of reference is composed of representatives of the Royal Colleges of Surgeons and Physicians and of the British College of Obstetricians and Gynæcologists, and advises the Central Medical War Committee in relation to the consultant and specialist staff of the voluntary and municipal hospitals in the London area only. They also consider the professional suitability of specialists in the London area who have volunteered for the medical services of the armed forces and whose names are submitted to them by the C.M.W.C. Recommendations for specialists outside the London area for service with the armed forces are made by a subcommittee of the C.M.W.C., which subcommittee includes distinguished consultant surgeons. The appointments referred to are made by selection from officers of the R.A.M.C. or from suitable civilian surgeons who volunteer for service with the Army.

German Books

Mr. KEELING asked the President of the Board of Trade whether the purchase from Germany of German books and periodicals was permitted during the war.—Sir ANDREW DUNCAN replied: The purchase of books and periodicals published in Germany is prohibited except under licence from the Board of Trade. The only licences granted have been for technical and scientific works and for a few other publications required here by responsible persons for purposes of national importance.

Paratyphoid in Glasgow

Mr. GROVES asked the Secretary of State for Scotland whether he was aware that although it was known on or about March 7 that many cases sent to hospital proved to be paratyphoid-B infections, and that consequently the sources of infection must have been operative from about Feb. 17, no notice was received by medical practitioners from the Public Health Department of Glasgow until March 16; and whether he would investigate the reason for the delay and endeavour to arrange that notification should be given to practitioners with the utmost promptitude.—Mr. COLVILLE replied: The final diagnosis of paratyphoid-B on March 7 related to three cases only. It was some days later before there was evidence pointing to an epidemic outbreak and the warning to medical practitioners followed on the receipt of this evidence. Immediate steps were taken to trace the source of infection.

Medical News

University of Dublin

At recent examinations at the school of physic, Trinity College, the following were successful:—

M.D.

R. Ed. Hemphill, Cecil Mushatt, and M. F. X. Slattery.

FINAL EXAMINATION FOR M.B., B.CH., B.A.O.

Therapeutics and Pathology.—Elizabeth D. L. Simpson (second-class honours); M. B. Flanagan, A. M. Russell, W. J. Thompson, Catherine E. Craig, J. P. Hearne, C. W. Lloyd, J. C. Watson, Isadore Shribman, A. C. M. Hobson, Dorothy W. M. Last, J. A. Pearce, and J. E. Adamson.

Medicine.—Bernard Kernoff and R. J. S. Wilson (second-class honours); R. R. Hogg, R. F. G. Lyons, J. R. A. Martin, H. F. Kamp, W. F. Rogers, H. J. Smith, David Aiken, Phoebina Eakins, D. R. McCaully, Einhart Kawerau, Moira M. Mallagh, W. B. Dennehy, F. J. Queally, P. F. Longford, E. G. R. Butler, T H. Downes, J. G. P. Mullally, and F. N. C. Levy.

Surgery.—Lois J. Macaulay and H. H. Balch (first-class honours); Samuel Tennenbaum (second-class honours); David Aiken, R. J. S. Wilson, M. N. O'Riordan, H. J. Smith, G. H. Blennerhassett, Caroline A. McEvett, Lily H. Bamber, Patricia D. Concannon, Annie Dowds, P. H. Rubenstein, Einhart Kawerau, Tom Shier, W. B. Dennehy, Olive S. H. Devlin, J. R. Healy, F. J. Queally, Henry FitzGibbon, J. R. A. Martin, R. M. Halahan, D. O. Hicks, H. F. Kamp, and W. M. Winn.

Midwifery.—C. P. Clancy-Gore, John Moore, J. M. Slattery, W. E. O'C. C. Powell, William Houston, E. C. J. Millar, John Nash, F. G. M. Ross, Louis Solomon, and A. E. Tinkler (second-class honours); Samuel Fine, J. D. Dennehy, Alicia G. Pike, S. O. O. Franklin, L. T. Kelly, B. E. R. Solomons, A. H. H. Guilbride, Edna G. Merrick, D. W. Montgomery, Isidore Shreider, N. M. Smith, J. M. Taylor, R. St. C. Mooney, H. Kitchener Bourns, Kathleen M. Patterson, E. P. Hill, M. D. Leitch, G. W. E. Little,

Gilbert Tattersall, L. C. Jacobson, M. A. Majekodunmi, D. S. M, Enraght-Moony, Myer Steinberg, and N. H. Stewart.

D.P.H.

Part I.—O. F. Warner, P. A. McNally, C. F. O'Reilly, D. K. Sundaresan, P. J. Mullaney, C. G. Reilly, and James Finegan.

D.P.M.

Part II.—J. N. P. Moore.

University of Edinburgh

On March 28 the following degrees and diplomas were conferred :—

M.D.—W. J. G. Barrie (in absentia) and J. D. Mill (in absentia).

M.B., Ch.B.—D. G. Aitken, A. D. F. Corrigall, Alexander Craig, W. M. Down, H. M. Fyvie, A. G. Hassan, V. C. Hassan, J. R. M. Johnston, G. A. D. Lamb, S. M. Mishriki, J. M. H. Mitchell, Andrew Morgan, Jane J. C. Muir, J. B. Porteous, Thomas Rutherford, Alexander Skene, J. M. Sturrock, W. R. N. Sutherland, A. F. Williams and T. M. Wilson.

D.M.R.—J. D. Brown.

Royal Institution of Great Britain

On May 31, at 9 P.M., Prof. W. W. C. Topley, F.R.S., will give a Friday evening discourse to this society. He will speak on bacteria in the air.

Auxiliary R.A.M.C. Funds

The annual meeting of the members of this fund will be held at 2.45 P.M. on Friday, April 19, at 11, Chandos Street, London, W.1.

Pharmaceutical Society of Great Britain

On Tuesday, April 9, at 7.30 P.M. at 17, Bloomsbury Square, London, W.C.1, Dr. C. H. Hampshire, secretary to the British Pharmacopœia Commission, will lecture to the society on Pharmacopœia Revision.

Royal Sanitary Institute

On Tuesday, April 16, at 90, Buckingham Palace Road, London, S.W.1, at 5 P.M., Prof. S. J. Cowell will address the institute on food in war-time.

International Union against Tuberculosis

The award of the Léon Bernard prize has been postponed for two years.

Ling Physical Education Association

This association will hold an Easter holiday course at Morley College, Westminster Bridge Road, London, S.W.1, from April 9 to 13. The lecturers will include Dr. Anna Broman who, on April 9 at 11.15 A.M., will describe the effects of gymnastics upon the spine. In the afternoon Mr. H. Bradley, director of the Boot, Shoe and Allied Trades Research Association, will speak on the relationship of footwear to health. On Wednesday, April 10 at 11.15 A.M., Dr. Grace Calver will discuss important phases in the development of the child. Further particulars may be had from the secretary of the association.

Teaching in a County-Council Hospital

Mr. M. F. Nicholls, dean of St. George's Hospital medical school, has found that association through the Emergency Medical Scheme with the West Middlesex County Hospital has provided his students with "a wealth of clinical material which no London teaching hospital could possess." Accordingly he has asked the Middlesex county council to approve a continuance of the arrangement so that the second-year students may be able to attend the hospital and learn by demonstrations given by the staff of the county hospital and such of St. George's staff as may remain there. For disciplinary purposes the students will be in charge of a member of St. George's staff, who will arrange a time-table under the direction of the medical superintendent of the hospital. Even if St. George's is able to re-open normally the dean hopes, for the sake of the students, that this arrangement may continue. The public health committee of the Middlesex county council have agreed to the proposal, and the school has arranged to pay a fee of £12 a year for each student admitted to clinical instruction at the West Middlesex County Hospital.

Vacancies

Altrincham General Hosp.—Sen. H.S., at rate of £150.
Bath, Royal National Hosp. for Rheumatic Diseases.—Res. M.O., £150.
Beit Memorial Fellowships.—Junior Fellows, £400.
Birmingham City.—Temp. senior asst. pathologist, 10 gns. per week.
Blackburn Royal Infirmary.—Res. H.P., at rate of £175.
Bradford City.—Res. surg. O. for Municipal General Hosp., £250.
Bradford Royal Infirmary.—H.P. to radium and skin dept., £200.
Bradford Royal Infirmary.—H.S., at rate of £150.
Brighton, Sussex Eye Hosp., Eastern Road.—H.S., at rate of £150.
Burton-on-Trent General Infirmary.—Cas. O. and H.P., £150.
Bury St. Edmund's, West Suffolk General Hosp.—H.S., at rate of £150.
Cambridge, Addenbrooke's Hosp.—H.P., at rate of £130.
Chester, City Hosp.—Jun. res. M.O., at rate of £150.
Chester, Upton Emergency Hosp.—Jun. res. H.S. Also jun. res. H.P., each £200.
Coventry and Warwickshire Hosp.—Res. surg. O., £300. Also H.S.'s and H.P.'s to spec. depts., each at rate of £150.
Derbyshire Royal Infirmary.—H.S. for cas. dept., £150.
Doncaster Royal Infirmary.—Cas. H.S., at rate of £150.
Dudley, Guest Hosp.—Cas. H.S., £150.
Ealing, W.13. King Edward Memorial Hospital.—Cas. O. and H.S. at rate of £150.
Essex Administrative County.—Third asst. M.O. for Essex County Hosp., £350.
Folkestone, Royal Victoria Hosp.—Res. H.S., £130.
Golden Sq. Throat, Nose, and Ear Hosp., W.1.—Hon. clin. assts.
Halifax Royal Infirmary.—Cas. O., at rate of £150.
Heston and Isleworth Borough.—Asst. M.O., £550.
Hôpital et Dispensaire Français, 172, Shaftesbury Avenue, W.C.2.—Anæsthetist, £25.
Huddersfield Royal Infirmary.—H.P., at rate of £150.
Hull Royal Infirmary.—Res. anæsthetist, at rate of £150.
Kidderminster and District General Hosp.—Jun. H.S., at rate of £100.
Lancashire County Council.—Jun. res. M.O. for Lake Hosp. and Darnton House Institution, at rate of £225.
Leeds Education Committee.—Asst. school M.O., £500.
Leicester City.—Res. M.O. for City General Hosp., at rate of £300.
Liverpool Sanatorium, Delamere Forest, Frodsham.—Asst. to med supt., £225.
Liverpool, Royal Children's Hosp.—H.S. for City Branch, at rate of £100. Also res. M.O. and res. surg. O. for Heswall Branch, each at rate of £120.
Maidstone, Kent County Ophthalmic and Aural Hosp.—Two H.S.'s to spec. depts., each at rate of £200.
Manchester Ear Hosp., Grosvenor Square.—Res. H.S. Also H.S., £120 and £150 respectively.
Manchester Royal Infirmary.—Five H.S.'s to spec. depts., each at rate of £50.
Manchester Victoria Memorial Jewish Hosp., Cheetham.—Res. M.O., at rate of £125.
Market Drayton, Cheshire Joint Sanat.—Third asst. M.O., £250.
Middlesbrough, North Riding Infirmary.—Cas. O., at rate of £150.
Newport County Borough.—Temp. asst. M.O.H., at rate of £500. Also asst. res. M.O., at rate of £200.
New Zealand, Otago Hosp. Board, Dunedin.—Radiotherapist, £1200.
Norwich, Norfolk and Norwich Hosp.—H.P., £120.
Oldham County Borough.—Res. obstet. officer for municipal hosp., £350. Also res. asst. M.O. for the municipal hosp., at rate of £200.
Preston and County of Lancaster Queen Victoria Royal Infirmary. H.S. and H.S. to eye, ear, nose, and throat depts., each at rate of £150.
Reading, Royal Berkshire Hosp.—H.S. to maternity dept. and H.P., each at rate of £150.
Redhill, Surrey County Hosp.—Res. asst. M.O., at rate of £250.
Redhill, Surrey, Royal Earlswood Institution.—Asst. M.O., £350.
Rhondda Urban District Council.—Asst. M.O., £500.
Rochdale Infirmary and Dispensary.—Second H.S., £150.
Royal Cancer Hosp. (Free), Fulham Road, S.W.3.—Asst. pathologist, £500.
Royal Masonic Hosp., Ravenscourt Park, W.6.—Two res. M.O.'s, each £300.
St. Peter's Hosp. for Stone, &c., Henrietta Street, W.C.2.—H.S., £75.
Sheffield Royal Hosp.—Ophth. H.S., £120.
South Shields County Borough.—H.S. for General Hosp., at rate of £150.
Stoke-on-Trent, North Staffordshire Royal Infirmary.—Radiotherapist, £500.
Swanley, Kent, Hosp. Convalescent Home, Parkwood.—Res. M.O., at rate of £200.
Taunton, Taunton and Somerset Hosp.—H.P., at rate of £125.
Walsall General Hosp.—H.S., £150.
Weir Hosp., Weir Road, Balham, S.W.12.—Sen. and jun. res. M.O., £200 and £150 respectively.
Weston-super-Mare Hosp.—Res. H.S., £150.
Wigan, Royal Albert Edward Infirmary and Dispensary.—H.S., at rate of £150.
Winchester, Royal Hampshire County Hosp.—H.S., at rate of £100.
Wolverhampton Royal Hosp.—Two H.S.'s to spec. depts., each at rate of £100.
Worcestershire, Barnsley Hall Emergency Hosp., Bromsgrove.—Four jun. res. M.O.'s, each at rate of £200–£350.

The Chief Inspector of Factories announces vacancies for examining surgeons at Penygroes, Caernarvon; and Llanwrtyd Wells, Brecon.

Medical Diary

Week beginning April 8

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2.

TUESDAY—5 P.M., Mr. Gwynne Williams: Intestinal Obstruction.

THURSDAY—4 P.M., Mr. E. W. Hey Groves: Life and Work of Moynihan. (Moynihan lecture.)

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1.

TUESDAY

Psychiatry—4.30 P.M., Dr. Derek Richter: The Action of Adrenaline in Anxiety. Dr. W. Sargant: Simultaneous Respiratory and Electroencephalographic Recordings in Cases of Petit Mal.

THURSDAY

Dermatology—4 P.M., Cases, 5 P.M., clinical meeting.

FRIDAY

Clinical—2.15 P.M., Mr. J. E. H. Roberts: Total Pneumonectomy for Bronchiestasis. Dr. E. M. Fraenkel: Recurrent Tumour in a Case of a Sarcofibroid of the Small Intestine.

CHADWICK LECTURE.

TUESDAY—2.30 P.M. (26 Portland Place, W.1.), Mr. W. H. Hamlyn, F.R.I.B.A.: Camps—Their Design, Construction, and Hygienic Arrangement.

EDINBURGH ROYAL INFIRMARY.

THURSDAY—4.30 P.M., Prof. F. P. Fraser: The Effort Syndrome in the Present War. (Honyman Gillespie lecture.)

SOUTH-WEST LONDON MEDICAL SOCIETY.

WEDNESDAY—3.30 P.M. (Bolingbroke Hospital, S.W.11.), Dr. P. M. F. Bishop: Present-day Applications of Sex-hormone Therapy.

MEDICAL SOCIETY OF INDIVIDUAL PSYCHOLOGY.

THURSDAY—8.30 P.M. (11, Chandos Street, W.1.), Dr. Plewa, Individual Psychology Technique.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W.12.

WEDNESDAY—11.30 A.M., clinico-pathological conference (medical); 3 P.M., clinico-pathological conference (surgical).

THURSDAY—2 P.M., Dr. Duncan White: radiological conference.

FRIDAY—2 P.M., clinico-pathological conference (gynæcological). 2.30 P.M., Dr. C. M. Hinds Howell: ward clinic. 2.30 P.M., Mr. V. B. Green-Armytage: sterility clinic.

DAILY 10 A.M.–4 P.M., medical clinics; surgical clinics and operations; obstetrical and gynæcological clinics and operations. 1.30–2 P.M., post-mortem demonstration.

FELLOWSHIP OF MEDICINE AND POSTGRADUATE MEDICAL ASSOCIATION, 1, Wimpole Street, W.1.

Medical Society of London, 11, Chandos Street, W.1. TUES., 5 P.M., Mr. J. Swift Joly: Bladder. THURS. 5 P.M., Mr. H. J. B. Atkins: Carcinoma of the Breast.—St. Mary's Hospital, Paddington, W.2. WED., 5.30 P.M., clinical F.R.C.S. class.—Brompton Hospital, S.W.3. TUES., 5.30 P.M. THURS. 5 P.M., M.R.C.P. course in chest diseases. Royal National Orthopædic Hospital, Brockley Hill, Stanmore. FRI., 2 P.M., F.R.C.S. orthopædic course.—Royal Cancer Hospital, Fulham Road, S.W.3. Daily, 9.30 A.M., F.R.C.S. course.—Practical operative surgery course for F.R.C.S. (days and times by arrangement).—Royal College of Surgeons, Lincoln's Inn Fields, W.C.2. WED., 3.30 P.M. and THURS. 3 P.M., F.R.C.S. pathology course.

Appointments

BENNION, E. R., M.B. Lond., D.P.H., tuberculosis officer and deputy medical officer of health for Tipton.

CLARK-MAXWELL, G. S., M.B. Durh., hon. neurological surgeon to Derbyshire Royal Infirmary, Derby.

COOTE, GWENDOLINE, K. G., M.B. Lond., temporary assistant school medical officer and assistant medical officer of health for Nuneaton.

CUNNINGHAM, ROBERT, M.B. Glasg., D.P.H., medical superintendent at Poole Sanatorium, Nunthorpe.

DE LARGY, JOHN, M.D. Belf., L.M., first assistant medical officer at Leytonstone Central Home.

D'OFFAY, T. M., M.B. Edin., F.R.C.S., deputy medical superintendent and surgeon at Leicester General Hospital.

GOOD, R. A., M.B. N.U.I., D.P.H., medical officer of health for Winchester.

GRACIE, A. P., M.B. Edin., resident surgical officer at Corbett Hospital, Stourbridge.

JONES, A. M., M.B. Manc., resident medical officer at Manchester Royal Infirmary.

NIVEN, EDITH G., M.R.C.S., temporary assistant school medical officer for Derbyshire.

ROBERTS, G. H. B., M.B. Dubl., D.P.H., L.M., resident medical officer at Leicester Isolation Hospital.

ROSS, R. M., M.B. Edin., D.P.H., resident medical officer at Leicester Isolation Hospital.

WILSON, GEORGE, M.B. B.Hy. Durh., D.P.H., deputy county medical officer for Durham.

ROYAL CANCER HOSPITAL (FREE), LONDON.—The following appointments are announced:—

LEDLIE, R. C. B., M.B. Lond., F.R.C.S., surgeon;
SPARKS, J. V., M.R.C.S., D.M.R.E., senior radiologist (part-time) in the diagnostic section;
GOLDING, F. C., M.B. Sydney, M.R.C.P., D.M.R.E., radiologist (part-time) in the diagnostic section; and
JACKSON, H. H. W., M.B. Lond., resident medical officer.

Medical referee under the Workmen's Compensation Act, 1925. Dr. E. L. H. JONES for ophthalmic cases in circuits 21, 22, 23, and 36.

Births, Marriages and Deaths

BIRTHS

ALDERSON.—On March 22, in Hull, the wife of Dr. F. G. S. Alderson—a daughter.

DUGGAN.—On March 30, at Forest Hill, S.E., the wife of Dr. F. R. Duggan—a son.

KIRKWOOD.—On March 29, at New Malden, the wife of Surgeon Lieutenant R. M. Kirkwood, R.N.—a daughter.

LILLICO.—On March 30, at Rochdale, the wife of Captain J. W. Lillico, I.M.S.—a son.

ORLEY.—On March 26, at Haywards Heath, the wife of Dr. Alexander Orley—a son.

REEVES.—On March 28, the wife of Mr. Brian Reeves, F.R.C.S.E., R.A.M.C.—a daughter.

RICHARDSON.—On March 25, the wife of Major J. S. Richardson, R.A.M.C., of Chorley Wood—a daughter.

MARRIAGES

BOUCHER—HASSLACHER.—On March 30, at Brompton Oratory, Anthony Boucher, D.M., to Cecily Hasslacher.

GODBER—PETIT.—On March 30, in London, Greville Noel Lambert Godber M.R.C.S., to Gwendoline Ursula Petit.

LENDON—MCNEILL.—On Feb. 3, in Bombay, Nelson Courtney Lendon, M.B., Captain, R.A.M.C., to Helen McNeill of Rutherglen, Scotland.

MARTIN-JONES—FIGGIS.—On March 30, at Carmarthen, John Dennis Martin-Jones, M.D., R.A.M.C., to Margaret Figgis.

SEEX—POULSEN.—On March 30, at Chipstead, Ian Harry Macgregor Seex, F.R.C.S.E., to Esther Poulsen of Reykjavik, Iceland.

SIMPSON—PODMANICZKY.—On March 29, at Bournemouth, Samuel Levy Simpson, M.D., to Baroness Heddy Podmaniczky.

DEATHS

HARDWICKE.—On March 30, in London, William Wright Hardwicke, M.D. St. And., M.R.C.P.E., aged nearly 92.

KEEP.—On March 26, in London, Major Arthur Corrie Keep, M.C., M.D. Edin., aged 78.

LISSAMAN.—On March 30, at Pucklechurch, near Bristol, Thomas Lissaman, M.R.C.S., aged 79.

STAINTON.—On March 24, on active service near Cape Town, Philip Geoffrey Stainton, M.R.C.S., Surgeon Lieutenant, R.N., aged 31.

GEOLOGIST AND SURGEON

MANY medical men have played truant and achieved success in a foreign field, but few have led a busy professional life and yet reaped greater fame in a side-line. Such a man was Gideon Mantell (1790–1852), who while continuing to practise collected vast quantities of fossils, including the iguanodon and other giant lizards of the Sussex weald. He was a keen antiquarian and botanist, with a love of romantic scenery, and made an ascent in a balloon. In 1833 he moved to Brighton to be near the courtiers, but the surgeon was eclipsed by the geologist and his practice suffered. Five years later he sold his collection of 1300 specimens, the fruit of twenty-five years, to the British Museum for £4000 and settled down to practise in London, where he delivered many public lectures, attended various scientific societies, and quarrelled with Sir Richard Owen. Dr. Curwen has edited Mantell's journal for the years 1818–52 (Humphrey Milford, Oxford University Press. 1940. Pp. 315. 12*s.* 6*d.*) and Mantell's diverse interests make it a useful guide to events and people of that time. His dissipation of energy led to coronary disease towards the end of his life, and his poor physical condition was intensified by a postural scoliosis, which such eminent surgeons as Robert Liston, Lawrence, William Coulson, and Sir Benjamin Brodie incorrectly diagnosed as an abscess during his life. His spine is preserved in the museum of the Royal College of Surgeons.

Dr. Curwen is to be congratulated on his presentation of the diary, and especially on his having tracked down and photographed Mantell's name carved inside a hollow oak at Penshurst in 1809.

NOTES, COMMENTS AND ABSTRACTS

HELPING THE HANDICAPPED

ON March 19 Dame Georgiana Buller reminded the annual meeting of the Central Council for the Care of Cripples that today when we were being urged to avoid all waste, economy in our most precious commodity, human material, was essential. The last war had seen the development of clinical orthopædic treatment, but this was only the first half of the problem of the cripple. There remained the rehabilitation of the permanently disabled. After his treatment proper the cripple's first need was remedial work to give him the maximal restoration of function in the shortest time and to help him to recover his habit of work or to build up a new one. Manual occupation tended to improve the patient's outlook and occupational therapy often gave better results than massage and physical therapy alone. Though remedial work as a phase of rehabilitation is distinct from vocational training, they are interdependent and cannot be separated without detriment. Indeed Dame Georgiana considers that they can with advantage be carried out side by side in the same building, for the disciplined workshop environment of the training-centre provides a favourable background for the re-adjustment of the injured person's outlook. Today work is no longer limited to long-term training for crafts such as tailoring and upholstery. The American Federal Board of Rehabilitation has drawn up a list of more than 700 occupations in which short-term training has fitted the cripple to hold jobs on equal terms with the able-bodied. There remained a small number of cripples who would always need sheltered conditions of work, probably with medical supervision. She thought these sheltered workshops could conveniently develop alongside the training-centre or "conditioning-centre," as she preferred to call it. In addition to the remedial department, the vocational training department, and the sheltered workshops the ideal centre should include hostels for resident workers and patients, recreational facilities including a swimming-bath, a medical block, a workshop for repairing surgical appliances, and an advisory bureau. She stressed the importance of the advisory bureau, for expert advice on the possibilities of his new life is what the cripple most often lacks. The centre might also help to market goods made by home-bound workers and thus offer them a measure of economic independence. Dame Georgiana looked forward to the day when there would be a chain of these regional conditioning centres throughout the country linking the hospitals with industry.

SOUND ADVICE ON CHILD FEEDING

MEDICAL publications from the United States are sometimes accused of being superficial, but when an American really gets down to the subject he makes an extraordinarily good job of it. "Your Child's Food," by Miriam E. Lowenberg [1] is an example of industry, enthusiasm and knowledge which writers of similar books on this side of the Atlantic might well follow. In Great Britain we have one professor of dietetics to 40,000,000 people, and dietetics is taught in a hole-and-corner way. In one state of the United States they have two, and that not a densely populated state. Miss Lowenberg is an assistant professor of foods and nutrition at Iowa State College; there is a professor, two associate professors, and two other assistant professors. Consequently the author can give her whole time to the important topic of child feeding, and produce a book of immense value. It is not an example of "knowing more and more about less and less" but a sane all-round book which every pædiatrician and dietitian should read and inwardly digest. The only criticisms of the book are of diffuseness, repetition and cost. But even the differences and repetition are valuable, since the book is not intended mainly for the academic but for the mother in the house. At times there is an unnecessary vagueness—e.g., "vegetables are high in mineral and vitamin content" and "they (white flour and milled cereals) cause a feeling of satiety in the child without giving him minerals and vitamins." A consideration of tables would modify the statement that vegetables are "high" in mineral content, and show that whole meals are of little value except in giving iron and vitamin B_1.

Half of the book consists of a year's menus for midday meals for children, with recipes. Miss Lowenberg makes some useful suggestions for inculcating good food habits in children and overcoming their natural dislike of new tastes and textures. These are based on her supervision of many thousands of meals served in the nursery school at Iowa State College. We commend her advice to all parents of pernickety children and especially her remark that "Adults must avoid discussing their own food dislikes before children or showing these by their facial expressions." "Many a run-about when rifling the ice-box," she says, "will turn down delicacies and consume a whole bottle of cod-liver oil." Most of the objections to fish-liver oil are due to its being started too late or to the parents' suggestion that it is nasty. The author prefers cod-liver oil to the more concentrated oils and suggests: "it is advisable to buy only reliable brands of cod-liver oil—those manufactured by companies maintaining laboratories for testing the vitamin content of their products and those whose product is approved by the Council of Foods of the American Medical Association." When shall we, in this country, insist that manufacturers guarantee the vitamin contents of the commodities they sell or persuade the B.M.A. to institute such a council?

1. Your Child's Food. By Miriam E. Lowenberg, Assistant professor of foods, nutrition and child development, Iowa State College, U.S.A. London: McGraw-Hill Publishing Company. 1939. Pp. 299. 12s. 6d.

REFLECTIONS ON A RED CROSS MANUAL

THE new edition of the Red Cross note-book [1] that was first published at the beginning of the last war raises some questions of general principle in first-aid instruction. Young ladies enrolled as ambulance drivers sometimes complain of having to learn the Latin names of bones, and the good English words thigh-bone, arm-bone, collar-bone and blade-bone should in fact be good enough for any Red-Cross or county-council examiner. With the leg and fore-arm it is different; there being two bones in each we cannot get away from tibia and fibula, or radius and ulna. But femur, humerus, clavicle and the like might well disappear from the note-book diagram of the skeleton, or perhaps it would be best to write blade-bone (scapula) and knee-cap (patella). There is certainly no need for the first-aid worker to know the different parts of the pelvis or even to have heard the word metacarpal. Hand and foot bones as distinct from finger and toe bones are enough. It is the same with the soft parts. We speak of the heart and lungs, not of the cor and pulmonæ. Why then should girls have to worry about the trachea and œsophagus? In the abdomen there is some excuse. Belly and guts are not pretty words, and they might frighten a mother or school-ma'am who was considering whether to allow her daughter or pupil to study elementary anatomy.

In the teaching of first-aid no attempt seems to be made to describe how the body is built up. It may be necessary to begin with big things that everyone can discover on his or her own body, such as bones and arteries, but teaching should pass on to the cells, tissues, organs and systems of the body. It is doubtful whether the first-aid student need know the different types of vertebræ, but in the note-book it

1. British Red Cross Society Note Book. (2nd ed.) Edited by St. J. D. Buxton, M.B., F.R.C.S. London: Humphrey Milford, Oxford University Press. 1940. Pp. 100. 2s. 6d.

would be well to add a cross-section of the medulla to the figure of the atlas and one of the spinal cord and emergent nerves to that of the thoracic vertebra. The diagrams of the brain should also be imposed in continuity on that of the spinal cord. This would leave a page for a simple diagram showing how the nervous system is constructed and serving as an introduction to the idea of the reflex arc. The clinical diagrams arouse criticism on other grounds. The ones illustrating compression of the great vessels give no idea of the amount of force needed. The first-aid worker pressing on the subclavian looks as though he were giving the boy an encouraging pat on the shoulder. In the illustration of femoral compression, too, the hands are trying to compress the artery at a point much lateral to it; and no-one would be able to apply the pad or tourniquet recommended with those hands in the way. The truth is that it is very difficult to compress the femoral artery against the shaft of the thigh-bone—the proper place is against its head or against the pelvis above it. The first-aid worker is then at the side of the patient's body so that he and his hands are out of the way of the worker who is applying the tourniquet. But he has to throw his whole weight from the shoulder to control it. The phrase "firm pressure is necessary" is quite inadequate.

The general plan of the note-book, with diagrams on the left and a blank page opposite for notes, is excellent, and it fulfils a need that will become more pressing before we are done. But it indicates a frame of mind that thinks names more important than things, and is satisfied when a structure has been described without entering into its meaning. A good lecturer can correct this fault, but the next edition should include diagrams illustrating the anatomy of such physiological principles as the reflex arc, the structure of an organ, the natural arrest of hæmorrhage, and the early changes in inflammation.

NEW PREPARATIONS

TABLOID EMOCIN THROAT LOZENGE.—These lozenges have been introduced by Burroughs Wellcome & Co. (Snow Hill Buildings, London, E.C.1) as a convenient form for the relief of inflammatory conditions of the throat. Each lozenge contains 2 grains of acetylsalicylic acid combined with a flavoured demulcent base, and when it is dissolved slowly in the mouth has an analgesic effect at the site of contact.

I.V.S. (B.D.H.).—We have received from British Drug Houses Ltd. (Graham Street, N.1.) a publication describing their epidemic influenza virus suspension, I.V.S. (B.D.H.), which is now available for general use. This preparation is stated to be free from danger in administration and yet to possess as great an immunogenic activity as a living virus suspension. Its dosage is 1 c.cm. administered by subcutaneous injection and it is said that the immunity resulting from this infection lasts for about twelve months. It should be administered one to two months before the possible onset of an epidemic.

PYELECTAN is the trade-mark name under which Glaxo Laboratories Ltd. (Greenford, Middlesex) have made available as a British product a solution of the bisodium salt of 3:5-di-iodo-4-pyridoxyl-N-methyl-2:6-dicarboxylic acid for use as a contrast-medium in intravenous pyelography The value of this organic iodine compound rests on its satisfying the following requirements: (1) density and clear definition of resulting shadow, (2) low toxicity, (3) inactivity of the iodine, (4) toleration in all conditions except severe renal impairment, severe hepatic dysfunction and serious general illness.

CEDILANID.—This is a new product in the Sandoz series presented by J. Sandoz Products Ltd., 134, Wigmore Street, W.1. It is the brand name for lanatosid C, a native glucoside of *Digitalis lanata*. Experimental work by G. K. Roe and M. B. Visscher (*J. Pharmacol.* 1938, **64**, 65) implies that lanatosid C has a greater margin of safety in improving cardiac efficiency than the other two glucosides in *d. Lanata*. It would therefore seem to offer advantages in the treatment of heart-failure where for hæmodynamic reasons excessive slowing is not desirable. By increasing the dosage the slowing of the heart-rate typical for digitalis may be obtained. Cedilanid is available in tablets and solution for oral administration, in ampoules for intravenous injection, and in suppositories.

GYNOMIN.—We are advised by Coates and Cooper Ltd., 94, Clerkenwell Road, E.C.1, that the chemical contraceptive tablet which has hitherto been known as Speton will in future be sold under the name of Gynomin. There will be no change in the product itself.

IDOZAN is a stabilised solution of ferric hydroxide containing 5 per cent. Fe in a palatable form. The ferric iron is gradually liberated from the preparation in the stomach and intestine becoming rapidly reduced to ferrous iron, according to the statement of the manufacturers, Coates & Cooper Ltd., 94, Clerkenwell Road, E.C.1.

CALFOS BRAND TABLETS.—The makers of this product (Calfos Ltd., Imperial House, Kingsway, W.C.2) state that it is a preparation of the unaltered basic constituent of bone prepared without the use of chemicals. Each tablet contains the equivalent of 1·7 grains of calcium, and phosphorus is present in the correct physiological ratio. The product is presented as a suitable means for the administration of calcium and phosphorus in easily assimilable form.

NIPECTIN is the baptismal name of a combination of pectin and 0·15 per cent. nickel. The metal is added to make the pectin more soluble than it is in its simple state and to enhance its bacterial properties. The product is in granular form and is presented by the makers (Eli Lilly & Co. Ltd., Basingstoke, Hants) in packages containing four ounces. It may be administered in such foods as soup, mashed potatoes, milk and cocoa. Nipectin treatment is a refinement of apple therapy, for pectin is a hydrophilic colloid present in apples and other fruits. It is suggested for use in the treatment of diarrhœa and dysentery.

PHARMACEUTICAL SPECIALITIES (May & Baker, Ltd), Dagenham, have issued a booklet dealing with the use of N.A.B. in the treatment of syphilis. Copies will be sent to any member of the medical profession on request.

REDIVIVUS

AFTER a refreshing sleep of over a quarter of a century the *Quarterly Bulletin of Northwestern University Medical School* has resumed publication. It is intended to serve as a link between "the basic sciences" and clinical medicine and surgery. The sequence of volumes is not interrupted, the first issue of the new series being called no. 1 of vol. 14. In it Sumner L. Koch writes on the repair of divided nerves and tendons, D. S. Hillis on ectopic pregnancy, A. J. Kendall and C. A. Colwell on the effect of ultraviolet radiation on bacteriophage, J. F. Delph on benign tumours of the larynx, W. F. Windle on the fœtal circulation, M. H. Barker on pneumococcal pneumonia, J. P. Simonds on coronary thrombosis, H. A. Davenport and F. B. Queen on the local effects of colchicine on the skin and testis of the white rat, J. G. Carr on coronary disease in physicians, and B. J. Anson on books about the great plague of London. The resurrected quarterly is well printed and illustrated, and the annual subscription in this country is $2.50.

EXPRESSIVITY

X. Y. Z.—The word used in a review of Julia Bell's "Hereditary Ataxia" (March 16, p. 504) is a convenient rendering of the German word *Expressivität*, which was coined by the geneticist Timofeeff-Ressovsky to denote the quality of certain genes of expressing themselves to a different degree in different cases. For instance, the gene (or genes) responsible for epiloia may express itself as a few scattered and unimportant abnormalities of the skin or as a widespread and severe disturbance, involving body, brain, and mind. The meaning of the word being highly specific, its addition to the medical vocabulary is probably justified.

ADDRESSES AND ORIGINAL ARTICLES

MENTAL ILLNESS AS A CLUE TO NORMALITY

BY STEPHEN TAYLOR, B.Sc., M.D. Lond., M.R.C.P.

SURGEON LIEUT.-COMMANDER (NEUROPSYCHIATRIC SPECIALIST) R.N.V.R.; FORMERLY ASSISTANT MEDICAL OFFICER AT THE MAUDSLEY HOSPITAL (L.C.C.), AND HOUSE-PHYSICIAN, BETHLEM ROYAL HOSPITAL

To most doctors mental illness is still something quite apart from everyday experience. The insane are separated from the sane by a clearly defined barrier, and, once this is passed, the patient, being no longer a rational individual, must be isolated from his fellows and placed under the constant care of a specially trained staff. The delusions, the hallucinations, and the strange behaviour seen in mental hospitals seem to bear little relation to the ordinary workaday world. Yet it is becoming commonplace for psychiatrists, especially those working on early mental illness, to regard this divorce from normality as an artefact, fostered by the demonstration of the grossly insane to the medical student and the isolation of the average mental-hospital doctor from the out-patient clinic. The modern psychiatrist thinks of mental illness rather as a caricature of one or more aspects of the sane mind. We can regard insanity as an informative experiment by nature in which certain normal personality traits are repainted in crude colours.

The points which it is hoped to establish in this paper are as follows :—

(1) The division of mental illnesses into two distinct classes, the neuroses and the psychoses, is not justified by the observed facts.

(2) A gradual transition exists between every variety of mental illness and normality. He who seeks may find the intermediate types.

(3) A similar transition may be found between the different mental illnesses themselves. The average psychiatric syndrome is a mixed picture of two or more reaction types, though one as a rule predominates.

(4) Inasmuch as each mental illness represents a caricature of normality, it is both possible and profitable to analyse the basic personality of the normal individual in these terms.

(5) There is evidence to suggest that the exaggerations of personality in mental illness may be biochemically determined. Equally then, the normal basic personality may be biochemically determined.

(6) The rapid growth of knowledge of psychopathology has tended to obscure the study of the basic personality, as revealed by the investigation of mental illness. Psychopathology emphasises environmental changes, especially those in early years, as factors in character-formation. It neglects the inherited mental material on which the environment acts. Psychopathology is not in itself a determinant of conduct. Rather does it determine the individual way in which the basic personality manifests itself. Psychiatry and psychopathology are not antagonists but partners in explaining the workings of the mind.

Some of these points are regarded as common knowledge by certain psychiatrists. Others regard them as fundamentally false. For this reason, detailed evidence for each contention must be given. Further, since the concern of this paper is as much with the normal mind as with the disease, the non-psychiatric reader must be considered; it will therefore be necessary to describe much with which the psychiatrist is familiar.

NEUROSES AND PSYCHOSES

The view that mental illnesses cannot be sharply divided into two groups, the neuroses and the psychoses, is rapidly gaining ground. The evidence on which this division was formerly based may be summarised thus :—

(1) Neurotic patients have insight into their illness while psychotic patients do not.

(2) The ætiology of the neuroses is mental—in the realm of psychopathology—whereas that of the psychoses is constitutional or physical.

(3) The neuroses can be treated successfully by psychotherapy and environmental adjustment, whereas the psychoses cannot.

In practice each of these lines for differentiation is found to break down continuously.

(1) *Insight.*—Few grossly hysterical patients have, or can be made by any psychotherapeutic procedure to have, true insight into their illness. On the other hand, many early schizophrenics seek medical aid precisely because their insight is so clear that they are alarmed by their symptoms. Melancholics too have enough insight to realise that they are mentally ill and in need of treatment, but, though better off than the hysterics, their insight is seldom complete, for they view the outlook as irretrievably hopeless. In mild depressive illnesses even this partial impairment of insight is absent. The fallacy of insight as a differentially diagnostic touchstone has been delightfully exposed by Curran (1937a).

(2) *Ætiology.*—In the course of any disease, be it mental or physical, two sets of factors must be considered, the constitutional and the environmental—the old-fashioned soil and seed. The constitution may be so weak that it breaks down spontaneously, or the environment so difficult that the finest constitution cracks, but in most illnesses both factors operate. The case for the psychological or environmental origin of the neuroses is as follows. Early environmental stresses so affect the mental make-up that subsequent environmental strains lead to anxiety, hysterical, or obsessional reactions. The evidence for this hypothesis is obtained by psycho-analysis, Freudian or otherwise. The psychopathological explanation of the morbid processes are so well substantiated that the unbiased observer is inevitably impressed. But the analysts themselves admit that in minds of normal people—e.g., student analysts—precisely similar processes are at work without causing symptoms. Further, in severe depressive and schizophrenic illnesses, for which only extremists claim a psychopathological causation, symptoms are often clearly explicable in terms of psychopathology.

Mr. A., aged 47, a supervisor in a large commercial undertaking, developed a severe depressive illness. Ten years previously he had married a clerk in his office, some years his junior. She was a hysterical personality and submitted with reluctance and frigidity to sexual intercourse. After the birth of two children she refused further intercourse, and the patient for seven years indulged in manual masturbation. At the outset of his depression he was filled with guilt about his conduct and, as he became worse, told everyone that he was a sexual maniac. Still later he announced that his trouble was really due to his wife's being a sexual maniac.

The psychopathology of this case might briefly be described as disappointment and dissatisfaction with sex life, repression, guilt to shield himself from his

wife's shortcomings, and finally inversion to shield himself from his own desires. That these hidden emotions played their part in the symptoms and possibly the onset of the illness is not denied ; but that they alone caused the condition is extremely improbable, especially since the family history was positive and the patient had had a previous attack of depression at the age of 30.

We have then to ask ourselves if there is any evidence as to why some people, when subjected to difficult infantile and adult environments, react in a so-called "neurotic" manner, while others in the same environments do not. That a constitutional factor is operative is suggested by the following quotation :—

"A group of hysterics who were pathological liars were compared with the average population in respect of the proportion of their brothers and sisters who were in mental hospitals : it was five times as many ; and of the parents of the group a sixth were psychopathic" (Mapother and Lewis 1937).

Of the obsessional disorders, the same authors say :

"The hereditary factor is strong. A third of the parents of obsessional patients, and a fifth of their brothers and sisters, have themselves shown pronounced obsessional traits ; and the proportion is in each case higher if all forms of mental abnormality be included, since both schizophrenia and affective illnesses occur with more than average frequency in families of obsessionals."

As these authors point out, parental abnormalities may equally be an environmental factor ; but, at the same time, many children react strongly and in the opposite direction to obsessional activities in parents. It appears then that hereditary or constitutional factors are operative in the so-called neuroses, even as they are in the so-called psychoses. Further, just as an acute environmental situation may precipitate a neurotic reaction, so equally it may push a patient over into psychosis. An unhappy love affair may preface schizophrenia or a business calamity melancholia.

If we wish to obtain an honest picture of the ætiology of any mental disorder, be it hysteria or paranoia, we must assess, by a study of the family and personal history and of the environment from birth to illness, how far the basic mental material is faulty, and how far outside circumstances have contributed to the illness. As a broad speculation, with admittedly many exceptions, one may suggest that schizophrenia is 90 per cent. constitutional and 10 per cent. environmental, melancholia is 80 per cent. constitutional and 20 per cent. environmental, the obsessional states 70 per cent. constitutional and 30 per cent. environmental, hysteria 60 per cent. constitutional and 40 per cent. environmental, and the anxiety states 30 per cent. constitutional and 70 per cent. environmental.

(3) *Treatment.*—The last alleged mode of differentiation between the neuroses and the psychoses is the success of psychotherapy and environmental adjustment with the one and their failure with the other. Here, unfortunately, it is impossible to give a dogmatic answer. In the first place, most psychotherapeutists admit that chronic, stupid, or elderly hysterics are beyond their power to treat. Secondly, both neuroses and psychoses are liable to recover spontaneously. This was well shown by Curran (1937 b). He followed up 83 psychiatric outpatients at St. George's Hospital, London, over one to three years and found that 51 were "improved" or "greatly improved" without anything in the nature of intensive psychotherapy. This recovery-rate does not differ greatly from the figures of Luff and Garrod (1935) at the Tavistock Clinic (55 per cent. "improved" or "greatly improved" after three years) and of Ross (1936) at the Cassel Hospital (70 per cent. "improved" or "greatly improved" after one year) using more intensive psychotherapy. The figures are not, however, strictly comparable, inasmuch as the cases subjected to psychotherapy were selected. Until adequately controlled series show that more neurotics recover with psychotherapy than with simple observation, we must remain in doubt. At the same time, psychotherapeutic and environmental changes often appear to produce beneficial results, even in gross psychotics. The catatonic schizophrenic will sometimes make a great social improvement if forced to associate with active workers on a mental-hospital farm. Efforts at treatment are not to be condemned. Patients with mental illness cry out for help, and though there is no proof that we can help them by psychotherapy, our clinical impressions, even if emotionally biased, justify our continuing to try.

To summarise, we may say that there does not seem to be a single fundamental way in which the neuroses differ from the psychoses. If the two terms mean anything, it is this : in the neuroses the environmental causes bulk larger than in the psychoses. Yet even in the neuroses, constitution may still be more important than environment.

INTERRELATIONS OF MENTAL ILLNESSES

There are, broadly speaking, eight main types of reaction in mental illness : mania, melancholia, anxiety, schizophrenia, paranoia, the confusional states, hysteria, and the obsessional state. Each occurs in pure form, which will be described in due course, but in addition each may show secondarily features of the others.

For example, when a hypomanic personality becomes depressed, hysterical features are common. Similarly, young depressives often show schizophrenic features, such as hallucinations, thus complicating both diagnosis and prognosis. Again, obsessional symptoms may be a manifestation of depression and will therefore speedily vanish when the depression spontaneously recovers. Should psychotherapy have been employed a spurious cure of an obstinate illness may be claimed. Bizarre obsessions may be the presenting symptoms of schizophrenia. Paranoid reactions are seen in manics, melancholics, and schizophrenics. Manics and schizophrenics too may behave hysterically, and anxiety may be the most prominent symptom of a true depressive illness.

From the point of view of both prognosis and treatment it is obviously important to decide which is the primary mental reaction and which are secondary ; but sometimes such a decision is impossible. The infinitely close series of gradations between two types of mental reaction is most obvious in schizophrenia and paranoia. It is possible to find every variety of patient intermediate between paranoid schizophrenia and paraphrenia, and between paraphrenia and pure paranoia. Similarly, acute mania and excited catatonia may present an identical clinical picture on cross-section. Anxiety states, too, merge imperceptibly into depressions.

Mr. B., a farmer, aged 54, complained of typical anxiety symptoms for eleven months. He had a substernal tense feeling, as though something, he knew not what, was going to happen. He denied stoutly that he was depressed, though he admitted he was irritable and worried. He could not understand it, for he had not a care in the world. Just before the attack came on, he had felt fitter than he had for years

and had taken part in the hay-making with astounding vigour. In fact, his wife attributed his breakdown to overwork and strain at this time. He was not retarded, had no delusions of guilt, had talked of suicide, but said he had no serious intentions.

Such a condition might justifiably be described as an anxiety state, but further investigation revealed the following facts. His father suffered from depression with hypochondriacal delusions at the age of 80, and from this he made a good recovery. One brother and one sister were in mental hospitals with depressive illnesses, and another sister was liable to phases of depression since the death of her son in an R.A.F. crash. The patient himself had, since the age of 30, been liable to attacks similar to, but milder than, the present one at intervals of three to five years. Each attack lasted a few weeks to a few months. The patient was an energetic, successful, and happy man, without an enemy in the world.

In view of the positive family history, the previous attacks, the hypomanic prepsychotic personality, and the absence of precipitating factors, there can be little doubt that this apparent anxiety state was really a true but mild endogenous depression.

We are now in a position to review the eight main types of mental reaction in detail, to see if in fact each does represent a caricature of a facet of normality, and to consider whether so-called normal behaviour becomes more intelligible after such a study.

MANIA

Full-blooded mania is rare. Mild hypomania, on the other hand, is extremely common. The essential features of mania are as follows :—

(1) *Mood.*—This is usually happy in spite of the environment, which may be the refractory ward of a mental hospital. The jollity is infectious but soon palls and becomes boring. The mood is labile, and tears flow easily but soon dry. Some manics are charming, but others often or always querulous. And their endless complaints are based on a minutely accurate observation.

(2) *Thought* is rapid and at times liable to such jumps that the thread is apparently lost. The flight of ideas is determined by associations both within the mind and in the environment, and as a result the manic is extremely distractible. He notices and remembers everything, and his knowledge of hospital and world affairs is astonishing. But in the wealth of detail major judgments become faulty.

(3) *Energy and activity* are increased, sometimes enormously. Psychomotor, intellectual, and association tests show that, while the apparent quickness and capacity of the manic are less than normal, those of the hypomanic are sometimes greater. Perseverance is usually lacking but is sometimes astonishing. Schemes for local and world improvement are evolved with ease and often with complete disregard for practical difficulties. Sleep is brief, but lack of it does not worry him. Sexual desire is at first heightened but potency lessened.

So close to one aspect of normality is mania that certification is often very difficult. Indeed, the psychiatric patient who will " complain of " nothing is usually a manic—or a schizophrenic. Repaint the picture in slightly less obvious tones, and a host of familiar normalities appear. The tramp singing as he swings along the road content with his lot, the busy surgeon doing ten operations in an afternoon and wisecracking with his students, the city magnate and the politician knowing every detail of a vast organisation and planning yet greater conferences or sales campaigns, and the club bore with his endless anecdotes and a fresh one for each distraction in his steady stream make up the great concourse of the mild hypomanics. At times invaluable and at times intolerable, the hypomanics behave, no less than the manics, according to a pattern. If we recognise in the one a definite disease which no amount of effort on the patient's part will conquer, so in the other we must recognise a mode of behaviour as strongly determined as the features of the face.

Just as in the physical examination of a patient it is possible to assess roughly the degree of enlargement of the liver or spleen although exact measurement is impossible, so in psychiatry one can give a rough estimate of the degree of manic behaviour of a patient. At one end is mild hypomania, a manifestation of normality, while at the other is severe mania, an obvious disease. Even in the absence of a unit of behaviour, a rough quantitative assessment of mania is of practical value. It will be seen that the same holds for the other types of mental disease reaction.

Causes of manic and hypomanic behaviour.—Kretschmer (1925) has observed that affective psychoses are commoner in the so-called " pyknic " constitution —the type of stocky build, with short massive neck, large body cavities, a tendency to fat on the trunk, especially its lower part, and slender extremities tapering to small hands and feet. Mayer-Gross and Slater (1938) summarise the findings of most workers by saying that 25 per cent. of patients with affective psychoses are pyknics against 12 to 15 per cent. in the average population.

There are three states of known causation in which manic or hypomanic behaviour occurs. The first of these is an infective process—namely, one type of general paralysis of the insane—while the other two result from taking two chemical substances, alcohol and benzedrine. The euphoric general paralytic is, like the true manic, becoming increasingly rare ; and there is evidence that the condition is likely to develop in persons who previously showed hypomanic tendencies. In his flight of ideas, easy distractibility, and grandiose schemes divorced from reality the euphoric paretic simulates mania closely enough to cause at times diagnostic difficulties ; but, sooner or later, signs of confusion and dementia manifest themselves. Nevertheless, the similarity in the clinical picture is close enough to suggest that in both some specific portion of the nervous system is functionally deranged.

Increasing doses of alcohol may also simulate extremely closely the progress from hypomania to mania, though, as in general paralysis, confusion ultimately results. In some people and on certain occasions alcohol admittedly produces depression ; but the usual sequence is elation, with flight of ideas, temporary increased efficiency followed by diminishing efficiency in spite of excessive confidence, and increased sexual desire with diminished potency. The partial inhibition of the higher critical and inhibiting centres may well be operative in both conditions.

The results of taking benzedrine provide an even closer parallel with hypomania. Peoples and Guttmann (1936) describe thus the psychic effects of benzedrine. There is increased talkativeness, depression and retardation vanish, the mood changes in the direction of euphoria, and there is motor restlessness. Personal experiences were described in glowing terms. One normal person felt extremely elated and free from all worries. Lectures seemed most lucid and interesting, and he felt an unusual self-confidence and equal to any task. Another felt an " exalted being." Guttmann and Sargant (1937), in 250 cases, confirmed the psychic changes. Objectively, they observed increased talkativeness and restlessness, while subjectively the subjects noticed increased confidence, initiative, and ease in making decisions. Thought was speeded up without impairing attention, concentration or judgment. Intelligence scores were increased by 8 per cent. (Sargant and Blackburn 1936). Sleeplessness was usual, but the lack of sleep was not unpleasant, and the subjects were often quite fresh in spite of it.

MELANCHOLIA AND ANXIETY

The relation of melancholia or depression to mania and hypomania is well known. It occurs in the same type of person, has the same strongly hereditary factors (a 69 per cent. concordance in manic-depressive monozygotic twins and only a 16 per cent. concordance in dizygotic pairs), and the one may alternate with the other; but, since depression is far more common than mania, the true alternating manic-depressive psychosis is less usual than isolated or recurrent attacks of depression.

It is now customary to attempt to classify depression as exogenous or as endogenous, according to whether environmental or constitutional factors predominate. The situation here is greatly complicated by hysterical patients who have discovered that a complaint of "a feeling of depression" is more likely to be treated seriously than an anæsthetic limb or a well-staged fit. One has even seen an old lady who compromised with "a feeling of depression all down one side." Beyond their complaint, hysterical "depressions" show no other features of the real condition. At the same time, hysterical reactions are extremely common in depressed people; hence the finding of hysteria does not free one from seeking further for signs of true depression. Hysterical "depressions" are neither exogenous nor endogenous but another disease. Had the word "depression" not so thoroughly displaced "melancholia" in the vocabulary of the psychiatrists, the hysterics might never have learnt this new and confusing trick. The more one seeks to press the distinction between exogenous and endogenous depression, the more shadowy does the distinction become. In fact, it appears that there is a gradual transition between justifiable grief, anxiety state, exogenous depression, and endogenous depression. The position will become clearer if the main features of endogenous depression are summarised:—

(1) *The mood* is one of increasing listlessness, depression, and anxiety. Indifference to pleasant or unpleasant environmental changes is coupled with an egotistical personal worry. The present is regarded as gloomy and the future as hopeless. Indeed, hopelessness is one of the keynotes of the picture, and suicidal ideas naturally follow.

(2) *Thought and speech* are retarded. Output diminishes. Ambition vanishes. Concentration is poor and memory difficult. In the agitated depressive, however, gloomy thoughts may chase themselves round the mind very rapidly, though on neutral subjects retardation is seen.

(3) *Delusions.*—As an apparently secondary phenomenon, the patient seeks a cause, and delusions of hypochondriasis or of guilt develop. True external hallucinations are said not to occur in pure depression.

The diagnostic features are the mood, the hopelessness, the retardation, the secondary delusions, and the family and past history. The details of the form of the illness are varied. As Mapother and Lewis (1937) remark, there are many varieties of misery, and melancholia knows them all. It is by no means rare to find patients who show a fairly adequate external cause for their depression but only two of the diagnostic features—for example, depressed mood and retardation but no hopelessness and no delusions. I have already quoted a case showing a positive family and past history, with anxiety as the only other symptom. On what criteria, then, can we justifiably draw the lines between these four states? In justifiable grief one becomes indifferent to one's environment, poor in concentration, and even temporarily hopeless. In the anxiety states the revelation of unconscious causes all too often converts the condition into one of justifiable worry. This I tried to show in my paper on the suburban neurosis (Taylor 1938). In these states, too, constitutional factors may be present. Because a clear-cut trouble precipitates a severe depression, that depression cannot be regarded as exogenous. The occurrence of hypomanic and mildly depressive swings is well known in perfectly normal people, as is shown in the following quotation from an obituary notice by Wilson (1937):—

"It was characteristic of Elliot Smith's methods of work to combine, or rather to alternate, periods of intense concentrated effort with intervals of apparent mental inertia. These were apt to be taken for mere idleness, but were actually, for him, indispensable and fertile brooding periods. And the succeeding phases of literary activity were at times astonishing, both in regard of rapidity of execution and of precision and finality of the product. Professor Wood Jones has commented on this the same diphasic characteristic of Elliot Smith's scientific activity."

It seems to me far more logical to think of the difference between the four states not as qualitative but as quantitative. As with mania, a rough assessment of the degree of depression present is of more use than any attempt at dogmatic artificial division.

(*To be concluded*)

PREVENTION OF MASTOIDITIS

A SURVEY OF 621 CASES OF ACUTE OTITIS MEDIA TREATED WITH SULPHANILAMIDE

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LAST year we reported on a series of 155 patients with acute suppurative otitis media (A.S.O.M.), who had been treated with sulphanilamide as soon as they were admitted to the Royal Naval Hospital, Chatham (Horan and French 1938). We compared the incidence of acute mastoiditis in these cases with the figures for the Royal Naval Hospital for the previous three and a half years and showed that this had been reduced from 22·7 per cent. (1934–37, i) to 4·5 per cent. (1937, i–38, i). We put forward these figures not dogmatically but rather as an observation, with the hope that a further year would see them confirmed by ourselves and other workers. Private communications from other otologists in various parts of the country have confirmed our conclusions of last year, and in America Fisher (1939), in a controlled series of 185 cases, has obtained convincing results. One of us (V. G. H.) has, for the past eighteen months, been working at the naval boys' training establishment at Shotley (H.M.S. *Ganges*); hence we can now put forward a more convincing number of cases, as follows:—

Period	A.S.O.M.	Acute mastoiditis
1934–37, i	607	138 (22·7 per cent.)
1937, i–39, i (sulphanilamide used)		
Chatham	291	12 (4·1 per cent.)
Shotley	330	9 (2·7 „ „)
Total	621	21 (3·4 „ „)

What is even more significant is that during the past two years there has not been one death from the complications of A.S.O.M., *because these complications have not arisen.* During the three and a half years before 1937 there were, on an average, 2·85 deaths a year

from this cause in the Naval Hospital. At Shotley no complications have been seen. At Chatham 2 patients were admitted with acute mastoiditis and lateral sinus thrombosis and were operated on at once; these have not been included in the series, though sulphanilamide was given after operation and both patients made an uneventful recovery. With the same incidence as that shown by hospital statistics before the introduction of sulphanilamide, these 621 cases would have produced about 140 cases of mastoiditis, with over 8 deaths, whereas there have been only 21 cases of mastoiditis and no deaths. If the difference in the time under treatment before return to duty between an uncomplicated case of A.S.O.M. and a case of mastoidectomy is at least five weeks, this represents a saving of some 4200 days' sickness (about eleven years).

DETAILS OF TREATMENT

As before, all patients, as soon as seen, were given an emulsion of sulphanilamide (Colsulanyde, Crookes) by mouth in full doses according to age and weight, and continuing to a total dosage of not more than 40 g. Often the ear recovered before the maximal dosage had been reached. Prontosil Red, administered parenterally, was used where it was thought advisable to reach the maximal concentration in the minimal time. Neither of us performed myringotomy under twenty-four hours, except for pain and subsequently only when there was insufficient drainage of the middle ear. Predisposing factors, such as infected tonsils, adenoids, and sinusitis, were dealt with concurrently. The patients were placed on a normal diet; if there was nausea, the diet was reduced and sodium bicarbonate given, without any obvious amelioration of the nausea. The diet was not sulphur-free, but sulphur-containing drugs, such as magnesium sulphate, were avoided. When bacteriological examination of the ears revealed the presence of pneumococci and in cases in which the ear did not seem to be reacting well to colsulanyde M. & B. 693 was substituted.

Of the *Ganges* patients 229 were treated as outpatients, the remainder being placed sick. No untoward results were noticed from the ambulatory treatment. Since last year our knowledge of the dangers of administration of sulphanilamide to patients not under continual observation has been largely clarified, and, although from time to time there have been reports of the various toxic manifestations of the drug, we have not observed any except nausea, vomiting, and cyanosis. Nausea and vomiting are annoying but not alarming, and cyanosis is probably unimportant, except from an academic biochemical point of view (Fernet et al. 1939, Watson et al. 1939). It should be noted, however, that these ambulant cases, while outpatients, were under constant supervision. In view of the large amounts of sulphanilamide given daily all over the world, if the drug were as dangerous as the pessimists make out, more than the almost non-existent case-mortality directly attributable to the drug would certainly have been recorded.

In the above series white-cell counts were done regularly, and in 2 cases only the number of white cells dropped—to 5200 and 4800. In both of these cases sulphanilamide was stopped and Pentnucleotide given, after which the white-cell count returned quickly to within normal limits.

OBSERVATIONS

The figures speak for themselves, and there is now no doubt that sulphanilamide has prophylactic qualities. The cases in which sulphanilamide did not prevent mastoiditis all showed the same characteristics; they were admitted with the typical history of coryza, followed by earache and otorrhœa, and differed clinically in no way from the cases which reacted well to sulphanilamide, except that the ear continued to discharge and the patient eventually developed symptoms of mastoiditis.

We agree with Maybaum and his colleagues (1939) that in some cases the administration of sulphanilamide appears to mask symptoms of an early mastoiditis. One case, for instance, showed only a "reservoir" sign and had a white-cell count of 24,000, with no other symptoms. At operation the mastoid cells were found to be hopelessly necrosed. On the other hand, the old classical acute mastoiditis, with displacement of the auricle, œdema over the mastoid process, acute tenderness, and cessation of the discharge, is, so far as we are concerned, now rare, and what is seen is the so-called "grumbling" mastoid, where the infection is almost subacute and the symptoms are not so obvious. Sulphanilamide even in these cases, appears to have prevented the development of anything resembling the fulminating mastoid, and it is because of this that we consider the *early* administration of sulphanilamide to be of paramount importance.

Increased confidence in the powers of sulphanilamide has led to a greater conservatism, so far as operation is concerned, than we dared to indulge in last year, when we stated that, although sulphanilamide would prevent mastoiditis, it would never cure it. This year we have seen several cases which, previously, would have been operated on, but which were treated conservatively for twenty-four hours and never came to operation. One such was as follows:—

A man, aged 33, admitted in the forenoon of August 8, 1938, with pain and discharge from his right ear. There was a previous history of periodic earache in this ear. The present attack started with coryza, followed by earache, deafness, and otorrhœa. Temperature 101·8° F., pulse-rate 70. Antero-inferior perforation of tympanic membrane, with pulsating discharge and an early sag of the postero-superior meatal wall. Tenderness over base of mastoid. White cells 9600.

Treatment: 10 c.cm. of a 2½ per cent. solution of prontosil red injected intramuscularly, followed by colsulanyde 2 drachms four-hourly. Guttæ hydrarg. nit. dil. to ear and foments. In the evening his temperature was 102° F. and white-cell count 13,400, but the ear was feeling easier. Next morning his temperature was 100° F. and white-cell count 8000, and there was no pain in the ear or on pressure over the mastoid, and the sag in the meatal wall was less. The ear was dry in eight days, and hearing was normal a week after this.

The foregoing clinical record is not meant to show that sulphanilamide is a cure for mastoiditis but to point out that, since the danger of complications arising from the expectant treatment of mastoiditis are so much less when sulphanilamide is being used, a more conservative attitude can be adopted, which will, in suitable cases of early mastoiditis, spare the patient an unpleasant operation and a long convalescence. Where the patient is admitted with hyperacute mastoiditis or with any complications arising therefrom, operation must be performed immediately; though, here again, sulphanilamide often produces miraculous results in an almost moribund patient.

Of the 5 cases which came to mastoidectomy at Chatham 3 were proved to be due to a hæmolytic streptococcus, and 2 were presumed to be pneumo-

coccal, though the organism could not be recovered from the mastoid antrum. The presumption of pneumococcal infection was made on the gross pathological appearance of the mastoid cells at operation. All 5 patients had had colsulanyde and M. & B. 693. All made an uneventful recovery and were discharged to duty with healed dry ears. It is presumed that these organisms were resistant strains.

It is difficult to judge whether the average number of days' sickness of an A.S.O.M. is shortened by the use of sulphanilamide, but we are of the opinion that it is. This view is confirmed by Fisher's (1939) cases. We have not found that the use of sulphanilamide in any way predisposes towards the encysting of infection and the consequent formation of a chronic otitis.

In this series 15 patients returned with a recurrence of the otorrhœa. Of these, 11 had tonsils which had been classed as "doubtful" when first seen and alone were sufficient to explain the recurrence; 4 other patients returned with an A.S.O.M. in the opposite ear. Now, if sulphanilamide predisposes to a recurrence, one would expect a nasopharyngeal infection to strike at the first ear affected, but these were normal when the patients were seen for the second time.

As before (Horan and French 1938) we have not found sulphanilamide to be of any value in the chronic suppurative ear. Here there are already macroscopical changes—perhaps ossicular caries—and the drug cannot be expected to influence these.

Most of our patients were aged 15–21.

BACTERIOLOGY

Of the 136 patients with A.S.O.M. at Chatham last year 48 were swabbed, and of these 94 per cent. were reported as infected with hæmolytic streptococci. From the remaining 3 patients one culture of type III pneumococcus and two of "diphtheroids" were obtained. In our 1937–38 cases all those in which a swab was examined showed hæmolytic streptococci. The almost complete absence of pneumococci in this series of ear infections is remarkable because it has been found that in other places pneumococci are a common cause of otitis media. For example, Griffith (1938) reported that 42·4 per cent. of 137 cases of otitis media arising in public schools were caused by pneumococci.

It is possible that the lower incidence of mastoiditis during the last two years, as compared with the years 1934–37, was due not so much to the use of sulphanilamide as to a reduction in the virulence of the infecting streptococci. In the present instance, however, there is no evidence to support this theory. On the contrary, it appears that the clinical severity, besides the incidence, of streptococcal and other infections tends to increase with the rate of recruiting, which has so greatly increased recently with the expansion of the services. Therefore it seems improbable that the striking improvement which followed the introduction of sulphanilamide therapy can altogether be explained by a change in the character of the infecting organisms.

A large proportion of pneumococcal infection among patients with otitis media may in part explain why certain other workers may not have found sulphanilamide as effective as we have in the treatment of otitis media, because sulphanilamide would not be expected to have much effect on pneumococcal infections. Whether M. & B. 693 will have the same excellent results of both the pneumococcus and the streptococcus that colsulanyde has had in this series on the streptococcus is a matter which is under investigation and looks promising. In this respect one known pneumococcal case is worthy of record, in view of the relatively poor prognosis of this type of infection:—

A man, aged 57, was admitted with right earache and otorrhœa of three days' duration, following coryza. History of pneumococcal empyema thoracis some years previously. On admission, temperature 103·2° F., pulse-rate 90. Patient looked very ill, with blood-stained sero-purulent discharge from right ear, meatus being swollen and landmarks of drum obscured. No mastoid tenderness (often absent in these infections), white cells 15,300. Full doses of M. & B. 693 were given immediately (5 g. in the first twelve hours). The temperature began to drop next day, as did the white-cell count, and both were normal by the third evening after admission. The ear was dry five days after this, and the patient was discharged to sick leave after ten days.

One drawback to the widespread use of M. & B. 693 is the high proportion of gastric intolerance which follows its administration by mouth. One of us (S. G. F.) is at present investigating the use of nicotinic acid, administered with it, to reduce these symptoms, as suggested by McGinty and others (1939). The soluble sodium salt, administered parenterally, is also an improvement in this way and raises the concentration quickly. Certainly, if these difficulties can be overcome, the worries of the otologist will be materially lessened in the future.

CONCLUSIONS

All cases of A.S.O.M. should have sulphanilamide administered as early as possible, besides the accepted treatment of the acute ear. White-cell counts are of great value, both as a check on the administration of the drug and as an index of the progress of the disease. The infecting organism should be identified if possible and M. & B. 693 substituted for sulphanilamide where a pneumococcus is found.

SUMMARY

A series of 621 cases of acute suppurative otitis media treated with sulphanilamide in the last two years is reviewed. The incidence of mastoiditis was only 3·4 per cent., compared with 22·7 per cent. before the introduction of treatment with sulphanilamide.

In all cases a course of colsulanyde by mouth was begun as soon as the patient was seen, the total dosage not exceeding 40 g. Prontosil red was given by injection in some more acute cases. If pneumococci were isolated, M. & B. 693 was substituted for sulphanilamide. Many of the patients were treated as outpatients under constant supervision. No serious toxic manifestations were seen.

It is urged that all cases of acute suppurative otitis media should receive sulphanilamide or sulphapyridine. This will greatly reduce the incidence of mastoiditis and will allow a more conservative attitude to be adopted once mastoiditis develops.

We wish to thank Surgeon Rear-Admiral S. F. Dudley for his assistance in compiling these results; Dr. Robert Forgan for his advice concerning dosage and toxicity of M. & B. 693; and Messrs. May and Baker Ltd. for samples of the sodium salt of M. & B. 693.

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THE THERAPEUTIC POOL

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THE after effects of war injuries in rheumatic subjects are apt to be complicated by a greatly protracted convalescence associated with much more pain and muscular stiffness than would be expected in ordinary people. The term "war injuries" is used here in its widest sense and includes not only gunshot wounds but also every kind of trauma besides exposure to cold, damp, and other adverse conditions, physical and mental. The susceptibility to manifestations of chronic rheumatism, such as pain and limitation of movement, implies a deficiency in the adaptive functions of the human organism. Patients in whom these adaptive functions are lacking or subnormal are seriously handicapped in their struggle against such adverse influences as chills, climatic vagaries, occupational stresses, bacterial invasions, and unsuitable food. Under ordinary conditions the body can adapt itself to constant changes in temperature and humidity. People vary enormously in their liability to "take cold;" some can sit for hours in damp clothing without ill effect, whereas others exposed to similar conditions contract a severe brachial neuralgia or lumbago. It is thought by many observers that one of the essential causes of the rheumatic syndrome is an inefficient cutaneous circulation. Most clinicians will agree that a rheumatic limb is colder than normal and shows evidence of peripheral vasoconstriction.

In considering the provision which will undoubtedly have to be made for dealing with this class of war disability it is to be sincerely hoped that the claims of the therapeutic pool will not be overlooked. Anyone who has had practical experience of the pool in the treatment of the various manifestations of chronic rheumatism cannot but be impressed with its value. Since it is equally applicable in non-rheumatic cases, there is every reason to assume that the results will be even better in the treatment of pain, stiffness, and deformity following war injuries affecting the limbs of possibly younger or, at any rate, healthier people. For some unexplained cause the therapeutic pool, apart from the spas, has never attained the popularity in this country that it has in America. A few institutions have installed them, and the sole object of this paper is to urge the importance of a rapid increase in their number. That this form of treatment is more extensively used in the United States is clearly shown by the responses to a questionnaire, addressed by Lowman[1] to a hundred prominent institutions, which indicate that two-thirds of these have had therapeutic pools for two months to eleven years, with an average of five years.

MECHANICAL EFFECTS

A reference to any textbook on physics or hydraulics will recall the following facts: (1) a floating body displaces its own weight of liquid; (2) a body wholly or partially immersed in a fluid is buoyed up by a force equal to the weight of fluid displaced; (3) hydrostatic pressure increases in direct proportion to fluid density and vertical depth of pressure point below the surface level; and (4) pressure on the surface of a moving body is directly related to the velocity of motion. Based on these principles, some important observations regarding movements in water have been made.

Movement of the limbs against viscosity.—The internal resistance of a fluid is called its viscosity. When a body sinks to a point where it lies as a dead weight, it is buoyed up by a pressure exerted by the water, which is equal to its weight. The body, being supported at all points by this force, is in much the same position as if it rested upon a table. If it is desired to move the body sideways, the upward pressure being constant, all that must be overcome is the dynamic pressure caused by the relative viscosity of body and water and the frictional resistance of the surface of the body. In other words, movement in water is merely the overcoming of the internal friction of the joints besides the resistance of the lateral pressure. Muscles sufficiently healthy to contract definitely but unable to move a joint out of water can often function in water. A good example of this is often seen in the stiffened and painful hip-joints in cases of coxarthritis: patients who have to be wheeled or carried and lowered into the pool can at once walk in the water with apparent ease.

Movement against gravity and weight of superincumbent water.—The contraction of a muscle raising a limb in water to a higher level towards the surface is aided by buoyancy. The work is done by the muscles pulling from the insertion towards the origin. The intrinsic muscles move the limb upwards and involve the extrinsic stabilisers of the joint according to the effort needed. Since the pull of gravity in water is nearly negligible, very little work is required of the intrinsic muscles.

Resistive action in pulling a part downwards from the surface.—This movement (the opposite to the one described above), being against the upward water pressure, needs more force in both intrinsic and extrinsic groups of muscles. If, for example, the patient is floating supine and performs a submergence movement of a leg by forcing it downwards in extension, the gluteal muscles intrinsically carry it out, while the back extensors and the abdominals are actively concerned in securing pelvic stabilisation extrinsically. This extrinsic fixation really consists in the effort of muscles to steady a base of action. Lowman summarises the differences between the work of a regulation remedial gymnasium and that carried out in the therapeutic pool as follows:—

(1) There may be no fixed resting-place in water, whereas there is in the gymnasium. In the water muscles contract and move origin and insertion or both, whereas the fixation in the gymnasium work does not allow this freedom of action.

(2) In the water a flow of fixative effort goes completely round the body, as though it were a cylinder. More synergists may be called into play because of the difficulty in obtaining stability. In consequence an unbalanced strong muscle assumes disproportionate activity—hence greater importance.

Lowman also points out that, even though a muscle has received special intrinsic training for several years and has apparently reached its maximal recovery in the gymnasium, it may improve still further in underwater work, owing to the tension load being increased by voluntary work as an extrinsic stabiliser before continuing its intrinsic action. In under-water work the necessity of developing these extrinsic stabilisers of origin or base of action of intrinsic groups opens up new possibilities of many muscles.

EXPENDITURE OF ENERGY

The relative expenditure of energy in exercises performed in air and water has been investigated by

1. Lowman, C. L. The Technique of Underwater Gymnastics, Los Angeles, 1937.

Crowden.[2] As a result of experiments carried out at the British Red Cross Society's rheumatism clinic it was found, by estimating the relative increase in the oxygen requirement over the resting level in air and water, that the increased oxygen requirement per minute of exercise was about twice as great in air as in water. The subject of the experiments plainly showed that he was practically exhausted after a period of two minutes' exercise in air, but under water he would carry on with the exercise almost indefinitely at the same rate. It is a matter of common knowledge that it would be impossible to perform in the air the ordinary motions of swimming for more than a few minutes, whereas under water they can be carried out for long periods.

THERMAL EFFECTS

Of the various means of applying heat to the surface of the body water is probably the best. This is no doubt due to its high specific heat, by which is meant the quantity of heat absorbed or evolved when a unit mass of a substance undergoes an increase of temperature of 1° C. For example, it takes much longer to heat a pint of water up to, say, 110° F. than an equal weight of iron, but the water in cooling will give out much more heat. Water has therefore a higher specific heat than iron.

EFFECT ON PERIPHERAL CIRCULATION

The blood-vessels of the skin—arterioles, capillaries, and venules—form one of the blood depôts of the human body. According to McDowell, about 10 per cent. of the total blood volume is stored in the skin, the other depôts being the spleen, liver, splanchnic area, lungs, larger veins, and bone-marrow. The cutaneous vessels are controlled by the sympathetic nerves, mostly vasoconstrictor, which are especially abundant in the skin. The skin vessels are readily influenced by changes in the tonic activity of the vasomotor centre and respond quickly to local, thermal, mechanical, and chemical stimuli. Besides this centrally produced vasoconstriction, the capillaries respond to mechanical stimulation, which liberates histamine from a precursor normally present in the skin. This sets up local vasoconstriction, then vasodilatation, and increased permeability of the vessels, which are included in the "triple response" so graphically described by Lewis. The surface application of heat causes the blood to flow in much larger volume through the dilated peripheral vessels, and the skin becomes reddened in consequence. Besides the dilatation of the arterioles, the number of open capillaries is increased, as is the rate of blood-flow through them. At a temperature of 90°–100° F. the rate of exchange between the blood and tissues reaches its optimum. In these circumstances the blood entering the veins contains 60–65 per cent. of its saturation value of oxygen. Too great heat (105° F. and above), while further increasing the number of open capillaries, accelerates the flow of blood to such an extent that the blood entering the veins simulates arterial blood, containing about 91 per cent. of its saturated value of oxygen. It should hardly be necessary to emphasise the supreme importance of improving the blood-supply and thereby promoting increased tissue exchanges in limbs in which, as a result of wounds, the circulation has been interfered with and their mobility diminished by the presence of exudations caused by inflammation.

UNDER-WATER DOUCHE

The under-water douche or *douche sous-marine* consists of a stream of water under pressure, at a temperature 10° higher than the pool, delivered through a hose with a fairly wide nozzle. This, directed against the submerged portions of the body, has a pronounced analgesic effect in painful conditions of various kinds. It constitutes, moreover, a most effective form of under-water massage, for the skin can be seen to be depressed by the force of the current as the nozzle is moved along its surface.

CONSTRUCTION OF POOL

Size.—Lowman recommends a pool 12–15 ft. wide and 20–24 ft. long for a large institution, if the pool is to be used for all types of cases in a full range of treatments. A depth of 4 ft. 6 in. at the deep end, graduated to 2 ft. 6 in. at the shallow, will be found to provide the least possible amount of water needed for constant practical use. In hospitals where adults predominate a greater depth, up to 5 ft., is of advantage. A pool less than 12 ft. wide is too small for certain exercises. For instance, from a plinth placed close to the side wall a 6 ft. patient with arms extended overhead will project 7–8 ft. Certain exercises that require the technician to stand beyond the patient's feet, reaching forwards to grasp the ankles, will need at least 2 ft. more, making necessary a minimum of at least 10 ft.

With a plinth placed at the narrow end of a pool and projecting lengthwise, the arm and leg spread in wide double abduction require at least 6 ft. Therefore 10 × 12 sq. ft. is the least amount of space useful for treatment, except in pools used exclusively for small children or for simple movements for localised muscle training for paralysis or fractures. Short pools cannot be deep enough to accommodate both shallow-water and deep-water exercises without having too steep a slant to the floor; this steepness interferes with the stance of the technician, the walking exercises of the patient, and the placing of any pedestal-supported apparatus.

These particulars regarding the dimensions of therapeutic pools in America, taken from Lowman's book, show that such pools are more applicable to institutions where every variety of remedial exercise is in use for the treatment of such neurological conditions as poliomyelitis and spastic paralysis. For rehabilitation after war wounds the installation need not be so elaborate.

The therapeutic pool at the B.R.C.S. clinic is circular, measures 18 ft. across, and allows for a depth of water of 3 ft. 4 in. It is kept at a temperature of 100° F. by the constant addition of hot water; hence it is really a flowing pool. When several patients are in the pool at one time, the under-water douche helps to maintain the required temperature. Fixed to the floor is a set of parallel bars, on which the patients carry out various gymnastic movements. It is not usually necessary to have a technician in the water; since in most cases active not passive movements are needed, the necessary instructions can be given from outside the pool. Seats are fixed within the circumference of the pool, so that patients can carry out entirely under water all movements involving the shoulder girdle. Steps with a handrail are provided for entering the water.

TREATMENT OF WAR DISABILITIES

The news-letter circulated in January, 1940, by the Central Council for the Care of Cripples says:—

"... But when we come to the question of restoration of function, something more is required than is generally found in the massage and physiotherapy departments of a hospital. Massage, movements, electrical treatment serve their purpose up to a point,

2. Crowden, G. P. *J. Physiol.* 1935, **84**, 31.

but actual use of the damaged limb, if possible under conditions which distract the attention from the disability, have a greater value. For this reason, facilities for exercise in a gymnasium for indoor and outdoor games and for light work are required ; and an instructor with the necessary persuasive power should be available to help the patients to resume their activities and to get back their confidence."

It would not be easy to find a more cogent argument for more pools in this country than that supplied by this paragraph. The therapeutic pool does supply something more than massage, movements, and electrical treatments, after these have served their purpose, because a patient, when he finds that movements which were difficult or impossible become comparatively easy under water, is encouraged and strengthened in his determination to persevere in his efforts. It appears therefore that the therapeutic pool occupies a position midway between ordinary massage and electrotherapy and occupational therapy. One has but to see a therapeutic pool in use and talk to the patients undergoing treatment to be convinced of its efficacy.

EFFECTS OF SOME PRESERVATIVES ON STORED BLOOD

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ALTHOUGH many investigations have been made on the preservation of blood, comparatively few have included studies of the chemical changes. Blood is a highly complex physicochemical system, and changes may arise through alterations in the organic constituents, by diffusion across the membrane of the red cell, or by liberation of the cell contents after rupture of the membrane. The experiments described below form part of some investigations designed to obtain more detailed knowledge of the chemical changes in blood during storage, and we propose in this paper to limit our discussion to hæmoglobin and potassium and phosphorus compounds, because these constituents are present in widely different concentrations in the cells and plasma of normal blood. In these experiments only the anticoagulant and the atmosphere above the blood were varied, while other factors, such as temperature, degree of dilution, area of contact between cells and plasma, and degree of mechanical disturbance, were kept constant. Alterations in any of these conditions might be expected to influence the chemical changes in blood by promoting or by retarding chemical reactions or by altering the permeability of the cell membrane.

EXPERIMENTS

An anticoagulant solution was put into each of twelve sterilised quart-sized milk bottles (lettered A to M) as follows :

Bottles A, B, C, and D each received 25 c.cm. of a solution containing 2·18 g. of anhydrous sodium citrate. Bottles E, F, G, and H each received 9 c.cm. of a solution containing 45 mg. of heparin equivalent to 18,000 units (Roche). Bottles J, K, L, and M each received 25 c.cm. of a solution containing 2·18 g. of anhydrous sodium citrate and 6·25 g. of glucose.

Fresh sterile blood (600 c.cm.) was collected from each of twelve donors belonging to group B, added to the prepared bottles, and well mixed with the anticoagulant solutions. The final concentrations of the anticoagulants in the three series of bottles were thus 0·35 per cent. of sodium citrate, 7·5 mg. of heparin per 100 c.cm., and 0·35 per cent. of sodium citrate + 1 per cent. of glucose respectively. Aliquots of 60 c.cm. were transferred under sterile conditions from each of these bottles (A–M) to a series of 120 sterile bottles lettered A_0, A_1–A_9 ; B_0, B_1–B_9 ; . . . . M_0, M_1–M_9 (180 c.cm. capacity ; 9 cm. high × 4·2 cm. diameter, making a depth of liquid of 4·5 cm.). The atmospheres (over the blood) in these bottles were adjusted so that the following combinations were obtained :—

	Citrate	Heparin	Citrate-glucose
Air . . .	A_0–A_9	E_0–E_9	J_0–J_9
Oxygen . .	B_0–B_9	F_0–F_9	K_0–K_9
Reduced pressure	C_0–C_9	G_0–G_9	L_0–L_9
Carbon dioxide .	D_0–D_9	H_0–H_9	M_0–M_9

These bottles were sealed with sterile screw caps, coated with paraffin wax, and placed in the refrigerator at 4° C. The first bottle of each of the twelve series (A_0–M_0) was used for analysis at the beginning of the experiment, and twelve further bottles, one from each of the series A–M, were removed together at intervals over a period of thirty days. The physical appearance of the blood in each bottle, after it had been removed from the refrigerator, was carefully noted. The blood was then shaken to ensure a uniform distribution of cells ; samples were removed for bacteriological and cytological examination by Dr. J. Goldman (whom we thank for his assistance in the collection of the blood from the donors), and the remainder was then used for the following analyses :—

Plasma : (1) inorganic, total acid-soluble and lipoid phosphorus (Fiske and Subbarow 1925) ; (2) potassium (Jacobs and Hoffman 1931) ; (3) hæmoglobin as iron (modification of Blackwood and Stirling 1932 and Jackson et al. 1935).

Whole blood : (4) cell volume by the hæmatocrit (Wintrobe tube) ; (5) inorganic, total acid-soluble and lipoid phosphorus ; (6) potassium and iron on the initial samples.

In the preparation of the plasma the blood was centrifuged under a layer of oil, and the separated plasma was recentrifuged to remove completely all the cells. From a review of some 2000 of our analyses it was obvious that the effects of storing the blood under different atmospheres or reduced pressure were small in comparison with those produced by using anticoagulants such as citrate or heparin. In the present paper, therefore, we shall limit our discussion to the influence of the latter. Our results are summarised in the accompanying table and fig. 1.

DISCUSSION

Degree of hæmolysis.—One important fact observed was that the appearance of the supernatant plasma in the bottles immediately after removal from the refrigerator was of little use in assessing the degree of hæmolysis. Even after three or four weeks' storage the supernatant plasma was often clear, although after mixing and centrifuging hæmolysis was obvious in the separated plasma. In some cases a layer of hæmolysis was apparent below the undisturbed supernatant

CHANGES IN PLASMA, HÆMOGLOBIN, POTASSIUM, AND INORGANIC PHOSPHATE

Day	Citrate (Mean values of series A, B, C, D)				Heparin (Mean values of series E, F, G, H)				Citrate-glucose (Mean values of series J, K, L, M)			
	Observed hæmolysis	Hb.*	K †	Inorg. P †	Observed hæmolysis	Hb.*	K †	Inorg. P †	Observed hæmolysis	Hb.*	K †	Inorg. P †
0	—	—	21·2	3·00	—	—	21·7	3·83	—	—	21·9	3·37
1	—	—	27·9	2·64	—	—	33·7	3·09	—	—	38·7	2·30
2	—	0·12	39·9	3·09	—	0·46	48·7	3·19	—	—	53·6	1·78
3	+	0·21	58·2	3·04	+	1·8	65·0	3·75	—	—	62·1	2·23
5	+	0·30	88·0	3·29	+ +	2·2	79·7	4·43	—	—	77·9	2·86
9	+ +	0·75	92·4	3·65	+ +	3·2	—	6·92	—	0·11	97·6	3·41
16	+ +	1·80	129·0	5·95	+ + +	—	131·0	8·86	—	0·21	115·0	4·96
23	+ +	2·80	154·0	8·62	+ + +	4·2	159·0	10·94	—	0·35	129·0	6·88
30	+ +	4·30	170·0	9·46	—	—	—	—	+	0·87	145·0	10·10

* g. per 100 c.cm. † mg. per 100 c.cm.

plasma and above the cells, and one effect of mixing was to distribute this throughout the blood. It is probable that the shaking caused also the further breakdown of the more fragile cells. For both these reasons, therefore, the figures obtained by the present technique must be higher than those obtained for the undisturbed supernatant plasma ; since shaking is an essential preliminary to the use of the blood for transfusion, it is felt that our data give a truer picture of the fluid that would be transfused.

The "observed hæmolysis" given in the table therefore refers to the appearance of the plasma after

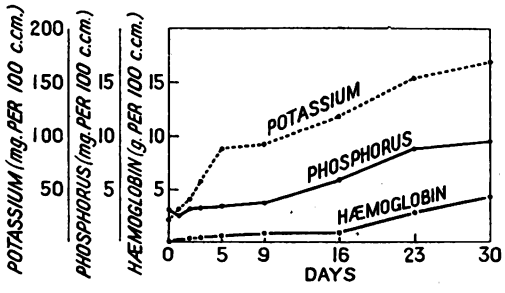

FIG. 1—Changes in concentration of plasma hæmoglobin, potassium, and inorganic phosphorus in citrated blood.

mixing and centrifugalisation and not to the supernatant plasma which had separated out during storage. A slight degree of hæmolysis was obvious in the citrate and heparin series on the third day, and this increased throughout the course of the experiments, being more pronounced in the heparinised blood. In the blood mixed with citrate + glucose the plasma was clear until the final sample on the thirtieth day. These observations were confirmed by determination of the plasma hæmoglobin (calculated from the plasma iron). The figures show that a measurable amount of free hæmoglobin was present in the plasma on the second day in the heparinised and citrated series. On the twenty-third day the amounts in the heparin, citrate, and citrate-glucose series were 4·2 g., 2·8 g., and 0·35 g. per 100 c.cm. respectively, corresponding to a hæmolysis of 15 per cent. (heparin series), 10 per cent. (citrate series), and 1·2 per cent. (citrate-glucose series). On the thirtieth day the hæmolysis had increased to 15·3 per cent. for the citrate series and 3 per cent. for the citrate-glucose series. It will be noted that the blood preserved in citrate-glucose was less hæmolysed on the twenty-third day than the heparinised series on the second day and the citrated series on the ninth day.

A matter of the greatest importance in transfusions is increased viscosity and formation of clots in the stored blood. We observed that the blood preserved with heparin became extremely viscous, clots appearing on the third day and increasing throughout storage. On the other hand, no clots were formed in the citrated blood, although there was some slight increase in viscosity. The blood, however, was only slightly diluted by the addition of the anticoagulants. Dilution—e.g., with isotinic saline—is often recommended for the storage of blood, and it is possible that a further dilution of the heparinised blood might retard more effectively the formation of clots and the onset of hæmolysis.

Changes in plasma potassium.—The table and fig. 1 show that a rise in plasma potassium took place during the first few days of storage and continued, though not so sharply, throughout the period investigated. None of the preservatives employed prevented the release of potassium from the cells into the plasma, although in the later stages the potassium levels in the citrate-glucose samples were lower than in the others. The increase in the plasma potassium in the later stages is due partly to the liberation of the cellular potassium by hæmolysis, but the initial rapid increase in plasma potassium cannot be due to this, as is shown by a comparison with the hæmoglobin figures (fig. 1). It therefore appears very probable that the cell membrane, which in vivo is usually considered to be impermeable to potassium ions, allows such ions to pass through soon after removal from the human body. These observations are in agreement with the studies of Ponder and Robinson (1934), Kerr (1929), Davson (1934), and Maizels (1935) on permeability and with the extensive investigations of Scudder et al. (1939).

The conditions governing the permeability of the cell membrane to potassium and other ions are very complex. It is obvious, however, that the osmotic pressure of the preserving fluid is a matter of prime importance and one to which insufficient attention has been paid in studies on blood storage, as Maizels and Whittaker (1939) have well demonstrated.

Distribution of phosphorus compounds.—The changes which took place in the distribution of the phosphorus of the cells and plasma of series A (citrate-air) are shown in fig. 2. Similar curves were obtained in all the other series. The main changes were as follows.

(1) Lipoid phosphorus remained constant in the red cells and plasma within the limits of experimental error.

(2) Organic acid-soluble phosphorus, after a small but consistent initial rise, sharply decreased in the red cells. In the plasma, after a slight initial rise, the value returned to its initial low value and remained constant.

(3) Inorganic phosphorus, after a small initial decrease, sharply rose in the red cells. A similar sequence of changes took place in the plasma, but the increase was delayed and not so pronounced.

(4) Total acid-soluble phosphorus: the changes were a summation of (2) and (3). The value was constant for whole blood but decreased in the red cells and increased in the plasma.

It is probable that these changes are the result of three main processes: the enzymic degradation of organic phosphates in the cells; the slow diffusion of the liberated inorganic phosphate into the plasma; and (in the later stages) the addition to the plasma of the phosphates of the hæmolysed cells. These processes take place at different rates; for example, on the ninth day the concentrations of organic and inorganic phosphate in the cells (sample A) were 16·9 mg. per 100 c.cm. and 22·1 mg. per 100 c.cm. respectively, representing a degradation of over half of the cellular organic phosphate and a sixfold increase in inorganic phosphate. Thus, in spite of the low temperature this process is fairly rapid. On the other hand, diffusion, depending on an increase in the permeability of the cell membrane for phosphate ion, has led on the ninth day to only a slight increase of the plasma inorganic phosphate. In the example quoted there was a 10 per cent. increase, some of which was due to hæmolysis, which in the later stages will play a major rôle (see fig. 1).

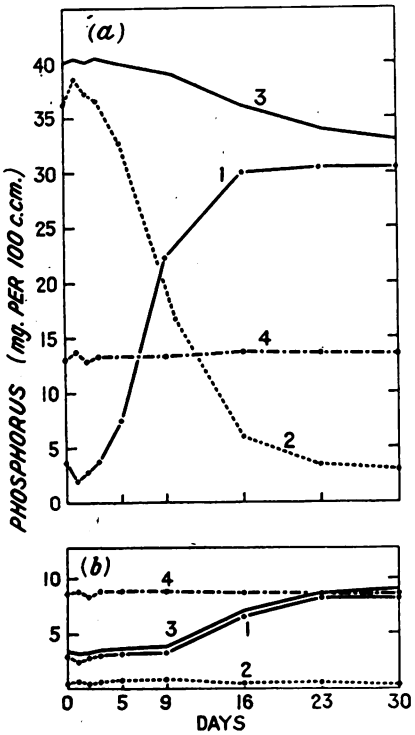

FIG. 2—Changes in distribution of phosphorus in citrated blood: (*a*) cells; (*b*) plasma; 1, inorganic phosphorus 2, organic acid-soluble phosphorus; 3, total acid-soluble phosphorus; 4 lipoid phosphorus.

The impermeability of the erythrocyte to phosphate ion at low temperatures has been emphasised by Maizels and Whittaker (1940), who have further shown that incubation for a few hours has a more profound effect than storage at 4° C. for many days. Higher temperatures would be expected to accelerate all the above processes, and further experimental evidence for this has been provided by the experiments of Martland et al. (1924) and Bick (1939).

The relative constancy of the lipoid phosphorus in both cells and plasma is of importance in that it shows that little if any of the inorganic phosphate can be derived from this source. With extensive hæmolysis an increase in plasma lipoid phosphorus would be expected. The initial fall in plasma inorganic phosphate is to be ascribed to a temporary enzymic synthesis of organic phosphate by a combination of the inorganic phosphate with the glucose of the blood (Lawaczeck 1924, Martland et al. 1924). This explanation is supported by the fact that the effect was much more pronounced in the series preserved with citrate-glucose.

These observations may provide a clue to the beneficial effect of glucose preservation, a fact observed by many workers (Rous and Turner 1916, Gwynn and Alsevers 1939, Harington and Miles 1939, Bick 1939, Maizels and Whittaker 1939, 1940). The last-named authors have put forward three possible explanations: the osmotic pressure effect due to the low permeability of the cell membrane to glucose; the physicochemical effect on the cell membrane; and the maintenance of cellular metabolism. It seems probable that all these processes are involved, but our data appear to indicate that the maintenance of cell metabolism may be of considerable importance, and that the most important effect of the added glucose may be to retard the degradation of the organic phosphates. These compounds probably play an important part in cellular metabolism besides assisting in the maintenance of osmotic and acid-base equilibrium (Peters and Van Slyke).

CONCLUSIONS

(1) In the plasma of stored blood there is an immediate rise in potassium, an initial fall followed by a gradual rise in inorganic phosphate, and a delayed and gradual rise in hæmoglobin.

(2) Since there is no direct correlation between these changes, different processes must be involved.

(3) In blood stored with the minimum of dilution, citrate-glucose appears to be definitely better than citrate alone, and both are better than heparin as anticoagulants in delaying hæmolysis and in retarding the chemical changes in the cells leading to increased values for plasma inorganic phosphate.

(4) None of these anticoagulants prevented the diffusion of potassium into the plasma, but over a long period the citrate-glucose showed a lower value for plasma potassium, probably owing to the lower degree of hæmolysis.

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HYPERÆMIA AS A TEST OF MALE SEX HORMONE

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H. KUN

SEX hormones, both in the natural state and when synthesised, cause hyperæmia (Steinach 1910 and 1936, Steinach, Peczenik, and Kun 1938). The development and maturity of seminal vesicles, prostate, uterus, and mammary glands are accompanied by a considerable hyperæmia, which can also be produced by administering the corresponding synthetic hormones (Steinach, Dohrn, et al. 1928). Hyperæmia was also produced in males by ligature of the vasa deferentia. This hyperæmia also affects the entire organism, as shown by considerable hyperæmia of abdominal muscles, mesentery, intestine, skin, and brain (vital stain) in senile rats after ligature of the vasa deferentia. Identically similar results were obtained by administering hormones. The clinical study of the influence of sex hormones on high blood-pressure and hypertonia also demonstrates that the administration of male hormones and of male and female hormones together both reduce hypertonus and increase the circulation (Steinach, Peczenik, and Kun 1938).

The following description of hyperæmia, produced by the male sex hormone (testosterone) in the skin of the male genital region, confirms our earlier findings in experiments with gonadotrophic hormone administered to infantile male rats (Steinach and Kun 1928). At that time we found that gonadotrophic hormone induced precocious sexual maturity as regards seminal vesicles, prostate, penis, libido, and potency, by activating the secretion of the testes. The first sign of precocious maturity was hyperæmia of the perineal and scrotal regions. At the same time, the testicles descended, as a result of which the skin of the scrotum became tense and the hyperæmia more striking. This sign can only be observed in albino or spotted males with little pigment in the perineal region.

The synthesis of various substances with androgenic activity has raised the question as to which of these substances, if any, is the natural hormone. To settle this question it is necessary to compare the effects of every synthetic hormone with those of the biologically prepared hormone. Since we attributed the above-mentioned appearance of scrotal hyperæmia and descent of the testes to the influence of increased physiological testicular hormone, we proceeded to find out whether synthetically prepared compounds could produce qualitatively and quantitatively identical responses.

EXPERIMENTS ON NORMAL RATS

Our experimental animals were normal infantile male rats. The animals were seventeen to fifty-six days old (body-weight 15–47 g.) at the beginning of the injections. We investigated one substance of the androsterone group (androsterone benzoate) and one of the testosterone group (testosterone propionate). A few animals were also treated with œstradiol benzoate and progesterone. In every experiment litter mates were used as controls. The total amount of the hormone was divided into ten equal single doses (testosterone propionate dissolved in 0·05–0·2 c.cm. of sesame oil, and androsterone benzoate in 0·1 and 0·5 c.cm). and injected within five days (once in the forenoon and once in the afternoon). The controls regularly received equal quantities of pure sesame oil.

Testosterone propionate was injected in doses of 0·1–50 mg. into 80 animals, and sterile oil into 60 controls, the animals coming from forty-eight litters. Androsterone benzoate was administered in doses of 20 and 100 mg. These high doses were chosen because of the slight effect of androsterone on the seminal vesicles and prostate of mammals. The results with androsterone benzoate were so clear that we contented ourselves with only 8 experimental animals and 10 controls from five litters.

RESULTS

The males treated with testosterone propionate showed all the symptoms we had observed as a result of injecting gonadotrophic hormone. Hyperæmia of the perineal region developed on the fourth to sixth day of treatment according to the dose. It began at the caudal end close to the anus and then extended towards the penis. The culminating point was reached on the sixth or seventh day. Then in the following two or three days the redness rapidly disappeared. The hyperæmia of the scrotum was accompanied by a remarkable reduction in the density of the hair at that place. This is also a sign of maturation, for the scrotum of the adult animal is only scantily covered with hair. Removal of the perineal skin showed that parts of the perineal muscles were also hyperæmic. During narcosis or after death the hyperæmia of the scrotum and perineum disappeared immediately; hence increase in the circulation cannot be proved microscopically. The smallest dose with which a recognisable redness could be demonstrated was 0·25 mg. If 0·1 mg. was injected, there was usually no hyperæmia or in some cases it was very slight.

EXPERIMENTS ON CASTRATED RATS

Since the above-mentioned experiments were made on normal infantile males, it was not clear whether the scrotal hyperæmia was produced directly by testosterone propionate or whether testosterone propionate, by activating the infantile testis, stimulated an increased production of autogenous hormone, which then caused the hyperæmia. There was also a third possibility—namely, that the administered hormone induced the secretion of pituitary (gonadotrophic) hormones, causing the hyperæmia by way of hypophysis → testicle → scrotum. Similar experiments were therefore carried out on castrated animals. Testosterone propionate produced hyperæmia in these castrated rats, and this fact suggests that the effect is directly due to this hormone.

TESTICULAR DESCENT

Descent of the testicles after the injections of testosterone propionate can be observed on the fourth to sixth day. At first the testes can be more easily pressed digitally from the abdomen into the scrotum, but they slip back again after removal of the pressure. When the animals are killed on the sixth or seventh day after the beginning of the treatment, the testicles are regularly found in the scrotum, in contrast to the controls, in which they remain in the abdomen. The threshold value for this response is 0·25 mg. of testosterone propionate. These experimental results suggest that testosterone propionate may be of value in the treatment of cryptorchism in human males. Androsterone benzoate (20 and 100 mg.) did not induce hyperæmia or descent of the testes in any animal. A negative result was also obtained

with œstradiol benzoate (60 and 500 g.) and progesterone (5 and 50 mg.)

COMMENTS

It thus seems that testosterone propionate alone of the male and female hormones used is capable of producing effects which were obtained with biological extracts of male hormone. Whether or not scrotal hyperæmia and descent of the testes are strictly specific effects of testosterone will be tested by examination of other male-hormone derivatives; if they are, a specific test for testosterone has been found for the first time, for the usual methods of standardisation on the comb of capons and on the seminal vesicles of rats do not allow a differentiation between androsterone and testosterone, even though there are considerable quantitative differences in the efficacy of the two hormones.

The negative results with œstradiol benzoate are of particular interest, for they appear to contradict our earlier experiments which showed that the female hormone produced a definite hyperæmia of brain, eye, and skin (Steinach, Kun, and Peczenik 1936, Kun 1937). It must be realised, however, that in these earlier experiments senile animals with underfunctioning organs were used. Œstradiol benzoate did not cause hyperæmia in the strict sense of the term in these animals but restored to normal the defective or disturbed functions of blood-vessels or, as Steinach called it, stimulated a "euhæmy" (Steinach, Peczenik, and Kun 1938). Œstradiol benzoate is incapable of raising the circulation beyond the normal limit in young animals, as has been shown by experiments on the brain and skin. But the female hormone also produces true hyperæmia of the uterus, mammary gland, and areola (Steinach, Dohrn, et al. 1928) comparable with that of the seminal vesicles, prostate, penis, and scrotum produced in the male by the male hormone.

SUMMARY

Testosterone propionate induces hyperæmia of the scrotal region and a precocious descent of the testicles in infantile male rats. The threshold value of both effects is 0·25 mg. Hyperæmia can also be obtained in castrated animals, a fact which indicates a direct effect of testosterone propionate on the cutaneous circulation. Androsterone benzoate, œstradiol benzoate, and progesterone do not produce this effect. The examination of further male-hormone compounds will show whether this action of testosterone is specific or not. If it is specific, the scrotal hyperæmia could be used as a test to identify testosterone.

Of all the synthetic hormones tried in these experiments testosterone alone acts like the natural hormone. This fact seems to be important for future hormone therapy; for the aim of clinical treatment must be the use of those hormonal substances whose effects resemble most closely those of the natural sex hormone. An advance towards this goal can be seen in the combined administration of male and female hormones proposed by us for the treatment of hypertonia and high blood-pressure (Steinach, Peczenik, and Kun 1938).

We are indebted to Prof. W. Schoeller, of Messrs. Schering, Berlin, for supplies of the hormones.

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ACUTE SUBDURAL HÆMATOMA

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I am prompted to report the following case after reading that described by Templeton in The Lancet of March 16, for although chronic subdural hæmatoma has been recognised for many years as a clinical entity the acute variety is not so well recognised. It is, however, sufficiently common to make it appropriate to draw attention to its features at a time when head injuries, both in the war and in the blackout, are on the increase. In the case reported here, the patient would certainly have died if he had not been operated on at the right moment.

Horrax and Poppen (1936) believe that chronic subdural hæmatoma is becoming commoner, no doubt owing to modern road traffic. Whereas in 1925 Putnam and Cushing found 5 cases in nine years at the Peter Bent Brigham Hospital, Horrax and Poppen found 18 cases in two years at the Lahey Clinic. They divide the patients into three main types: (1) those in whom intracranial symptoms develop many weeks after a cranial injury; (2) those sent in with a diagnosis of intracranial tumour; and (3) those admitted with occasional headache only. Kennedy and Wortis (1937) have studied the acute variety and conclude that it occurs in 9–13 per cent. of all head injuries, and that it is four times as common as the classical middle-meningeal hæmorrhage. They found 72 cases between 1912 and 1936 at the Bellevue Hospital. It is important to note that in about a third of the cases the hæmorrhages are bilateral. In the acute variety they include all cases in which symptoms develop a few hours to twenty-one days after the injury. They suggest that the hæmorrhage may come from a cerebral laceration or a cortical vein, whereas in the chronic variety Trotter (1914) described it as coming from a tear of a vein at its junction with the superior longitudinal sinus. The chief symptoms and signs are focal signs of hemiparesis, waxing and waning consciousness or progressive stupor, a pulse-rate below 60, a dilated pupil on the affected side, and bloodstained cerebrospinal fluid (C.S.F.). Other prominent symptoms are initial unconsciousness followed by a lucid interval of hours or days, vomiting, headache, incontinence, cranial-nerve palsies (particularly a lower facial weakness), motor weaknesses, absent abdominal reflexes, and altered plantar reflexes. It is the absence of a single clear-cut clinical picture that makes diagnosis so difficult, and bilateral hæmorrhages confuse the signs even more.

CASE-RECORD

A man, aged 73, was knocked down by a car on July 25, 1939. He was dazed but able to get up and was taken home by car. There was a cut on the middle of the forehead, and small bruises elsewhere; there was some shock and vomiting and a complaint of frontal headache but no recollection of the accident. When seen by Dr. Nelson Jones (for Dr. D. G. Carmichael) his temperature was 97° F., pulse-rate 54, and blood-pressure 135/90. Pupils equal and reacting; other reflexes normal.

July 26: left-sided headache; otherwise as before. Radiography revealed Paget's disease of the skull but no fracture. On the 27th the left pupil was sometimes smaller than the right and reaction less brisk. Reflexes on right brisker than left. Right extensor plantar. Slight dysphasia. Lumbar puncture revealed yellow C.S.F. Headache continued, for which bromide and

chloral were given. After this he began to be somewhat drowsy, and deep reflexes were obtained only with reinforcement. On the 29th knee-jerks and ankle-jerks were absent, and plantar reflexes were extensor on both sides. Since there was no improvement during the next few days, he was seen by Dr. Russell Brain and myself on July 31, when the neurological signs were as mentioned above, but he had to be stimulated to answer questions. Although we suspected that there might be a subdural hæmatoma, we thought that these few signs could be caused by cerebral œdema, and we therefore instituted treatment designed to reduce this.

On August 2, at 2 P.M., the patient's condition suddenly became much worse, and, since it was now clear that he would certainly die unless something were done promptly, he was transferred to Nuffield House, Guy's Hospital, where I asked Mr. D. W. C. Northfield to see him with me at 5 P.M. The patient was now deeply comatose, with blood-pressure 140/80, pulse-rate 60, and deep and periodic respiration. No verbal response. Resented nose pinch, but not pinprick. No rigidity of the neck. Optic disks normal. Left pupil brisker than right, but both sluggish. Right grasp reflex (does not move right arm well). Tendon-jerks: arms, right brisker than left; legs, brisk and equal; abdominals, absent; plantars, extensor. Sensory changes could not be elicited. A subdural hæmatoma was diagnosed, and an operation was performed by Mr. Northfield, assisted by me.

Operation.—Local anæsthetic was injected in four places, in the frontal and parietal regions of the vertex on both sides, in anticipation of the possible necessity of exploring all these regions. The left frontal region was explored first through a burr hole, and 2 oz. of dark bloodstained fluid was aspirated from the subdural space. This was not so syrupy as the fluid in the more chronic cases. The cavity was washed out with saline; but, since the brain showed no signs of expanding at once, it was difficult to be sure that the cavity was completely emptied of blood. There was no visible membrane on the surface of the brain, and the convolutions could be clearly seen. The right side was then explored through a frontal burr hole; the subdural space contained a small quantity of clear fluid but no hæmatoma. Both skin incisions were sutured without drainage.

The patient was distinctly less stuporose at the end of the operation and during the night following. The next day (August 3) he was rather more stuporose but could swallow a little. His fluid intake was supplemented with rectal saline. On the 4th he was still more deeply stuporose and not swallowing so well. Nasal feeding was instituted, 8 oz. every two hours. Left pupil larger than right. Reflexes all absent, except plantars, which were extensor. That evening he was rather better and responded to speech with an effort. Knee-jerks now present, but pupil still dilated. Lumbar puncture revealed a slightly straw-coloured fluid under a pressure of 40 mm. On the 5th his condition was about the same, except that the arm tendon-jerks and the ankle-jerks had returned. Plantars still extensor. Left pupil still larger than right. A needle through the left frontal burr hole drew off 46 c.cm. of thin dark fluid.

August 8: there is slow but steady improvement in his general condition; although he has slept a fair amount, he is now alert and has been holding long conversations since the morning of the 6th. He occasionally gets a little giddiness, with a sensation of rotation when he is turned in bed, and is beginning to resent the elevation of the foot of the bed, which he thinks gives him a headache. He is no longer incontinent, and pulse-rate and temperature are low and steady. He sleeps fairly well and is no longer confused. There is slight rigidity of the neck. Pupils are both small, with a brisk reaction. There is slight left lower facial weakness. Power in the arms and legs is good and equal. Tendon-jerks are brisker in the left arm than the right. Both lower abdominal reflexes obtained for the first time. Knee-jerks and ankle-jerks absent (the latter have been present from time to time). Plantars still extensor in the big toes, although the other toes flex. He has been receiving each day 120 oz. by nasal tube and 20–30 oz. by mouth. Since the power of swallowing has returned, the nasal tube has been removed. A needle inserted through the left frontal burr hole withdrew 13 c.cm. of dark fluid under low pressure.

August 10: 6 c.cm. of slightly thinner fluid withdrawn through the same hole from a cavity about 0·5 cm. below the bone. August 12: is taking well by mouth and is alert. Gets occasional headache which is made worse by taking the bed off its blocks for twenty-four hours. Plantar reflexes mainly flexor, with a tendency for the big toe to go up. Tendon-jerks variable; ankle-jerks usually absent. A few days after this he was sent to the country, in view of the crisis then developing. He has steadily improved and, when seen on Jan. 14, 1940, was completely normal. He had no headache. His wife suggested that he was a little forgetful, but no more than was to be expected in a man of his age.

SUMMARY

A man, aged 73, having sustained an injury to the head, was at first not unconscious for more than a moment, but complained of headache and became gradually drowsy during the next eight days, then suddenly deeply comatose. In spite of the relative paucity of neurological signs a subdural hæmatoma was diagnosed and found at operation. Complete recovery followed.

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PROBABLE CHORIONEPITHELIOMA
IN A VIRGIN OF SEVENTY-ONE

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ALTHOUGH chorionepithelioma has been reported in patients aged 7–70 (Soresi 1936), it has with few exceptions affected parous women. The case reported here combines the unusual association of chorionepithelioma, virginity, and senility.

CASE-RECORD

A single woman, aged 71, was admitted into the gynæcological department of Dulwich Hospital because a pelvic tumour had been discovered by her doctor. She had been healthy all her life and had neither undergone any operation nor had had any serious illness. The menopause had taken place before the age of 50, and there was no history of pregnancy or of any gynæcological lesion. This was confirmed by her relations, who further stated that they had noticed a gradual decline in her general condition for the past six months. The patient said that she had felt well until three months ago, when she began to complain of severe pains in the lower abdomen. This was followed a week later by vaginal hæmorrhage, which had since continued for two or three days a week, accompanied by intermittent aching pains in the abdomen. She did not complain of any urinary symptoms but had recently become constipated and had lost much weight.

Her general condition was fair, and despite the loss of weight her abdomen was still well covered with fat. Nothing abnormal was found in the heart, lungs, kidneys, or nervous system. In the abdomen a mass could be palpated in the middle line, its upper pole being midway between the symphysis pubis and the umbilicus. Since the hymen was intact, a vaginal

examination was made under a general anæsthetic. The condition of the vulva, cervix, and vagina was consistent with virginity, and on palpation of the posterior fornix a hard fixed mass, connected with the uterus, was discovered. Although the obesity of the patient made a bimanual examination difficult, it seemed that the abdominal tumour was uterine rather than ovarian. A provisional diagnosis was made of malignant disease of the uterus, possibly associated with fibroids. On the ninth day after admission the patient's condition became worse, after that the cachexia rapidly increased, and a week later she died.

At necropsy the uterus was found to be enlarged to the size of a four-month pregnancy, and on the anterior surface there were two large subserous metastases. The pouch of Douglas was completely filled by a soft necrotic tumour spreading from the uterus and fixed both anteriorly and laterally to the rectum. The right broad ligament was also invaded by direct extension from the uterus, and the right tube and ovary were buried in the tumour but were not enlarged. The left tube and ovary were not involved and were of normal size. Neither ovary contained any cysts, and each was consistent in appearance with the age of the patient. There was no invasion of the bladder. The whole of the upper two-thirds of the corpus uteri was filled and the walls were invaded by a friable dark-red hæmorrhagic tumour, of which the lower free edge was shaggy, while the cervix was absolutely free from invasion.

The tumour both in the uterus and in the pouch of Douglas was in an advanced stage of necrosis. The lymphatic glands in the pelvis, besides those in the hilum of the liver, were also involved. Both lungs were riddled with small metastases, few being more than 1–2 cm. in diameter; the very small ones were distinctly hæmorrhagic, but the larger ones were pale in the centre and pinkish-red round the periphery. The liver was firm, slightly enlarged, and had a yellow toxæmic appearance; it contained several large pale metastases. The remaining organs were normal.

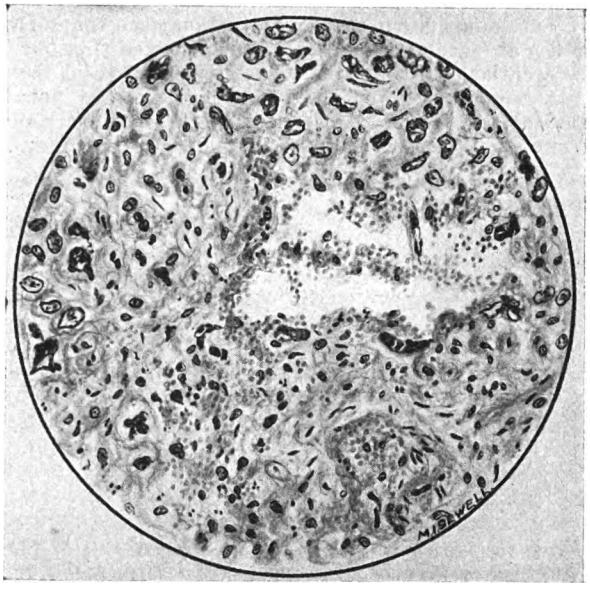

FIG. 2—Fibroblasts, extravasated red blood-cells, and syncytial cells showing polymorphism.

Microscopic examination.—The predominating cells were syncytial (fig. 1); large multinucleated masses of cytoplasm were scattered throughout the section and exhibited a considerable degree of polymorphism (figs. 2 and 3). There were also many smaller and heavily staining cells of an intermediate type, while those cells derived from the Langhans' layer were the least numerous (fig. 1). Extensive areas of hæmorrhage were also common (fig. 4) and in several places were closely related to the syncytial cells.

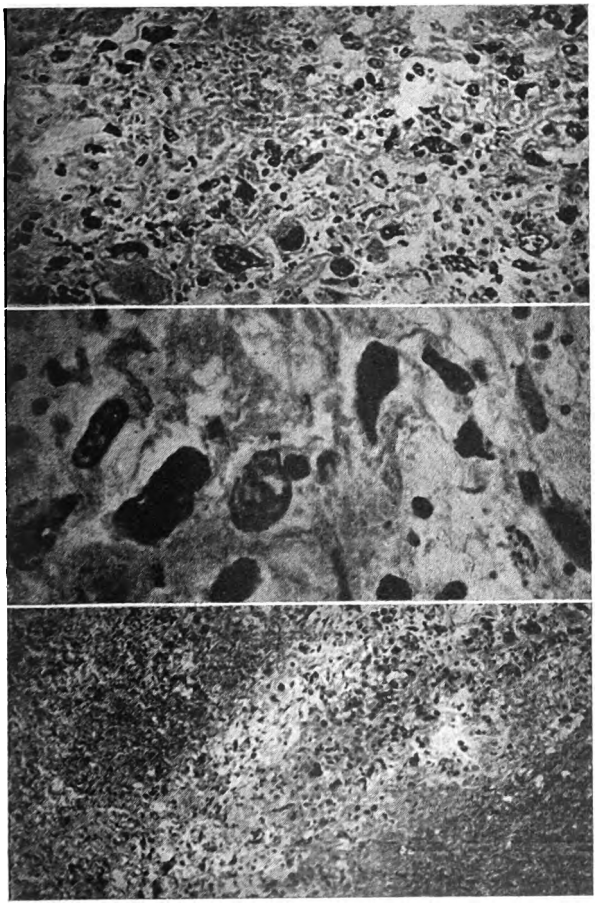

FIG. 1—Large multinucleated cells and Langhans' cells. (× 200.)
FIG. 3—Types of syncytial cells. (× 600.)
FIG. 4—Syncytial cells and cells of intermediate type; two areas of hæmorrhage. (× 100.)

COMMENT

The diagnosis of chorionepithelioma in this case rests entirely on the histology, although it receives some support from the macroscopical appearances, the dark-red friable tumour in the uterus and the small hæmorrhagic metastases in the lungs being typical of this condition. Unfortunately it lacks the confirmatory evidence of an Aschheim-Zondek test, for the final diagnosis was not suspected when the patient was alive. However, the microscopic section has been submitted to several competent authorities, who with one exception had no hesitation in accepting it as a typical and highly malignant chorionepithelioma. The origin of the tumour in this case is purely speculative, for the question of pregnancy does not arise. The extensive involvement of the corpus uteri leaves little doubt that that was the primary site, but there is a slight possibility that the tumour may have originated from an ovary. Since no microscopical examination of the ovaries was made, all that can be said is that the left ovary was normal in size and was not involved; that the right ovary, although buried in a mass of tumour, was not noticeably enlarged; and that neither ovary appeared abnormal to the naked eye. The most reasonable explanation is that the tumour originated from a teratoma of the uterus; another explanation is that it developed from a carcinoma of the corpus uteri.

Ahlström (1931), in trying to explain the occurrence of carcinoma with chorionepithelioma in the male in the absence of a teratoma, has suggested that local differentiation is the cause. Mathieu (1939) recognises that some cases of chorionepithelioma are paradoxical and would place them in the irreconcilable group, and that is where this case undoubtedly belongs.

I wish to thank Sir Frederick Menzies for permission to publish this case.

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A NEW WAY TO DETERMINE BLEEDING-TIME

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AND

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The usual method of determining the bleeding-time is that described by Duke (1912), who makes a stab wound in the finger-tip or in the ear lobe after careful cleaning. The blood flowing from the wound is sucked away with tissue-paper every 15–30 sec., without the wound being touched. To obtain more accurate results, Spitz (1923) has suggested making a wound of fixed depth in the ear lobe with a Francke's blood lancet and rubbing the lobe firmly before measuring the bleeding-time. In this way a maximal quantity of blood will flow from the ear lobe. Even then, as Fonio (1928) and others admit, the determination of the bleeding-time is inaccurate. This is due to the fact that the thickness of the skin differs in different places and in different people, with the result that the resistance to the blood-flow varies. Moreover, this resistance is enhanced by the edges of the wound adhering together, and the direction of the stab wound influences the direction in which the skin splits and the relative direction of the vessels. These factors may hinder hæmorrhage so much that a small punctured wound may show no increased bleeding-time in hæmophilia, although an operation would be fatal, because tension and adhesion of the skin play no part in an open wound, only the contraction of the vessels and the formation of thrombus being of importance.

For these reasons we have developed a method which imitates as nearly as possible the circumstances of an open wound. First, the ear lobe is made hyperæmic by rubbing. Next, it is pressed against a thin steel plate—e.g., a razor blade—with a circular opening 4 mm. in diameter. A small part of the lobe is protruded through this opening and cut off with a razor. Thus an open wound is obtained, in which many capillaries have been cut. The wound should preferably not be made on the edge of the lobe. The blood is sucked up every half-minute with a separate portion of filter paper without the wound being touched, and the number of drops on the paper indicates the bleeding-time in half-minutes. The force with which the ear lobe is pressed against the steel plate can be made constant by fastening a steel spring to the plate and fixing the lobe in between. This method is not very painful, probably owing to the pressure; at any rate it is much less painful than a puncture.

To find out whether with this method sufficiently consistent results can be obtained, we have determined the bleeding-time of 85 people, each twice with an interval of four hours. The difference between the two records was only in a few cases more than a minute. The average bleeding-time estimated by this method in 450 tests was 3 min. 25 sec. By Duke's method an average bleeding-time of only 2 min. 30 sec. was obtained. The increased time obtained by our method is important in scientific investigations because the margin of error is thus reduced. The longer the bleeding-time, the more accurately the difference between two groups of observations can be shown.

To summarise, this method produces consistent results, is not painful, and leads to a longer bleeding-time, hæmorrhage not being hindered by the edges of the wound adhering together and by tension of the tissues. In this way some cases of hæmorrhagic diathesis can be detected which could not be discovered by previous methods.

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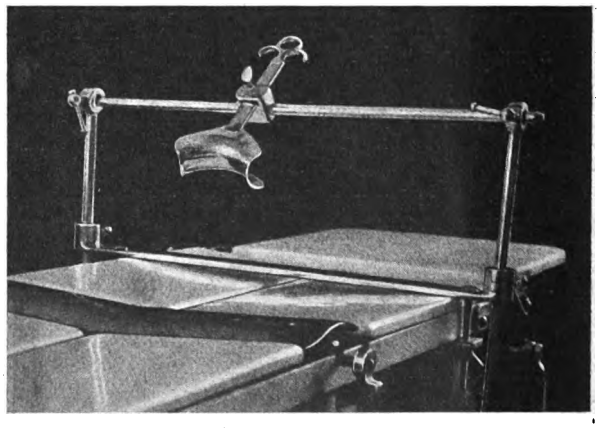
New Inventions

AUTOMATIC RETRACTOR FOR ABDOMINAL SURGERY

The retractor and stand here illustrated is for use in deep pelvic and other abdominal operations and has been made for me by Powells Ltd., Bombay. The use of this retractor, which holds the tissues firmly and exposes to view a large field of operation,



dispenses with the services of a third surgical assistant, who would otherwise to required to hold a retractor. Since this apparatus is not placed between the patient's legs, it does not interfere with the arrangement of sterilised towels and with the passage of instruments into the rectum or into the vagina; nor does it cause pressure on the genitalia.

F. R. Parakh, M.D. Manc., F.C.P.S. Bombay.

Parsi General Hospital, Bombay.

". . . Studying medicine is probably the worst nervous strain you can put any man through. It's like having a wife who is pregnant all the time and never delivered; only when the time for the delivery comes, as in a nightmare, it turns out to be you, and not your wife, who have to be delivered."—Augusta Tucker in "Miss Susie Slagle's," London, 1940.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

EPIDEMIOLOGY AND STATE MEDICINE

THE new president of this section, Dr. J. ALISON GLOVER, delivered his presidential address on April 5 on

Evacuation

being some epidemiological observations on the first four months. He recalled that evacuation has been a rare experience to English people: Eton and Westminster Schools and Oxford University, he said, evacuated in Tudor times to escape the plague, and he showed an interesting engraving depicting the flight of many of the inhabitants of the country round Chatham when the Dutch raided the Thames and Medway in 1667; but no migration on anything like the present scale has ever taken place. The Ministry of Health, in addition to preparing the Emergency Hospital Service, also arranged with the local authorities to increase hospital provision for infectious disease in the reception areas. Obstetric areas were defined according to the accessibility of lying-in hospitals, and in these areas 137 emergency maternity homes, staffed by qualified maternity nurses and containing 3700 additional beds, were provided for normal cases. Consultant obstetric services and hospital accommodation were provided for abnormal cases, and arrangement was made for the prompt isolation of cases of puerperal pyrexia. The Ministry also agreed with the British Medical Association for the domiciliary treatment of evacuated children. The Medical Research Council organised 2 central and 23 subsidiary laboratories to augment the existing facilities. In many areas water-supplies, sewerage and drainage were also organised. The most imminent risk seemed to be the spread of those epidemic diseases of which the seasonal maximum falls in August—poliomyelitis, diphtheria, scarlatina, enteric fever and dysentery. Diphtheria and scarlet fever showed high incidences in 1938 and recent years, and seemed likely to flare up still higher if town carriers and country susceptibles were freely mixed. Up to mid-July poliomyelitis seemed to threaten an incidence as great as that of last years; both dysentery and enteric showed increases in the two months before the war. Yet how providential was the outcome. The incidence of infectious diseases in the first four war months was remarkably low. September is one of the healthiest periods of the year for droplet infections. The double-shift method of schooling enabled the children to spend half their time in the open air playing organised games and walking in the splendid autumn weather. This acclimatised the town children and allowed the native children to acquire immunity to unfamiliar strains. The notified cases of poliomyelitis were only a third and those of diphtheria and scarlet fever only two-thirds of the figures for the corresponding period of 1938: 16,000 against 24,000. Strong efforts were made in some areas to immunise the children artificially, but the difficulty of obtaining parental consent hindered progress. Diphtheria is school-spread more than most other diseases, and the closure of the schools in the evacuation areas, their partial closure in the neutral areas and the double-shift method in the reception areas, helped to diminish the incidence and to produce satisfactory conditions. The prevalence of scarlet fever fell rapidly from the end of July, and at the end of August the incidence was below the minimum for the last nine years. A sharp rise towards the end of September never reached the figure of the year before. In the great cities the incidence of these diseases was quite out of proportion to the number of children remaining in them. In late October only 47 per cent. of the normal child population were in London, but the cases of scarlet fever numbered only 18 per cent. of the figure for the previous year; the incidence of diphtheria was only 23 per cent. This low rate was probably due to the removal of susceptibles from the cities, and the closure of the schools to the children who remained behind.

Despite the large migration of expectant mothers, Dr. Glover went on, the figures for puerperal pyrexia showed a decrease—a result which reflects much credit on the arrangements made by the authorities. A four months' period began with an epidemic of chickenpox, and closed with a very extensive outbreak of German measles. The prevalence of German measles was greater than anything in Dr. Glover's experience. Although the deaths from infectious disease did not decrease in quite the same proportion as the infections, there was nevertheless a substantial reduction. The percentage reduction from the 1938 figures was—scarlet fever 27, diphtheria 16, enteric 34, diarrhœa and enteritis under two years, 27. The statistics for the special schools were extraordinary. Measles broke out in only one of the 17 schools examined, and the attack-rate was 67 per cent. Whooping-cough occurred only in five, epidemic diarrhœa only in four, scarlet fever in two, and diphtheria in two special schools.

In the evacuation, incomplete as it was, a number of persons ten times the size of the original expeditionary force were moved and billeted in four days with wonderful success and punctuality. Hundreds of thousands of rural homes had new inmates who might have brought new strains of infection. The daily lives of millions of school-children were completely altered by school closure and the double shift; many special, day and nursery schools became residential. In the absence of immediate air attack, exaggerated criticism has entirely obscured the extraordinary good record of the fight against infectious disease during the first four months. Credit is due to the careful preparation and hard work of the evacuation department of the Ministry of Health, and to the public-health services, ably seconded by the domiciliary medical services, the devotion of teachers and school nurses, the generous care so often shown by the foster-parents, and nature's gift of a glorious autumn. The results are evidence of the basic soundness of the environmental hygiene of this country. Other things which seem to cloud evacuation had their epidemiological silver lining. The reluctance of some to move and the rapid drift-back simplified billeting, left the children most suited to country life, and kept children in the open air for double the usual time. Even the much-deplored school closure contributed to the result. The record proves the soundness of the policy of dispersing the children in billets, in preventing the spread of airborne disease. A policy of concentration in camps has been much recommended, but previous experience suggests that it would have produced far less satisfactory results. In contagious disease the record is less satisfactory, and in pediculosis it is disappointing. The evacuated children have benefited enormously in health, and have shown more immunity and far better school attendances than the native children. Many of those who returned home still show, after some months, the stimulating effects of their experience on their growth and well-being.

A vote of thanks to the President for his address was proposed by Sir ARTHUR MACNALTY, seconded by Dr. J. D. ROLLESTON, and carried with acclamation.

PANEL AND CONTRACT PRACTICE

An American View of European Health Insurance

IN the last few years American administrators have been taking a good deal of interest in European systems of health insurance because of the imminence of developments on these lines in the United States. In 1936 Dr. Falk produced his book "Security Against Sickness," in which he discussed the need for group payments of insurance costs in America and described systems of insurance in force in Germany, France, Denmark and Great Britain. Prof. Barbara Armstrong's new book, "The Health Insurance Doctor,"[1] deals with the relationship between state, doctor and patient in three democracies, England, Denmark and France. Mrs. Armstrong is an observer trained in law and economics, professor of law in the University of California, and was formerly executive secretary of the California social-insurance commission. She approaches health-insurance administration in the three countries along a common plan, first summarising the system of insurance, then dealing with medical benefit and such questions as remuneration and disciplinary procedure, and finally trying to estimate the attitude of the medical profession to the prevailing system. It is not easy to acquire enough background to form a balanced judgment on the health services of a foreign country in the course of a comparatively short visit—the difficulty is not merely the obvious one of language, but of securing sufficient width of approach to ensure that the data collected are really representative. Nevertheless, Mrs. Armstrong's study of British practice rings true, though it does contain a few very minor inaccuracies and some expressions of opinion that are a little odd. Thus, discussing the report of the Scottish departmental committee on health services, which recommended the extension to dependents of national health insurance, she writes that "there is a fairly strong tradition that things which are under consideration for the United Kingdom as a whole are tried out in Scotland; general medical and lay opinion has it that the action of this Scottish body is prophetic of what may be expected in the course of time from the Ministry at Whitehall." She recognises that changes are impending in the voluntary hospital world, and maintains that the almoner system strikes at the very heart of the voluntary-hospital tradition, being, in fact, largely a camouflaged means test never really acceptable. She recalls that the Royal Commission on National Health Insurance did not recommend making institutional care a statutory benefit chiefly on the ground that this would be prejudicial to the voluntary-hospital tradition.

In Denmark, on the other hand, hospital benefit is compulsory. The hospital system there is regarded as a kind of insurance for the whole population. Hospitalisation is urged as a matter of public policy, and the tendency is to develop the hospital system still further, supplementing existing central hospitals by establishing smaller units at the periphery and by placing specialists in these units as necessary. The insurance system covers the children of an insured person as well as himself; wives are expected to insure themselves and commonly do so. Cash benefits have been regarded as less important than in this country, though there is a growing recognition that adequate cash allowances are valuable alike from health and economic standpoints. There are in Denmark two alternative methods of paying insurance practitioners—the method employed in Copenhagen and increasingly throughout the rest of the country, chiefly capitation with supplementary fees for special services, and that which makes payment for each unit of service according to a fee schedule. There is similar official provision for the employment and payment of specialists, though it must be remembered that in Denmark specialisation is controlled to an extent quite unknown in this country. There is no medical referee system, neither the societies nor the doctors feeling any need for it.

The insurance system of France is the youngest of the three—it has been in operation only since 1930—and it has not yet succeeded in resolving its difficulties as have Denmark and Britain. On paper the aims of the scheme are excellent, but the money necessary to work the scheme as drafted is not applied to it, and it is not surprising that there have been differences between doctors and the administration. One fertile cause of trouble lies in the fact that while insured persons are required to find 20 per cent. of the cost of medical treatment the cash payments made to them are based on a standardised schedule of fees which may bear little relation to those charged by individual doctors, who can charge what fees they please. Another source of difficulty is that French doctors seem to be more concerned than their Danish and British colleagues with the implications of national health insurance certification in relation to professional secrecy.

Mrs. Armstrong sees in French insurance some things that might be borrowed in framing a pattern for the new world; but in the main her sympathies are with the Danish system, for she believes that Danish practice does most to make the doctor a real force in the public-health organisation of the country, creating a professional life calculated to stimulate the doctor to extend his interest beyond the purely curative problems of his daily practice. "The journals of the Copenhagen Medical Association," she writes, "have been carrying an increasing number of articles on preventive medicine. These have been emanating not from public-health officials or university professors, but from practising health-insurance doctors, who urge that the times demand of the family doctor that he take his proper place as the unit in a great preventive system for eliminating illness itself."

1. The Health Insurance Doctor. By Barbara N. Armstrong. London: Humphrey Milford, Oxford University Press. 1939. Pp. 264. 18s. 6d.

THE LERICHE TREATMENT OF SPRAINS.—Prof. René Leriche has for several years taught that most sprained joints are not the result of anatomically demonstrable rupture of certain ligaments but of changes in the nerves amenable to an injection of procaine. At a meeting of the French Academy of Surgery on Jan. 10 Dr. Mondor admitted the validity of Leriche's view as confirmed by a dozen cases of sprained joints in which, at the time of operation, Leriche had failed to find ruptured ligaments, but he countered this evidence with the case of a 32-year-old woman operated on for a sprained knee at the Bichat Hospital. The clinical picture in this case was typical of the sprained knee of moderate degree following a trifling accident, but at the operation gross and multiple lesions of the structures involved were discovered and dealt with on surgical lines. This observation was confirmed in three similar cases by Dr. Ameline who agreed with Dr. Mondor in not accepting the Leriche teaching concerning the genesis of sprains without reserve.

REVIEWS OF BOOKS

Tumors of the Skin

Benign and Malignant. By JOSEPH JORDAN ELLER, M.D., attending dermatologist, City Hospital, New York. London: Henry Kimpton. 1939. Pp. 607. 45*s*.

AMONG many novel features in this notable production Dr. Eller's chapter on the diagnosis and treatment of malignant tumours is as lucid and detailed as any in the English language. The author bases his recommendations for treatment on a personal experience of twenty years, so that in many instances he can illustrate his results photographically ten or more years after the patient was treated. Even more impressive are the diagrams of the various types, sizes and locations of carcinomata and the practical discussion of the different methods of therapy which may be used for each lesion. The recommendations under this heading are given in order of the author's preference —e.g., radium, X rays, surgical excision or the diathermy knife, with or without immediate or subsequent plastic repair. For those whose bent is surgical there is a simple account of the modern developments in plastic technique, illustrated with diagrams of the incisions and sutures available in different situations in the "lines of cleavage," while skin grafts and their varieties are not neglected. From the dermatological aspect the book reaches a high standard. The many clinical photographs and microphotographs, all apparently from the author's collection, stand comparison with any. There is a comprehensive bibiliography.

Pulmonary Tuberculosis

Pathology, diagnosis, management and prevention. By G. GREGORY KAYNE, M.D. Lond., M.R.C.P., tuberculosis officer, Middlesex county council; WALTER PAGEL, M.D. Berlin, pathologist, Papworth Village Settlement; and LAURENCE O'SHAUGHNESSY, M.D. Durh., F.R.C.S., consulting and thoracic surgeon to Preston Hall. London: Humphrey Milford, Oxford University Press. 1939. Pp. 565. 42*s*.

WHEN it is remembered that not long ago a two-volume work of 1100 pages appeared on the treatment of phthisis by collapse therapy, it is clear that to produce a textbook of reasonable dimensions covering all aspects of pulmonary tuberculosis is now an ambitious undertaking. If such a venture is to succeed it must provide a new slant on old problems, and that is what Dr. Kayne and his colleagues have done. For originality and completeness the first section, on the pathology and natural history of the disease, deserves pride of place; it is one of the best accounts of the evolution of pulmonary tuberculosis that has been written. The question of dissemination and the immediate post-primary sequelæ is a little involved but well repays careful study by one who is not primarily a pathologist. The clinician would have been glad of some elaboration of the statement that "fibrous tissue is easily converted back to the original cellular state." He may be persuaded that *in time* fibrous tissue can be absorbed and he will readily appreciate that it could be destroyed by advancing caseation, but the idea of its "conversion" to cellular tissue is contrary to the first principles he was taught at his medical school.

Much discretion has been exercised in the section on diagnosis, and, in keeping with the modern outlook, half of this is about radiology. How to search for the tubercle bacillus is described at length; the tuberculous patient of today must be finding it increasingly difficult to acquire and maintain a "negative sputum." Another valuable section deals with the examination of the blood, a side-line of the investigation of the patient that is often neglected. An earnest attempt has been made to discuss prognosis, the most difficult of the clinical arts to cultivate and so individual an affair that it can only be learned by experience. The guiding principles on which an accurate prognosis of phthisis can be founded are clearly laid down.

Management takes up nearly half the book, and although collapse therapy occupies a large proportion of this the account is well balanced. Two pleasing features are the short historical review of collapse therapy and the few pages on the physiological and pathological basis of surgical intervention, which will dispel many misconceptions as to the aim and limitations of pulmonary "relaxation." Thereafter the different methods of obtaining collapse are taken seriatim, the indications and contra-indications wisely being given more attention than operative detail. While a distinct bias in favour of the total paravertebral thoracoplasty can be detected, yet the advantages of a partial or spitzen-plasty are fairly enumerated. The more recent developments in this field, such as Semb's operation and the extrapleural pneumothorax, are given due recognition.

Synopsis of Surgery

(11th ed.) By ERNEST W. HEY GROVES, M.S., M.D. Lond., F.R.C.S., consulting surgeon to the Bristol General and Municipal Hospitals; emeritus professor of surgery, Bristol University. Bristol: John Wright and Sons. 1940. Pp. 714. 17*s*. 6*d*.

THIS book has become one of the props of the final-year student, and a familiar friend in hospital and study. The new edition includes an account of the Böhler technique in fracture treatment, and the subject of cleft palate has been carefully revised. The operation for cleft palate is now described according to the principles laid down by Veau, while the older operations have been omitted. The book succeeds in fixing the main points of diagnosis and treatment rapidly in the mind of the reader. An example of how information can be quickly and easily imparted is the table of special diagnostic tests for tuberculosis. Is it a fact, though, that the opsonic index is still considered a reliable indication of the effect of tuberculin? And the statement that only 25 per cent. of cases of intussusception occur before the age of one year and 50 per cent. before the age of ten years is not in accord with the general conception of the disease as one affecting babies between six and ten months.

This is one of the short cuts to rapid revision for which both the lecturer and the candidate for examination have been and will be grateful.

Minor Surgery and Treatment of Fractures

(22nd ed.) By GWYNNE WILLIAMS, M.S., F.R.C.S., surgeon, University College Hospital. London: J. and A. Churchill. 1940. Pp. 472. 12*s*. 6*d*.

THIS is one of the most practical, simple and useful guides for house-surgeons, and it is also cheap. Mr. Gwynne Williams has extensively revised the text and added some new illustrations. The methods he recommends are simple and easy to apply, and few surgeons will quarrel with his selection. He leaves little for criticism. In strapping varicose ulcers the method depicted is apt to lead to excoriations of the skin at the edges of the strips unless vertical pieces of plaster are placed first on the inner and outer sides of the leg. Moreover, elastic strapping which is wound

on like a bandage is more effective than the short strips of zinc oxide plaster shown. The reader is told that the colon of a colostomy patient will empty itself a few minutes after a pint of warm water has been run in. This is very rarely the case. The toilet of a colostomy usually consumes at least ¾ hour every morning. The line drawings show clearly what the author has in mind, though plaster-of-paris should surely be made dead white and something has happened to the shape of the child's buttocks in fig. 225. These are all small points, and the resident who follows the instructions given will not go far wrong. There is an excellent chapter on anæsthetics by Dr. H. N. Webber.

Environment and Heredity

By OLIVE D. MAGUINNESS, M.Sc., D. ès Sc. London: Thomas Nelson and Sons. 1940. Pp. 216. 2*s*. 6*d*.

MANY people are prepared to make assumptions about the inheritance of human characteristics, but few have any sound knowledge of the principles of genetics or of their application to man. This is the more deplorable in that the most pressing social problems of the day, in particular those of health and education, have important genetical aspects. But good popular books on human heredity are rare. It is easy enough to explain the basic principles as illustrated by the inheritance of clear-cut characters in plants and animals. But it is equally essential that the layman should fully realise the uncertainties and the present difficulties in applying these principles to human affairs. The author of this book has combined skilfully and in a small space a clear exposition of the laws of inheritance with a sound discussion of their possible application to man. As an educationist she is naturally most interested in mental characters and the relative influence of heredity and environment on them. The most important recent investigations on this subject are ably summarised. In view, however, of the differences of opinion on the social value of the characteristics measured in intelligence tests, the critical reader would no doubt like some information on the nature of these tests. Some also will feel the inadequacy of the conditioned-reflex theory of learning, which is presented without discussion of the difficulties in its application such as those which the Gestalt psychologists have attempted to resolve. In view of the author's evident desire to dispel unfounded illusions, it is surprising that she has not dealt with the eugenists, some of whose proposals have been made with no regard for modern genetical research. But in spite of these deficiencies this is without doubt an excellent introduction to the subject. It affords little encouragement to those who would find biological justification for the present injustices in our social system.

Problèmes actuels de biologie générale et de pathologie expérimentale

By HENRI BENARD. Paris: Masson et Cie. 1939. Pp. 173. $1.05.

IN spite of its rather forbidding title, this book consists of six rather delightful essays or lectures, the titles of which are:—

(1) Respiration cellulaire; (2) Intoxication cyanhydrique; (3) Diabète pancréatique expérimental; (4) Mode d'action de l'insuline; (5) Le glucose et sa dégradation; (6) Rachitisme expérimental.

There is a certain continuity of thought and construction between the first and second and between the next three, but each chapter begins with a historical introduction and ends with more recent work and can be read without reference to the others. The essays have no bibliography but a few authors of all nationalities are named in the text. They are simply written with an abundance of structural formulæ and illustrations, and in consequence are easy to read. Students or lecturers should find them valuable when they want to get a general idea of any of the problems considered. The spelling of one or two of the proper names is not accurate, hardly anything is said about rickets in dogs and Young's work on the production of permanent diabetes by pituitary injections is not mentioned at all. These, however, are minor blemishes in essays which set out to give a balanced review of the subject, and probably the author would be the first to admit them. The book has a simplicity and charm which will appeal to those who are weary of the other sort of review.

Standard Methods

of the Division of Laboratories and Research of the New York State Department of Health. (2nd ed.) By AUGUSTUS B. WADSWORTH, M.D., director of the department. London: Baillière, Tindall and Cox. 1939. Pp. 681. 41*s*.

UNLESS one has visited the laboratory at Albany of the New York state department of health it is difficult to realise the comprehensiveness of that institution. This book will, however, give some indication to the general reader, and it sets out the whole of pathological laboratory technique as fully as any in the English language. It covers everything from the selection of glassware and the breeding of animals to the details of technique. The descriptions are clear and complete, and as an encyclopædia for the routine laboratory it will be hard to beat.

The Rhythm

of Sterility and Fertility in Women. (6th ed.) By LEO J. LATZ, M.D. Chicago: Latz Foundation. 1939. Pp. 151. $1.

EIGHT years ago Dr. Latz, a leading American propagandist for the use of the "safe-period" method of contraception, published this small handbook which tells the basic facts of human reproduction, and puts forward the view that women are fertile during only a few days in the middle of each menstrual cycle as a practical measure of birth-control. Its appeal has proved so wide that Dr. Latz has been able to endow a research fund with the profits.

The safe-period method of contraception is based on the knowledge that ovulation usually takes place in the mid-interval, and on the fairly well-established fact that both ova and sperms are very short-lived. The researches on which these conclusions rest are indicated by Dr. Latz, who also refers to and rejects the view that ovulation can be stimulated by emotional excitement. The variability of the length of the menstrual cycle is treated in close detail, and as a practical measure the following formula for determining the fertile period of the menstrual cycle in any given case is suggested: "the fertile period extends from the 12th to the 19th day before the expected menstruation; plus the days of variation between the longest and shortest cycle of the last eight months, added to the front of the fertile period. The probable date of the next menstruation is determined by taking the longest cycle of the last eight months." The evidence that this rule, if adhered to carefully, is effective is extensive enough to convert even the most sceptical.

The book is written in the form of question and answer, and incorporates much of the relevant literature, but the average medical reader will probably find its sticky and sentimental language irritating.

THE LANCET

LONDON: SATURDAY, APRIL 13, 1940

FOCAL SEPSIS

IT is a little pathetic to read some of the discussions on the pathogenesis of pernicious anæmia that were written before liver treatment became known and CASTLE'S experiments were done. Relevant facts were scanty. Bits of circumstantial evidence were built together in tottering support of this theory or that, preferably one that invoked a bacterial cause. It seemed difficult for writers to remain completely objective. They worked under an almost irrational compulsion: some sort of a theory had to be produced out of those few confusing facts, and somehow it had to be argued for; agnosticism was impossible for them. Would it not have been better, we think now, if they had been content to say bluntly that they did not understand the pathogenesis of pernicious anæmia, and could make no sense out of the knowledge they had of it? Could they not have frankly admitted their defeat, and waited for the solution which, we now know, was on its way? That attitude would have been possible, and no doubt more prevalent, if medicine were studied only in the clear and dispassionate atmosphere of the scientific laboratory. But it came hard to the physician at the anæmic patient's bedside. He could not wait indefinitely; he must try something, and preferably something with a glimmer of a rationale to it. So it came about that his desire to treat disposed him to believe in the most plausible theory available, and not to be too rigorous in his demand for proof. He did not realise how shaky the streptococcal theory of the pathogenesis of pernicious anæmia was, until the "conditioned deficiency" came along to displace it.

There must be other parts of medicine in which our present beliefs are more shakily based than we realise. When a thesis obtains much support from clinicians and little from the more critical kind of laboratory worker it should be suspect, for the laboratory worker is unbiased by the need to apply immediate treatment. The theory of focal sepsis, now some thirty years old, is an example in point. It is offered as an explanation of such conditions as muscular rheumatism and rheumatoid arthritis, which were obstacles to the early triumphant march of bacteriology because they could not be attributed to a direct invasion of tissues by pathogenic organisms. But the organisms could still be blamed if they were allowed to entrench themselves in a septic tonsil and bombard the afflicted joint from a distance, through the blood-stream. "Focal sepsis is a term used to signify the presence of a local and chronic infection, itself yielding few or no symptoms, yet resulting in a state of toxæmia, with or without mild bacteriæmia, and leading to a number of general or remote local disturbances." That is the definition made by Lord HORDER in his foreword to a symposium on the subject in the *Post-Graduate Medical Journal* for February. It is an attractive theory, and it affords clear indications for active treatment: the septic tonsils and the infected teeth, or the doubtful tonsils and the suspect teeth, can be safely and hopefully removed. It is true that removal often fails to cure the rheumatism, and equally true that many people harbour septic foci without suffering remote ill effects. But the theory can be adapted to withstand these criticisms: the wrong focus may have been removed, or a secondary focus already established in an inaccessible place; the joint or the muscle must be sensitised by injury or allergy before it is susceptible to the toxins arising in the septic focus; and on the positive side cases are not lacking where ablation of the focus has been followed by rapid amelioration of the rheumatism. Along these lines the theory has been ably defended by Prof. L. S. P. DAVIDSON,[1] who in discussing "chronic infective arthritis" marshalled varied and weighty evidence for its plausibility, but admitted that "it is not possible to bring forward definite proof." The present symposium takes the problem no nearer finality. Dr. E. WILFRED FISH describes with beautiful clarity the histopathology of the common septic foci in the gums and at the roots of the teeth. He attributes the round-cell infiltration and the osteoclastic and osteoblastic activity in the peripheries of these lesions to the soluble toxic products of the organisms lying among the polymorphonuclear cells at their centres, and points to the general similarity between these mesenchymal tissue reactions and those characteristic of chronic rheumatic lesions round joints and in fibrous tissue; it is plausible to suggest that the one toxin may cause both. Mr. F. C. W. CAPPS gives clear indications for identifying sepsis in tonsils and nasal accessory sinuses. He maintains that the most convincing beneficial results of the removal of foci in these sites are obtained in nephritis: "the most favourable cases are those in which the nephritis is the first acute attack, and not an exacerbation of a chronic condition." A physician might reply that those are precisely the cases in which the disease runs a self-limited course to end in recovery in perhaps 80 per cent. of patients. Dr. JOEKES writes about the gall-bladder as a site of focal sepsis, but is more concerned with the recognition and investigation of cholecystitis than with the evidence that it can or does produce remote effects. Dr. JAMES WILTSIE of Binghampton, New York, believes ardently that focal infection of the colon is a common and important factor in causing rheumatoid arthritis, and therefore aims, by a system of colonic lavage under direct medical supervision, at keeping that organ "as free from the presence of the pathogenic organism as possible, continu-

1. Reports on Chronic Rheumatic Diseases, No. 2, London. 1936.

ously, for many months." Finally, and in contrast with his predecessors, who mostly accept the validity of the focal-sepsis theory with little question, Mr. ALEC BOURNE considers focal sepsis in the female pelvis. He allows that chronic suppurative salpingitis and pyometra will make a woman ill, and that gonococcal cervicitis will give rise to metastatic gonococcal lesions elsewhere, but further he does not go. Chronic cervicitis in his experience is seldom a focus causing general toxæmia or metastatic lesions, and in any case—gonorrhœa apart—it is not a cervicitis at all; the common leucorrhœal discharge is not pus, but simply mucus, desquamated cells and harmless bacteria, and while the cervical mucosa may be hypertrophied or eroded it is not infected.

The symposium, therefore, deals more with the practical application of the focal-sepsis theory than with the academic question of its validity. This is right, for the practitioner has no choice but to act as if the theory were valid, up to a point. There is reason to think that it may be true; therefore the patient must be given the benefit of the chance, provided the treatment involved carries no appreciable risk, and provided that zeal is tempered with moderation. This means that the tooth, the tonsil or the gall-bladder to be removed must be shown to be chronically and macroscopically infected. But there is no proof that the theory is true. Therefore the practitioner can never foretell that removal of a given patient's focus will certainly cure his rheumatism. And those whose minds, for better or worse, have an academic bias will preserve a certain scepticism, coupled with the hope that some day clear light will be shone on the pathogenesis of rheumatism, making its control as effective as that of pernicious anæmia.

THE CAUSES OF DEATH

ALL who wish to study the secular changes revealed in our mortality records, or—a still harder task—to compare the incidence of particular causes of death between one country and another, are confronted with the changing and differing methods of certification and tabulation. The statement of the cause of death may be one of hundreds of variants, many of which will, of course, be merely synonyms. They must, accordingly, be collated under a reasonable number of broad headings. But what it is proper to place under each such heading must change with advances in knowledge. Sure guidance is available in the manual [1] which has just been brought up to date. Its object is twofold. It acts as a guide to the Registrar-General's staff engaged in tabulation, laying down an assignment to one or other of the International List of all forms of return met with in death certificates, thus ensuring uniformity of practice. Secondly, and equally important, it enables the worker in the field of mortality-rates to learn precisely what death certificates underlie a particular title; without that knowledge he cannot tell whether observed time changes or international differences are not merely reflections of changes or variations in office procedure. The International List is revised decennially to keep abreast of recent advances in medical science and the new manual is based upon the 5th revision by the International Commission which met in Paris in 1938. It is the system of classification which is to be used in England and Wales during the ten years beginning Jan. 1, 1940, and it reveals numerous changes for the better. For instance, the infective and parasitic diseases have been conveniently rearranged into groups according to the type of infective agent (bacterial, spirochætal, virus, &c.), the site-grouping of deaths from cancer has been considerably extended, vitamin-deficiency deaths have been brought together, while the sections dealing with maternal mortality and accidental deaths have been fully revised to meet modern requirements. In the abridged list, under which local variations in mortality must be studied, acute poliomyelitis, cancer of several sites, prematurity and road traffic accidents replace postsyphilitic diseases, liver diseases, senility and ill-defined causes—useful changes which should produce interesting data. Along with these revised lists there comes into force the new method of classifying deaths for which more than one cause is stated upon the certificate. Arbitrary rules of precedence are thereby reduced to a minimum and tabulation more reasonably follows the order of statement of the diseases made by the certifying physician.

1. Manual of the International List of Causes of Death as adapted for use in England and Wales, Scotland and Northern Ireland. Based on the 5th decennial revision by the International Commission, Paris, 1938. London: H.M. Stat. Office. 1940. Pp. 166. 3s. 6d.

CONCUSSION AND CONTUSION

MUCH of the confusion surrounding head injuries could be avoided if the terms in common use were more clearly defined. Cerebral concussion or commotion describes the physical effect on the brain of a force transmitted to it from a blow on the head. This is the definition which JEAN LOUIS PETIT introduced in his "Traité des Maladies Chirurgicales" in 1790: "un ébranlement plus ou moins considérable dans le cerveau: c'est ce qu'on nomme commotion." Today we speak of a clinical state of cerebral concussion, meaning thereby the state of unconsciousness caused by a cerebral injury, characterised by an instantaneous and complete cessation of nervous reflex activity. This state, after a varying interval, is followed by complete recovery. If this definition, particularly the return to completely normal functions after a short period of unconsciousness, is adhered to, the problem of concussion presents little difficulty. The original diagnosis of concussion will often have to be revised later when signs of more lasting cerebral damage appear, but this is no argument against the definition, for it is in the nature of head injuries that their diagnosis must be written in pencil and not in ink. The transient state of unconsciousness due to concussion has no demonstrable pathological basis. By definition an

autopsy will be performed only if the patient has succumbed to an intercurrent disease or to a concomitant injury to another organ. The findings in such cases fully support the contention that simple cerebral concussion gives rise to functional disturbance only, and its effects cannot be described today in terms of anatomical damage. The cessation of nervous activity, however, could certainly be expressed in terms of electrical units.

If the return to normal after the initial unconsciousness is delayed beyond a few hours, or if after a latent interval signs of cerebral damage reappear, it is fair to conclude that the damage which the brain has suffered has produced more than a purely physiological disturbance. It would be wrong in this type of patient to say that he has passed from a stage of concussion to a stage of cerebral contusion. Cerebral concussion has only one sequel—complete recovery. If prolonged stupor, restlessness, headache or nervous instability are a feature of the clinical picture, the loss of neural function which immediately followed the injury must have been due to something more than a simple concussion. The changes found at necropsy in cases of this type are well known. They affect both neural and supporting elements; ischæmic damage to ganglion cells, swelling of the myelin sheaths, perivascular hæmorrhages and glial activity have been described, and these are the changes which in varying degrees of severity combine to form the pathological picture of cerebral contusion. The damage to nerve cells, glia and mesoderm may be said to be the effect of a severe degree of cerebral "concussion," and probably the same physical mechanism, differing only in quantity, underlies both concussion and contusion. These two terms are commonly applied to stages in one process. It might be better if each were reserved for one entire clinical or pathological process. The stage of unconsciousness may to all appearances be identical in simple concussion and in cerebral contusion. Only future events will reveal the extent of cerebral damage in a clinically or anatomically tangible manner, and will allow a final diagnosis to be made in retrospect.

On this view the late symptoms of head injuries —headache, dizziness, loss of nervous stability and so on—must be regarded as evidence of an anatomical lesion of the brain, that is, of cerebral contusion, and the term post-concussion syndrome becomes meaningless. DANSON[1] has lately laid stress on the organic nature of these sequelæ, which are too often dismissed as "traumatic neurasthenia." Undoubtedly the same organic damage may produce a variety of clinical states in different people, and the late effects of brain injury may be regarded as the resultant of two factors: the severity of the original injury and the constitutional disposition of the patient's nervous system. Not only constitutional dispositions, such as epileptic tendencies, but a number of other pathological states may be awakened by cranial trauma and become clinically obvious. A pre-existent pathological state may also obviously play its part in determining the extent and type of the organic damage itself. With the increasing commonness of head injuries the treatment and prevention of their delayed effects have become of great social importance. We are still far from a satisfactory solution of these questions, but we can at least have a proper appreciation of their complexity.

1. Danson, J. G. *Proc. R. Soc. Med.* 1939, **33**, 51.

ANNOTATIONS

A REMINDER TO EMPLOYERS

THE lessons learnt in the last war by the committee on the health of munition workers and since then by various official and unofficial inquirers are clear to all who care to study them.[1] Whether they are being studied and taken to heart in the present necessary drive for greater output is another matter. There can, however, be no doubt that the Industrial Health Research Board has been wise in drawing attention to those features of industrial work to which continual attention should be paid if the national production is to be increased as well as the national health maintained.[2] Its first emergency report is both short and lucid, written in simple terms by different members of its staff, and no-one need hesitate to read it on the score of its being too "highbrow" for the man in the street or the factory. It deals first with the problem of the best length of the working day and week. Within limits an increase in the hours of labour will certainly increase output, but there is a limit. A twelve-hour day in munition factories during the last war produced no more than a ten-hour. In fact, in the striking words of the Health of Munition Workers Committee,[3] "the country cannot afford the extravagance of paying for work done during incapacity from fatigue, just because so many hours are spent on it. . . . Misguided efforts to stimulate workers to feverish activity in the supposed interests of output are as useless as would be the cheers of partisans encouraging a long-distance runner to a futile sprint early in the race." Equally clear now are the benefits of organised rest pauses, of holidays, and of methods to relieve boredom. The board therefore makes these recommendations under this heading: (1) avoid over-long hours and continuous work without intervals for rest; (2) allow Sunday rest and ordinary holidays; (3) reduce boredom by varying the work and by providing distractions, such as music, that do not too greatly alienate the attention; (4) study the arrangement of the work to cut out unnecessary movements and effort; and (5) keep an eye open for danger signals, such as increase in sickness absence, accidents and labour wastage. Records of these last items can be of great value as indices of efficiency and content, and one section of the report is usefully given up to demonstrating to those who have not statistical methods at their finger-tips some simple means of keeping and analysing them. Another deals with the essentials of artificial lighting and the effect of allowing it to be inadequate, and a third with heating and ventilation,

1. *Lancet*, 1939, **2**, 1032, and March 30, 1940, p. 601.
2. Industrial Health in War. A summary of research findings capable of immediate application in furtherance of the national effort. Ind. Hlth Res. Bd. Emergency Report No. 1. H.M. Stationery Office. 1940. Pp. 36. 6*d*.
3. Interim report, 1917.

both highly important questions at all times but especially so under blackout conditions. The screening of windows and skylights is bound to reduce ventilation to an undesirably low level unless special steps are taken to allow entry and exit of air. Various methods are here suggested. Under different varieties of undesirable environmental conditions accidents, too, have been found to increase, as they do also when the number of inexperienced workers rises. During the war the proportion of such workers is certain to go up and special supervision will therefore be called for, as well as methods for detecting the accident-prone and as far as possible placing them where they will do no harm to themselves or others. Such, in outline, is a report that should have a wide circulation, for the need at the moment is for application of knowledge previously gained rather than for new researches. Where recommendations are made which seem to war-time managers or employers impracticable or needing further research before they can be applied, or where new problems present themselves, the board hopes to be consulted at once.

ANOTHER TEST FOR OBSTRUCTIVE JAUNDICE

THE name of biochemical tests intended to distinguish between obstructive and toxic or infective jaundice is legion. Most of them are based on some recognised function of the liver. Those in most common use are probably the van den Bergh reaction, the tests for bile in stool and urine, the galactose-tolerance test, and lately the estimation of plasma phosphatase. The rationale behind these tests is fairly well understood. A new test emanating from France [1] is not so well founded in theory, but it claims such a sharp differentiation between obstructive and toxic jaundice that it may prove a useful adjunct to the investigation of these cases. The blood-serum is heated with sulphuric acid and then phosphoric acid and vanillin are added. A colour develops which is very intense with the sera of cases of obstructive jaundice and much less intense with those of toxic jaundice. The authors are not certain what substance or substances are responsible for the reaction, but they are in no doubt as to its clinical usefulness. So many claims have been made in the past, however, for tests for obstructive jaundice, that more information will be required, with trials by other investigators, before the "réaction sulpho-phospho-vanillique" can be regarded as of established value in the differential diagnosis of jaundice.

SERUM AND SULPHAPYRIDINE

Two papers by Finland [2] and colleagues at the Boston City Hospital serve, if only by repetition, to underline certain principles which may easily be forgotten in the clinical application of the sulphonamide group of drugs. Using blood-broth or defibrinated human and rabbit bloods as their media, to which were added 5 and 10 mg. per cent. of sulphapyridine, they confirmed earlier observations that whatever the number of pneumococci (they used types I, III and V) in the inoculation and whatever the concentration of the drug there is always a preliminary phase of growth of the organism, and, what is equally important, the organism must multiply before the drug can act. Afterwards the fate of the pneumococcus depends mainly on three factors—the size of the inoculum, the concentration of the drug, and the susceptibility of the strain—strains of the same type varying in sensitivity. The natural inferences are that a certain concentration of the drug in the blood (Finland suggests 5 mg. per cent.) is required to deal with a generalised infection, and that in severe septicæmias no amount of the drug will per se save the patient. The next point demonstrated was that sulphapyridine exerts its delayed bacteriostatic or bactericidal action on the pneumococcus in the presence of considerable amounts of the homologous specific polysaccharide, a substance which has a direct neutralising effect on antiserum. Thus the drug might be expected to do good in the late stages of a pneumonia when antiserum is admittedly less effective. Antiserum by itself was found to have a rapid pneumococcidal action which was completed before the sulphapyridine began to act. Lastly, Finland confirmed the "summation" effect of serum and sulphapyridine when used together. These findings from in-vitro tests were confirmed by tests carried out on the blood of pneumonia patients under treatment with sulphapyridine or serum, and they substantiated the clinical impression that a combination of serum and sulphapyridine produces the most rapid amelioration of symptoms. No-one would suggest that every case of pneumonia should be treated with both remedies, but in severe infections, whether with the pneumococcus or other pathogen, there are firm grounds for using a combination of serum- and chemotherapy whenever possible, and at the moment this dictum is particularly applicable to epidemic cerebrospinal fever. The drug seems to act directly on the organism or its enzymes (Prof. H. N. Green [3] has thrown some light on its mode of action) whereas antiserum neutralises the toxins or specific substances of the organism. Together the two remedies pave the way for the third factor—the body's natural defences—to complete the destruction of the invading pathogen.

IF EVACUATION HAS COME TO STAY

ENGLAND has probably had more experience of evacuating children than any other country, for the children of our so-called upper classes have traditionally spent the greater part of their childhood in boarding-schools. We may learn from this peculiarly English custom that children and parents will accept prolonged separation if the children live in communities where they are cared for and educated by professionals, where there is not the competition of "another home," and where there is opportunity for regular visits. Dr. Alison Glover (on p. 693) tells a convincing story of the success of the September evacuation, but the results of the new registration are said to be disappointing. Perhaps that is because we have begun at the wrong end. The best stimulus to evacuation—short of actual bombs—would be an improvement of conditions in the reception areas. In September people rose to the occasion and accepted household billeting as a temporary measure. As a permanent scheme it arouses resentment. The A.R.P. Co-ordinating Committee, of which Prof. J. B. S. Haldane, F.R.S., is chairman, in a memorandum to the Minister of Health and the President of the Board of Education stigmatises household billeting as the greatest single cause for the failure of evacuation. In this the committee put forward as an alternative plan that our unemployed builders should be set to work at once on a two-year programme to build camp schools for the older children, and nursery centres and hostels for the mothers and young children. The committee have estimated that this scheme would cost £104 million,

1. Chabrol, E., Charonnat, R. and Blanchard, J., *Pr. méd.* Feb. 13, 1940, p. 177.
2. Spring, W. C. Jr., Lowell, F. C. and Finland, F. *J. clin. Invest.* January, 1940, p. 163; Finland, Spring and Lowell, *Ibid*, p. 179.
3. *Brit. J. exp. Path.* February, 1940, p. 38.

but they hold that this expenditure would be justified by the present need and would give us a valuable asset for the future. In the meantime to stem the drift back to the towns and to encourage further evacuation (which they feel should take place at once and not as the Government suggests only at the moment of danger) more use should be made of empty buildings as communal feeding-centres and hostels.

Both the A.R.P. Co-ordinating Committee and the Cambridge Education Survey, which has also submitted a memorandum to the Minister, consider that visits from parents should be encouraged. The survey also urges that responsible social workers should be available at week-ends to interview the parents, while they suggest that there should be a low flat-rate fare for all such visits. The survey stresses the need for paid and voluntary workers to share the responsibility of looking after the children with foster-parents and teachers. They suggest that reception areas should appoint workers with a general training in social service and also some with special clinical experience of nervous and difficult children. The school helpers and local voluntary visitors should work under the general direction of the trained social worker. They estimate that at least 2 per cent. of the children will be permanently unsuitable for foster-homes and should be housed in groups of 10 or 15 scattered over the reception area.

Last week two of our peripatetic correspondents admitted that evacuation had become part of our social structure. But they seemed to feel that we had yet to make a success of it. Both these memoranda have been drawn up by people who seem to feel the same and want to help.

RADIOGRAPHY IN PLACENTA PRÆVIA

THE presence or absence of placenta prævia is not always easy to establish, and a simple way of locating the placenta without risk to patient or fœtus would often be welcome. Amniography in skilled hands will decide the position of the placenta in a fairly high percentage of cases, but this examination should not be embarked on lightly since injection of an opaque medium directly into the liquor amnii may introduce infection and may also bring on labour. Radiological examination of the relative positions of the presenting fœtal part and the urinary bladder filled with opaque fluid also has technical disadvantages and may cause irritation to the bladder wall. Brown and Dippel[1] describe a procedure by which they are able to localise the placenta in at least 85 per cent. of cases. The method consists of two separate examinations. First, a lateral radiogram of the uterus is taken, using a technique designed to demonstrate the maximum of soft-tissue detail. This film is then examined, a concentrated light being needed for viewing the anterior uterine wall. Where the placenta lies there is an increase in the thickness of the structures between the outer uterine wall and the periphery of the fœtal soft tissues. The outer uterine wall can nearly always be seen in a properly exposed radiogram and the cutaneous outline of the fœtus is represented by a thin dark line, probably due to subcutaneous fœtal fat. In this preliminary examination Brown and Dippel consider that a lateral view is sufficient since the placenta is rarely implanted other than on the anterior or posterior surface of the uterus. Even if it is implanted on the lateral walls it should be seen in the lateral view, for the average placenta covers at least a quarter of the internal uterine surface and therefore extends far enough over the anterior or posterior wall to be visualised. The common causes which hinder localisation of the placenta by this method are excessive obesity, hydramnios, the absence of the dark line outlining the fœtal soft tissue because of insufficient fœtal subcutaneous fat, and multiple pregnancy. Where the results are doubtful and in cases where there is strong clinical evidence of a low implantation of the placenta the bladder is filled with 100 to 150 c.cm. of air and anteroposterior and lateral radiograms are taken. The thickness of the soft tissue between the presenting part and the posterosuperior portion of the air-filled bladder is then measured; normally this is not more than 2 cm., whereas in a central placenta prævia it may be increased to 5 or 6 cm. With a marginal placenta the increase in thickness is found either anteriorly or laterally. Certain factors may lead to errors in diagnosis by this method, such as air or fæces in the rectum, or blood-clot in the region of the internal os resulting from premature separation of a normally implanted placenta, and some experience is necessary to interpret the findings accurately. Brown and Dippel certainly make out a good case for the more extensive use of soft-tissue radiograms in obstetrics, and their method seems to be relatively simple to perform, devoid of risk to the patient and fœtus, and according to their figures highly accurate.

1. Brown, W. H. and Dippel, A. L. *Bull. Johns Hopk. Hosp.* February, 1940, p. 90.

MORTALITY IN 1938

IT may seem rather late in the day to discuss the incidence of mortality in 1938 as shown by the Registrar-General's returns just published.[1] But the value of his reports is not ephemeral, to be lost by a few months' delay in issue owing to war conditions, while in addition the year 1938 has the melancholy privilege of being the last for some time to present a complete and understandable picture of the national record and to allow a satisfactory assessment of gains and losses. It has often been noted that the annual death-rate is now largely determined by the rate prevailing in the first quarter of the year, because of the presence or absence of influenza; 1938 was no exception. Deaths from influenza were relatively few in number and the year's crude death-rate of 11·6 per 1000 persons living has only once (1930) been surpassed, while the standardised rate of 8·5 per 1000 sets up a new low record, a figure below 9 not having been previously observed. The infant-mortality rate likewise reached a new low point at 53 deaths per 1000 livebirths or 4 points below the previous record. This improvement was shared by illegitimate as well as legitimate babies, their relative rates being 81 and 51 per 1000. In the years of childhood, 5–15, the death-rates were as low as any previously registered; at all subsequent ages they were the lowest on record. Judged by mortality 1938 was clearly a strikingly good year. Causes materially contributing to its advantage include the low incidence of influenza, a further fall in mortality from tuberculosis, both in its respiratory and other forms, and an exceptionally low death-rate from whooping-cough. Maternal mortality also reached its lowest level with only 2·97 deaths per 1000 births (live and still) and a steady decline since 1934. On the other hand mortality from diphtheria remained relatively high, and was responsible for 2931 deaths and nearly 65,000 notified cases, acute poliomyelitis was epidemic, and the incidence of cerebrospinal fever was at a higher level than it had been for five years though its mortality showed no corre-

1. The Registrar-General's Statistical Review of England and Wales for the Year 1938. New Annual Series No. 18. Tables, Part 1. Medical. H.M. Stationery Office, 1940. 6s.

sponding rise. The standardised mortality-rate from cancer, for both sexes combined, has shown very little change over the last decade. In 1928 there were 1001 such deaths per million living, in 1933 997, in 1938 1005. Infant mortality continues to show its pronounced contrasts between one locality and another. For instance, in 1937 and 1938 the deaths per 1000 livebirths were 37 and 43 in Stoke Newington and 83 and 78 in Kensington, 46 and 42 in the county borough of Bristol and 92 and 99 in Wigan. Taking wider areas, stillbirths in 1938 varied between 31 per 1000 total births in Greater London, 46 in Cheshire and Lancashire and 51 in Wales.

SUBDURAL HÆMATOMA

ATTENTION has been drawn to the importance of reaching an early diagnosis in subdural hæmatoma by Templeton in our issue of March 16 and again by Eckhoff in this issue. In this they echo Trotter, who pointed out in 1914 that the only chance of saving these patients lies in early operation. This however is difficult to achieve unless all concerned bear the diagnosis in mind in problematical cases. Trivial injury to the skull is the accepted cause of the condition but many cases give no history of trauma. After a known injury there is a latent period which according to Trotter [1] is usually about six weeks. During this time headache and a certain amount of mental impairment are present without definite physical signs. The mental disturbance may be such that the patient is liable to be transferred to a mental hospital. The prodromal period is followed by a sudden lapse into unconsciousness, usually preceded by violent headache and vomiting. Trotter says that the most characteristic feature of the coma is its spontaneous variability: "there is no other condition in which this is so clear and striking a feature." This variability is well demonstrated by Templeton's case. The assistance in diagnosis that may be given by radiography has recently been described by Bull [2] in an analysis of 26 cases studied in Olivecrona's clinic at Stockholm. Of the different techniques available in this sphere pneumo-encephalography seems of most value. By this means it is possible to recognise the type of ventricular displacement that will be produced by a structure having the characteristic shape and position of a subdural hæmatoma.

DRUG STANDARDS IN INDIA

MAINLY as a result of the persistent efforts of a group of Indian medical men under the leadership of Dr. Chopra, the standardisation of drugs in India is in sight. All the provincial legislatures have passed resolutions empowering the central legislature to pass a measure for the control of drugs and a bill has now been introduced to regulate their importation, manufacture, distribution and sale. The word drug here applies to all substances intended to be used for "the treatment, mitigation or prevention of disease in human beings or animals, other than medicines or substances exclusively used or prepared for use in accordance with the Ayurvedic or Unani systems of medicine." The standards proposed for both imported and home-manufactured drugs are the same. Patent and proprietary medicines must conform to the formula or list of ingredients displayed on the label or the formula disclosed to the central drugs laboratory, as the case may be. For vaccines, sera, toxins, toxoids, antitoxins, antigens and the like, as well as vitamins and hormones the standards are those maintained at the Medical Research Institute, Hampstead, and such others as may be prescribed by the central (or provincial) government. Other drugs must be up to the standards specified in the latest edition of either the British Pharmacopœia, the British Pharmaceutical Codex or any other prescribed pharmacopœia, or those adopted by the permanent commission on biological standardisation of the League of Nations. Thus it is proposed to adopt for the last two groups standards which are followed in this country. In the case of proprietary medicines the bill appears at first sight to go much further than English laws and to be based rather on recent American legislation. For instance, the sale of any proprietary medicine will be unlawful unless its label displays either its formula or a list of its ingredients in a manner readily intelligible to members of the medical profession, or else the number of the certificate of registration granted by the Central Drugs Laboratory after being informed of its formula. This provision loses some of its force by an explanation in a later clause to the effect that the formula or list of ingredients shall be deemed to comply with the provision if "without disclosing a full and detailed recipe of the ingredients, it indicates correctly all the potent or poisonous substances contained therein together with an approximate statement of the composition of the medicine." This explanation seems to bring the labelling of proprietary medicines more or less into line with the practice which has grown up in this country under the pressure of the medicine stamp duty acts.

INVESTIGATION OF CANCER CURES

FROM New York comes a very definite claim by Glover and White [1] that cancer is being cured by a specific antiserum. They claim that in 1920 it was demonstrated before members of the staff of St. Michael's Hospital, Toronto, that the inoculation of a bacterial suspension containing a micro-organism obtained from human cancer produced metastasising tumours in animals, and that this work was repeated in the hygienic laboratory of the United States Public Health Service in 1929. Their antiserum is prepared by repeated injection of horses with Berkefeld filtrates and fluid cultures of various strains of this micro-organism and the serum is used to treat patients suffering from cancer. Such claims are familiar to all who treat cancer patients because patients and their friends hear or read of them and at once beg to be treated by a method which seems to them simple and logical. The cures set out in this booklet are striking and however doubtful the doctor may feel about claims that appear in private publications and do not conform to the usual medical criteria for the presentation of statistics, it is not helpful if he tells the patient that he does not believe the facts. It can be said that many of the cases quoted have no histological proof, have really been cured by operation, or present the signs of radiation reaction with a cured cancer. Even then a residue of cases remain in which no explanation is possible and the question becomes one of truth or falsehood. There is, for instance, a record of a case of adenocarcinoma with a positive pathological report alive for 14 years with no other treatment than antiserum. Had this case been quoted in a statistical report for any of the accepted methods of treatment it would have been accepted without question. The work of the American Medical Association in investigating the claims made for secret remedies is well known, and it is probable from references to the hostile reception of their work made by the authors of this report that some such investiga-

1. Trotter, W. *Brit. J. Surg.* 1914, **2**, 271.
2. Bull, J. W. D. *Proc. R. Soc. Med.* February, 1940, p. 203.

1. Treatment of Cancer in Man. By T. J. Glover, M.B. and J. E. White, M.D. New York: Murdoch Foundation. 1940.

tion has already been made. It would be of real value to the medical profession if all claims to cure the diseases which at present are regarded as inevitably fatal without special treatment and which yield only low percentages of cures could be investigated by a specially appointed body. The authority of an international committee sponsored by the League of Nations would lend great weight to such investigation, but even without this the national bodies such as the British Empire Cancer Campaign, who have already done good work on these lines, could give a useful lead.

THE IRREPRESSIBLE *BACTERIUM TULARENSE*

TULARÆMIA, a plague-like disease of animals and man, is an infection which America is proud to call its own, for although it has been reported from countries as far away as Norway, Russia and Japan the whole history of the disease has been worked out by American observers, particularly McCoy and Francis. For our part we are content that the disease should remain American, for the ways in which *Bacterium tularense* attacks its victims are wide and varied. A natural disease of ground squirrels and wild rabbits in the western states of America, the infection may be conveyed to man from the skin or carcases of these animals, or from hares (Norway) or water-rats (Russia), or from the bites of ticks or of horse flies. Even when it is apparently safely caged in the bacteriologist's test-tube it may still escape, and there is no other organism which is so dangerous to the laboratory worker. It will pass through the intact skin of the guineapig and probably, too, of homo sapiens, and infection takes place most often through the skin of the fingers and the conjunctival mucous membrane. Polluted water had not until lately been incriminated as a possible source of infection, although the "lemming fever" of Norway, which follows the drinking of water polluted by the bodies and excreta of the small rodents called lemmings, is thought to be a form of tularæmia. Now, however, comes a report[1] from America that the water in three Montana streams has been found contaminated with *Bact. tularense*. Two of the streams are flowing creeks, while the third consists at certain times of the year of a succession of pools, and the organism was present also in the mud of one of these pools. These findings were made while studying epizoötic tularæmia in beavers, and in the neighbouring state of Wyoming these animals have provided a striking illustration of the infectiousness of tularæmia.[2] A year ago the game warden sent a dead beaver to the University of Wyoming for a post-mortem examination, and the man who unwrapped the body developed tularæmia five days later and took three months to recover from the recurring attacks of fever. At Pass Creek, from which this beaver came, a large number of beavers had died mysteriously and the trapper developed what was later proved bacteriologically to be tularæmia. It seemed likely that the beavers had died of the same disease, and there was some evidence that the infection was water-borne.

GENTIAN VIOLET FOR THREADWORMS

NEW remedies for the cure of threadworm infections are liable to enjoy but a brief popularity since relapses are frequent, and, what is less recognised than it should be, familial infestation leads to early reinfection. Unfortunately the most efficient remedies so far suggested have involved long courses of enemas which are in many ways undesirable for children, difficult to carry out on a large scale in the family circle or in institutions, and if hexyl-resorcinol is used (certainly the most reliable rectal medicament to date) definitely expensive. For some time past the United States Public Health Service has been issuing a series of valuable studies on oxyuriasis, and the National Institute of Health anal swab for diagnosis and for checking cure has featured in many of these. Armed with this weapon Wright and Brady[1] now bring forward evidence that in gentian violet there has at last been found a relatively cheap, safe and practical method of getting rid of threadworms without the use of enemas. Four methods have been tested. In the first ½-grain "enteric-coated" tablets of gentian violet were given to adults three times a day before meals for ten consecutive days. Children received smaller doses, based on a general rule of gr. 1/6 per day for each year of apparent age, divided into three doses. In a series of 107 patients 91 per cent. gave negative swab results ten to twenty-one days after the completion of treatment. Since the life cycle of the threadworm may be as long as twenty-one days a second group of patients were given the tablets for eight days, then rested for a week and given the tablets again for eight days. Of 30 patients treated in this way 27 were negative in swab examinations made between the fourteenth and twenty-first day after the end of treatment. A third method involved similar dosage but examination was deferred until between the forty-second and the forty-eighth day after the end of treatment; here only 58 per cent. were negative. It was felt that the efficiency of gentian violet might be improved by varying the coating of the tablets so as to ensure complete disintegration. A fourth group of patients were therefore given tablets with a water-soluble coating an hour before meals for the sixteen-day course with a week's rest in the middle. Here 79 per cent. of patients were negative for threadworm ova on seven consecutive daily swabs taken from the forty-second to the forty-eighth day after the end of treatment—a rigorous test it will be agreed. Some of the positive results may have been due to reinfection in the environment from which the patients came, so that if all infested individuals in the patients' families were treated at the same time better control might be obtained. A small proportion of the patients treated suffered from nausea, vomiting, diarrhœa and abdominal pain but these complications quickly disappeared when the dosage of gentian violet was reduced or omitted for a day or two. The drug should not be used where there is concomitant infection with the round worm (which must be got rid of first), moderate to severe cardiac, hepatic or renal disease, alcoholism, or diseases of the gastro-intestinal tract. Wright and Brady conclude that gentian violet is "eminently superior to some and superior to all the other methods of therapy tested under similar conditions." Previous publications have shown that such conditions, including the use of the anal swab, are strict, so that "because of its relative cheapness, its ease of administration and its relatively high degree of efficacy" gentian violet appears to hold the field for the treatment of threadworms, especially when familial infestation is present. The sixteen-day course with a week's rest in the middle is the method of choice and tablets with a water-soluble coating should be used.

DR. JOHN GRAY, senior medical officer in St. Helena, has been made a member of the executive council of the island.

1. *Publ. Hlth Rep., Wash.* Feb. 9, 1940, p. 227.
2. *Science*, March 15, 1940, p. 263.

1. Wright, W. H. and Brady, F. J. *J. Amer. med. Ass.* March 9, 1940, p. 861.

PREVENTION AND TREATMENT OF WOUND INFECTION

III.

BACTERIOLOGY OF INFECTED WOUNDS

By ROBERT CRUICKSHANK, M.D. Aberd., D.P.H.
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THE diminishing incidence in wars of once rampant infectious diseases together with the developments of modern warfare has brought into greater prominence the bacterial infection of wounds. It became a major problem in the last war, when gas gangrene, although known since the 16th century, emerged as a dreaded and well-defined entity, and pyogenic infection was a veritable scourge among the wounded at base hospitals. Intimate coöperation between the surgical unit and the laboratory, essential for the prevention and treatment of such bacterial infection, is probably more common now than in 1914 when difficulties in organising an efficient laboratory service, inadequate technical assistance and methods, and excess of routine work rather interfered with organised investigation. This coöperation, for which in the event of active warfare adequate laboratory facilities will be available, may be helped by a review of the bacteriological causes of wound infection, their possible sources, and the methods of specific prophylaxis and treatment.

The triad of bacterial infections which principally attack wounds are pyogenic infection, gas gangrene and tetanus, probably in that order of importance as killing and maiming diseases. Thus, the bacteriologist has to set his field to catch two groups of bacteria: (1) the pyogenic aerobes and (2) the sporing anaerobes.

PYOGENIC INFECTION

Of the pyogenic bacteria the most important is *Streptococcus pyogenes,* with *Staphylococcus aureus* second and the coliform group together with *Bacillus proteus* and *B. pyocyaneus* third. This last group of gram-negative bacilli usually become prominent in the later stages of the infected wound, and they are to be regarded more as contaminants than pathogens although they contribute to the delayed healing of the wound. Purely saprophytic organisms include the enterococcus, white staphylococci, diphtheroids, sporing aerobes of the subtilis group, and indeterminate gram-negative cocci, all of which may be found at any stage of the infected wound.

Strep. pyogenes is most to be feared because of its great invasiveness, and it is most likely to invade the tissues if it gains early access to the wound before the defensive reaction has begun. At this stage it may spread beyond the wound, causing cellulitis or erysipelas or even generalised infection (septicæmia). Sometimes, if the strain is highly toxigenic and the patient susceptible, a scarlatinal rash will accompany the local infection, but this need not be regarded as an indication for removal to an isolation hospital. Infection of a wound with *Strep. pyogenes* after granulation has begun will often escape clinical observation and may only be detected bacteriologically. Such secondary infection delays healing of the wound, produces a degree of toxæmia, and may at any time extend to tissues beyond the wound, especially if and when surgical interference is required. In this connexion the affinity of the streptococcus for joints and the consequent risk of secondary septic arthritis must ever be borne in mind. It is essential, therefore, that a bacteriological examination be made of the granulating wound of any patient on whom operation is intended, and steps taken to prevent dissemination of any discovered streptococcal infection. The hæmolytic streptococci of infected wounds belong almost wholly to Lancefield group A, and so Lancefield grouping is not an essential part of the diagnostic report. Serological typing, if it is available, will give information about possible sources of infection and may perhaps, with further evidence than we now possess, give a clue to the virulence of the infecting streptococcus.

Staph. aureus has been the cause of much chronic invalidism from infected wounds and bones. It is less invasive than the streptococcus but it would be unwise to ignore its presence, for it may, if it does invade the tissues, set up a fulminating septicæmia, or more often a subacute pyæmia, which will require all the patient's natural resistance aided by specific and non-specific remedies to overcome it. Staphylococcal infection about the face or of bone is especially apt to cause septic thrombophlebitis with metastatic abscesses in such organs as lungs, kidneys, brain or heart. The clinician sometimes asks what is the significance of *Staph. albus* in a wound or a blood-culture. The white staphylococci are seldom pathogenic even when, as frequently happens, they produce hæmolysis on a blood-agar plate, but if there is any doubt, a simple and reliable test of pathogenicity is the power to coagulate human or rabbit plasma inoculated with a young culture of the organism and incubated at 37° C. for 3 to 6 hours.

The presence of *B. proteus* or *B. pyocyaneus* in a wound need not in themselves cause any alarm as these organisms are unlikely ever to produce a spreading or generalised infection. They may, however, as is mentioned later, play an important part in the initiation of anaerobic infections. They have also a "nuisance" value in that they may mask the presence of more pathogenic bacteria, so that the bacteriologist may have to adopt methods to inhibit their growth or spreading property. The propensity of bacteria to spread from wound to wound in a hospital ward is well exemplified by proteus and pyocyaneus, to which the surgeon can testify by the colour and smell of the discharge and the bacteriologist from his cultures.

GAS GANGRENE

Gas gangrene in man may be caused by one or a combination of sporing anaerobes or clostridia, of which the most important are *Clostridium welchii type A*[1] (*B. perfringens*), *Cl. septique* (*Cl. œdematis maligni, Vibrion septique*) and *Cl. œdematiens* (*Cl. novyi*),[2] to which certain authors would add *Cl. histolyticum. Cl. welchii* is the most common, having been present alone or in combination in 70–80 per cent. of cases of gas gangrene in the last war, which may be compared with 10–15 per cent. for *Cl. septique* and 5–35 per cent. for *Cl. œdematiens.* However, the surgeon must know that these anaerobes are frequently isolated from wounds not affected with gas gangrene (there may be some bubbles of gas in such a wound and the brownish discharge may have a foul acrid

1. *Cl. welchii* has been divided into four types according to the serological nature of the toxin or toxins produced. Type A is the human type and gas gangrene antitoxin is prepared with the toxin of this type. Strains from patients who do not respond to specific prophylaxis or treatment might be serologically examined to find whether they belong to types B, C or D.
2. The name *Cl. novyi* has priority claims but *Cl. œdematiens* is now generally used.

odour). Thus, gas gangrene is, like diphtheria, to be diagnosed primarily on clinical evidence which the bacteriologist may or may not be able to confirm, but as in diphtheria it would be quite unjustifiable to wait for a bacteriological report in a suspected case. Nevertheless, where mono-specific antitoxins are available for treatment it is an urgent necessity to know the species of the infecting anaerobe. It is not possible to say which of these gas-gangrene anaerobes is the most virulent, for experimentally different strains of the same species differ widely in their toxigenicity and invasiveness. However, since the intense toxæmia which develops with the infection is the probable cause of death, it may be said that in general *Cl. œdematiens* is mainly toxigenic. *Cl. welchii* is more toxigenic than invasive, while *Vibrion septique* is both toxigenic and invasive. Thus the latter organism may be found in the blood of patients with well-established gas gangrene due to it, whereas invasion of the blood by *Cl. welchii* is a late or terminal event, although a temporary bacteræmia may occur about the time of operation or other manipulation. In this respect gas gangrene, essentially an infection of muscle, differs materially from the *Cl. welchii* septicæmia that sometimes develops after abortion or confinement, where early invasion of the blood and intravascular hæmolysis are outstanding features of the infection. Jaundice is as a rule seen only in the last stages of classical gas gangrene.

The bacteria causing the initial infection in gas gangrene are but poorly proteolytic, so that much of the tissue destruction and digestion that follow the gaseous infiltration and œdema is due to proteolytic commensals, and of these the most frequent and active is *Cl. sporogenes*. This sporing bacillus, which morphologically rather resembles *Vibrion septique*, is often present in wounds whether affected with gangrene or not, and is a great nuisance to the bacteriologist because of the difficulty in separating it in culture from the more pathogenic clostridia. At this point it may be asked what is the effect of coincident aerobic infection on the growth of the sporing anaerobes. Experimentally, a mixture of aerobic and anaerobic pathogens will often initiate a gangrenous infection of muscle where the anaerobe by itself may fail, and it is now believed that the growth of the aerobic bacteria lowers the oxidation-reduction potential in the tissue to a degree which will allow active germination of the spore-bearers. American observers in the last war found that a combination of gas-gangrene organisms with *Strep. pyogenes* produced a more virulent, and with *Staph. aureus* a less virulent, gangrenous infection than the anaerobes alone. But obviously other factors than an accompanying aerobic infection will provide conditions suitable for the growth of the sporing anaerobes, since gas gangrene may be well-established within a few hours of the injury.

TETANUS

Tetanus is the second and, now that the population at risk may be actively or passively immunised against it, much the less serious of the clostridial infections. Whereas gas gangrene declares itself within the first few days and seldom after the seventh day of injury, the incubation period of tetanus varies usually between three and twenty-one days, depending probably more on the nature than the site of the lesion, and if the patient has been passively protected by tetanus antitoxin the period may be extended to a month or more. Passive immunisation also results in a proportion of cases of "local tetanus" (tetanic spasms developing among the muscles adjacent to the primary wound), which may or may not be accompanied by the classical descending tetanus; careful observation for and the early detection of local tetanus may save lives. The surgeon will also remember that tetanus may develop from small and easily overlooked wounds, particularly penetrating wounds about the extremities. Wound sepsis and especially the toxins of other clostridia facilitate infection, but whether by lowering the oxidation-reduction potential in the tissues or by preventing phagocytosis of the tetanus spores is still in dispute. As with the other pathogenic clostridia, *Cl. tetani* is not uncommonly found in the wounds of patients not affected with tetanus.

OTHER INFECTIONS

While these are the major infections of war wounds, the doctor must always be on the outlook for other and rarer forms of infection. Wound-diphtheria, characterised as in the throat by membrane formation, may occur sporadically or in epidemic form as it did among a group of Canadian soldiers who were infected from the finger of a nurse. The virulence of any morphological *C. diphtheriæ* from wounds must always be proved. Local or generalised infection with anaerobic streptococci or fine gram-negative bacilli (*Bact. necrophorus*) which thrive on necrotic tissue was probably not uncommon in the early years of the last war before excision of wounds became a routine practice. The generalised infection begins from a septic thrombophlebitis and is manifested by daily rigors, a progressive anæmia, and embolic phenomena in the lungs, often with secondary empyema. Spreading gangrene of the skin due, according to Meleney,[3] to a micro-aerophilic streptococcus may also occur, and may require the special treatment with zinc peroxide that he recommended.

Since the treatment of wounds by packing the open wound with gauze and then enclosing the limb in plaster may, after the example of Winnett Orr and the Spanish surgeons, become popular, it is interesting to know what is the bacterial flora of such wounds. According to Trueta[4] there is a great diversity of bacteria, but principally staphylococci, streptococci and *B. pyocyaneus*. He thinks the latter organism may be antagonistic to the pyogenic cocci, and he finds that as healing progresses it becomes more prominent, while other organisms tend to disappear. Allbee found that in cases of osteomyelitis treated by the Winnett Orr technique bacteriophage to the staphylococcus frequently developed. It might be expected that proteolytic bacteria would find the wound discharges suitable for growth, and the stench is probably due to proteolytic activity. Among four cases of gunshot wounds recently treated by the closed plaster method in this country, *B. pyocyaneus* was present in one, proteolytic clostridia in one, and *Staph. aureus* in all four.

MATERIAL FOR ISOLATION OF BACTERIA FROM WOUNDS

It is not intended to discuss here methods for the isolation and identification of pathogenic bacteria from wounds. The surgeon will doubtless make most use of the ordinary throat-swab for obtaining material, but wherever possible he should try to collect some discharge or sanious fluid in a screw-cap container which is particularly useful if the specimen has to be sent some distance to the laboratory; an adequate sample of the discharge also facilitates animal-inoculation tests, often the quickest and most reliable method for identifying the pathogenic clostridia. In gas

3. Meleney, F. L. and Johnson, B. *Surg. Gynec. Obstet.* 1937, **64**, 387.
4. Trueta, J. *Proc. R. Soc. Med.* 1939, **33**, 65.

gangrene, a piece of infected muscle or fluid from bullæ should also be sent. The specimen must be properly labelled and accompanied by a clinical diagnosis of the case, so that the bacteriologist may immediately concentrate on isolating the suspected pathogen. For primary culture the blood-agar plate incubated aerobically and anaerobically will be most generally useful, so that anaerobic jars and the means (e.g., the Hyvac pump) for rapid evacuation of the contained oxygen are essential. The replacement of the air with an inert gas is best done from a cylinder of hydrogen via a football bladder. A bacteriological diagnosis should never be expected or attempted from a stained smear of the discharge because almost every one of these pathogens has its morphological double among the saprophytic bacteria. Smears from gangrenous muscle or bulla fluid may, however, be used for an early tentative report. The bacteriologist for his part should familiarise himself with the biological characters and selective methods for early isolation of the pathogenic clostridia.

(*To be concluded*)

SPECIAL ARTICLES

SETTING THE DANE ON HIS FEET

THE DANISH INVALIDITY INSURANCE COURT

THERE is much in the health services of Denmark that might with profit be incorporated in ours, and the system of invalidity insurance merits closer study in view of the rising trend of chronic incapacity. Invalidity insurance in Denmark dates from 1927. All members of an approved sick club now have to be members of invalidity insurance, and membership of a sick club is compulsory for virtually the entire population between the ages of twenty-one and sixty. At the end of 1938 about 90 per cent. of the adult population was insured against invalidity.

The resources of the invalidity insurance scheme are provided partly through premiums paid by the insured person, partly by employers and partly through state and communal subsidy. The Invalidity Insurance Court decides whether an applicant for insurance pension is entitled to receive that pension (and supplements to it), whether help towards restoring health or occupational measures can be granted to an insured person or pensioner, and whether an insured person continues to fulfil the conditions entitling him to the pension. The court consists of a chairman appointed by the crown, two medical members, two representatives of insured persons and one representative of employers with several associated expert advisers.

When the earning capacity of an applicant is found to be reduced to a third of the sum usually earned by physically and mentally sound persons with similar training, he is entitled to a pension unless the invalidity has been brought about or wilfully increased by himself or has been contracted through the abuse of alcohol or narcotics. To the basic pension rate certain supplements may be added, including one in respect of dependent children and one for the payment of an attendant, where required. All blind applicants are entitled to a supplement, and lesser degrees of amblyopia are considered on their merits.

When required by the court, insured persons and invalids, as well as children under fifteen years, must submit to training and medical attendance, including the acceptance of training in the use of surgical appliances, artificial limbs, spectacles, invalid carriages and other appliances, but no-one is obliged to undergo an operation which may involve danger to life or health. Help to start independent work and to provide working machines, as well as other help to procure employment, may also be granted by the court.

The National Insurance Act lays on every medical practitioner (in hospitals the chief physician) the duty of reporting to the Invalidity Court persons under thirty having diseases or infirmities which have reduced, or in the near future seem likely to reduce, their earning capacity to a third. Schools have a similar duty to report cases among children. At the age of sixty-five a pensioner is transferred to old-age pension and is then no longer under the supervision of the court.

During 1938 the Invalidity Court dealt with 32,000 applications and received 7000 notifications of invalid persons under thirty. About a quarter of the applicants were found by the court to be "non-invalid." At the end of 1938, 37,000 persons were in receipt of invalidity pensions, and during the year some 1500 applicants were granted a supplement for helplessness, 29 for blindness and 62 for extreme amblyopia.

OCCUPATIONAL TRAINING

From the introduction of the scheme in 1927 to the end of 1938, 54,000 patients have benefited from "health-restoring and occupational measures." The distribution by diagnosis of the cases granted assistance during 1938 is set out in table I.

TABLE I—CASES GRANTED ASSISTANCE IN 1938

Cause of invalidity	Medical treatment and nursing	Protheses, bandages, and repair of same	Invalid chairs	Working machines and start help	Training	Work found by court	Total
Deformities ..	283	1173	2	28	121	6	1613
Congenital ..	*181*	*390*	*0*	*9*	*31*	*0*	*611*
Diseases of brain, spine and peripheral nerves ..	159	683	29	22	77	3	973
Poliomyelitis ..	*72*	*599*	*21*	*13*	*62*	*3*	*789*
Tuberculosis ..	789	62	1	7	24	0	883
Pulmonary ..	*659*	*0*	*0*	*3*	*7*	*0*	*669*
Amputations ..	17	540	3	12	23	4	599
Mental diseases and neuroses ..	464	1	0	1	6	0	472
Chronic intoxications and infectious diseases ..	248	77	0	6	25	3	359
Diseases of organs of special sense	29	190	1	30	14	1	265
Diseases of metabolism	161	9	0	4	24	1	199
Results of accidents	29	104	1	11	25	2	172
Diseases of digestive system ..	55	52	0	1	1	0	109
Others	399	29	1	12	49	2	492
Total	2633	2920	37	134	389	22	6135

The type of training given to patients selected for it is interesting. During 1938, 219 men and 170 women received such training: 79 of the men at special schools, commercial, teachers' training colleges, chauffeur courses, technological courses, central heating courses, milk recorders' courses, &c., and 140 at various artisan trades, chiefly shoemaker, tailor,

barber, mechanic, painter, joiner, clerk, in that order of frequency. Of the 170 women who received occupational training, 41 were trained in special schools (mainly commercial), 114 were trained as seamstresses, and smaller numbers as weavers, tie-makers, clerks, hairdressers, and the like. Since 1927, 726 patients have been provided with equipment to enable them to start business on their own account, 167 as shoemakers, 190 as other artisans, 197 in domestic industries (sewing, knitting machines, looms) and the remainder in a diversity of other occupations. In most cases the help was given by way of loan.

TABLE II—EARNINGS BEFORE AND AFTER OCCUPATIONAL TRAINING

Annual earnings before training	Number of trained persons in 1937 earning:						
	0	£1–25	£25–50	£50–150	£150–300	£300 +	Tot.
0	14	100	121	250	23	3	511
£1–25	1	5	11	17	0	0	34
£25–50	0	8	1	19	5	0	33
£50 + ...	0	2	6	17	3	0	28
No information	1	8	11	24	1	0	45
Total ..	16	123	150	327	32	3	651

Up to the end of 1937, 923 patients received occupational training, about half of these being between nineteen and twenty-five. The duration of training varied widely. In 336 cases it occupied less than one year; in 295 up to two years; in 133, two to three years; in 85, three to four years; and in 74, four years and upwards. The average cost was about £75 per patient; it cost more to train artisan tradesmen than to give scholastic training. In 651 cases the occupational training was described as "utilised" and in the remainder as "non-utilised." The earnings of the former before and after training are shown in table II.

The causes of non-utilisation included death (26), health impaired (35), taken up other trade (78), married (43) and other causes (90). Of 223 patients who discontinued training the causes of discontinuance were: death (15), state of health impaired (75), lack of assiduity (30), lack of aptitude (58), taken up other trade (5), and other causes (40). The percentage failure due to lack of aptitude was higher among workers training in the more scholastic occupations and that due to impairment of health among those training in artisan trades.

Up to the end of 1937, 455 machines were granted to applicants to assist them to start work on their own account. Of these patients 370 were then still at work: 105 as shoemakers, 86 as dressmakers, 43 as brushmakers, 30 as spinners or knitters, 17 in engineering trade, 15 as watchmakers and repairers, 11 as bookbinders and 10 as basketmakers. Apart from the provision of machines, 92 patients were given help towards setting up in business: 14 as tobacconists, 8 as street newsvendors, 4 as butchers, 6 as grocers, 15 as poultry breeders, 13 as musicians, 3 as piano-tuners, 5 as mangle minders.

There is evidence in the majority of cases that employment found under the ægis of the Invalidity Court is held for a reasonably long period. As an economic factor the work of the court must have considerable significance, and as a therapeutic instrument its value must be great. The total administrative expenses of the court amounted in 1938–39 to £50,000—not a great deal to pay for new lamps for old.

SOCIETY OF M.O.H.'s

THE annual luncheon of this society was held at the Piccadilly Hotel on April 5 with the president, Dr. F. T. H. WOOD, in the chair. After the loyal toast the President welcomed the Minister of Health, Mr. Walter Elliot, and the other distinguished guests, especially the heads of the Royal Colleges and of the Society of Apothecaries, the administrative and medical heads of the Ministry of Health, the representatives of local authorities, of their dental colleagues and of the House of Commons. He suggested a reconstruction of the speech which Sir John Simon, the first president of the society, might have made in the presence of the forerunner of Mr. Elliot, the President of the General Board of Health, eighty-four years ago. It would have been in the nature of a diplomatic and elegantly phrased regret that the functions of the board were ill-defined and resented on the rare occasions when they were exercised; and a lament that to stand and wait in the antechambers of legislation was not truly to serve, nor was it such able-bodied service as he and his colleagues were desiring to render. He might even have ventured to repeat an observation he had made, as M.O.H. for the City of London, to the effect that the difficulties which had baffled successive Home Secretaries might soon find their solution in the less divided attention which a Minister of Health might bring to their study. The country now had a Minister of Health with extensive and well-defined functions, the exercise of which the President could say—not being on oath—were always welcomed by local authorities. There was still much "waiting in the antechambers of legislation," but in those chambers municipal medical officers were given opportunities of shaping and—who knows?—of improving the statutes and regulations on public health which still came out in a steady spate. He paid tribute to Mr. Elliot's personal qualities and greeted him as a fellow-member of the medical profession.

Mr. ELLIOT, in reply, observed that the luncheon was noteworthy as a step towards the restoration of ordinary activities. He, like the medical officers, suffered from too much reading of regulations, and was glad of the opportunity to join again in an assembly of the brethren. The 1500 local authorities and their medical and administrative staffs are, he said, greatly indebted to the work of the medical practitioners. As an honorary Englishman he did his best to imitate the qualities of the great and distinguished English race, and particularly its power of working with others, its kindliness and tolerance, all of which were now more necessary than ever before. The administrative and practising sides of medicine were much more closely interwoven now than they had been a year ago. The diversion of so much energy from the tasks of peace to those of war was in one way a tragedy, but in the sphere of national health tremendous advances could be dated from the end of the last war. The vital statistics of this year were vastly better than those of 1918. The outpatient rate had been reduced by half, the general death-rate had fallen, the infantile mortality had dropped from 89 to 53. What had been done once could be done again, and the end of this war might see another similar advance. Evacuation and the emergency medical service had thrown gigantic and immediate tasks upon the shoulders of many of those present. He and his colleagues in Whitehall were by no means ignorant or unmindful of those tasks. The success of the evacuation, carried through without injury to the public health, had been built on the achievement of medical

officers of health in years past. The fact that infectious diseases had not increased, but even in some places had diminished, was a striking tribute to the solid work which had gone into the public-health services during recent years. In 1837 Sir John Simon would have had to deplore an expectation of life in Manchester of only 20 years and in Liverpool of only 17 years—very different from the figures of today: 59 years for a boy and 63 for a girl. A great hospital building programme was actively under way for providing 40,000 beds, nearly all under the supervision of local authority medical officers. The war effort of the medical officers of health was no less important than that of the men of the fighting services.

MEDICINE AND THE LAW

Cancer Act Prosecution

ALTHOUGH the legislature has neglected opportunities to forbid the advertisement of cures for various diseases for which no cure is at present known, a clause was inserted in the Cancer Act last year to make illegal the advertising of a cure for cancer. Last week the Bath magistrates dealt with one of the first prosecutions under the clause. A herbalist displayed in a shop window a board bearing the words "Cancer Cure—£100 to Leeds Hospital if I fail to cure cancer —Wright, herbalist." The medical officer of health drew the attention of the police to the advertisement and a summons was issued. The herbalist told the magistrates that he was guilty of treating cancer; he had, he said, brought a case to the court. He claimed to have cured cancer where hospitals had failed. It was explained to him that he was not charged with treating cancer but with advertising a cure. In answer to the magistrates he undertook not to repeat his offence. The police having reported that there were no previous convictions against the defendant, he was bound over for a year in the sum of £5 and was ordered to pay 4*s*. costs. "We think you did not know about the statute," said the chairman of the bench; "we did not know about it ourselves, but there it is; people are supposed to know these things."

There is a legal maxim that ignorance of the law is no excuse. A few years ago a flustered defendant offered a metropolitan magistrate a revised version of the maxim—"Of course," he said, "I know that ignorance is no excuse for the law." There will be no excuse in future either for the herbalist or for the Bath magistrates. If there are many such cases, the legislature can feel amply justified in having inserted the statutory prohibition in the Cancer Act last year.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

ABERDEEN GRADUATION

Lord Meston, chancellor of the University of Aberdeen, in his address to new graduates at the spring graduation ceremony said that it is inconceivable that the nations will again allow the progress of man to be exposed to the sabotage from which it has suffered in recent years. In the measures to be taken our country will almost certainly have to take the lead. The responsibility will fall on those of the new graduates' generation who have brains and are not afraid to use them. He felt an evergrowing impatience and resentment that those who cannot serve as combatants are not being used to support the actual fighting forces. Perhaps one day a Government department will begin to realise what a volume of human power is running to waste in this country in a way which would be impossible in Germany or indeed in France. Then it may be able to tell the university and all its members what it and they could be doing to help in the struggle. Lord Meston asked whether his hearers would prefer to be idealists with Thomas More or realists with Nicolas Machiavelli. If Europe had followed More rather than Machiavelli what a different world we should find ourselves in today.

CANCER RESEARCH IN EDINBURGH

The cancer-control organisation for Edinburgh and the south-east of Scotland has decided to renew grants for research work at present being conducted in the university, the Royal College of Physicians laboratory and the Royal Infirmary amounting to over £1000 in the present year. The committee also voted £250 to the Royal Infirmary towards the cost of a new tube for deep X-ray therapy. It was felt that there should be no remission in the scientific investigation and treatment of cancer even during the years of war. Research must continue on a wide scale and the fullest range of modern methods of treatment must be available wherever possible. It was decided not to make any general request for financial support during the war in order to avoid clashing with what were perhaps more urgent appeals, but the committee hopes that there will be no falling off in contributions and legacies.

WOODEND HOSPITAL, ABERDEEN

Under the Emergency Hospital Scheme an annexe containing some 200 beds is to be erected at Woodend Hospital, Aberdeen, by the Office of Works. A sixty-cubicle ward at present being used by nurses might be utilised, when the new nurses' home is finished, for the nursing staff of the annexe. The domestic staff of Woodend live out, so there will be no need to construct any new buildings to house them. Meals for the annexe will be cooked in the kitchens of the parent hospital.

UNITED STATES OF AMERICA

(FROM OUR OWN CORRESPONDENT)

U.S. VERSUS A.M.A.

THE suit of the government against the American Medical Association charging that their efforts to discourage the Group Health Association of Washington D.C. constitute a violation of the Sherman anti-trust act has been carried one stage further. The district court had held that medicine is a "learned profession" not within the scope of the act under whose provisions the suit was instituted. This ruling was reversed on March 4 by the Court of Appeals which has held that "it cannot be admitted that the medical profession may through its great medical societies, either by rule or disciplinary proceedings, legally effectuate restraints as far reaching as those now charged." This decision does not establish the guilt of the A.M.A. but merely the propriety of the suit under the anti-trust act. The case will now be retried in the lower court unless in the meantime the attorneys of the association decide to carry an appeal against the latest decision to the supreme court.

QUARTERLY JOURNAL ABOUT ALCOHOL

The Research Council on Problems of Alcohol is to publish a *Quarterly Journal of Studies on Alcohol*. This will be edited by Dr. Howard W. Haggard, assisted by a distinguished editorial board. Manuscripts may be submitted to the editor at 4, Hillhouse Avenue, New Haven, Connecticut, U.S.A. The first issue is to appear in May and will include original

scientific papers reporting experimental, clinical and sociological investigations and reviews; editorials; abstracts of current literature; medicolegal cases; and reports on the activities of the council.

AMYOTROPHIC LATERAL SCLEROSIS TREATED WITH VITAMIN E

On March 12 a paper was read by Dr. I. S. Wechsler of the Mount Sinai Hospital to a joint meeting of the New York Neurological Society and the section of neurology and psychiatry of the New York Academy of Medicine on the treatment of amyotrophic lateral sclerosis with tocopherol (vitamin E). Since October of last year eight cases have been under treatment. In three advanced cases no improvement was observed, in three there has been some improvement and the other two have been remarkably improved. One bedridden patient, with commencing paralysis of the tongue and dysphagia, is able after three months' treatment to move about the house with assistance. Another patient who three months ago suffered from paralysis and atrophy of the muscles of one hand is now able to use the hand for skilled movements. The rationale of tocopherol treatment is based on observations made by Evans and more recently by Einarsen and Ringsted of the pathology of the nervous systems of animals that have been deprived of this vitamin.

PUBLIC HEALTH

Points from Annual Reports

Dr. A. Hamilton-Wood, of *Warwickshire*, mainly a rural county in area (477,186 out of 558,710 acres), but urban in population (257,880 out of 397,600) gives the corrected death-rate for 1938 as 10·17. Of the total deaths 25 per cent. were due to heart disease and 13 per cent. to cancer. There was a slight increase in deaths from tuberculosis to 188, giving a rate of 0·47 against 0·41 in 1937.

At Rugby there is a gynæcological clinic at which advice on contraception is given. Dr. Jean Watson, who was medical officer of the clinic, reporting on the year's work, says that the main difficulty is to get the women to report regularly. This is due partly to distance, but partly to subnormal intelligence. "Return visits have been made mostly by patients of average intelligence" and "Both subnormal intelligence and poor environment are serious obstacles to the successful use of the method." Contraception fails socially because that section of the community for which it might be valuable is unable or unwilling to use it.

Staffordshire is another mixed rural and urban county tending towards urbanisation. In 1931 the total population was 703,254 of which 212,622 was rural; in 1938 the total population had risen to 749,900, but the rural population had fallen to 180,700. Dr. W. D. Carruthers says that the decrease in the rural population is explained by changes in sanitary districts brought about by the Staffordshire Review Order, 1934. The issue of the order was, however, itself due to the growing urbanisation of the county. The report contains some interesting information on the working of midwives. In 1915 there were in the county 320 midwives, of whom only 129 were trained, who attended 11,325 confinements and called in doctors for 1209 or 12·7 per cent. In 1938 there were only 201 midwives, all trained, who attended 8570 confinements and called in doctors for 4283 or 50 per cent. The fees paid to doctors rose from £1100 in 1925–26 to £3513 in 1937–38 and the amounts recovered from the patients rose from £366 to £1593 in the same period. The results judged by the only measure available—the death-rates of mothers and babies—show little or no change. It would be improper to conclude that the midwifery service has grown in complexity and expense without any compensating return, for the real test of efficient midwifery is the postnatal condition of the mothers, of which we have no information.

Cerebrospinal fever gave 33 notifications and 15 deaths. This is an average fatality for the days before the sulphonamide compounds were used. It will be interesting to see how this record for 1938 compares with that of 1940.

The corrected death-rate of Staffordshire in 1938 was 11·2. In many reports from 1938 we have noticed the use of the expression "standardised death-rate" when "comparable death-rate" is meant. The standardised death-rate is the crude death-rate (corrected for transfers) reduced to what it would be on the population of the standard year 1901. For England and Wales the standard death-rates for the three years 1935–37 were 9·0 9·2, 9·3. The comparable death-rate is the crude death-rate (corrected for transfers) multiplied by a comparability factor to enable the rates of different districts to be compared for the current year. The comparability factors in use were cast in 1931 and call for revision.

The city of *Wakefield*, one of the last towns to be granted county-borough powers, suffered severely from the industrial revolution. Dr. Thomas Gibson, formerly medical officer of health, in his valedictory report, gave a detailed history of the public health of the city since the early days of the nineteenth century which reveals that until recently Wakefield was an exceptionally filthy town. Needless to say conditions have improved out of recognition, but it still suffers from severe atmospheric pollution, partly through its own fault but more from the misfortune of its position. In 1927 the monthly average soot deposit in the cleanest part of the town was 21·66 tons per square mile. In 1934 it sank to 7·61 tons, but it has risen since and in 1938 it was 9·25 tons. In 1938 in the centre of the town (Northgate Station) the deposit varied between 18 and 30 tons per month. There has been a satisfactory reduction in the number and wickedness of black-smoke offenders, but there are still some. In 1938 the second worst offender was the West Riding Mental Hospital. Dr. Frank Allardice, the present medical officer of health, reports that in 1938 the infantile mortality was 60, of which the neonatal mortality accounts for 43. Amongst male infants the rate was 77, amongst females 39. The daily consumption of milk per head was 0·46 pint. The percentage of infants born in 1937 who were wholly breast-fed for six months or longer was 70·43. The Wakefield Corporation Act which came into operation in June, 1938, has some interesting features, three of which are of great importance to the practice of medicine. They are, first, the requirement of parents to notify certain diseases of school-children; secondly, the power to remove infirm and diseased persons neglected or in insanitary premises, and thirdly, the power of the medical officer of health, upon obtaining a warrant, to enter premises and examine persons if he has reasonable cause to believe there is or has been a person therein suffering from a notifiable disease.

Dr. Ian McCracken was promoted medical officer of health to the county of *Durham* in October, 1938, so the report for that year deals mainly with events during the tenure of office of the late Dr. J. McIntyre. Durham contains 623,260 acres of which rather less than a quarter is in boroughs and urban districts. Of its total population of 884,000 the rural districts contain 270,000. For its size, Durham contains more distressed areas than any other English county, yet its health record is by no means unfavourable, the death-rate in 1938 being 11·7 against the England and Wales rate of 11·6. The infantile mortality-rate was 61, the lowest ever recorded in the county. Of the 10,239 deaths in 1938 suicides account for 73 and other accidents for 369, of which only 73 were of females. May had the highest number of suicides with 12, August the lowest with 2 and January and November 3 each. Of the deaths from accidents, 89 occurred in coal mining, the highest number (18) in Easington. Deaths from motor vehicles numbered 81 males and 16 females. The incidence of tuberculosis in the county is estimated at 4·9 per 1000 population. Pulmonary (2238) and non-pulmonary cases (2120) are nearly equally frequent.

Dr. G. Matthew Fyfe succeeded Dr. G. Pratt Yule, to whom he had been deputy for some years, as county medical officer of *Fife* in July, 1928. His first annual report, therefore, deals with matters for which he was not responsible, but with which he was familiar. The chief interest in the report lies in the table of maternal mortality. The Scottish rate for 1938 was 4·9, the Fife county rate 3·8. The rate for Fife was 7·4 in 1930 and in 1935, but since then the decline has been regular: 7·4, 6·2, 4·4, 3·8. Most remarkable is the fall in the rural landward area from 9·1 in 1930 to 1·7 in 1938. The rate in the small burghs varied from 9·0 in 1935 to 3·1 in 1937, but shows no definite trend. Of the 3469 births in the county in 1938 only 944 were attended by midwives, but arrangements were made in 2137 for a doctor to be in attendance at the confinement. The Scottish Maternity Act of 1927 requires the local authorities to make arrangements for the supply of midwives and doctors, for Scottish midwifery practice has always been in the hands of doctors and the English system which culminated in the Midwives Act 1936 does not apply north of the border.

Dr. A. Massey produced his 1939 school report for the city of *Coventry* in February, 1940, and was the first medical officer of an evacuated area to give his version of the alleged shortcomings of evacuated children. Shortly after evacuation an inspection was carried out of the Coventry pilgrims by the school medical and nursing staff. Varying degrees of uncleanliness were found in 10·3 per cent. against the usual finding of 9 per cent., a normal deterioration at the end of the summer holidays. Of the 12,400 school-children in the evacuable part of Coventry the parents of 5555 expressed their willingness for the children to go; 3119 were actually evacuated, but only 1387 remained in the reception area at the end of 1939. Teams from the staff of the Coventry school medical department were sent into the reception area to supervise the children and make arrangements for their medical and dental supervision. The cases of uncleanliness were "radically dealt with," satisfactory arrangements made with the reception authorities and the teams returned to Coventry, the receiving authorities being able to carry on without them. All schools in Coventry were closed for five weeks at the outbreak of war but after that the school medical department rapidly got back to normal working and by the end of the year had settled down to war-time routine. The Coventry evacuation was simple compared with that of London, but the way it was carried out was commendable, especially for the expedition with which the Coventry authorities looked after the settlement of their children in the reception area. Since Coventry had always admitted an average amount of uncleanliness in the city children, the reception areas could have no cause to complain, for the children they received tallied with expectation.

Infectious Disease in England and Wales

DURING THE WEEK ENDED MARCH 23, 1940

Notifications.—The following cases of infectious disease were notified during the week: Smallpox, 0; scarlet fever, 770; whooping-cough, 449; diphtheria, 678; enteric fever, 29; measles (excluding rubella), 4111; pneumonia (primary or influenzal), 1296; puerperal pyrexia, 170; cerebrospinal fever, 475; poliomyelitis, 4; polio-encephalitis, 1; encephalitis lethargica, 4; dysentery, 28; ophthalmia neonatorum, 83. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on March 22 was 1184 made up of: scarlet fever, 117; diphtheria, 182; measles, 5; whooping-cough, 46; enteritis, 59; chicken-pox, 52; erysipelas, 36; mumps, 5; poliomyelitis, 3; dysentery, 7; cerebrospinal fever, 119; puerperal sepsis, 14; enteric fevers, 7; german measles, 313; other diseases (non-infectious), 62; not yet diagnosed, 157.

Deaths.—In 126 great towns, including London, there was no death from smallpox, 2 (1) from enteric fever, 2 (0) from scarlet fever, 7 (0) from measles, 7 (0) from whooping-cough, 20 (1) from diphtheria, 35 (2) from diarrhœa and enteritis under 2 years, and 221 (16) from influenza. The figures in parentheses are those for London itself.

Sheffield reported 13 deaths from influenza, Liverpool 12, Manchester 10, Birmingham 8, no other great town more than 6. The second fatal case of typhoid was at Keighley. There were 8 deaths from diarrhœa at Birmingham and 4 at Liverpool. In the same week Glasgow reported 7 deaths from cerebrospinal fever and London 6.

The Lancet 100 Years Ago

April 11, 1840, *p.* 93.

From a report of a paper read to the British Association for the Advancement of Science by Dr. R. D. Thomson.

The object of the paper was to discuss the experiments from which the deduction had been drawn by Prout, Tiedemann, and Gmelin, that free muriatic acid exists in the stomach. The author had made varied experiments in order to ascertain whether any acid could be distilled over from the filtered fluid contents both of the human stomach and of the inferior animals; and although he has generally procured traces of acetic acid, he could never detect the slightest indication of the muriatic. This result is in consonance with that of Schultz, who denies that there is any acid in the stomach, save the lactic, and this he admits he has met with in a free state, almost constantly, in the course of a very extended experience. The method adopted by Prout and others to determine whether free muriatic acid was contained in the stomach was to filter the contents of that viscus, to take a certain weight of the fluid, and to precipitate it with nitrate of silver. An equal quantity was taken, evaporated, and ignited; the residue was then dissolved in distilled water, and the solution precipitated with nitrate of silver. The difference between the weights of chlorine in the two silver precipitates was taken as the indication of the total amount of free chlorine or muriatic acid contained in the stomach. Now, according to Dr. Thomson, this experiment is liable to, at least, one objection; he has ascertained that common salt is decomposed to a considerable extent by various vegetable substances, when they are ignited in contact with each other; and hence the saline matters of the stomach may lose muriatic acid without there being any of this acid in a free state in the stomach.

IN ENGLAND NOW

A running commentary from our Peripatetic Correspondents

My first impression on emerging from retirement to be a M.O.H. again was that apart from the number of people in uniform things are going on much as usual; but a little practical experience shows striking alterations. This is a county with a lot of troops in training and various other war activities and receiving a large number of evacuees. One noticeable change is the transference of health officials from their normal duties to work especially associated with the war. The M.O.H.'s are kept busy with duties as clinical officers in the A.R.P. scheme and with responsibilities for the organisation and efficient functioning of A.R.P. Those useful men the sanitary inspectors have been roped in for all sorts of war duties. Most of them are billeting officers for their districts and this is absorbing much of their energies. This involves them in all sorts of duties from helping their committees to find suitable "sick bays" and the arrangement of emergency medical treatment to the solution of the ever-pressing problem of finding boots and clothing for evacuee children whose parents harbour the view that what they originally provided was immortal. When rationing officers are needed again many inspectors are utilised, while all of them are concerned with A.R.P. as decontamination officers and the like. While therefore most medical and sanitary officers are retained in the county there is a considerable deviation of function and a concentration of mind and practice on the problems of war as distinct from health.

The war has created a number of new problems. The first and most urgent was due to the heavy introduction of evacuees, official and unofficial. The official evacuee school-children added 50 per cent. to the normal elementary-school population, this apart from over 2000 unofficial evacuee children. The thousands of nursing and expectant mothers created many difficulties and emergency maternity beds had to be improvised in large numbers. Most of these women and children have now returned, but about three-quarters of the children still remain. The degree to which they were verminous varied greatly in the different parts of the county but a good many were. The health visitors, district nurses and volunteers did a splendid job and most of the trouble is now eliminated. Scabies has also been a problem and most of the cases had to go to isolation hospitals or any other place we could utilise in the emergency. It is neither reasonable nor practicable to expect a woman who has been kind enough to take three London children also to work to clear them of scabies, so institutional treatment was inevitable. The same point arises with other conditions such as impetigo and this accounts for the need for sick bays to deal with such cases. These have been mostly converted houses.

An interesting point about the evacuees is that when a comparison was made between their medical condition and those of the native children they showed rather higher malnutrition figures (17 to 12 per cent.) but much less nose and throat abnormalities (8 to 28 per cent.) and less physical deformities. The nose and throat differences are probably largely due to the fact that the county figures were for the whole year while the evacuee figures were examinations mostly made (by the same medical men) in a dry autumn. It was mainly a matter of less chronic tonsillitis or enlarged tonsils. Obviously with a 50 per cent. increase in the county school staff additional medical officers, school dentists and dental attendants have had to be provided, for the guiding principle of the county education authority is to give their little visitors exactly the same health facilities as are enjoyed by the native children. It has all been done and things are working well. Most of the children I have come across thoroughly enjoy this country life.

An unfortunate effect of the war effort, to which not enough attention has been paid, is that the military and A.R.P. bodies with single-hearted attention to their own needs requisitioned entirely or in large part all the buildings like clinics, public halls, village halls and the like for their own purposes. This means that now, when it is so important that efforts should be made to keep our own people and our importations in good heart and help them by educational efforts, the premises we need are either not available or so mutilated that they are of limited value. War effort involves mind as well as material and crude materialism has tipped the scales too far on the one side.

Of other new problems one of considerable importance is the provision of beds for infectious diseases. The military hope to use the civilian beds and have been able to do so to a large extent. This was only possible by a considerable extension in the autumn of emergency beds. This county was well provided and a further 80–90 beds was found to be adequate for the extra responsibilities. Cerebrospinal fever gave us some anxiety but 21 cases a week was the highest reached and it now seems well on the decline in the county. This number of cases could easily be accommodated in our isolation hospitals, for all these are linked together in one scheme and cases can go anywhere if necessary. Venereal disease is also a war problem but the county is so well supplied with clinics that no additional provision has been needed. Actually I do not think there has been any material increase in venereal disease.

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To the uninitiated the life of a laboratory worker may seem sedentary and stay-at-home; actually it often involves a lot of travelling and today, if one is lucky, travelling means flying. He who flies soon makes the acquaintance of "La Marignane," not as might be supposed a rival to Mistinguette but the airport of Marseilles. In my youth, before the days of motor-cars, almost everyone had a favourite railway junction where all trains stopped and one changed trains; usually one waited at Clapham Junction, Bletchley or Newton Abbot. Today La Marignane has replaced them all, but as a junction for the world. Nevertheless, La Marignane retains many of the features of the old-time junctions. Though the Provençal sun beats down upon an arid plain and on the choppy waves of the lake where the seaplanes land, it is usually cold and a biting wind blows round unexpected quarters. The restaurant provides one of the world's worst lunches, while the lavatories, though clean and marble-tiled, are void of that essential article, toilet paper. Those who know bring their own. But to make up for these deficiencies the waiting-room is fascinating. On a large map La Marignane is shown as the centre whence radiate out planes to all parts of the world, while large time-tables show you the hours at which they leave for Sydney or Shanghai, Cape Town or Corfu.

My last visit to La Marignane was a somewhat lengthy one. Owing to what the French term *agitation* in the air in the neighbourhood of Sardinia

we were an hour and a half late and the plane had left for Paris; it didn't matter for there was another at half-past two. If one fancied it there was a free lunch, and there were the addresses to read on the parcels which forever litter the promenade. "Urgently wanted in Hanoi" read one label; "Fragile for Malakal" another. What could they possibly contain? Half-past two but no-one has made a move towards our plane, which is sitting smugly on the asphalt. Ah! the *correspondance*; the plane from Dakar is late.

At half-past four the *correspondance* duly arrives and the usual crowd of somewhat bedraggled passengers emerges. How different from the immaculate men and women who, in the advertisements, are seen descending from aeroplanes! The routine of tickets and douane is gone through, and finally, just after five, all the passengers for Paris are duly embarked in the plane and the doors are closed. The motors start to rev., though even to my inexpert ear they don't seem to be doing too well. However, we taxi off and from the farthest corner of the bumpy field we begin that final rush which should give us the impetus to soar off into the air. But alas, there is no increase in the motors' revolutions, they suddenly stop, and after rising a few feet from the ground the plane, with a final bang, comes to earth again with a jar. No-one is hurt. The mechanic gets out, the two pilots get out, and finally we passengers get out and all gaze fixedly at the engines. "Eh bien!" says the senior pilot, "il faut coucher ce soir à Marseilles"; and then to console us, "Anyhow, it's raining in Paris and there's a nasty head-wind." And so off to Marseilles in the blue autobus. Seven o'clock next morning sees us in the same bus again on our way to La Marignane. There are only five passengers. The anæmic infant from Dakar, recognising me as a friend from yesterday, insists on calling me "Papa." His "Maman," who is shortly to add to the family, is dressed in deepest mourning, but she looks quite cheerful so probably it is only for her husband's uncle's wife.

This time we are really off. The small boy from Dakar starts to cry and is being given greenish-coloured bonbons. We fly off over the Camargue. There below us is the winding Rhône. That over there must be Beaucaire and Tarascon—shades of Tartarin and of Aucassin and Nicolette—and that is certainly Avignon, one can just recognise the broken bridge. The small boy is being sick and Maman has not been quick enough with the brown paper bag so thoughtfully provided. I change my seat. We are rising now above the clouds which cover the central massif of France, twelve, thirteen, fourteen thousand feet. The small boy and Maman have both gone to sleep so there is no likelihood of any immediate emergency in that direction. I feel sleepy myself. I must have slept for more than an hour. We are lower now and its a bit bumpy. Through openings in the clouds one can see a straight white road, an occasional patch of water. Red roofs appear, we are well below the clouds now. Its the outskirts of Paris at last, and in a few minutes we are taxiing up to the black buildings of Le Bourget. There's G; I can hand over my mice to him at last. Soon we are rattling over the Paris pavé in G's ancient but historic car, for this was the motor in which Charles Nicolle drove in the last years of his life in Tunis.

PARLIAMENT

ON THE FLOOR OF THE HOUSE

By MEDICUS, M.P.

THE proceedings of the House opened after Easter with the Prime Minister's statement on the tightening up of the blockade. This week the screw has turned and the momentous announcement of the laying of mines in Norwegian territorial waters to stop the German protected route to Narvik for iron ore has been made. It is clear that neutrality in this war has to be redefined. And in respect of the main issue between the Allies and Germany it is doubtful if real neutrality can exist.

These great events do not dwarf the importance of Parliamentary debates but they set the scene for those debates. Last week the debate on agricultural wages was not a wrangle about a shilling or two one way or the other on wages, but a debate on the best means of getting production from the land in the national emergency. The Minister of Agriculture laid it down that agricultural wages must rise and that the gap between agricultural wages and wages in other occupations must be substantially lessened. "If we are to intensify our food-production campaign," said the Minister, "a fair and proper reward" must go to both employer and employed. Minimum wages in the bill presented "are to be looked at . . . from the broad national view." Many farmers would like to link the rates of agricultural wages with prices of agricultural products, but that is hardly practical politics.

Mr. Lloyd George spoke in the debate for fifty minutes and said that he agreed with Sir John Orr "that during the war we ought to deal, in one comprehensive stroke, with the whole question of keeping down food prices and that the state should give a big comprehensive subsidy for all vital foods." Another member, Brigadier-General Brown, also quoted Sir John Orr's views at length and suggested that Government and Opposition should "get in touch" and "arrange a policy extending over five or six years to deal with this matter." Mr. Roberts calculated that on the basis of the rise of agricultural prices which has occurred since war began the farmers were receiving an increased amount of about fifty million pounds a year. If the agricultural worker got a rise of 5*s*. a week this would cost the farmers five million pounds a year, or 10 per cent. of the increased prices. It was of course true that the farmer had to pay increased prices for feeding stuffs, but this was more than offset by the increased prices he received.

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More and more interest is being taken in the agricultural situation for the simple reason that we are more and more having to live off our own land and because also members of all parties are impressed with the importance of nutrition as a factor in national defence. In the food-prices debate on the opening day of Parliament Mr. L. S. Amery also quoted Sir John Orr as saying that 10 per cent. of the wage-earners of the country and 20 to 25 per cent. of the children are undernourished. He went on to say that every investigation tends to show that the main problem of poverty is the family. The last investigation carried out in Bristol, fully reported in the current number of the *Economic Journal*, showed that in Bristol, a fairly well-to-do city, 80 per cent. of the poverty occurs when there are three or more children in the family. This problem ought to be faced "as an

urgent human need and as an urgent problem of the war." Dr. Summerskill, who spoke immediately after Mr. Amery, wholeheartedly endorsed his sentiments and said that she considered there had been a rapid deterioration in the standard of living. The question of the supply of vitamin A for margarine was also raised. Dr. Summerskill was very definite about onions, which she said had no value at all, a remark which obviously seriously disturbed numbers of members on the Opposition and Government benches. Whether a food like onions or shallots could spread over Europe and Africa and be used century after century if it had no food value at all seems doubtful. Even if its value is that of an appetiser only its value is not negligible. Possibly by the time the alphabet of vitamins becomes more extended someone may discover an essential accessory food in the onion. But one wonders if vitamins and minerals added to the carbohydrates, fats and proteins of diet cover everything. Do we really know all about the food values even of the commonest food substances? Perhaps we do. But the experts used to mock at the housewife's preference for yellow butter—until another expert discovered vitamins. Another matter much present in members' minds is the experience of world epidemic diseases at the end of the last war and their relation to privations and especially to food deficiencies.

* * *

Another bill considered was that to repay £37,000,000 of the debt on the Unemployment Insurance Fund. The Opposition thought this was too much and proposed to use some of this money in shortening the waiting period for unemployment benefit, increasing benefits to bring them into line with the increased cost of living and other payments to remove anomalies applying to married women. "If unemployment benefit scales," asked Mr. John Griffiths, "were inadequate before the war, how much more are they inadequate now?" The bill incorporates a proposal to increase the benefit for the first two children of an unemployed man—but for the first two children only. Mr. Griffiths argued that all children should have the increase and said that the difference in cost between the Government and the Labour Party proposals would be £250,000. But the Minister of Labour resisted this. Mr. Griffiths had also been reading Sir John Orr's book and quoted this sentence: "Victory will depend as much on the morale and powers of endurance of the civilian population as on the efficiency of the fighting forces. Morale and powers of endurance cannot be maintained unless the whole population is on a diet good enough to maintain it in health." The House of Commons is very much nutrition conscious, and the subject is recognised as of equal importance with that of civil defence or the fighting services. The Minister of Labour defended his position with his accustomed debating skill and said that the time might be coming when jobs would be seeking men and not men jobs. Unfortunately this does not mean that nutrition standards will be adequate in all cases as witness the experiences of Russia and Germany. Before long therefore we are likely to have more far-reaching proposals with regard to nutrition brought before us. The new Minister of Food is first and foremost a great shopkeeper and he knows the advantages of economical dealing with large quantities. It would not be surprising therefore if he produced some new ideas; he was well known for that in his business. And as he might say, new ideas sell goods. So perhaps the new Minister will, in the American sense "sell" nutrition to his colleagues.

FROM THE PRESS GALLERY

Food Prices

IN the House of Commons on April 2 Mr. W. S. MORRISON said that the prices of controlled foodstuffs were to be reviewed in the light of an elaborate costing inquiry now being made into the cost of distribution. The Government had tried in fixing prices to arrange that cheap and plentiful supplies were left for the poorer people. Recently, on account of the increase in the price of materials, they had had to advance the price of margarine by 1*d.* a pound, but that advance was restricted to the two dearer varieties, and the price of the 5*d.* variety was left where it was. In addition all the 5*d.* margarine was now vitaminised, an advantage which previously was possessed only by the more expensive brands.

Dr. EDITH SUMMERSKILL said that there had been a rapid deterioration in the standard of living. She had observed in her work and by looking at the tables of the people in the country that an undue proportion of sausages, condensed milk and margarine was being eaten. In houses which she visited before the war there was always fresh milk, but since the war she had seen tins of condensed milk. She wanted to know what factors determined the controlled prices. She found on inquiry at her grocer's shop that among the controlled foods the only foods which a wise woman could buy as a substitute for meat were tinned salmon, sausage and imported eggs. It was no use saying, "I will fill the children up with bread and batter pudding." All that meant was that at the end of the war the physique of the children would have deteriorated. Why had not the problem of food-supply been approached in an entirely different way, and why had not someone with a knowledge of food values been consulted? Such a person would have said that in subsidising the food of the country they must subsidise those substitutes which the people would buy. The people were being given what might be described as an *ersatz* diet, coloured and made up. They were told by the Government that it was good and cheap, but it had no food value. Unless the Ministry of Food reviewed the whole situation they would find that after the war they would have an *ersatz* population.

Mr. LENNOX-BOYD, parliamentary secretary to the Ministry of Food, said that there was nothing in the recently announced milk policy to prevent an extension of cheap milk schemes to those who really needed them. The question of condensed milk and its retail price was still under consideration. When the campaign which the Minister of Food was inaugurating that week was fully launched, it would show that the Government were fully alive to the need of teaching people to eat the right food and the need of seeing that they could get it at prices which they could afford to pay.

In a debate on agricultural policy on April 3 Mr. LLOYD GEORGE called attention to a pamphlet issued by Sir John Orr. The Government had to decide not merely the quantities of foods which they were going to produce but which were the most important things to produce, so that if anything had to be done without it would be only those things which were not essential to the vitality of the human frame. Sir John Orr pointed out that if they were going to put burdens on the farmer which he could not bear he would not carry them, and he urged that during the war the Government ought to deal in one comprehensive stroke with the whole question of keeping down food prices, and the state should give a big comprehensive subsidy for all vital foods. As Mr. Amery had said, it was the family that reduced the standard of living in cases where the wage was not adequate to cover the whole business. The advantage of Sir John Orr's proposal was that it met that case. The more the consumption was the more beneficent would be the spending of the subsidy, because it covered the produce and not the individual. They were not subsidising wages by such a plan; they were subsidising

the standard of living and preventing the war from driving wages up to a height which would in the end increase the cost of living again. He asked the Government to bring forward a great, broad, comprehensive scheme for seeing that the nation was fed, however long it might have to fight. (Cheers.)

Sir REGINALD DORMAN-SMITH, Minister of Agriculture, replying to the debate, said that his department had been trying to lay their plans in the light of the experience which they had gained this winter and of the future prospects of labour. They were taking advice from the experts and scientists. They were also working in coöperation with the Ministry of Food, which was the buyer and provider for the nation, and the Ministry of Food had nutrition experts who were available to give advice.

QUESTION TIME

Scottish Central Medical War Committee

IN reply to a question addressed to the Secretary of State for Scotland Mr. COLVILLE said that on Sept. 1, 1939, in accordance with prearranged plans drawn up by the Government, he had instructed the Scottish secretary to the British Medical Association to convene the Scottish Central Medical War Committee. Its functions are, he said, to advise the Government on the allocation of doctors in Scotland to H.M. Forces and to civilian services connected with the war, and generally to represent the profession in Scotland in any negotiations with the Government affecting questions of medical personnel. Mr. Colville gave a list of the members of this Committee as follows:—

Members of the former War Emergency Committee of the Scottish Committee of the British Medical Association: Dr. D. Elliot Dickson, Dr. J. G. McCutcheon, Dr. G. W. Miller, Dr. J. B. Miller, the Scottish Secretary. Members appointed directly by the Scottish Committee of the British Medical Association: Dr. D. Dale Logan, Dr. G. MacFeat, Dr. A. H. Macklin.

Liaison with the Central Medical War Committee, England, Dr. G. C. Anderson.

Appointed by: University of Aberdeen, Prof. David Campbell; University of Edinburgh, Prof. Sydney Smith; University of Glasgow, Prof. J. R. Currie; University of St. Andrews, Prof. F. J. Charteris; Royal College of Physicians of Edinburgh, Dr. Alex. Goodall; Royal College of Surgeons of Edinburgh, Mr. D. Stewart Middleton, F.R.C.S.E.; Royal Faculty of Physicians and Surgeons of Glasgow, Dr. John Henderson.

Representative of the Teaching Hospitals in Scotland, Colonel A. D. Stewart.

Appointed by: Scottish Branch of the Society of Medical Officers of Health, Dr. W. G. Clark; Scottish Association of the Medical Women's Federation, Dr. Gladys Boyd; Scottish Association of Insurance Committees, Sir William Marshall, Mr. Thomas J. Addly.

Chairman of the Insurance Acts Subcommittee (Scotland) of the British Medical Association, Dr. J. F. Lambie.

Liaison Officers of the British Medical Association in Scotland (not otherwise members of the Committee), Dr. D. G. Leys, Dr. Middleton Connon, Dr. I. D. Grant.

Representative of the Scottish Central Dental War Committee, Dr. A. C. W. Hutchinson.

Coöpted Members, Mr. T. H. Graham, Mr. J. J. M. Shaw, F.R.C.S.E.

Highlands and Islands Area, Dr. J. B. Simpson.

Officers of the following Government Departments attend meetings of the Committee: Royal Naval Medical Service, Royal Army Medical Corps, Royal Air Force Medical Service, Department of Health for Scotland, General Board of Control for Scotland, Air-Raid Precautions Department, Ministry of Home Security, Ministry of Pensions.

London Hospital Sectors

Sir ERNEST GRAHAM-LITTLE asked the Minister of Health how many members of the honorary staffs of the voluntary hospitals in London had accepted part-time service up to date; what was the cost to the Exchequer of this reorganisation of the Emergency Medical Service; how many beds at the teaching hospitals had been reserved by his department for casualties and at what cost.—Mr. WALTER ELLIOT replied: In the London hospital sectors 519 whole-time officers of consultant or specialist grade in the Emergency Medical Service have elected to transfer to the arrangement under which they receive a salary of £500 a year for whatever services are required of them. This reorganisation has effected a saving to the Exchequer at the rate of £160,300 a year. The number of beds now maintained at the twelve London teaching hospitals for casualties is 1946, for which an average weekly payment of £6386 is being made on account, pending ascertainment of the actual cost properly involved.

Hospital Beds in London

Sir E. GRAHAM-LITTLE asked the Minister whether he was aware that partly as a result of the reservation of beds, the number available for civilian cases, and, consequently, for teaching purposes, had diminished to one-third of the normal complement, with the result that medical education in London had been disorganised; and whether he proposed, in view of the reorganisation he had effected, to review the whole position in the near future.—Mr. ELLIOT replied: The number of beds available for civilian cases in the London area as a whole is considerably greater than before the war, although the number available in the central part of the area has been reduced owing to war measures and the necessity of maintaining a certain number of beds for casualties. Some disorganisation of medical education has undoubtedly taken place, but the clinical education of students has been carried on at various hospitals, both municipal and voluntary, under the London sector scheme. The question of reopening further beds in the central area will certainly be reviewed in the light of experience.

Medical Volunteers

Mr. LIDDALL asked the Minister how many of the 63,500 on the medical register had volunteered for the navy, army and air-force medical services since the declaration of war; and whether he was satisfied that an adequate number of medical men were being left in this country to meet the ordinary needs of the civilian population, and to cope with any possible emergency.—Miss HORSBRUGH replied: Of the 45,000 registered medical practitioners in Great Britain and Northern Ireland, 3001 have voluntarily joined the forces as medical officers, in addition to those called up by virtue of their obligations as territorial or reserve officers. My officers are in consultation with those of the service departments with the object of securing a fair distribution of the available doctors between the forces and the emergency and other civilian services.

Medical Treatment of Evacuated Children

Mr. SORENSEN asked the Minister whether adequate provision of sick bays and of hospital treatment now existed for evacuated children in all existing reception areas; whether he was satisfied with provisional medical arrangements for children likely to be evacuated in the new evacuation scheme; and whether similar plans for the treatment of sick and ill evacuated children as had been adopted by the Essex county council also existed in other comparable counties.—Mr. ELLIOT replied: I consider that the arrangements which have been, and are being, made should be adequate. I am not clear what special provision in Essex, differing from that in other reception areas, is referred to.

Exemption of Students

Mr. GROVES asked the Minister of Labour and National Service whether he was aware that men registered as medical students prior to Sept. 3, 1939, in order to be exempt from military service must have passed their first professional examination and completed two years of study in anatomy and physiology; and whether he would now consider exemption from military service of all men registered as medical students prior to Sept. 3, 1939, while they were satisfactorily pursuing their studies.—Mr. ERNEST BROWN replied: After consultation with the Minister of Health and the Secretary of State for Scotland, and with representatives of the medical teaching bodies, it was decided that medical students who have passed their first professional examination and have completed two terms (not years, as suggested in the question) of study in anatomy and physiology shall be reserved under the schedule of reserved occupations. This arrangement secures adequate reservation of medical students at the present time, and I see no reason for any change of the kind suggested.

Corrigendum.—Our attention is drawn to an error in the paper by Stuart-Harris, Wilson Smith and Andrewes in THE LANCET of Feb. 3. In fig. 2 (p. 209) the legend should read: Black columns represent virus-positive cases and white columns virus-negative cases.

CONSCRIPTION OF DOCTORS

Two months ago the Central Medical War Committee suggested to the Minister of Health and the Minister of Labour that medical men within the age-limits of current proclamations should be made liable for compulsory medical service with the forces, the compulsion to be applied through the machinery of the central committee. The Minister of Labour has now excluded the medical profession from the schedule of reserved occupations, and male doctors under the age of 41 will be liable for compulsory service, subject to proclamation, in a medical capacity. The C.M.W.C. will advise the Government on the application of the liability in the light of the needs of civilians.

Medical men, like other men, will register in accordance with the programme announced from time to time by the Ministry of Labour. Those under 28 on Jan. 1, 1940, fall within the current proclamation. The "under 25's" have already registered; the 25's and 26's are registering this month; and the 27's will probably register in June. It is not proposed at present to fix a higher age for registration for doctors than for other citizens, but the question may have to be reconsidered later if the normal process of registration does not provide a wide enough field for selection. When doctors register at the employment exchange they will fill up the Central Medical War Committee's form of questionnaire, and the committee will enter the information in the National Register. Practitioners who registered as students will fill in a similar form six months after qualification. The names of doctors who have registered and who have completed six months since qualifying will be conveyed to the local medical war committees who will place the letter "R" against their names in their records.

To meet service demands, actual or anticipated, the C.M.W.C. will allocate quotas, classified under the various branches of practice, to local committees, who will recommend the required number of doctors, excluding those who have been qualified for less than six months and those who obtained house-appointments within six months of qualification and who have not yet completed six months in that appointment. Local committees will make up their quotas from those men on the "R" list and volunteers who can most easily be spared. In doing so they will not take into consideration either medical fitness or personal hardship. Any doctor provisionally recommended by the local committee will be informed of this decision and afforded an opportunity to make representations in writing or in person at the committee's next meeting. In the case of insurance practitioners, and those holding whole-time or part-time appointments under local authorities, voluntary hospitals, and so on, the insurance committee or the authority concerned will have the opportunity of expressing its views. In the case of doctors in the E.M.S. the views of the group officer or hospital officer will be considered. When all representations have been taken into account the local committee will transmit the names of those chosen to the central committee, who will inform them that they have been recommended for immediate service. The central committee will also exclude from consideration questions of personal hardship, and in due course will submit a list to the service departments. The central committee will, as far as possible, give consideration to any strong preference expressed by a practitioner for a particular service.

The next step is for the service departments and the Ministry of Labour to arrange for the medical examination, interview and calling up of the selected doctors. Within two days after his medical examination a practitioner not rejected on medical grounds may apply to the Ministry of Labour for postponement of calling up on the ground of exceptional hardship, and on that ground alone. His application, if not granted by the Ministry, will be referred to a military service (hardship) committee and there will be a right of appeal under certain circumstances to an umpire. A medical man desiring to make application as a conscientious objector should intimate his objection at the employment exchange when he registers.

Newly qualified men, as they become liable for conscription, will be dealt with by the C.M.W.C. As hitherto, the Committee of Reference will assume the functions of local medical war committees in London in dealing with consultants and specialists on the staffs of London hospitals, as well as with registrars, chief assistants and the like holding teaching appointments in London hospitals. Pathologists will be dealt with in the first instance by the usual local machinery, and where necessary the central committee will consult the Medical Research Council about them at a later stage.

STUDENTS IN CONFERENCE

OVER a long weekend after Easter 550 students met in Leeds to consider their rôle in the world today. The congress was organised by the National Union of Students. One commission considering the health services included students of medicine, education and natural and social sciences, and got down to medical problems in relation to modern social conditions. The difficulties of medical practice insuperable under existing social conditions would, it was agreed, yield only to some radical alteration in the conditions of life of the population as a whole, and the congress passed by a vote of 448 to 1 a resolution urging a unified and comprehensive system of free health services. In any case, the national health insurance scheme should be extended to include dependants and old-age pensioners. Later in the congress 40 medical students from eleven different schools discussed the relationship between medical and other students. A feeling of isolation was admitted and attributed to "the faculty management of medical societies." Nevertheless, students at Liverpool, Oxford and Cambridge had shown their ability to respond, given the right circumstances. Any satisfactory staff-student relationship was also held to be barred by the executive of the medical societies. The position of women in medicine should be adjusted by an immediate attempt "to rationalise the irrationalities existing in certain schools." On the medical curriculum opinion was divided between removal of some of the scientific subjects and the correlation of anatomy and physiology more closely with clinical practice. Experience of general practice and training in psychology were also emphasised and a compulsory year of internship before qualification. In their own commission it is stated medical students did not discuss curriculum so much from the view-point of a safe and easy transit through examinations as the opportunity given to become good citizens.

ROYAL SANITARY INSTITUTE.—A discussion on food in war-time has been arranged by this institute for 5 P.M. on Tuesday, April 16, at 90, Buckingham Palace Road, London, S.W.1. Prof. S. J. Cowell will be the first speaker, and the chair will be taken by Sir Wilson Jameson.

LETTERS TO THE EDITOR

PEPTIC ULCER IN THE SERVICES

SIR,—I am happy to feel that Professor Pannett in his letter of March 30 does not dispute the contention that it is in the interests of all concerned that young sailors, soldiers, and airmen found to be suffering from peptic ulcer should be returned to civil life as soon as possible. But he is mistaken in assuming that my experience does not include many of the older and more chronic cases which have been treated surgically; it has been my misfortune to encounter very serious and resistant cases which had previously been treated by many of the most distinguished surgeons in Great Britain. That the latest of these was a man who has had five serious hæmorrhages during the last nine years, following resection of the duodenum by Professor Pannett, is a coincidence from which no conclusion should be drawn except perhaps that neither the surgical nor the medical treatment of this disease has yet reached that state of perfection which we all desire to see.

I am, Sir, yours faithfully,

London, W.1. T. IZOD BENNETT.

SIR,—In this discussion it is important not to lose sight of the essential questions which are:—

1. Whether soldiers who suffer from a chronic gastric or duodenal ulcer should be subjected to a partial gastrectomy or partial duodenectomy whilst in the army.
2. Whether if so operated upon they would be capable of useful service.

Bearing these in mind the investigations carried out by Sir Henry Bashford, valuable as they were, are rather irrelevant. For they refer, in the case of duodenal ulcer, to the results of gastrojejunostomy, which, as every surgeon knows, are as unsatisfactory as he declares; and in the case of gastric ulcer no attempt has been made to discriminate between the various operations which have been practised.

Sir Arthur Hurst again refers to the failures of gastrectomy. These failures are admitted by surgeons. They amount to 13–16 per cent.; but this is not a very discreditable number when it is remembered that these operations are only performed when medical measures have proved a failure. And he neglects to mention the 84 per cent. of patients who react to the turmoil and affronts of ordinary life, apparently as normal individuals. Perhaps the practicability of some of them returning to military duty is not so absurd as both he and Dr. Bennett think.

Mr. Ellison Nash assumes that after these operations prudence in diet is always demanded. This is not so. Three months after the operation patients can usually eat any kind of food without discomfort, though not in large quantity. They must have small meals. Twelve months after the operation even this disability has gone, for the stomach has adapted itself to the new conditions. He goes on to say that the expense of surgical treatment for these patients would in very few cases be a good investment for the state, and makes the following astonishing remarks: "It is fairer to all concerned to release them from service. They can still receive operative treatment as civilians." It is a curious sort of fairness to a patient to withhold from him treatment which in over 80 per cent. of cases will restore him to health, and to throw upon him the burden of seeking out surgical treatment when he is re-entering civil life with perhaps poor prospects, rendered the more uncertain by his gastric invalidism.

If these men were operated upon in the services, some would be able to carry out their ordinary duties, some would be able to perform duties which did not necessitate undergoing great physical hardship. Perhaps 16 per cent. would still suffer. Even though the rule were made that all peptic ulcer patients should be discharged from the army, the state would find it an immeasurably good investment if they received adequate treatment before dismissal. Not only would much time be saved if the onus of obtaining such treatment were not delegated to the individual on his entry into civil life, but a large proportion of fit men would be returned to carry on activities which are as essential to the prosecution of the war as those of the soldiers themselves.

I am, Sir, yours faithfully,

Basingstoke. CHARLES A. PANNETT.

INFECTIVE HEPATITIS AND CATARRHAL JAUNDICE

SIR,—In a letter in your issue of March 30 Dr. Hope Simpson quoted some experiments in America into the causes of arsphenamine jaundice which "revealed that a high carbohydrate diet was, surprisingly, a predisposing cause of this type of liver necrosis, and that the liver could be fortified by a diet rich in fats." If, perchance, recent work on this subject has escaped their notice Dr. Simpson and your readers will be interested to learn that Craven's conclusions, to which he refers—and to which I have also given some prominence—seem now to have been completely contradicted by the work of W. J. Messinger and W. B. Hopkins (*Amer. J. med. Sci.* 1940, **199**, 216), which shows that, whereas fats promote liver damage by arsphenamine compounds, the best protective of the liver against this form of poisoning is a protein diet and after this a carbohydrate one.

I am, Sir, yours faithfully,

Eccleston Square, S.W.1. L. W. HARRISON.

FRACTURED FEMUR IN CONVULSION THERAPY

SIR,—Age is the great cause of the fracture discussed in the article Dr. Rankine Good has criticised (*Lancet*, March 23, 1940, p. 575). His categorical statement that in his experience "age or prolonged inactivity bear no relation to the incidence of fractures" is contrary to all surgical experience. Here is a table of age-incidence in the last 100 patients whose intracapsular femoral neck fractures I have immobilised with a Smith-Petersen nail. The list does not include patients too senile to submit to operation, or whose X rays showed a bone architecture too frail to hold the nail effectively. Convulsion-therapy fractures are not included.

Age-group	Patients	Age-group	Patients
20–29	2	60–69	38
30–39	3	70–79	23
40–49	3	80 and over	15
50–59	16		

Of these, 80 were women. Thus 92 fractures were in patients of 50 years and over, and only 8 in patients under 50. In 4 of the latter group the fracture occurred in a limb partly paralysed as the result of poliomyelitis. Our statement that "convulsion therapy should not be used in the elderly" was too dogmatic. We would amend it to "Have a care with the elderly and in those who have had prolonged

periods of inactivity, for surgical experience teaches that the bones in such patients may fracture from trivial violence."

We agree with Dr. Good that the patient should be unrestrained during the convulsion, restraint may well increase the incidence of fractures. Indeed we go further and advise against covering bed-clothes during the convulsion. The patients discussed in our article were not restrained, in consequence we were forced to seek other explanations for their fractures.

In laying the main blame on the force of the muscular violence in intracapsular femoral neck fractures during convulsion therapy we were impressed by the age-incidence in the 10 fractures reported in detail. All the patients were under 40 years, a marked contrast to our previous experience with this fracture. The force of the muscular contraction must also be the cause of the more common lesions in convulsion treatment—namely, dislocation of the jaw and compression fractures of the vertebral bodies.

A distinguished Australian psychiatrist has recently stated that "Cardiazol is the elixir of life to a hitherto doomed race" (*Med. J. Aust.* 1939, **2**, 430). If that is the truth of the matter, then a fracture is a small price to pay for such benefit.

I am, Sir, yours faithfully,

Richmond, Surrey. WILLIAM GISSANE.

SIR,—Dr. Rankine Good disputes certain of the conclusions reached by Mr. Gissane, Mr. Rank and myself in our article in THE LANCET of March 9. He does not agree that the fractures are the result of muscular violence in rather brittle bones but considers the most important factor in their ætiology to be restraint of the patient during the convulsion by excessively enthusiastic doctors and nurses.

Our contention that the bones in these patients were more brittle than normal was based on the observations of orthopædic specialists of considerable experience (Mr. Gissane and Mr. Rank) when they bored the bones for the insertion of Smith-Petersen nails, and seems indisputable.

Regarding the strength of muscular contraction, I agree with Dr. Good that there is little difference between the pattern of epileptic and Cardiazol fits, but I still maintain that in certain cases cardiazol convulsions are muscularly more powerful than those of epilepsy. That muscular contractions can in themselves cause fractures of bones is shown by their occurrence in cases of tetanus where the patients have previously been in perfect health. Moreover, I have described a case of fractured femur due to an epileptic convulsion (*Brit. med. J.* 1939, **2**, 1227) and come across a case of fractured vertebræ in an epileptic exactly similar to those resulting from cardiozol convulsions (paper now in the press).

Finally, may I point out that in none of our cases was restraint of any sort used on the patients during fits since I also hold the opinion that restraint of any form is highly undesirable. This seems to refute beyond doubt Dr. Good's conclusion.

Dr. Rankine Good also says that he has treated many elderly people with few fractures of the long bones, but his 2 fractures out of 80 cases treated is not an excessively low incidence. My search into the literature on cardiazol shows that in 3000–4000 cases fractures of the femur occurred in only 0·66 per cent. and of any of the long bones in slightly over 1 per cent. Before we accept Dr. Good's contention that "age and prolonged activity bear no relation to the incidence of fractures" and that "it would be a pity if someone were prevented from employing it in elderly people or those who have been inactive for a long time by the article referred to" considerably more evidence is needed.

The final verdict regarding this treatment must be based on the proportionate risks of complications versus the chance of improvement unobtainable by any other method. I personally consider the former of sufficient importance to warrant a careful selection of cases likely to benefit and in my experience patients who do not benefit by the time they have had ten injections (i.e., fits) extremely rarely do so afterwards. I now make it a practice never to give more than ten fits if there has not been very definite improvement.

I am, Sir, yours faithfully,

DONALD BLAIR.

Cane Hill.

THE E.M.S. TODAY AND TOMORROW

SIR,—I have read with interest Mr. Somerville Hastings's comments on my article. His main point of disagreement is in the necessity of allowing heads of departments the power to engage in a certain amount of private practice. I believe this to be essential because the best men in the profession should be incorporated in the new service and it seems extremely unjust that those capable of paying should be deprived of the services of such men; nor can I see why those providing the skilled medical help should be denied the reward of their skill and labour. The fact however that Mr. Somerville Hastings does disagree with me on this point confirms my view that there are certain to be considerable divergencies of opinion and thus it is of the utmost importance that a representative body be formed as soon as possible to discuss fully all such divergent views, and to draw up an authoritative scheme for the future of British medicine. I agree with Mr. Somerville Hastings that those engaged in municipal medicine should be represented on such a body.

I am, Sir, yours faithfully,

Weymouth Street, W.1. JAMES WALTON.

THE BIRTH OF THE E.M.S.

SIR,—In your issue of March 23 Sir Ernest Graham-Little wrote that a committee appointed by Sir Samuel Hoare, of which I was chairman, was responsible for the degrading of the London hospitals, for the dispersal of students and for the terms of service of the E.M.S. In your issue of April 6 he readily admits this committee was not responsible, that it had in fact nothing to do with these measures. It was the only purpose of my letter to correct a question of fact. Otherwise I was not concerned with the responsibility for these measures. That was taken once and for all by the Government when it accepted the Air Ministry's estimate of casualties. The province of the medical advisers of the Government was not to criticise those figures but to make preparations on the assumption that they were correct. If they had proved accurate there could have been no alternative to these steps: for example if casualties had occurred on such a scale private practice would have ceased.

Sir Ernest refers to my "eulogy" of the E.M.S. in a letter to the *Times* of Dec. 6; the paragraph in question reads:

"Finally I have to ask: Has the education of the medical student suffered? It is not true that the students have been left to their own devices. Presently they will return to London with some insight into the structure of public health services. By their dispersal over the sectors something has been lost but

much has been gained. A conclusion of that kind is fortified by the students' own verdict which, so far as it can be ascertained, is friendly to the system. They live in the sector hospitals and their number in any one institution is small. The large class is gone. In its place there is intimate contact between student and teacher. The teacher is always in the hospital, the student shares his day. And when the work is done student and teacher go to the same building, they talk and play together, they live together, with incalculable gain to both. This means much; it is a new relationship that is worth preserving. The physicians and surgeons of the Emergency Medical Service have built better than they knew."

The words Sir Ernest quotes—namely, the final sentence—plainly refer to medical education; in the rest of the letter there is not a word of eulogy of that service. I ask you to print the passage to emphasise once more a memorable educational experiment. In normal circumstances a student has to rest content with a fraction of the physician's day, whereas for some months after the outbreak of war the teacher was always in the hospital and the student shared his working hours. With the return to London of many teachers on part-time service these conditions have already passed away. They will not recur in my time but I cannot doubt that we have seen the birth of a new relationship between the student and his teacher, of which more will be heard. Meanwhile to record the student's appreciation of his unusual fortune is not to argue that the London schools and their Government grants should be scrapped.

I am sure that Sir Ernest is at heart more interested in an educational adventure of this kind than in scoring debating points, which is perhaps hardly a game for grown-ups in these times.

I am, Sir, yours faithfully,

C. M. WILSON.

THROMBOSIS OF THE SUPERIOR VENA CAVA

SIR,—The annotation under this heading in your issue of March 23 (p. 559) recalls to my mind a note which I contributed more than forty years ago to your Mirror of Hospital Practice (*Lancet*, 1898, **2**, 206). It was entitled "Three cases of extensive venous thrombosis associated with severe rheumatic carditis," under the care of W. B. Cheadle and D. B. Lees. One of these was a case of thrombosis of the superior vena cava and its tributaries, fatal from pulmonary embolism due to detachment of a portion of the clot in the vena cava. The illustration was reprinted with your permission in "Researches in Rheumatism" (Poynton and Paine, 1913).

The note is historic because it was the first attempt in this country to show by pathological investigation that this thrombosis was not merely obstructive in origin but due to rheumatic inflammation of the wall of the vein, and an indication of the infective nature of juvenile rheumatism; it was quoted in several editions of Osler's Textbook of Medicine. Since then I have seen at least ten cases of venous thrombosis in juvenile rheumatism, several affecting the innominate veins, the most interesting being a thrombosis of the inferior vena cava in a case of severe rheumatic chorea, with a result strictly comparable to that seen in the same condition associated with typhoid fever. Later (*Lancet*, 1933, **2**, 966) Bruce Perry confirmed and carried further the study of these cases as probably infective.

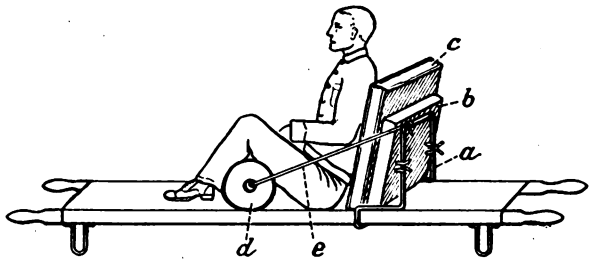
The original drawing together with all the other original illustrations by Paine and myself, published and not published, are in the safe custody of the medical school of Harvard University. Since those early days it has been recognised that juvenile rheumatism not only attacks the heart but all the vascular system, from the origin of the aorta to the superior vena cava, including the blood capillaries. There is a good illustration of this venous thrombosis by B. Schlesinger in "Recent Advances in the Study of Rheumatism" (2nd ed. 1937).

I am, Sir, your faithfully,

Bath. F. JOHN POYNTON.

STRETCHER FOR ABDOMINAL WOUNDS

SIR,—Mr. T. B. Layton in his instructive article on the Transport of Wounded has stressed the importance of placing a patient with abdominal wounds in the Fowler position as early as possible and of transporting him in this position. Sergeants Harris and Young, both of the R.A.M.C., have worked out a means of carrying this out, making use simply of the ordinary service stretcher, and the suspension bar of the Thomas splint. The accompanying illustration serves best to describe the means of transport, and the patient can be wrapped in three blankets, a method which, as Mr. Layton rightly states, has saved many lives.



Service stretcher adapted for Fowler position: (*a*) suspension bar of Thomas splint; (*b*) stretcher pillow tied to suspension bar; (*c*) spare pillow; (*d*) spare pillow, to be placed under the three blankets so as to be able to be made fast to the suspension bar, thus acting as donkey and firmly holding patient; (*e*) strong tape fastened to each end of donkey and to suspension bar.

I am, Sir, yours faithfully,

M. DE LACEY,
Major, R.A.M.C.

THE NAME OF INFLUENZA

SIR,—Renaming diseases is never easy and many, like the Secretary of State for War who has been told he ought not to call epidemic influenza by that name, will continue to refuse the advice (*Lancet*, March 23, 1940, p. 571). Common sense on this occasion is in agreement with the present medical evidence.

Dr. Stuart-Harris and his co-workers (*Lancet*, Feb. 3, 1940, p. 205) wish to use "epidemic influenza" to indicate only the condition of influenza-virus infection and we others must be content with "febrile catarrh" for our old familiar "influenza" or "'flu." Clinical experience never supported the idea that virus influenza was distinct from other conditions usually called influenza. Any two epidemics of virus influenza or any two epidemics of ordinary influenza show as much dissimilarity as is shown in Stuart-Harris's table demonstrating the percentage frequency of symptoms. I wish that your statement that "It is highly probable therefore that a disease exists which is clinically indistinguishable from epidemic influenza yet is not apt to occur in such widespread epidemics" were true. The

epidemics of which I have had experience and from which the virus was unobtainable have spread in a school community and in the whole country with as great rapidity as virus infections; as Stuart-Harris states, "No sharp distinction was possible between the outbreaks—i.e., of virus and not-virus influenza—on clinical and epidemiological grounds."

This change of mind is very welcome but it does not give the right to change the names. Let us keep influenza, even if qualified by the adjective epidemic, for that disease which with almost monotonous regularity attacks large numbers of an exposed population usually in the winter or early spring, causing congestive pharyngeal, respiratory and sometimes gastro-intestinal symptoms, and if the virus-form must have a special name let us call it something else.

I only met Sir Patrick Laidlaw once, but I am sure he would have agreed with the last paragraph. His contribution to our knowledge of influenza was the greatest of all and may we not commemorate this by calling virus influenza Laidlaw's influenza? This would be analogous to Addison's anæmia, Jacksonian epilepsy or Gaucher's splenomegaly. The names of the discoverers live because they clearly differentiated one form of the syndromes in which they were interested from the large number of cases encountered. I believe the same will be true of Laidlaw.

I am, Sir, yours faithfully,

Rugby. R. E. SMITH.

AIR PURIFICATION BY HYPOCHLOROUS ACID

SIR,—On p. 581 of your issue of March 23 you call attention to the purification of air by means of hypochlorous acid and briefly summarise the facilities offered by Milton Proprietary for carrying out such a system. You make the statement that "to achieve almost complete sterilisation of an occupied room with inoffensive concentrations of hypochlorous acid of the order of 1 in 10 million of air takes some hours, but, as would be expected, the greatest reduction occurs soon after spraying has commenced." I venture to correct both parts of this statement.

In my original report A System of Air-Purification by Hypochlorous Acid Gas, table II gives the results in an inhabited room of 10,000 cubic feet, wherein it is shown that the percentage germ-reduction increased steadily during 1 to 5 hours from 50 to 85 per cent. This was obtained by two hours' spraying with a very weak solution of only 2 g.p.l. of available chlorine. Subsequently the same room under similar working conditions was treated with a full 10 g.p.l. solution for 15 minutes, and complete sterility was obtained within half an hour after spraying. In this instance a filtration method was used instead of deposition. The concentration of HOCl was approximately 1 in 17,000,000.

Amid the extensive data we have obtained, with all the varying conditions of size and condition of room, air-currents, number of inhabitants, method of spraying, &c., there emerges one definite law. Given a concentration of HOCl above a certain amount, varying between 1 in 10,000,000 and 1 in 20,000,000 almost complete sterility will be obtained. How quickly this result is attained depends upon the efficiency of the vaporising apparatus in producing and diffusing its gas. On p. 14 of the report it is shown that 1 c.cm. of hypochlorite vaporised in just over one minute in a room of 1000 cubic feet (a concentration of 1 in 15,000,000) heavily charged with *B. prodigiosus* gave a 99·75 per cent. degree of sterility in 15 minutes.

I hope these instances are sufficient to show that with dilute solutions the degree of sterility ascends gradually from hour to hour, and that with strong solutions an "almost complete sterilisation" can be produced by an operation of one minute or more according to size of room, which repeated as required should maintain such sterility indefinitely. One part in a million of HOCl can be inhaled with impunity and it is the enormous difference between this and the minimum lethal dose for air-borne germs which gives a unique character to this system.

I am, Sir, yours faithfully,

Ebury Street, S.W.1. A. T. MASTERMAN.

*** If the germs in the inhabited room were reduced by a half during the first hour's spraying and 15 per cent. survived the fifth hour it is evident that the rate of destruction must have fallen off. But we are in full agreement with Dr. Masterman that hypochlorous acid is a very efficient agent for reducing the bacterial content of air.—ED. L.

HÆMORRHAGE IN THE NEWBORN

SIR,—After reading the leading article in your issue of April 6, I thought my recent experience of a case in my practice might be of interest. The baby had a severe hæmatemesis and severe melæna on the second day after birth. I injected 0·2 c.cm. snake-venom solution (Moccasin, Lederle). There was no more hæmatemesis but one or two rather tarry motions. Next day to be on the safe side I injected another 0·1 c.cm. There were no further hæmorrhagic symptoms.

I am, Sir, yours faithfully,

Chelford. E. S. EVANS.

ECONOMY IN PRESCRIBING

SIR,—Some of the hints for prescribers that you base on the statement issued by the Medical Research Council (*Lancet*, April 6, p. 660) are surprising. It is sound enough to reserve the sugar for children and leave the bitters for adults with coarsened palates, but it would be interesting to know for what "other purposes" glycerin is wanted. "Do not substitute glycerin for syrup," you say, "because glycerin is wanted for other purposes." Long before the war the trade and technical press told the world, in effect, that in warfare glycerin was a museum piece along with battle-axes and bows and arrows; the world's markets were glutted with glycerin and prizes offered for new uses for this waste product of the soap industry. It is true that no soap is being made in Germany but the rest of the civilised globe is still washing itself and the price of medicinal glycerin is the same today as it was in August last year. It is true that some manufacturers and many retail chemists were prompted to buy more than their usual quantities of glycerin in preparation for sugar rationing and it is true that soap-makers hesitated to supply abnormal demands; but beyond that there is nothing peculiar about the glycerin market. On the other hand saccharin is a tax-gatherer; it is far more heavily taxed than the multi-millionaire; glycerin pays the same direct tax as the pauper does—namely, nil. Of course that may have nothing to do with the case, but if it has, why not say so? Another doubtful hint is the advice to be careful in prescribing ephedrine, when as a matter of fact the London market is so overloaded with this product that dealers are shouldering each other out of the way to get first to the buyer. It is a surprise, too, to be told to hold aloof from gentian root, a drug which our French friends are only too glad to let us have in abundance. It is doubtful

if panel patients will respond so quickly to kaolin as to bismuth carbonate, if only for the reason that the dear old stock mixture looks different. There are other points in this article over which the general practitioner, the statistician, the shipper and the economist could spend a happy half-hour.

I am, Sir, yours faithfully,

London, S.W.1. F. C. GOODALL.

VITAMIN E AND NEUROMUSCULAR DISEASES

SIR,—In his letter in your issue of March 9 Mr. Graves of Vitamins Ltd. lays stress on the hypothesis that wheat germ contains an unidentified myo-neurotrophic factor, and that this factor is responsible for the remarkable results reported in THE LANCET of Jan. 6 (p. 10). Professor Demole, however, in his letter of March 2, marshalled ample evidence to show that this hypothesis is quite unnecessary and that only one factor, namely alpha-tocopherol, is needed to prevent paralysis &c. in experimental animals on a diet deficient in vitamin E. Clinical results will be even more convincing and I would therefore draw attention to a paper by Wechsler published in the *Journal of the American Medical Association* of March 16. Wechsler treated six cases of amyotrophic lateral sclerosis with pure synthetic alpha-tocopherol and obtained remarkably good results in two.

I am, Sir, your faithfully,

H. J. W. FRANCE,
Managing Director, Roche Products Ltd.

FEES FOR WALKING THE WARDS

SIR,—The announcement in THE LANCET of April 6 (p. 673) that St. George's medical school is paying fees to the Middlesex county council in order that students may be allowed to receive tuition in the wards of one of their hospitals raises the question why a similar payment should not be made to a voluntary hospital. It would seem to be analogous to the fees paid by the students of Scottish medical schools to the hospitals for the privilege of walking the wards. Although efforts to assess the additional cost of a hospital, where there is a medical school attached to it, have not yet been successful it is generally admitted that the hospital cost is higher on that account. Even it were not so, access to the hospital surely has a definite value to the students which deserves financial recognition.

I am, Sir, yours faithfully,

Temple, E.C.4. C. E. A. BEDWELL.

OBITUARY

CHARLES SLATER

M.B. CAMB., M.R.C.S., F.C.S.

Dr. Slater, who died at his home near Tunbridge Wells on March 15, had retired before the last war from directing the clinical laboratories at St. George's Hospital, but his memory is still cherished by St. George's men for he was one of the most generous of friends and most courtly of colleagues. Born at Southport in 1856, he went to Clifton College for two years and from there with a foundation scholarship to St. John's College, Cambridge, taking a second class in the Natural Sciences Tripos in 1878. In later life he discharged his debt to St. John's by endowing a research studentship there. He brought out in collaboration with Pattison Muir a primer of elementary chemistry and became F.C.S. before completing his clinical studies at St. George's Hospital from which he qualified in 1884. He was then medical registrar at the hospital and when his mind turned from pure chemistry to bacteriology he went to the Pasteur Institute in Paris and from there to Berlin, intending to include Copenhagen, but his continental study was cut short by his call to St. George's to be hospital bacteriologist at a salary of £100 a year "to include all laboratory expenses." At the same time he was appointed lecturer on bacteriology in the medical school and later became university reader in bacteriology. It was the beginning of a new department at St. George's and it was not long before the laboratory needed enlargement to cope with the work Slater was called upon to undertake. The teaching of state medicine drew students to his laboratories from other London schools and from much further afield; finally in 1895 new laboratories and classrooms were built of which he became director for the next 25 years. On his retirement at the age of 57 his affection for his old school was in no way diminished and at the bicentenary in 1933 he quietly sent a cheque for £10,000 with which to build a new clinical laboratory. At Tunbridge Wells to which he retired he helped to make the project for the new Kent and Sussex Hospital a success, and kept in touch with its growth and development. His retirement gave him more time for painting and photography and for long visits to Switzerland where he had always been an ardent climber. At every stage of his career his reserve and his instinctive avoidance of publicity prevented him from reaping the full reward of his ability; he had a profound knowledge of bacteriology and contemporary medicine, and read both French and German fluently. For a time he was joint editor of the *Review of Bacteriology* and he brought out with Dr. E. J. Spitta a small but excellent Atlas of Bacteriology. The photograph which we reproduce was taken soon after he became director of the clinical laboratories.

Maull & Fox

Dr. Harold Spitta writes: During the time when Slater was in full control of the clinical laboratories he threw himself wholeheartedly into research and did his utmost to encourage the younger generation to work in his laboratories and discuss with him matters of interest in clinical pathology. He engaged an assistant bacteriologist, providing his salary out of his private purse, and it was not long before the various laboratories became a hive of industry. Pressure was often brought to bear upon him to publish his work but he was never able to overcome his natural reticence and very rarely would he allow the results of his work to appear in the press. As time went on he would provide scientific apparatus necessary for the prosecution of research out of his private pocket and on many occasions he would help the less fortunate members

of the medical profession with financial support, assistance and advice. The encouragement he gave to the younger men will never be forgotten and conversations with other bacteriologists revealed his sometimes quite astonishing knowledge of contemporary bacteriology and research. The bicentenary gift of £10,000 was followed up by a further bequest of like amount to augment the salaries of workers in the laboratory.

GEORGE ERNEST WAUGH

B.A. CAMB., M.D. LOND., F.R.C.S.

Mr. Waugh died on April 3 at King's Sutton, Northants, where he was born and his father had practised medicine. He was educated at Epsom College and Downing College, Cambridge, holding a foundation scholarship there, and went on to University College Hospital from which he qualified in 1901. He remained in the dissecting-rooms to become senior demonstrator and teacher of surgical anatomy, and was soon appointed to the surgical staff of the Hampstead Hospital and the Hospital for Sick Children, Great Ormond Street. His major interest was in children's diseases, but he became a versatile general surgeon, possessing an enviable diagnostic balance and a meticulous technique. He did pioneer work in tonsillar enucleation, insisting on deep anæsthesia for carrying it out, and he was elected to membership of various surgical societies, including some in France and America, and to the medical faculty of London University. At Hampstead he became chairman of the medical committee in succession to Sir William Collins and, despite his deafness, bore worthily the mantle of his predecessor. Occasionally he would arrange a committee at his house partly it would seem as an excuse for showing hospitality (including the cigars for which he was famous) to his colleagues.

At Ormond Street he quickly fell under the spell of the place, its traditions and its work, and as resident medical officer worked with many of the best men from Canada, Australia, South Africa and all the British schools of medicine. His example and teaching in those days laid a firm foundation not only for his own future as a surgeon but also for the widespread devotion to the hospital which is found in the Dominions and in England among all who have worked there. His election to the staff gave an added impetus to the study of the surgical diseases of children. More than that, he was a natural leader of men, even those who disagreed with his opinions finding it impossible not to acknowledge his fairmindedness or admire the even temper and willingness to examine and debate the opposite view. His intellect was keen, and his reading and appreciation wide—wider probably than many of his associates guessed; and while he set a high standard for the student and the operator he was a severe critic of his own attainments. Latterly his health failed—he was never robust—but he carried on until the end of his term of service.

He married Ada Hélène, daughter of John Farrington of New York. They had one daughter.

H. A. T. F. writes: George Waugh was always brilliant, always outstanding. At school I was envious, I must confess, of the way in which he reached the top of his class apparently without an effort, certainly without doing any extra work. In the field, if not perhaps so brilliant, he was sufficiently sound to be a member of both the rugby and cricket teams. His gratitude to his old school was shown by the great interest he took in the work of the college council, of which he was a member for many years. Waugh, in my opinion, had a profound influence on the surgery done at Ormond Street. Inspired by Arbuthnot Lane and the late Arthur Barker, his old chief at U.C.H., he was chiefly responsible when medical superintendent for the introduction of aseptic methods, little practiced at that time, and for the institution of a theatre routine and general surgical technique throughout the hospital second to none. It was there that he did most of his pioneer work on total removal of the tonsils and on the surgery of the abdomen.

Waugh was a highly cultured man whose brilliance no-one could fail to realise. But the thing about him which endeared him to his friends, and never failed to impress even a chance acquaintance, was his personality. It was this personality that was chiefly responsible for welding the surgical staff into a team of brothers. He was a man from whom young and old sought advice, on personal as well as professional matters. A mutual friend once said to me, "You never hear George say an unkind word about anybody." His career would have been even more brilliant but for the unfortunate handicap of deafness.

PHILIP GEOFFREY STAINTON

M.R.C.S., SURGEON LIEUTENANT R.N.

Lenare

Surgeon Lieutenant Stainton, who was killed in a motor accident on March 24 while on active service near Cape Town, studied medicine at Guy's Hospital and qualified in 1933. After spending a year as medical resident at Ramsgate General Hospital he went for another year as assistant to Dr. S. S. Rendall in a general practice at Boston, Lincs. He next returned to London for more hospital appointments and then joined the Royal Navy in which he saw three years service before his untimely death. He was 31 years old.

Mr. J. B. Gurney Smith writes: As a fellow-student of Lieut. E. G. REYNOLDS, although not one of his intimate friends, I knew him well enough to form a high opinion of him as a social personality and as a man. His charm of manner and his radiant smile were infectious to those who came in contact with him. He had that great gift of inspiring confidence. He was a type of conscientious worker that the profession can ill spare.

THE Sanatorio Español de México has begun to publish as its official organ a quarterly journal entitled *Analecta medica*, the first number being issued for March, 1940. Dr. J. A. Alvarez, director of the institution, contributes an article on accidents in gastroduodenal surgery; Drs. Angel Matute V. and Jesus Salas describe a method of injecting air into the knee-joint in connexion with radiography, calling it pneumofascia; Dr. L. L. Vega discusses the correlation of psychological and physical types in man; Dr. S. A. Sarmiento describes endoscopic injection of the prostate; Dr. Eduardo Arin reviews abnormal radiological appearances localised in and about the oblique fissure of the right lung; Dr. Samuel Morones contributes a few notes on typhoid; and Dr. C. D. Guerrero publishes a case of painless tabetic gastric crises in a woman of 30 whose only symptom was frequent nausea, retching, and vomiting.

Medical News

University of London

At a recent examination the following were successful:—

D.M.R.

Part I.—H. F. Francis, G. A. Macadie, Esmond Millington, M. A. Stewart and T. A. Watson.

Royal College of Surgeons of England

The spring course of museum demonstrations is now being given at the college, Lincoln's Inn Fields, London, W.C.2. On April 17 and 24 Dr. A. J. E. Cave will lecture on the anatomy of the head and neck, and on May 1, 8 and 15 on the anatomy of the abdomen. The demonstrations are open to advanced students and medical practitioners and are at 5 P.M.

Royal College of Obstetricians and Gynæcologists

Mr. Morris Datnow will deliver the third William Blair-Bell lecture at the house of the college, 58, Queen Anne Street, London, W.1, at 3 P.M. on Saturday, April 27. He will speak on Blair-Bell's contributions to science with especial reference to cancer research.

The following have satisfied the examiners and have been awarded the diploma of the college:—

S. K. Christie, Annie M. Dawson, Bessie Dodd, A. G. Edwards, K. A. Evans, John Griffith, Archie Herstein, Mary Kane, B. G. Kearon, Elizabeth G. Keith, E. J. Lace, A. M. Lester, Duncan Malloch, Mabel A. Masih, Elizabeth V. Newlands, Marjorie A. Powys, D. A. F. Shaw, J. R. Sides, C. J. Stewart, Violet E. A. Sykes, Mary R. Thompson, Agnes E. Towers, J. P. Watson, Eluned Woodford-Williams and Elizabeth M. Wright.

Medical Conscription

At its last meeting the executive committee of the Socialist Medical Association of Great Britain passed the following resolution: "The Socialist Medical Association demands that medical conscription shall not be enforced until a national plan has been elaborated whereby allocation can be decided upon to meet the needs of both the armed forces and the civil population so that available medical personnel shall be distributed to the best advantage of all."

National Association for the Prevention of Tuberculosis

The annual meeting will be held in Tavistock House, Tavistock Square, London, W.C.1, on Thursday, April 18, at 2.30 P.M., when the chair will be taken by the Marchioness of Titchfield. Sir Hugh Walpole will address the meeting, which will be followed by a discussion on tuberculosis care work in war-time.

Health of the Troops

Sir William MacArthur, director-general of Army Medical Services, told the Unionist Health and Housing Committee on April 4 that in spite of the severe winter there have been relatively few cases of serious illness among the troops and a very light incidence of acute infectious diseases. As regards hospitals, the Army has done reasonably well in competition with the abnormal provision necessary to meet the possible needs of civilians. There is no shortage of military medical equipment, and indeed reserve supplies are adequate for the estimated requirements for six months ahead. General MacArthur referred to the irresponsible complaints which are often forwarded to the War Office by well-meaning civilians. Eighty per cent. of the alleged cases of medical neglect or unhygienic conditions are shown on investigation to have no foundation. Equally troublesome are the false rumours of heavy mortality from such infections as pneumonia and cerebrospinal meningitis. It sometimes seems that such stories are deliberately spread by people who want to create mischief. All things considered the country may rest assured that the medical services are keeping fully abreast of the requirements of our rapidly expanding armies.

Royal Microscopical Society

The annual meeting of this society will be held at B.M.A. House, Tavistock Square, London, W.C.1, on Wednesday, April 17, at 3.30 P.M., when Mr. P. N. Bhaduri, Ph.D., will read a paper entitled Improved Smear Methods for Rapid Double Staining.

Sulphapyridine and Sulphonal by Prescription only

The Poisons (Amendment) Rules 1940 and the Poisons List (Amendment) Order 1940 came into operation on April 1. Their main effect is to bring sulphapyridine within part 1 of the Poisons List and also to make it subject to the fourth schedule to the Poisons Rules. As a consequence this product can now only be supplied on prescriptions, as is already the case with sulphanilamide and allied substances. Another effect of the amendment to the rules is to include sulphonal in the first schedule.

Exeter's Radium

The report of the trustees of the Devon and Exeter Cancer Fund for the year 1939 was presented at the annual meeting held on March 29 under the chairmanship of Mr. P. F. Rowsell, the founder of the fund. The report states that the chief concern in all radium departments has been the question of safe keeping in the event of air-raids. The solution in Exeter has been to transfer the radium safe to an underground cellar below the west wing of the Devon and Exeter Hospital, which has a thick concrete roof. The radium itself is in metal containers and these are enclosed within 6 inches of metal.

Nurses' Superannuation in War-time

The superannuation of nurses engaged in the service reserves and Civil Nursing Reserve was again considered at a meeting of the Royal College of Nursing on March 28. The Ministry of Health wrote that the rates of salary of the reserve were calculated to allow for the maintenance of superannuation premiums and that it appeared to the Ministry that the reserve was recruited solely from nurses not in hospital service so that very few members would be participants in the federated scheme before joining. But it was pointed out at the meeting that though the number may be proportionately small, certainly some nurses have joined the reserve directly from hospital service owing to the higher salaries offered; also the scheme is open to private nurses and there are probably some among these who belong to the scheme. Sir Bernard Docker, chairman of the British Hospitals' Association, will shortly present a memorandum, supported by the college and the Federated Superannuation Scheme, on the question of the superannuation of hospital officers and nurses in the various reserves, to Sir George Chrystal. The college is pressing for the payment of the employer's contribution by the military, naval or Air Force authorities.

Vacancies

Agent General for Western Australia, Savoy House, Strand, W.C.2.—Inspector-general of mental hosps. dept., £1100.
Altrincham General Hosp.—H.S., at rate of £120.
Barking Borough.—Temp. asst. M.O., £500.
Bath, Royal National Hosp. for Rheumatic Diseases.—Res. M.O., £150.
Bury St. Edmund's, West Suffolk General Hosp.—H.S., at rate of £150.
Cambridge, Addenbrooke's Hosp.—H.P., at rate of £130.
Derbyshire Royal Infirmary.—H.S. for cas. dept., £150.
Doncaster Royal Infirmary.—Cas. H.S., at rate of £150.
Enfield Urban District Council.—Asst. M.O.H. for maternity and child welfare, £600.
Essex Administrative County.—Third asst. M.O. for Essex County Hosp., £350.
Folkestone, Royal Victoria Hosp.—Res. H.S., £130.
Grimsby and District Hospital.—H.P. at rate of £175.
Glasgow Eye Infirmary.—Res. H.S., £150.
Gloucester, Gloucestershire Royal Infirmary.—H.S. to ear, nose, and throat Dept., £150.
Hereford, Herefordshire General Hosp.—H.S. for casualty and ear, nose, and throat depts., £120.
Hampstead General Hospital, Haverstock Hill, N.W.3.—Temp. phys. to outpatients.
Hove General Hosp.—Jun. res. M.O., at rate of £120.
Hull Royal Infirmary.—Res. anæsthetist, at rate of £150.
Ilford Borough.—Asst. dental surgeon, £450, also R.M.O., £400.
Kidderminster and District General Hosp.—Jun. H.S., at rate of £100.
Lancaster Royal Infirmary.—Two jun. H.S.'s, each at rate of £130.
Leicester City.—Res. M.O. for City General Hosp., at rate of £300.
Liverpool Sanatorium, Delamere Forest, Frodsham.—Asst. to med. supt., £225.
Liphook, Hants, King George's Sanatorium for Sailors.—Asst. M.O., at rate of £200.
London Chest Hospital, Victoria Park, E.2.—H.P. at rate of £100.
Maidstone, Kent County Ophthalmic and Aural Hosp.—Two H.S.'s to spec. depts., each at rate of £200.

Manchester Royal Infirmary.—Five H.S.'s to spec. depts., each at rate of £50., also res. cas. O., £150.
Market Drayton, Cheshire Joint Sanat.—Third asst. M.O., £250.
Newcastle-upon-Tyne City and County.—H.P.s and H.S.s for Newcastle General Hospital at rate of £150, H.P.s and H.S.s at Shotley Bridge Emergency Hosp. at rate of £200, also res. med. asst. at Barrasford Sanatorium, at rate of £250.
Newcastle-upon-Tyne Hospital for Sick Children.—Temp. hon. ophthal. S.
Newcastle-upon-Tyne City and County, Newcastle General Hosp.—Res. M.O., £450.
New Zealand, Otago Hosp. Board, Dunedin.—Radiotherapist, £1200.
Norwich, Norfolk and Norwich Hosp.—H.P., £120.
Nottingham General Hosp.—Res. cas. O., at rate of £150.
Nottinghamshire County Council.—Second asst. county M.O., £675.
Portsmouth City.—Temp. asst. M.O., £600.
Portsmouth, Portsmouth and Southern Counties Eye and Ear Hosp.—H.S., at rate of £150.
Reading, Royal Berkshire Hosp.—H.S. and H.P., each at rate of £150.
*Royal Free Hospital, Grays Inn Road, W.C.*1.—Asst. M.O., £300.
Royal Masonic Hosp., Ravenscourt Park, W.6.—Two res. M.O.'s, each £300.
Sheffield Children's Hospital.—Clin. pathologist, £350–£400.
*St. Peter's Hosp. for Stone, &c., Henrietta Street, W.C.*2.—H.S., £75.
Swanley, Kent, Hosp. Convalescent Home, Parkwood.—Res. M.O., at rate of £200.
Swansea General and Eye Hosp.—Res. anæsthetist, at rate of £150.
*Westminster Hosp., St. John's Gardens, S.W.*1.—Physician.
West Ham County Borough.—Asst. R.M.O. at Forest Gate Hospital, £350.
*Willesden General Hospital, N.W.*10.—Hon. phys. to skin dept., also asst. surg. O., £50.

The Chief Inspector of Factories announces a vacant appointment for an examining surgeon at Llanwrtyd Wells, Brecon.

Medical Diary

Week beginning April 15

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1.
THURSDAY
Neurology—5 P.M., Dr. Dorothy Russell: Ectopic Pinealomas. Prof. Geoffrey Jefferson: Aneurysm in the Iter of Sylvius; Malignant Pituitary Adenoma. Dr. Samuel Nevin: Histological Changes in the Brain in Diabetic Hypoglycæmia. Dr. A. Meyer: Neuropathological Changes in Pick's Disease. Dr. G. E. Smyth: Histological Lesions in the Cerebellar Dentate.
FRIDAY
Physical Medicine—3.45 P.M., Annual General Meeting. Sir Robert Stanton Woods: Organisation of Physical Medicine in the E.M.S. Dr. John Cowan: Physical Treatment of Nerve Injuries. Dr. A. R. Neligan: Balneological Treatment of War Injuries. Dr. Philippe Bauwens: Some Possibilities of Physical Treatment in Infective Complications. Dr. James Mennell: Danger of Treatment by Manipulation in War-time Injuries.
Obstetrics and Gynæcology—5 P.M., Mr. Stanley A. Boyd: Radio-opaque Calcification of the Fallopian Tubes with Tubal Patency. Prof. F. J. Browne: Brain showing Cerebral Hæmorrhage in a Case of Spontaneous Labour. Miss Meave Kenny: A Case of Osteomalacia. Miss Gladys H. Dodds and Prof. F. J. Browne: Chronic Nephritis in Pregnancy.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W.12.
WEDNESDAY.—11.30 A.M., clinico-pathological conference (medical); 3 P.M., clinico-pathological conference (surgical).
THURSDAY.—2 P.M., Dr. Duncan White: radiological conference.
FRIDAY.—2 P.M., clinico-pathological conference (gynæcological); 2.30 P.M., Dr. C. M. Hinds Howell: ward clinic; 2.30 P.M., Mr. V. B. Green Armytage: sterility clinic.
DAILY.—10 A.M.–4 P.M., medical clinics; surgical clinics and operations; obstetrical and gynæcological clinics and operations. 1.30–2 P.M., post-mortem demonstration.

FELLOWSHIP OF MEDICINE AND POSTGRADUATE MEDICAL ASSOCIATION, 1, Wimpole Street, W.1.
Medical Society of London, 11, Chandos Street, W.1. TUES., 5 P.M., Mr. T. Meyrick Thomas: Intestinal Obstruction. THURS., 5 P.M., Mr. R. A. Fitzsimons: Fractures.—St. Mary's Hospital, Paddington, W.2. WED., 5.30 P.M., clinical F.R.C.S. class.—Royal National Orthopædic Hospital, Brockley Hill, Stanmore. FRI., 2 P.M., F.R.C.S. orthopædic course.—Royal Cancer Hospital, Fulham Road, S.W.3. DAILY, 9.30 A.M., F.R.C.S. course.—Royal College of Surgeons, Lincoln's Inn Fields, W.C.2. WED., 3.30 P.M. and THURS., 3 P.M., F.R.C.S. pathology course (by kind permission of the college).—Brompton Hospital, S.W.3. TUES., 5.30 P.M., THURS., 5 P.M., M.R.C.P. course in chest diseases.—Royal Chest Hospital, City Road, E.C.1. MON., WED., THURS., 5 P.M., M.R.C.P. course in heart and lung diseases.

NATIONAL HOSPITAL, Queen Square, W.C.1.
MONDAY—5 P.M., Dr. E. A. Carmichael: Lesions of the Autonomic Nervous System.
TUESDAY—5 P.M., Mr. Julian Taylor: Craniocerebral Injuries.
WEDNESDAY—5 P.M., Dr. T. A. Ross: Psychoneuroses of War-time.
THURSDAY—5 P.M., Dr. George Riddoch: Injuries to Peripheral Nerves.
FRIDAY—5 P.M., Dr. T. A. Ross: Psychoneuroses of War-time.

ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS.
FRIDAY—5 P.M. (St. Ermin's Hotel, Caxton Street, S.W.1), business meeting. 5.45 P.M., Dr. P. M. D'Arcy Hart, Dr. C. L. Sutherland, Sir Henry Bashford: Tuberculosis and the Industrial Worker.

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1.
MONDAY—5.30 P.M., Dr. G. W. B. James introducing a discussion on Anxiety Neurosis.

EUGENICS SOCIETY (at the rooms of the Linnean Society, Burlington House, Piccadilly, W.1).
FRIDAY—5 P.M., Mrs. Eva Hubback, M.A.: Family Allowances.

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2.
TUESDAY—5 P.M., Mr. Gwynne Williams: Affections of the Small Intestine.
WEDNESDAY—5 P.M., Dr. A. J. E. Cave: Applied Anatomy of the Head and Neck.
THURSDAY—5 P.M., Mr. Gwynne Williams: Non-union of Bone.

Births, Marriages and Deaths

BIRTHS

AVERY JONES.—On April 5, at Bromley, the wife of Dr. F. Avery Jones—a son.
CAMERON.—On April 6, in Westminster Hospital, the wife of Dr. J. C. Cameron, of South Woodford, Essex—a son.
CHAMBERLAIN.—On April 4, at Hindhead, the wife of Dr. J. Chamberlain—a son.
FIDDIAN-GREEN.—On March 8, at Matatiele, East Griqualand, South Africa, the wife of Dr. W. B. Fiddian-Green—a son.
HULBERT.—On April 3, in London, the wife of Dr. N. G. Hulbert—a son.
KENT.—On April 2, the wife of Dr. Basil Kent, of Eastbourne—a daughter.
WILSON.—On April 4, at Oxford, the wife of Prof. G. S. Wilson—a son.

DEATHS

HULL.—On April 4, at Southgate, Walter Hull, M.D. Lond., aged 83.
HUNTER.—On April 5, at Brighton, Percy Douglas Hunter, M.R.C.S., aged 66.
WAUGH.—On April 3, at King's Sutton, George Ernest Waugh, F.R.C.S.
WIGAN.—On April 5, at Wadebridge, Clarence Edward Wigan, M.B. Aberd., of Chelsea.

Appointments

BARNETT, NORMAN, M.B. Belf., senior house-surgeon at Oldham Royal Infirmary.
FALCONER, DORA J. B., M.R.C.S, deputy medical superintendent at South Middlesex Fever Hospital, Isleworth.
LOGAN, J. S., M.B. Lpool, D.P.H., medical officer of health for Southend-on-Sea.
LUMSDEN, R. J., M.B. Glasg., D.P.H., assistant medical officer of health and assistant school medical officer for Ross and Cromarty.
MACFARLANE, G., M.B., emergency surgical officer at the Royal Berkshire Hospital, Reading.
MILNE, G. P., M.B. Aberd., M.R.C.O.G., temporary consultant in obstetrics to the Cumberland county council.
REID, R. G., F.R.C.S., assistant surgical registrar at the Royal Berkshire Hospital, Reading.
TALBOT, GEOFFREY, M.B. Manc., medical superintendent at Lancashire County Mental Hospital, Prestwich.
THOMSON, D. M., M.D. Manitoba, F.R.C.S., resident surgical officer at St. John's Hospital, Lewisham.
Colonial Service.—The following appointments are announced:
CUMPSTON, H. B., M.B., medical officer, Northern Rhodesia;
GRAHAM, H. P., M.B., medical officer, Northern Rhodesia;
HARDY, E. A., M.D., D.P.H., health officer, Malaya;
NELSON, W., M.B., senior medical officer, Nigeria.
London County Council.—The following have been appointed second assistant medical officers in the mental health service:
HERD, J. A., M.B. Manc., D.P.M., at Long Grove Hospital;
MACDONALD, R., M.B., D.P.M., at Bexley Hospital;
MULINDER, E. K., M.B. N.Z., D.P.M., at Tooting Bec Hospital;
MURPHY, THOMAS, M.B. N.U.I., D.P.M., at Cave Hill Hospital; and
SWITZER, S. LE R., M.R.C.S., D.P.M., at Claybury Hospital.
Examining Surgeons under the Factories Act, 1937: Dr. N. J. BOULTON (Hungerford district, county of Berkshire); Dr. G. M. W. HODGES (Deddington district, county of Oxford).

NOTES, COMMENTS AND ABSTRACTS

HOSPITAL LIBRARIES

To provide books and magazines for over 1500 hospitals—service and civilian—in this country, and for all hospitals with the B.E.F. in France and in the Middle East, together with hospital ships and convalescent homes and the smallest sick bay, is no mean task; but it is being done. Hospitals in the counties are supplied from county book depôts of the Red Cross hospital library which have been formed since war broke out, and are run voluntarily, free of rent and salaries. The hospitals in London and the B.E.F. hospitals and hospital ships are supplied from the Red Cross hospital library at Queen's Gardens, in London. The organisation and secretarial work is done at the office of the British Red Cross and Order of St. John in Belgrave Square. The librarian side of the work is as important as the book side; for books are of little value unless they can be cared for—indexed, mended, and above all distributed regularly to each patient. Requests for every kind of book, modern and classical, fiction and non-fiction, technical, foreign and so forth, must be met; this needs knowledge and time to carry out the work. Before the Guild of Hospital Librarians came into being sisters, chaplains, and sometimes stewards did their best to grapple with the gifts of books. But now more and more hospitals have libraries run by voluntary librarians, of whom the head librarians have had training. Crowded wards, with all available corners packed out with beds, make accommodation for libraries hard to come by in the emergency hospitals, and thousands of books are housed as well as may be in small cubby holes. Then timber shortage makes shelving and book trolleys difficult to obtain. It is up-hill work, but the gratitude of patients for books, and their disappointment if a ward-round is missed, make it worth while. For the first time the service hospitals have opened their doors to whole-time voluntary librarians, found and trained by the guild. For some of these hospitals librarians volunteer from a distance, and pay their own board and lodging, in addition to giving full-time work. It must be hoped that in a not far distant future libraries and librarians will be considered such an essential part of hospital equipment that provision will be made for them in every non-infectious hospital except the smallest.

THE APPROACH TO THE PATIENT

IN his paper read to the Medical Society of Individual Psychology on March 14, Dr. Allen Worsley said he recognised two types of patient, irrespective of diagnosis. The coöperative type, who were receptive and submissive were treated on an equality of mutual coöperation. Information was gathered in free-association and classified. In the non-coöperative type resistances were broken down by getting the patient to see obstinacy as an infantile attempt to dominate the parents—i.e., the analyst. Where this failed resistances were broken down by insisting on unhelped free-association and a process of wearing down the patient's defiance against the analyst's patience was adopted. The analyst must be proof against unconscious reaction to the patient's fears, insults, and attempts at exasperation; otherwise the patient sensed this unconsciously and made capital out of it. Severe neuroses, psychoses and bad conversion hysterias, unsuitable for this method, he treated by Freudian analysis of modified type, alone or combined with this method. The success of the method depended more than anything on a sense of understanding in the analyst, which guarded him against attacks, disarming the patient at every turn, and bringing about rapid transference. In other words, his approach was through the heart, not through the head.

SANATORIUM METHODS

ONE way of finding out what are the fashionable methods of treating pulmonary tuberculosis is to glance through the annual report of an important sanatorium. For such a purpose the reports of Vejlefjord Sanatorium, established by Professor Saugman in Denmark forty years ago, are particularly suitable, for the sanatorium is large (over 80 patients can be treated at the same time) and the outlook of the founder and his successor, Dr. J. Gravesen, is wide. The report for 1939 discloses the fact that the sanatorium, like many others, gets cluttered up with advanced cases. Thus of 140 cases of active pulmonary tuberculosis in adults 99 were severe and 29 moderately severe, only 12 being classed as slight. Some may say that the 35 severe cases discharged much improved and the 35 others discharged improved, had only had their sentence deferred. The average duration of sanatorium treatment in 1939 was 207 days. In 84 patients an artificial pneumothorax was prescribed or actually carried out, and in 33 cauterisation of adhesions was found necessary. As many as 50 patients underwent some thoracoplastic operation or other. Treatment with Sanocrysin is slow in dying out, for in 1939 7 patients were given it. Carbon-arc light baths were prescribed in 39 cases, quartz light baths in 8, and short-wave treatment in 13.

NEW PREPARATIONS

PROKAYVIT.—Under this name British Drug Houses Ltd. (Graham Street, London, N.1) have issued a synthetic substance (2-methyl-1 : 4-naphthoquinone) chemically related to vitamin K which, it is believed, possesses properties identical with those of the natural vitamin. For use in clinical practice Prokayvit is presented in ampoules each containing 5 mg. in 1 c.cm. of oily solution for intramuscular injection.

CARBACHOL.—This product which was originally made by E. Merck under the name Doryl is now introduced by Burroughs Wellcome and Co. as Carbachol. Its chemical name is carbamycholine chloride, a choline ester having a pharmacological activity similar to that of acetycholine, but much more resistant to hydrolysis. It is exceptionally stable and is effective both by mouth and parenterally. It is issued in four forms: a "tabloid" product of 0·002 g. for oral administration; a "hypoloid" product of 0·25 mg. in 1 c.cm. for subcutaneous or intramuscular injection; as "Wellcome" (ophthalmic) solution of Carbachol of 0·75 per cent. with a dropper; and as "Vaporole" (nasal) solution of 0·05 per cent.

UROPAC.—Under this name Pharmaceutical Specialties (May and Baker), Dagenham, are issuing a preparation of the di-sodium salt of 3 : 5-di-iodo-4-pyridoxyl-N-methyl-2 : 6-dicarboxylic acid containing 51·5 per cent. of iodine. It is used as a contrast medium in intravenous urography and other radiographic investigations; before the outbreak of war this substance was not produced in this country. It is presented in ampoules containing 20 c.cm. of a stable sterile 75 per cent. solution for intravenous injection.

QUEEN TOILET PREPARATIONS.—Under this name Boutall Ltd. (150, Southampton Row, London, W.C.1) have issued a series of toilet preparations. The soap is said to be made from a pure edible fat and to be free from any irritating ingredient.

RADIOTHERAPY IN WAR-TIME.—Dr. D. W. Smithers writes: In your report of the meeting of the British Institute of Radiology on March 16 I am quoted as saying that 167 cases of gas gangrene had been treated by radiotherapy at my hospital. I said, in fact, that only 167 patients so treated had been recorded in the medical literature, that only 2 had been treated in this country and that I personally had never treated a case.

ADDRESSES AND ORIGINAL ARTICLES

THE FIRST SEVEN MONTHS
A STUDY OF WAR-TIME MORTALITY IN LONDON

BY PERCY STOCKS, M.D. Camb., D.P.H.
MEDICAL STATISTICAL OFFICER, GENERAL REGISTER OFFICE, LONDON

FOR many years past the Registrar-General's *Weekly Return* has contained a table of the deaths registered during the week in London administrative county, analysed by age and about 55 causes. Up to the end of 1939 these causes consisted of the *Short List* as used by medical officers of health with about 20 additional subdivisions; from the beginning of this year the list consists of the new *Abridged International List* for 1940 as adapted for local mortality statistics in England and Wales, together with the *Supplementary Abridged List* as used by the Registrar-General for special purposes.[1] The purpose of this table has been to provide a continuous index of current mortality from a large variety of causes, London being used as a sample—about one-tenth in normal times—of the country as a whole. Without it we should be unable until the end of the year to detect the changes which are taking place in mortality from separate causes other than the seven infectious diseases for which special weekly or quarterly returns are made from the 126 Great Towns and 148 Small Towns. The coding of the London deaths by cause is carried out by the Registrar-General in precisely the same manner as in the preparation of his *Annual Statistical Review* for the country as a whole, the counting being done by hand instead of by machines.

The only differences between these weekly records for London and those finally obtained for the *Annual Review*, up to the beginning of the war, were that—

(1) The inward transfer of deaths of London residents who died away from London was incomplete in the weekly record, being limited to deaths in the Outer Ring and in L.C.C. institutions outside the boundaries of London, and (2) the cause of death was corrected in a small proportion of instances from further information obtained by enquiries after the weekly record had been published.

The effect of these corrections was small; thus in 1938 the total deaths of London residents recorded in the weekly tables were 45,545, and in the *Annual Review* this number was increased to 46,456, or by less than 2 per cent., by the addition of deaths of London residents which were registered away from London and which could not be ascertained for the purposes of the weekly return.

At the beginning of the war it became necessary to suspend entirely both the outward transfer of deaths of non-residents and the inward transfer of deaths of residents for the purposes of the *Weekly Return*, and from Sept. 3 onwards the published weekly figures for London and the Great Towns have been the numbers of deaths registered within the respective areas without any correction for non-residents who may have died in hospitals or elsewhere within their boundaries. In London in 1938 the registered deaths without correction were about 9 per cent. in excess of the figures as published in the *Weekly Returns*. It is necessary, therefore, when comparing current London figures of deaths as given in the weekly tables with weekly figures in the pre-war period, to increase the latter in order to allow for the transfer factor. Another point to be remembered is that deaths of non-civilian males are no longer included in the weekly returns, but this difference is allowed for in the population adjustments mentioned below.

In view of the prolonged closure of schools, the large-scale dispersal of the child population and the exceptionally severe winter, a brief review of London's mortality according to age and cause from the middle of 1939 to the end of March, 1940, seems to be opportune. In the following tables comparisons have been made with corresponding weeks or quarters of the preceding and earlier years, with such correction for population movements and differences of compilation as is possible from the available information.

TABLE I.—DEATHS OF CHILDREN UNDER 5 YEARS OF AGE REGISTERED IN LONDON IN 3-WEEK PERIODS FROM JULY, 1939, TO MARCH, 1940, COMPARED WITH THE NUMBERS EXPECTED FROM THE ESTIMATED POPULATION IN EACH PERIOD IF THE DEATH-RATE HAD BEEN THE SAME AS IN THE CORRESPONDING WEEKS OF 1937–38 AND 1938–39

3-week period ending	Deaths registered in 1939–40	Expected numbers from mortality in—		Excess or defect in 1939–40 compared with—	
		1937–38	1938–39	1937–38	1938–39
July 22 ..	169	215	216	− 46	− 47
August 12	142	205	171	− 63	− 29
Sept. 2 ..	157	185	180	− 28	− 23
Sept. 23 ..	100	99	102	+ 1	− 2
Oct. 14 ..	98	95	90	+ 3	+ 8
Nov. 4 ..	75	114	97	− 39	− 22
Nov. 25 ..	106	169	128	− 63	− 22
Dec. 16 ..	136	263	184	− 127	− 48
Jan. 6 ..	117	288	245	− 171	− 128
Jan. 27 ..	196	339	263	− 143	− 67
Feb. 17 ..	210	288	236	− 78	− 26
March 9 ..	224	291	222	− 67	+ 2
March 30 ..	220	312	217	− 92	+ 3

Children under 15

The second column of table I shows the deaths at ages under 5 years registered in London during successive 3-week periods from July, 1939, to March, 1940. In the next two columns are the numbers expected if the rates of mortality had been the same as in the corresponding period of 1937–38 and 1938–39 respectively. These are approximate estimates based upon such information as is available as to the numbers of children of this age who were living in London at each period. There was a large outward movement at the end of August followed by a gradual return in subsequent months, and the depression in both curves at ages under five in the diagram from mid-August to the end of November is due in the main to this, for the curves represent numbers of deaths and not death-rates. The last columns of the table give the excess or defect of deaths compared with the expected numbers.

In the nine weeks of July and August there was a deficiency of about 100 deaths compared with the previous year and of 137 compared with the summer of 1937. Absence of children on holiday would not contribute to this, since the registered deaths in the pre-war period were estimated by applying the same correction to each year's deaths as published in the *Weekly Return*. Evidently this period of the summer of 1939 was exceptionally healthy for young children in London. The next 6 weeks up to mid-October showed no appreciable change over expectation based on previous years after allowing for the fall in population at the commencement of the war. As the

1. Manual of the International List of Causes of Death (5th revision, 1938). London. 1940. Pp. 29–35.

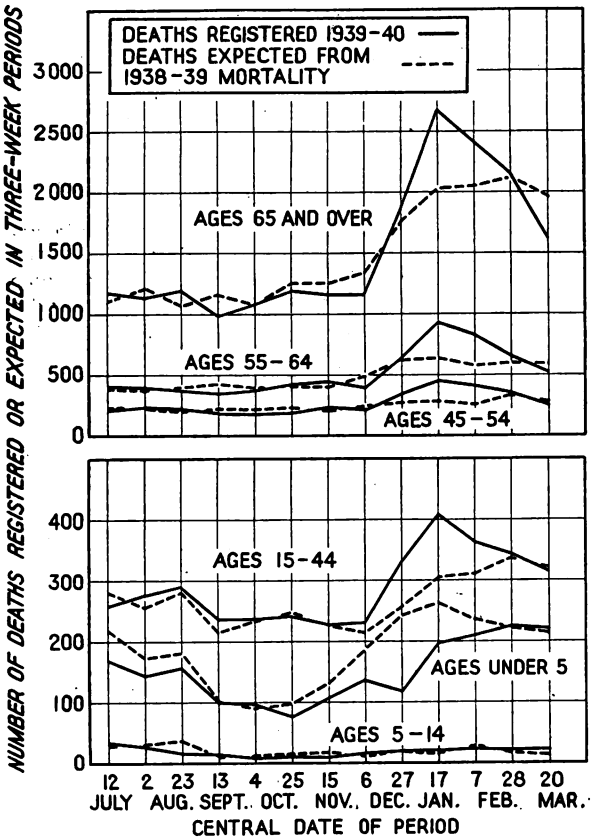


Diagram of deaths registered in London at six age groups from July, 1939, to March, 1940, compared with numbers expected in the same populations if mortality had been as in 1938–39.

autumn advanced the deficiency in deaths again became pronounced and reached its peak in the Christmas period. Despite the severe weather which followed and the prevalence of catarrhal affections in adults, the deficiency persisted, and during the 18 weeks from mid-October to mid-February there was an estimated saving of some 300 deaths compared with the number expected from 1938–39 mortality in the corresponding weeks. This saving is evident from the wide divergence between the curves in the diagram during this period. When comparison is made with

TABLE A

Cause	Deaths 1939–40	Expected numbers from mortality in—		Excess or defect in 1939–40 from—	
		1938–39	1937–38	1938–39	1937–38
Diphtheria ..	3	12	19	− 9	− 16
Measles	1	—	26	+ 1	− 25
Whooping-cough	3	27	31	− 24	− 28
Cerebrospinal fever	9	2	14	+ 7	− 5
Tuberculosis ..	20	7	16	+ 13	+ 4
Bronchitis ..	24	32	42	− 8	− 18
Pneumonia ..	73	169	291	− 96	−218
Diarrhœa ..	32	106	125	− 74	− 93
Prematurity ..	109	128	137	− 19	− 28
Violence	24	19	15	+ 5	+ 9
All other causes	151	190	174	− 39	− 23
All causes ..	449	692	890	−243	−441

the same weeks 2 years previously the saving was much greater, amounting to some 600 deaths. If the deaths during residence in the country of the dispersed children could also be ascertained and compared with the previous years' experience when they were in London, the total saving of life amongst all children under 5 with permanent homes in London would probably be found to have been considerably larger than the above figures, which deal only with the mortality of children who were living at the time in London.

Analysis of the deaths at ages under 5 by cause gives a comparison for the 9 weeks from Nov. 26 to Jan. 27, the period when the greatest saving of life occurred (table A).

Pneumonia accounted for a saving of 96 out of a total saving of 243 lives compared with the previous winter, and for 218 out of a total saving of 441 compared with two years before. Diarrhœa came next with 74 and 93 respectively, whooping-cough with 24 and 28, bronchitis with 8 and 18, and diphtheria with 9 and 16. Measles was epidemic in 1937–38 and 26 deaths occurred in the period, but only 1 in the same weeks of 1939–40 when an epidemic was again expected. The decrease in prematurity deaths may have been due to many confinements having taken place outside London owing to special arrangements for expectant mothers. On the other hand deaths from tuberculosis and violence showed an increase on the previous years. The most remarkable features of this comparison are the great fall in pneumonia deaths notwithstanding the severe weather in January, and

TABLE II.—DEATHS AT AGES 5–14 AND 15–44 REGISTERED IN LONDON, JULY, 1939, TO MARCH, 1940, WITH COMPARATIVE FIGURES FOR 1938–39 CORRECTED AS IN TABLE I

3-week period ending—	Deaths at ages 5–14			Deaths at ages 15–44		
	Registered in 1939–40	Expected from 1938–39	Excess or defect in 1939–40	Registered in 1939–40	Expected from 1938–39	Excess or defect in 1939–40
July 22 ..	33	28	+ 5	259	280	− 21
August 12	27	28	− 1	274	256	+ 18
Sept. 2 ..	17	36	− 19	289	282	+ 7
Sept. 23 ..	12	11	+ 1	236	216	+ 20
Oct. 14 ..	8	9	− 1	237	235	+ 2
Nov. 4 ..	10	12	− 2	242	247	− 5
Nov. 25 ..	10	17	− 7	226	225	+ 1
Dec. 16 ..	16	12	+ 4	231	213	+ 18
Jan. 6 ..	18	18	—	332	257	+ 75
Jan. 27 ..	20	17	+ 3	408	303	+ 105
Feb. 17 ..	22	27	− 5	362	309	+ 53
March 9 ..	20	18	+ 2	343	337	+ 6
March 30 ..	21	13	+ 8	315	320	− 5

the almost complete absence of measles, whooping-cough and diphtheria deaths. Part of the fall in pneumonia deaths is doubtless due to development of the new therapy, and this may have contributed to the decrease in whooping-cough mortality, which is mainly from secondary pneumonia, but another important factor in the reduction of deaths from these causes must have been school closure during the period, reducing the carrying of infection to young children by their brothers and sisters of school age.

The school-children who remained in London also showed a slight reduction in deaths compared with the expected numbers obtained by applying the mortality-rates of the corresponding weeks of 1938–39 to the estimated population at ages 5–14 in London at each period. This population underwent great changes, which accounted for the depression in the curve of expected deaths during the late summer and early autumn. Comparison of the figures in table II and of the curves shows only a small deficiency in deaths between mid-October and mid-February, and it is evident that the pre-school children benefited as regards survival by the school closure and dispersal to a much greater extent than did the school-children themselves, a result which was to be expected from

TABLE III.—DEATHS OF CHILDREN UNDER 15 FROM WHOOPING-COUGH AND DIPHTHERIA REGISTERED IN LONDON DURING EACH QUARTER FROM JULY, 1931, TO MARCH, 1940 (EXCLUDING DEATHS OF NON-RESIDENTS BEFORE SEPT. 3, 1940)

Years	WHOOPING-COUGH				DIPHTHERIA			
	3rd	4th	1st	2nd	3rd	4th	1st	2nd
1931–32 ..	56	62	102	127	34	60	82	69
1932–33 ..	65	40	174	57	66	79	84	67
1933–34 ..	54	42	135	95	67	133	119	126
1934–35 ..	21	31	33	49	81	124	99	62
1935–36 ..	52	30	104	104	33	60	64	39
1936–37 ..	32	32	92	66	43	69	55	44
1937–38 ..	47	40	41	31	35	67	60	44
1938–39 ..	10	20	55	36	41	44	37	24
1939–40 ..	33	6	none	—	12	7	8	—

previous studies of the mortality of children from infectious and respiratory disease.

WHOOPING-COUGH, DIPHTHERIA AND MEASLES

In table III the deaths of London children under 15 from whooping-cough and diphtheria are given for each quarter of the year from mid-1931 to March, 1940, and the remarkable reduction during the last quarter of 1939 and first quarter of 1940 of both these causes of mortality is clearly seen. No correction has been made in this table for population movements or for inclusion of non-residents in these two quarters, but the utmost effect of such correction would be to double the deaths in the last quarter of 1939 and increase them by about 50 per cent. in the March quarter of 1940 in order to make them comparable with the two years preceding. This approximate correction would give, for deaths amongst equal numbers of children resident in London during the December and March quarters (table B):—

TABLE B

	1937–38	1938–39	1939–40
Diphtheria	137	81	26
Whooping-cough	81	75	12

Table IV gives the London deaths at all ages from measles in each quarter of the year from the last quarter of 1910 to March, 1940, no correction being made for population changes. Since 1917–18 there has been a regular biennial periodicity in the epidemics which is clearly seen in the total column of the table. Under normal circumstances an epidemic was expected to commence in the last quarter of 1939, but compared with 221 deaths in the December and March quarters of 1935–36 and 137 deaths in the corresponding quarters of 1937–38 that was only 1 death in these quarters of 1939–40. This suggests that the epidemic failed to start on account of the attenuation of the child population combined with school closure. By the end of the year 1939, when the epidemic was due to begin, the child density was not very greatly below the normal, and it seems probable that school closure was the more important factor in preventing an epidemic. It is possible, of course, that the delay in the expected measles epidemic was due to unknown factors which would have produced this result in normal circumstances, but table V shows that the same phenomenon has occurred in Manchester and Liverpool, and such a threefold coincidence is scarcely credible. In Manchester there was an unbroken biennial swing of epidemics from 1919–20 to 1937–38 and another epidemic was expected in the autumn and winter of 1939–40, but it failed to appear, as in London. In Liverpool the biennial periodicity has not been so regular, but it was maintained from 1923–24 to 1931–32 and again from 1933–34 to 1937–38, and at no period have two successive winters passed with less than 100 deaths in the December and March quarters, whereas in these periods of 1938–39 and 1939–40 the deaths numbered 3 and 1 respectively. The deaths in these two quarters of the past 12 years have been, in London, Manchester and Liverpool respectively (table C):—

TABLE C

London ..	19,	633,	23,	413,	17,	513,	6,	221,	6,	137,	2, 1.
Manchester ..	4,	143,	6,	138,	1,	125,	2,	188,	2,	83,	1, 2.
Liverpool ..	213,	22,	374,	60,	102,	148,	6,	213,	0,	215,	3, 1.

TABLE IV.—DEATHS FROM MEASLES REGISTERED IN LONDON DURING EACH QUARTER FROM OCTOBER, 1910, TO MARCH, 1940*

Years	4th quarter	1st quarter	2nd quarter	3rd quarter	Total
1910–11	844	1581	690	159	3274
1911–12	140	202	433	376	1151
1912–13	788	845	549	124	2306
1913–14	52	148	346	412	958
1914–15	479	1120	946	131	2676
1915–16	75	159	291	187	712
1916–17	178	695	775	171	1819
1917–18	357	702	680	196	1935
1918–19	73	69	91	70	303
1919–20	129	529	404	51	1113
1920–21	23	27	68	39	157
1921–22	108	642	841	65	1656
1922–23	11	26	68	49	154
1923–24	224	907	388	20	1539
1924–25	20	11	45	41	117
1925–26	260	661	239	10	1170
1926–27	4	10	21	18	53
1927–28	130	813	510	27	1480
1928–29	5	14	31	62	112
1929–30	87	546	439	41	1113
1930–31	9	14	16	17	56
1931–32	68	345	441	31	885
1932–33	7	10	19	26	62
1933–34	46	467	375	18	906
1934–35	4	2	3	1	10
1935–36	13	208	348	27	596
1936–37	2	4	6	3	15
1937–38	12	125	96	12	245
1938–39	none	2	none	none	2
1939–40	none	1	—	—	—

* Excluding deaths of non-residents before Sept. 3, 1940 and excluding deaths of non-civilians from that date onwards (see text).

TABLE V.—DEATHS FROM MEASLES REGISTERED IN MANCHESTER AND LIVERPOOL DURING EACH QUARTER FROM OCTOBER, 1910, TO MARCH, 1940*

Years	MANCHESTER					LIVERPOOL				
	4th quarter	1st quarter	2nd quarter	3rd quarter	Total	4th quarter	1st quarter	2nd quarter	3rd quarter	Total
1910–11	69	48	197	62	376	85	101	121	52	359
1911–12	30	214	210	28	482	37	47	262	243	589
1912–13	37	89	107	58	291	312	143	94	58	607
1913–14	10	38	132	51	231	24	29	152	145	350
1914–15	77	155	226	34	492	195	94	121	30	440
1915–16	31	27	88	29	175	10	55	114	57	236
1916–17	38	134	129	14	315	36	85	245	57	423
1917–18	5	34	56	30	125	39	73	209	88	409
1918–19	45	12	33	16	106	34	17	8	2	61
1919–20	44	121	85	1	251	84	282	90	6	462
1920–21	none	1	1	none	2	none	5	50	56	111
1921–22	2	1	161	162	326	215	120	22	12	369
1922–23	31	13	42	21	107	4	48	119	108	279
1923–24	7	39	296	34	376	82	64	49	8	203
1924–25	2	17	28	9	56	25	223	144	20	412
1925–26	78	118	37	3	236	8	46	88	42	184
1926–27	2	3	2	11	18	45	126	145	26	342
1927–28	148	101	17	4	270	9	11	61	57	138
1928–29	none	4	7	18	29	40	173	181	57	451
1929–30	32	111	27	5	175	13	9	52	22	96
1930–31	3	3	8	4	18	99	275	67	10	451
1931–32	48	90	32	2	172	12	48	175	52	287
1932–33	1	none	2	6	9	28	74	154	36	292
1933–34	39	86	7	1	133	24	124	91	7	246
1934–35	1	1	2	5	9	2	4	33	39	78
1935–36	88	100	16	none	204	75	138	34	1	248
1936–37	none	2	3	3	8	none	none	1	1	2
1937–38	37	46	13	none	96	112	103	9	none	224
1938–39	none	1	none	none	1	none	3	none	none	3
1939–40	none	2	—	—	—	1	none	—	—	—

* Excluding deaths of non-residents before Sept. 3, 1940, and excluding deaths of non-civilians from that date onwards (see text).

Young adults, aged 15-44

Table II shows that deaths at these ages were slightly in excess of the numbers expected from the previous year's mortality from July to mid-December, 1939, and the excess became considerable from mid-December to mid-February, amounting in the 9 weeks to some 230 deaths or about 27 per cent. of the estimate based on 1938–39. The curves in the diagram are in great contrast to those at ages under 5, the excess of mortality during the winter months

TABLE D

Cause	Deaths 1939–40	Expected numbers from 1938–39	Excess in 1939–40
Tuberculosis of respiratory system	301	228	+ 73
Influenza	34	20	+ 14
Pneumonia	65	60	+ 5
Bronchitis	56	28	+ 28
Other respiratory disease	29	10	+ 19
Heart diseases ..	130	92	+ 38
Other causes ..	487	433	+ 54
All causes ..	1102	871	+231

at 15–44 being similar in amount to the deficiency at ages under 5. Analysis of the principal causes of the increase during the 9 weeks gives the above result (table D).

The deaths prior to 1940 have been corrected for the differences of cause assignment arising out of the new method of joint-cause selection in accordance with the order of statement of causes on the medical certificate, which came into force from Jan. 1, 1940[2]; they have also been corrected for the effects of population movements and for exclusion of non-residents from the weekly returns prior to the war.

Tuberculosis of the respiratory system was responsible for an increase of some 70 deaths in the 9 weeks compared with the previous year, and similar increases

TABLE VI.—DEATHS AT AGES 45–54 AND 55–64 REGISTERED IN LONDON, JULY, 1939, TO MARCH, 1940, WITH COMPARATIVE FIGURES FOR 1938–39 CORRECTED AS IN TABLE I

3-week period ending—	Deaths at ages 45–54			Deaths at ages 55–64		
	Registered in 1939–40	Expected from 1938–39	Excess or defect in 1939–40	Registered in 1939–40	Expected from 1938–39	Excess or defect in 1939–40
July 22 ..	209	212	− 3	403	397	+ 6
August 12	225	225	—	395	388	+ 7
Sept. 2 ..	209	203	+ 6	377	395	− 18
,, 23 ..	187	212	− 25	353	419	− 66
Oct. 14 ..	187	212	− 25	371	395	− 24
Nov. 4 ..	197	235	− 38	419	415	+ 4
,, 25 ..	229	203	+ 26	445	406	+ 39
Dec. 16 ..	210	243	− 33	398	496	− 98
Jan. 6 ..	354	276	+ 78	644	627	+ 17
,, 27 ..	449	285	+ 164	919	636	+ 283
Feb. 17 ..	407	260	+ 147	818	569	+ 249
March 9 ..	350	340	+ 10	643	596	+ 47
,, 30 ..	250	290	− 40	506	594	− 88

occurred at other ages. This increase can be explained by the epidemic prevalence of influenza which has long been known to be associated with an increased mortality from respiratory tuberculosis.

It is interesting to note that whereas deaths from bronchitis and other respiratory disease and from heart diseases were in considerable excess, pneumonia deaths registered only a small increase on the previous winter, despite the very severe weather conditions.

2. Manual of the International List of Causes of Death (5th revision, 1938). London. 1940. Pp. 36–41.

TABLE VII.—DEATHS AT AGES 65 AND OVER REGISTERED IN LONDON, JULY, 1939, TO MARCH, 1940, WITH COMPARATIVE FIGURES FOR 1938–39 CORRECTED AS IN TABLE I

3-week period ending—	Registered in 1939–40			Expected from 1938–39. Ages 65 and over	Excess or defect in 1939–40
	Ages 65–74	Ages 75 and over	Total, 65 and over		
July 22 ..	563	619	1182	1115	+ 67
August 12	546	586	1132	1214	− 82
Sept. 2 ..	582	615	1197	1066	+ 131
,, 23	467	518	985	1165	− 180
Oct. 14 ..	489	599	1088	1088	—
Nov. 4 ..	561	640	1201	1259	− 58
,, 25 ..	531	627	1158	1266	− 108
Dec. 16 ..	588	582	1170	1345	− 175
Jan. 6 ..	872	983	1855	1768	+ 87
,, 27 ..	1228	1460	2688	2015	+ 673
Feb. 17 ..	1116	1295	2411	2042	+ 369
March 9	963	1200	2163	2136	+ 27
,, 30	699	915	1614	1955	− 341

Adults aged 45 and over

The diagram indicates a large increase in deaths at ages 45–54, 55–64 and 65 and over, commencing from about the end of the year 1939, as in the case of young adults. The upper portion of the diagram has been drawn to a vertical scale only one-fifth of that used in the lower portion, and the significance of any divergence between the 1940 and 1939 curves, as

TABLE E

Deaths at ages 45–64 (*Jan.* 7–*Feb.* 17)

Cause	Deaths 1939–40	Expected numbers from 1938–39	Excess in 1939–40
Tuberculosis of respiratory system	151	112	+ 39
Influenza	95	28	+ 67
Pneumonia	240	176	+ 64
Bronchitis	572	209	+ 363
Other respiratory disease	100	19	+ 81
Heart diseases ..	453	398	+ 55
Violent causes ..	77	52	+ 25
Other causes ..	905	741	+ 164
All causes ..	2593	1735	+ 858

Deaths at ages 65 *and over* (*Jan.* 7–*Feb.* 17)

Cause	Deaths 1939–40	Expected numbers from 1938–39	Excess in 1939–40
Tuberculosis of respiratory system	41	26	+ 15
Influenza	96	93	+ 3
Pneumonia	402	286	+ 116
Bronchitis	982	545	+ 437
Other respiratory disease	86	31	+ 55
Heart diseases ..	1726	1512	+ 214
Violent causes ..	178	120	+ 58
Other causes ..	1588	1444	+ 144
All causes ..	5099	4057	+1042

measured by numbers of deaths, is correspondingly greater. Tables VI and VII give the comparative figures of deaths from all causes at these ages in 3-weekly periods from July, 1939, to March, 1940, as in the previous tables. There was no important change in mortality compared with the previous winter until the severe weather set in, but a very large excess of deaths resulted during the 6 weeks from Jan. 7 to Feb. 17. Analysis according to cause during this 6-week period leads to the above comparisons, the same process of correction being applied for population changes, deaths of non-residents and changes in method of joint-cause classification as at ages 15–44 (table E).

The total excess of deaths in the 6 weeks at ages over 45 amounted to 1900. Respiratory tuberculosis showed an increase similar to that in young adults.

Influenza accounted for 70, pneumonia for 180, bronchitis for 800 and other respiratory disease for 136. The proportionate increase in pneumonia was about 40 per cent., compared with 58 per cent. for influenza and over 100 per cent. for bronchitis and other respiratory disease, and this gives some indication of the effects of the development of sulphapyridine treatment in keeping down pneumonia mortality under very adverse conditions. Heart diseases accounted for an increase of 269 deaths, chiefly at ages 65 and over, this being readily explained by the effects

TABLE VIII.—DEATHS FROM ROAD TRAFFIC ACCIDENTS, SUICIDE AND OTHER FORMS OF VIOLENCE REGISTERED IN LONDON IN EACH WEEK FROM JULY, 1939, TO MARCH, 1940, COMPARED WITH NUMBERS IN CORRESPONDING WEEKS OF 1938–39 (EXCLUDING DEATHS OF NON-RESIDENTS BEFORE SEPT. 3, 1939, AND EXCLUDING THOSE OF NON-CIVILIANS FROM THAT DATE ONWARDS)

Week ending (1939–40)	Weeks with full moon		Road traffic accident deaths		Suicides		Deaths from other forms of violence (including burns drowning, &c.)	
	1939–40	1938–39	1939–40	1938–39	1939–40	1938–39	1939–40	1938–39
July 8	..	..	3	10	18	12	20	16
,, 15	..	FM	5	5	8	3	15	25
,, 22	..	..	8	12	7	7	19	17
,, 29	..	..	8	6	18	7	11	17
Aug. 5	FM	..	8	7	9	13	17	7
,, 12	..	FM	4	3	2	10	17	10
,, 19	..	..	4	6	12	7	12	13
,, 26	..	..	7	6	21	8	18	15
Sept. 2	FM	..	7	4	8	12	15	12
,, 9	..	FM	14	3	20	13	20	21
,, 16	..	..	17	3	13	14	29	16
,, 23	..	..	17	2	13	12	24	30
,, 30	FM	..	6	6	7	16	14	18
Oct. 7	..	..	10	8	12	10	13	16
,, 14	..	FM	16	11	12	8	20	17
,, 21	..	..	18	7	10	7	24	17
,, 28	FM	..	18	9	6	11	28	19
Nov. 4	..	..	5	11	11	4	15	25
,, 11	..	FM	10	4	8	12	16	15
,, 18	..	..	13	6	4	9	33	19
,, 25	..	..	14	3	6	13	25	13
Dec. 2	FM	..	8	2	7	7	24	17
,, 9	..	FM	25	6	7	10	20	17
,, 16	..	..	16	11	7	15	26	28
,, 23	..	..	22	5	16	10	32	24
,, 30	FM	..	17	5	12	9	37	27
Jan. 6	..	FM	15	9	8	14	39	37
,, 13	..	..	23	9	9	5	48	36
,, 20	..	..	20	6	11	9	24	28
,, 27	FM	..	10	11	10	9	28	23
Feb. 3	..	..	11	9	9	4	33	20
,, 10	..	FM	8	6	15	10	40	27
,, 17	..	..	10	12	9	11	22	32
,, 24	FM	..	4	3	17	9	34	28
Mar. 2	..	..	8	4	12	12	31	16
,, 9	..	FM	12	7	13	6	22	24
,, 16	..	..	8	12	6	9	32	17
,, 23	FM	..	12	4	7	10	24	24
,, 30	..	..	4	4	8	10	19	38

of the severe weather. Violent causes accounted for an increase of 83 and other causes for 308.

Violent Deaths

A good deal of discussion has taken place with regard to the increase in road traffic deaths in the large towns, attributable to the lighting restrictions consequent upon the war. In table VIII the deaths from road accidents registered in London in each week from July, 1939, to March, 1940, and from suicide and all other forms of violence, are given for comparison with the numbers in the corresponding weeks of 1938–39. The weeks in which the moon was full are indicated by the letters FM. Taking the period from Sept. 3 to Feb. 24 in 1939–40 and from Sept. 4 to March 4 in 1938–39, we may arrange the weeks according to the lunar cycles as follows and total the deaths from road traffic accidents in each group of weeks (table F).

It is evident that under normal conditions of 1938–39 there was no important variation of traffic fatalities in London according to the moon, but under blackout conditions the increase in deaths registered from this cause was least in the weeks when a full moon occurred and most serious in the two weeks preceding.

TABLE F

	No. of weeks	1939–40	1938–39	Excess in 1939–40
Weeks with full moon	6	63	39	+ 24
1 week before ,, ..	6	101	39	+ 62
2 weeks ,, ,, ..	6	93	37	+ 56
3 weeks ,, ,, ..	6	85	44	+ 41
4 weeks ,, ,, ..	1 and 2	5	12	—

The number of suicides in London during the first 25 weeks of the war was 259 compared with 251 in the corresponding weeks of 1938–39. These are crude figures and an approximately corrected total for 1938–39 would be about 230. On the other hand the number of suicides during the 9 weeks before the commencement of war was 103 compared with 79 in the same weeks of the previous year. These figures require no comment.

The last columns of the table show that deaths from all other forms of violence registered in London during the first 25 weeks of the war totalled 668, compared with 570 (or when corrected about 520) in the corresponding weeks of 1938–39.

Summary

1. A comparison is made between mortality at different ages and from various causes in London from July, 1939, to March, 1940, and that in the corresponding weeks of previous years with suitable corrections.

2. A very substantial saving of life at ages under 5 occurred, chiefly accounted for by a remarkable fall in mortality from pneumonia, bronchitis, diarrhœa and whooping-cough, and the failure of a measles epidemic to appear at the expected time. A similar absence of measles has been noted in Manchester and Liverpool.

3. Children of school age did not benefit from school closure and dispersal to the same extent as the children of pre-school age in so far as mortality was concerned. Nevertheless, deaths from diphtheria, measles and whooping-cough declined to very small numbers.

4. Young adults showed a pronounced increase in mortality during the winter period, mainly due to respiratory tuberculosis, bronchitis, respiratory diseases (other than pneumonia) and heart diseases, but their pneumonia deaths did not increase appreciably despite the severe weather.

5. Adults over 45 years of age registered a very substantial increase in mortality during the cold weather of January and February, mainly due to respiratory and heart diseases, but the proportionate increase in pneumonia was much less than that for influenza, bronchitis and other respiratory diseases.

6. The increase in traffic fatalities during the autumn and winter was much greater in moonless weeks than in weeks when the moon was full.

Grateful acknowledgment must be made to Sir Arthur MacNalty, chief medical officer of the Ministry of Health, for his help in the publication of this report, and to many of my colleagues at the General Register Office, who must perforce remain anonymous, for their assistance in preparing the tables and diagram.

On and after Monday, April 29, outpatients are asked to attend the National Hospital for Nervous Diseases, Queen Square, at 1.30 P.M., instead of 9.30 A.M. as at present.

MENTAL ILLNESS AS A CLUE TO NORMALITY

By Stephen Taylor, B.Sc., M.D. Lond., M.R.C.P.

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(*Concluded from p. 680*)

SCHIZOPHRENIA AND PARANOIA

That schizophrenia is regarded by most psychiatrists as so much further from the normal than the affective psychoses is, I think, due to the constitutional mental make-up of the observers. Most psychiatrists, and for that matter most doctors, appear to be practical and efficient rather unimaginative cyclothymes; but to the creative artist the schizophrenic divorce from reality is much more understandable than the bounding energy of the hypomanic. Indeed, as with the other psychoses, the earlier that cases are examined the more indistinct becomes the dividing line from normality. One recalls a schizophrenic scholar who persuaded publishers to issue a textbook on philosophy which to the uninitiated appears obscure profundity but in reality is completely unintelligible nonsense. The schizophrenic will talk of the "wind on the heath" in a way which Borrow's Mr. Petulengro would appreciate, but which is out of place in the outpatient clinic. Given, however, the premise that health is less important than beauty and that doctors are misguided in their efforts to produce health, such conversations are completely reasonable.

The correlation between schizophrenia and the weedy asthenic, athletic, and dysplastic physical types is poor; but pyknic schizophrenics are rare. On the other hand, features of "schizoid" personality are extremely common as precursors of schizophrenia, though many schizoid people never become mentally ill, and a temporary increase in schizoid features about the time of puberty is often seen in persons who later become full-blooded cyclothymes. The features of schizoid personality are well known. The individual is quiet, shy, and retiring, and more interested in abstract speculation and artistic achievement than in practical everyday activities. There is often a tendency to oppose the older generation, to resent advice and control, and to strike out alone into the world on a wagon fixed to an unsubstantial star. According to the intellectual capacity, the main interest may be the radio, religion, abstract theology, art, or philosophy. One envies, at times, the otherworldliness of the schizoid personality in his studies. The schizoid scholar, looking for truth for truth's sake, content in his poverty, forms a contrast with the successful cyclothymic physician, concerned rather with satisfactory therapeutics than molecular pathology. Yet this is happily only a picture of extremes; for, unless the scholar can at times descend from his mountain top to reality and the cyclothyme occasionally indulge in imaginative schizoid vision, each is an incomplete and less valuable personality. Here it is worth while to point out that the predominantly manic-depressive or cyclothymic personality is identical with Jung's extravert type, and the predominantly schizoid with his introvert type.

The early symptoms of schizophrenia may be summarised thus:—

(1) *Thought disorder* is perhaps the most fundamental disturbance. Logical sequences are ignored, and in their place associations based on vague analogy, symbolism, sound, and chance are substituted. At times the thoughts stop suddenly (blocking). At other times incongruous and bizarre ideas spring into the mind as though from nowhere (autochthonous ideas). Sometimes these bizarre ideas are connected with trivial environmental events.

(2) *Affective upsets* are usual. Not only are new and incongruous emotions attached to stimuli, but emotionally charged situations may be met with apathy. The states experienced range from ecstasy and mystic salvation to blank despair, yet even these are seldom constant.

(3) *Ideas of reference and hallucinations* often appear to arise secondarily from autochthonous ideas. A thought springs into the mind. Where did it come from? It was put there. By whom? Someone outside Why, I actually heard them saying the same thing. So paranoid delusions begin.

Of the advanced schizophrenic features, catatonia calls for comment. This resembles closely the extrapyramidal syndromes seen sometimes in encephalitis lethargica, general paralysis of the insane, and after the administration of bulbocapnine in animals. The resemblance is sufficiently striking to suggest that in all these conditions the same functional upset is present.

I have already tried to show how schizophrenia connects with normality. In his surrealist pictures the artist forewarns us of schizophrenic hallucinations, in his sublimities the poet pictures the state of ecstasy, in his profound religious experiences the mystic experiences schizophrenic affect, and in his disjointed prose the modernist author reproduces schizophrenic disorder of thought. Even the most matter-of-fact may, in the interval between sleeping and waking, know something of schizophrenia—the so-called "hypnagogic" hallucinations. But schizophrenia links itself also with other mental disorders. The transition from paranoid schizophrenia through paraphrenia to paranoia has been mentioned. Pure paranoia, too, occurs in schizoid personalities; in it the delusions are beautifully systematised, and thought disorder, affective upsets, and hallucinations are absent. Whether or no it is a separate disease, it is certainly an individual reaction or attitude to life. Most of us have at some time or other been unjustifiably suspicious. At such times we misinterpret trivialities and suspect our friends of talking of us behind our back. We all know, too, psychopaths who spend years in proclaiming fancied wrongs and in profitless litigation. Such persons merge imperceptibly with those socially valuable people who feel strongly enough about impersonal injustice to do something to defeat it. The schizophrenic and the paranoid ways of life are, I think, sufficiently distinct to justify two separate categories with a spectrum-like transition between. In each a quantitative assessment is possible, though this is less easy than in mania and depression, because these ways of life are further from the everyday experience of most of us.

CONFUSIONAL STATE

The confusional state is characterised by disorientation, irritability, and delirium, with visual hallucinations, perplexed paranoid attitudes, and dulling of consciousness. This picture may have manifold causes—acute toxæmias, such as pneumonia and typhoid, alcoholic and drug intoxications, cerebral syphilis, and arteriosclerosis. Where these symptoms are found, these causes must be looked for. But the confusional state is not a clear-cut entity merging gradually with normality like the other psychoses. It is an acute reaction of perhaps slightly faulty material to severe physical stress. One symptom

only it can claim which is rare in other conditions, and that is disorientation—something quite apart from normal experience. Delirium itself, as Bernard Hart (1936) says, shades imperceptibly into schizophrenia on the one hand and hysteria on the other. It is probably most valuable to regard the confusional state as a violent upset, structurally or physico-chemically determined, of the normal psychic machinery. The epileptic psychosis falls into a somewhat similar category. The egocentricity, vanity, and boasting hint at mania, and the phases of depression and irritability at melancholia. The pedantry has an obsessional smack, and the religiose ostentatiousness and desire to please suggests hysteria. It is, as it were, another hotch-potch of behaviour patterns.

HYSTERIA

Of all the mental illnesses hysteria shows perhaps the most perfect transition between normality and gross disease; for there are few people who have not, at some time or another, exhibited hysterical phenomena. Hysteria is a perfect escape from unpleasant or hopeless reality, but it can also become one of the most powerful driving forces in human behaviour. Hysteria is defined as the unconscious production of symptoms with the object of obtaining a gain. Such a phenomenon appears to occur much more readily in a personality showing certain specific features—the so-called hysterical personality.

The form taken by the symptoms is as varied as human experience. In stupid people anæsthesiæ, paralyses, blindness, and aphonia are usual, though even among the intelligent these are not unknown. Pain, be it headache or backache following an injury or a grossly physical illness, paræsthesiæ, and strange sensations, such as depersonalisation, may be hysterical. Hysterics may produce symptoms of nervous illness—for example, depression, anxiety, hallucinations, or confusion. Most obvious of these is the so-called Ganser syndrome, seen in prisoners desiring preferential treatment, but it is the other mental forms which present the greatest difficulties in differential diagnosis. The difficulties are accentuated by the liability of all mental illness to show at times hysterical features. The diagnosis can as a rule only be made by the complete absence of the more subtle criteria of the psychoses—for example, retardation in depression and blocking in schizophrenia—the clear demonstration of an obvious gain from the illness, and the finding of extreme suggestibility. The gain may be material—cash in a compensation case, home for the shell-shocked soldier—or psychological—attention for the family "ugly duckling," revenge for the abandoned lover, or escape for the disappointed wife or the married homosexual. One recalls a husband, forced by the absence of a doctor to attend at his wife's parturition, who subsequently had a hysterical fugue of about a week's duration, whenever she was again due to be delivered. The question of the unconsciousness of the motive is interesting. The husband mentioned above had spontaneously realised the reason for his fugues. The malingerer in search of a hospital bed for the night appears to differ only in degree from the compensation hysteric collecting his weekly remittance. Indeed, it is at times impossible to say how far hysterical behaviour is deliberately put on, as when a wife switches on a torrent of emotion at her late home-coming husband.

The hysterical personality, and for that matter the patient with hysterical symptoms, is with a great deal of emotional justification apt to be treated as a pariah, as someone for whom the stick is the only cure. Though in practice firmness is the first consideration in the management of hysterical behaviour, the hysteric is as much to be pitied as the melancholic and is as little to blame for her conduct. The features of the hysterical personality are really a generalised extension of the hysterical mechanism of symptom production. In essence they represent an attempt to achieve without the bother of achievement. There is a histrionic emotional display, with a hedonistic desire for immediate gratification. The complete picture may be summarised thus:—

(1) *Selfishness* is complete and absolute, though coupled with frequent explanations that there is no-one more unselfish in the world. The egocentricity is such that every event is referred to the self. She says "I don't like him. He looks at *me* in a funny way. . . . I wonder what she thinks about *me*. . . . Everybody likes me!" There is complete inability to love anyone but the self, and other people are forgotten with the greatest ease whenever convenient. This is exactly analogous to the ease with which a child forgets its parents when parted from them. The supposed misery of children in these circumstances is invariably a projection of parental emotions. The self-importance of the hysteric is never lost for a moment, even when contemplating her own troubles; John Bunyan* plainly showed his hand when he described himself as "the chief of sinners."

(2) *Desire for immediate gratification* is shown without the bother of working for it. The hysteric shows superficial ability and is a brilliant beginner but has no staying power when it comes to the difficult part of anything. Often there is a "scintillating futility and silly smartness" (Mapother). There is no wish to be self-respecting and self-sufficient.

(3) *Exploitation of emotions and helplessness.*—To explain failures and achieve success, in appropriately chosen situations, there are outbursts of apparently uncontrolled emotion; yet, should the situation suddenly change, the emotion is at once put into cold storage. The mother of a hysteric will say: "The strange thing about Ivy is that she only gets her attacks when there are no visitors in the house." The noble virtues seem to have no place in the hysteric's make-up, and instead she adopts a cheap sentimental set of values, clearly reflected in her favourite paper, the *Daily Peepshow*. She will weep over a "poor little doggie," yet a war leaves her unmoved. Though she revels in pseudo-distress, she is completely without shame. She grumbles at trifles and makes mountains out of non-existent emotional molehills. She loves to embroider and exaggerate morbidly the simplest incident. She discriminates imperfectly between truth and falsehood and appears to believe the slanderous and ridiculously improbable tales she tells showing herself in a romantic light (pseudologia fantastica). She craves for notice and sees herself as the heroine of a picturesque autobiography. To gain the limelight she will behave in a ludicrous manner. Her real feelings are as shallow as her emotional expression is extravagant. She enjoys the petting of flirtation and courtship, but when it comes to intercourse she is frigid, and she dislikes the chores and the children in the home. As a mother she is sentimentally loving and so kind that she is painfully cruel. If her first man is lucky enough to escape, he is bombarded by letters with threats of suicide, until she finds a new whipping-stone. Often she will lead a weirdly patterned sex-life, first encouraging men and then scorning them, and occasionally landing herself in such emotional "hot water" that "the worst" happens. In her childish coquettishness she has a definite superficial attractiveness.

(4) *Absence of satisfaction.*—If she attains her ends she is incapable of satisfaction. She must be for ever pressing on in the hope of something better round the corner. In her search her self-love makes her hard and cruel, and those to whom she owes most are often

* Besides his hysterical personality features, Bunyan showed also the characteristics of the ruminating obsessional.

those whom she makes suffer most. Yet her self-love sometimes sets a limit to her activities; and, if she has to risk genuine danger—be it physical (such as a staged suicide) or emotional (such as social opprobrium)—in the pursuit of her aims, she will usually stop; for she is intensely conventional.

(5) *Response to firm treatment.*—She responds to firmness and takes reproof like a child. She will listen to remarks which would make of the ordinary adult an enemy for life, and thank one for them. When up against unassailable reality, her behaviour becomes for a time normal, but at the first sign of weakness she redoubles her efforts and displays once again the astounding toughness of her character.

She is a sad creature, knowing neither true happiness nor true sorrow. In her full-blooded form she represents almost a specific species. Her behaviour can usually be predicted to a nicety. The letters of ten different hysterics read as though they were all written by the same person. It is not surprising that so remarkable a type should have received the attention of the novelist. Mildred in Somerset Maugham's "Of Human Bondage" and Mrs. Dubidat in Shaw's "The Doctor's Dilemma" are perfect pictures, and there are many more.

If the hysteric is endowed with hypomanic driving power and considerable intelligence, the result is often of world-shaking or even world-shattering significance. An emotional vision, with the subject as its centre, a ruthless disregard of reason and other people, and an iron-bound hide are no mean weapons in this world. If we remember that hallucinations may be hysterical and that schizophrenics are not given to practical achievement, the conduct of Joan of Arc is simply explained. Florence Nightingale's astounding efforts in the face of insuperable obstacles are perhaps less astounding, if no less valuable, when it is recalled that she spent the last thirty years of her life in bed with a mysterious malady, and that even the Queen herself had to come to the bedside. The clue to T. E. Lawrence, in his perpetually dissatisfied search for a "way of life," is provided by Bernard Shaw's observation that "he never seemed to have reached full maturity." In our own time we are witnessing perhaps the apotheosis of the hysteric. In his play "Geneva" Bernard Shaw makes Battler burst into tears at the thought of the death of his dog in a world cataclysm. The mystic Aryan myth is but the pseudologia fantastica of a shell-shocked German corporal.

It must in fairness be pointed out that, because a genius shows hysterical emotional abnormalities, it does not necessarily invalidate his or her spiritual, artistic, and material achievements. As James (1902) remarks of Saint Teresa:

> "If her theology can stand these other tests . . . *immediate luminousness, philosophical reasonableness,* and *moral helpfulness* . . . it will make no difference how hysterical or nervously off her balance she may have been when she was with us here below."

The same author points out that, although from the point of view of his nervous constitution George Fox was a psychopath or détraqué of the deepest dye, yet "the Quaker religion which he founded is something which it is impossible to overpraise in a day of shams, it was a religion of veracity rooted in spiritual inwardness, and a return to something more like the original gospel truth than men had ever known in England. . . . No one can pretend for a moment that in point of spiritual sagacity and capacity, Fox's mind was unsound."

The strange hysterical psychopath, whether a dictator or a remittance man, seems a far cry from normality; yet a close self-examination may be painfully illuminating. A tincture of hysteria adds an emotional spice to life. A more generous measure converts the sober vicarage daughter into an Emily Brontë. What evidence have we about the cause of this most remarkable facet of human behaviour? As a result of psycho-analytical studies the Freudians postulate as a cause the fixation of the sexual emotions at an infantile level. That such a phenomenon occurs seems on the face of it extremely likely. Children show gross hysterical behaviour far more often than adults, and the whole emotional equipment of the hysteric is remarkably like that of a child. Indeed, the emotional side of "growing up" may almost be described as a "growing out of" hysterical self-love into a mature ability to love others. Each of the famous hysterics mentioned above was unmarried and, so far as we know, unsatisfied. But the difficulty is to explain why this emotional fixation at an infantile level takes place. The Freudians suggest emotional traumata received in childhood, but similar traumata affect normal people. It seems more likely that, although these traumata may determine the form of the symptoms, the ultimate cause is constitutional. Such a view is supported by the hysterical behaviour of animals, in whom infantile emotional traumata are an awkward conception. A recently broken-in colt will sometimes obstinately refuse to leave the stable yard. The treatment is to walk it continuously round the yard with its head facing the wall, so that it can never take a step forward. At the end of two or three hours it will walk out of the yard like a lamb. I have already quoted Mapother and Lewis's observation that hysterical liars had five times as many siblings in mental hospitals as the average population, and the occurrence of psychopathy, mental illness, and hysteria in the same family is a common clinical finding in psychiatric work. Let us suppose that a constitutional hysterical potentiality is present in various amounts in all people. If this is great, the stress and strain of normal family life is enough to excite symptoms. If it is considerable but still sub-threshold, a severe emotional temptation, such as the marriage of a younger sister, an industrial accident, or the frontline under shell fire, will produce symptoms. In this connexion it is interesting to note that psychotherapy would often relieve the symptoms of shell-shock, but that such "cures" were seldom maintained in the face of fresh exposure to active service. If the potentiality is small, only occasional mild hysterical conduct is seen, such as ambitious day-dreaming and the use of emotional means to obtain rational ends. There is some evidence that this potentiality is connected with the endocrine system. In hysterical women not only is frigidity usual, but amenorrhœa, infantile uterus, and a poorly developed vagina are common. The breasts are usually flat, as in the young girl; later they sag but lack substance. One can sometimes identify the hysteric at a distance by her thin lips and thin hips. It would be an interesting research to estimate the sex hormones in a series of hysterics.

OBSESSIONAL STATE

The obsessional state is the last of the eight main types of reaction of the diseased mind. Mild obsessional traits are widespread among the normal population, but the true obsessional disorder is relatively rare. Its features are a subjective compulsion, a resistance to it, a recognition of the senselessness of the compulsion, and some unpleasant mental reaction, such as anxiety, fear, or morbid preoccupation. The compulsion may take a variety of forms. It may be

TYPES OF REACTION

	Mania (M)	Anxiety and depression (D)	Schizophrenia (S)	Paranoia (P)	Hysteria (H)	Obsessional state (O)
			NORMALITY			
Stage 1	Mildly bouncing personality	Justifiable grief and unhappiness	Shy, reserved personality; sometimes artistic, dreamy, and philosophical	Occasional unjustifiable suspicions	The touch of hysteria which is an added attraction	Ordinary neatness
,, 2	Excessively energetic restless type	Tendency to be easily unhappy, worried, and anxious	Surrealist artist and writer	Continually suspicious type	The extra touch which makes life difficult for all around	Extraordinary neatness
			INTERMEDIATE PSYCHOPATHIES			
Stage 3	Mild hypomanic—a social blessing	Anxiety state	Mild schizoid psychopath with queer rites and cults	Suspicions severe enough to lead to absurd litigation	Mild hysterical psychopath—a menace to the family	Obsessions causing worry to their possessor
,, 4	Severe hypomanic—a social curse	Reactive depression	Severe antisocial schizoid psychopath	Litigant crank who parades street with placards, &c.	Severe hysterical psychopath—a menace to society	Obsessions upsetting the conduct of their possessor
			INSANE PSYCHOTICS			
Stage 5	Certifiable manic	True but mild endogenous depression	Hallucinated schizophrenic with gross thought disorder	Mild but certifiable paranoiac	Certifiable hysteric—Hitler type	Obsessions making their possessor socially impossible
,, 6	Gross mania with flight of ideas producing unintelligible speech, &c.	Gross melancholia with delusions of guilt, &c.	Catatonic schizophrenic	Gross and dangerous paranoiac	Gross certifiable hysteric—often somewhat mentally defective also	Bizarre obsessions, often coupled with schizophrenia

nothing more than a tune running in the head, a desire to swear in church, or an impulse to count, touch, or tidy things. If the compulsion is strongly antisocial or repugnant to the individual, an elaborate ritual may be developed to avoid provoking factors. A fear of something provoking an obsessional sequence is a "phobia." Often the whole process may be illuminated by psychopathology. A ritualistic cleansing process both springs from the leads to a fear of dirt, itself symbolic of sexual guilt, often of masturbation. But psycho-analysis or, for that matter, any form of psychotherapy seldom produces a cure. In its severe forms the obsessional disorder leads to endless rumination; the wretched sufferer goes over every possible result, good and bad, of every course of action before making up his mind. Just when he has decided, a fresh doubt springs up, and action is indefinitely postponed. A beautiful picture of the ruminating obsessional has been drawn by Borrow in chapters 64–66 of "Lavengro."

The previous personalities of sufferers from the obsessional disorders are characterised by excessive cleanliness, orderliness, conscientiousness, and precision. Needless repetition occurs. They both think and act in inconclusive ways. They may be irritable, obstinate, and morose or alternatively submissive, vacillating, and uncertain. Should another mental illness develop in such a personality, it will be coloured by obsessional features. Schizophrenia may begin with obsessional ideas which become increasingly bizarre. An obsessional disorder may be the main symptom of a depressive attack. A hysteric in contact with obsessionals may mimic the obsessional disorder, though at times forgetting her elaborate rituals.

The arguments applied to the psychogenic explanations of hysteria apply with equal force to the obsessional state. Once again strong constitutional factors are evident. A third of the parents and a fifth of the siblings of obsessionals show strong obsessional traits (Mapother and Lewis 1937), and in obsessional families schizophrenic and affective illnesses are commoner than the average.

In normal persons a tincture of the meticulous behaviour of the obsessional is common. For society it is a great convenience. The mildly obsessional person keeps himself, his possessions, and his affairs neat and in order. If he is a trifle more strongly flavoured he becomes an admirable librarian, systematic biologist, or editor of an encyclopædia. It is unwise for him to become a dispensing chemist or booking-office clerk, for he will be tortured with doubts about the correctness of his medicines or his change. The German and Japanese nations as a whole show more obsessional features than most. Their neatness and love of classification is combined with an alternate submissiveness and touchy irritability. Their value to humanity as systematic investigators is enormous, but in our dealings with them, as with all obsessional patients, we must remember the advice of Mapother and Lewis (1937): "The physician must aim at getting a patient well by putting an end to this anxiety and struggle." Everyday experience is enough to convince one that the obsessional state is an exaggeration of one aspect of normality.

A PSYCHIATRIC SYNTHESIS

We are now in a position to review the personality as a whole, as revealed by a study of mental illness. We have seen how each group of symptoms represents not something arising de novo but rather an exaggeration or caricature of a facet of normality. We have seen, too, that between normality and gross mental disease there exists series of intermediate types, and the transition from one end of the scale to the other is not in steps or jumps but in a gradual slope. The diagnosis of insanity is then a legal and social one, rather than an exact medical label. A gross hysteric may be and often is rightly certified, while a mild schizophrenic makes a sound social adaptation in the outside world. It follows that, if we are trying to

assess psychiatrically the personality of any person, normal or abnormal, an attempt at quantitative assessment must be made. This was briefly dealt with when mania and hypomania were under consideration. It is not enough to say that someone shows a schizophrenic type of reaction. The degree of the reaction may be mild and within normal limits; moderate and sufficiently abnormal to justify the term "psychopathic"; or severe enough to class its exhibitor as insane or psychotic. In the absence of any exact method of measuring the degree of the reaction the number of stages recognised must be a matter of individual taste. I favour six arbitrary stages, two within normality, two in an intermediate or psychopathic division, and two in the insane or psychotic division. The accompanying table gives an admittedly imperfect attempt to divide the six main types of reaction on this basis. The use of the word "psychopathic" for the intermediate types is open to criticism, inasmuch as I have used it to cover what may be short-term mental reactions besides long-term ones. This departure from conventional usage is made because there is no other word which covers the intermediate group of cases without hinting at speculative ætiology.

It has been shown that in gross mental abnormalities pure single reaction types are by no means the rule. While one reaction usually predominates, features of a second or even a third type can often be found if looked for. Similarly, the more one examines the normal personality, the more does it become apparent that it is not, as it were, a single mental illness in minor key but rather a combination in various proportions of all six behaviour patterns. An honest self-examination will reveal facets of one's character which are easily explained in terms of mild manic, depressive, schizoid, paranoid, hysterical, and obsessional reactions. It seems that the normal mind has these six facets developed in varying degrees. All the evidence suggests that this arrangement is primarily hereditary or constitutional. The environment from birth acts on this background, producing the complicated psycho-pathological pattern which the analysts unearth. The background is the limiting factor. If its balance is satisfactory, no number of emotional traumata will upset it. If its hysterical or depressive facets are hypertrophied, trivial situations will fire off these reactions.

The conception of the personality as a structure with six facets calls for an alteration in psychiatric diagnoses. An attempt should be made in every patient to assess the degree of each facet present. The result may well be referred to as a "personality picture." The personality picture of a depressed patient might read thus:

		Designation from table
Primary reaction:	True endogenous depression	D 5
Secondary reaction:	Obvious hysterical features	H 3
	Very suspicious	P 2
Degree of other reactions:	Normally a bouncing personality	M 1
	No schizoid features ..	S —
	Ordinarily neat	O 1

A hypothetical normal individual might have a personality picture of this kind:—

	Designation from table
Excessively energetic restless type	M 2
Does not show more than justifiable grief	D 1
No schizoid features	S —
Occasional unjustifiable suspicions	P 1
Enough of the hysteric to be a nuisance at times ..	H 1–2
Ordinarily neat	O 1

And so one can go on. The personality picture, if conscientiously constructed, will not only give a fair indication of how the subject will act in given circumstances, but will also indicate the limits beyond which one cannot hope to produce personality changes by environmental changes.

AN ÆTIOLOGICAL SPECULATION

For brevity and simplicity, let each of the six facets of the personality be designed by a letter—M, D, S, P, H, and O. Each of these is both qualitative and quantitative. Further, the quantitative increase in each is gradual and not in a series of steps or stages (although an arbitrary grading has been suggested). The evidence about what determines the amount of each facet present many be summarised thus:—

(1) In all cases constitution or heredity is most important. The endowment from the parental germ plasm sets a limit in each to the increase or decrease which environment can produce.

(2) Accentuation may be produced by physical disorders of the brain. In general paralysis of the insane M behaviour and D behaviour are common. D behaviour is often a feature of cerebral arteriosclerosis. In the extrapyramidal syndrome of encephalitis lethargica catatonic S behaviour is seen.

(3) The administration of certain chemical substances will lead to great increases in some of the facets. It has already been shown that alcohol and benzedrine reproduce severe M reactions. Similarly, bromides will produce D reactions, though confusion is seen if the administration continues too long. The characteristic hallucinations of S reactions may be experienced as a result of taking mescaline. With mescaline, too, temporary P reactions are not unusual. Further, bulbocapnine will reproduce catatonic S states.

(4) Characteristic H behaviour is often associated with evidence of endocrine upset.

It seems, then, not unreasonable to suppose that the degree of M, D, S, P, H, and O behaviour is biochemically determined. As a speculation, one might suggest that each is quantitatively associated with a specific biochemical substance; that the initial levels of these are determined by the genetic equipment of the individual; and that transient or permanent increases may be brought about by emotionally charged situations, structural damage to the brain, or the administration of certain drugs. If this is true, the solution of the problems of personality is ultimately in the hands of the biochemist.

FORTY YEARS BACK

It is usual to open a paper with a quotation and close it with a summary. I have reversed this order. Before Freud and his many followers began their expeditions into the unconscious, psychiatry had reached a point not far distant from where we find ourselves to-day. For nearly forty years the analysts have been ploughing a single furrow, admittedly with great profit, but they have neglected the rest of the arable spaces of the mind. They have perhaps failed to see that objective observation of mental illness, without speculation or argument by analogy, provides a host of valuable clues to the normal personality. Now the wheel has swung full circle, and we find ourselves echoing the words of James (1902):—

"Insane conditions have this advantage, that they isolate special factors of the mental life, and enable us to inspect them unmasked by their more usual surroundings. They play the part in mental anatomy which the scalpel and the microscope play in the anatomy of the body."

References at foot of opposite page

VITAMINS AS A SUPPLEMENT TO SANOCRYSIN IN ARTHRITIS

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I have previously pointed out the importance of using large doses of vitamins A, B, and C as a supplement to treatment with Sanocrysin (Secher 1938). Their employment was based on the facts that many of the reactions brought about by treatment with sanocrysin are similar to those due to a deficiency of vitamins, and that the diet of the general population is often deficient in vitamins, and on the working theory that the symptoms were caused by the toxins liberated. Subsequent investigation and experiment have confirmed this view.

The treatment is particularly effective in thrombopenia and dermatitis. Thrombopenia, or any fairly pronounced decrease in the number of thrombocytes, has not been observed since the introduction of the treatment. The following figures are taken from a series of cases of articular rheumatism after the administration of 25 + 35 + 50 + 65 + 75 cg. of sanocrysin to each patient :—

Patient	Thrombocytes	Patient	Thrombocytes
Case 449 ..	452,000	Case 453 ..	359,000
,, 450 ..	455,000	,, 454 ..	397,000
,, 451 ..	316,000	,, 455 ..	494,000
,, 452 ..	209,000		

As can be seen, there is no case with a low value. These doses were succeeded by one or two administrations of 1 g. of sanocrysin. This considerable dosage improved the results of the treatment of arthritis still more. Erythema disappeared almost entirely with this treatment, only a few slight cases being observed. If erythema still appears in spite of this dosage of vitamins, a further 200 mg. of ascorbic acid should be administered for the sake of safety. This will stop the erythema.

ASCORBIC ACID IN THE BLOOD

Confirmation of the value of the treatment and an explanation of it are now provided by the quantitative determination of the ascorbic acid in the blood, a method of investigation which had not been elaborated sufficiently when the vitamin treatment was introduced. We employed the method of Farmer and Abt, which is undoubtedly the best. In confirmation of the investigations of others, we found that patients with rheumatic arthritis generally had no ascorbic acid in the blood. Similar conditions are found in tuberculous patients, but often with somewhat higher values, which provides a reasonable explanation of the fact that these patients tolerate the treatment better. On the other hand, little or no ascorbic acid is found in patients with very different diseases; in future this must be taken into consideration.

After all, it is not so remarkable that exhausting treatments can produce the serious toxic effects described previously. All these patients have been treated the world over in ignorance of the fact that their decreased powers of resistance might be explained in this way. But this also shows how wrong it is to blame a preparation for certain reactions. We find

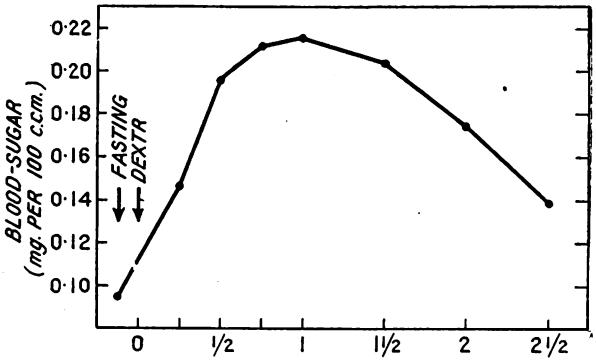

FIG. 1—Blood-sugar curve after administration of 77 g. of dextrose to a patient, aged 45, with abscess of the lung and no ascorbic acid in his serum.

now that with this treatment the quantity of ascorbic acid in the blood is increased during the treatment. Case 463 in my material can be quoted as a typical example. She had been ill for eighteen months with pains in the fingers, from which they spread to the joints of the wrist, elbow, toe, and left knee. The results of treatment are given in the accompanying table.

EFFECTS OF TREATMENT WITH SANOCRYSIN AND VITAMINS

S.-R. = Sedimentation-rate. D.S. = Dose of sanocrysin (cg.). A.A.B. = Ascorbic acid in blood (mg. per 100 c.cm.).

Date	S.-R.	D.S.	A.A.B.	Date	S.-R.	D.S.	A.A.B.
Aug. 25	67	—	0·00	Sept. 28	—	65	0·84
Sept. 1	—	25	0·88	Oct. 5	—	75	1·00
,, 6	—	35	0·40	,, 9	40*	—	—
,, 12	—	50	1·60	,, 11	—	100	0·94
,, 21	—	50	0·72	,, 17	30	—	—

* Thrombocytes 234,000

The quantity of ascorbic acid in the blood is greatly increased, and there are no untoward reactions. This case is only one example of many.

Experimental work supports the conclusions reached through clinical experience. Thus, Szent-Györgyi (1937) demonstrated increased resistance in mice to infection with rising ascorbic-acid values; Widenbauer and Saretz (1936) described the antitoxic action of ascorbic-acid in diphtheria; and Bruno (1938) showed that injections of tuberculin caused shock in tuberculous guineapigs on a diet deficient in vitamins. All this confirms my theory that in gold treatment we are dealing with reactions that are due not to metallic poisoning but to toxins liberated.

CARBOHYDRATE METABOLISM

Deficiency of ascorbic acid also throws light on the carbohydrate metabolism in these cases. Pemberton (1935) has shown that abnormal blood-sugar curves

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are found in arthritis and indicate a decreased tolerance of sugar, which increases when the patients improve. A re-examination of Pemberton's investigations has fully confirmed his results. If the blood-sugar curves of arthritic patients are unaccompanied by further information they must be interpreted as a sign of diabetes; but I have found these curves in other diseases also, which had only one feature in common with arthritis: no ascorbic acid in their blood. Fig. 1 is the blood-sugar curve of a patient, aged 45, with abscess of the lung. He had no ascorbic acid in his serum and was given 77 g. of dextrose. Without his abscess this patient might be said to have latent diabetes. The continuous line in fig. 2 is the blood-sugar

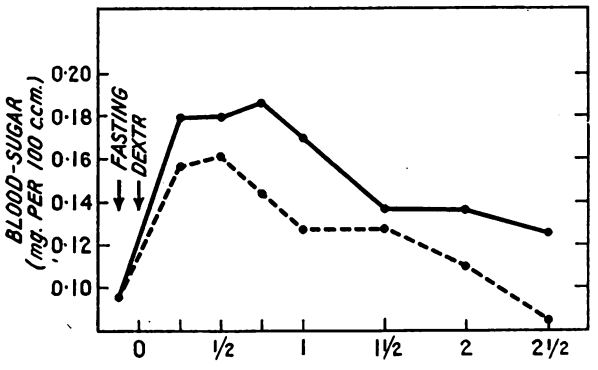

FIG. 2—Blood-sugar curve after administration of 77 g. of dextrose to a patient with pleurisy: continuous line, no ascorbic acid in the blood, Sept. 16; interrupted line, 0·72 mg. of ascorbic acid per 100 c.cm. of blood, Oct. 19.

curve, after a similar dose of dextrose, of a patient with pleurisy and no ascorbic acid in his serum. The interrupted line is the blood-sugar curve of the same patient a month or so later, when the ascorbic acid had risen to 0·72 mg. per 100 c.cm. It thus appears that a condition typical of latent diabetes is produced in the blood-sugar curve when there is no ascorbic acid in the blood; but that, if the quantity of ascorbic acid is increased to a normal value, the curve becomes normal.

CONCLUSIONS

It may therefore be assumed that the cause of the abnormal blood-sugar curves described by Pemberton (1935) is a deficiency of ascorbic acid, and it is on this deficiency that the shape of the curves depends. But, since ascorbic acid is an important factor in resistance to infection, it can be assumed that decreased tolerance of carbohydrates is also important. This is a further reason for giving the vitamin treatment. The importance of vitamin C in treatment with sanocrysin has probably been established through these investigations. We have hitherto been able to determine only ascorbic acid in clinical practice. The importance of the other vitamins cannot be finally decided until quantitative determinations have been carried out.

SUMMARY

(1) The importance of the administration of vitamins during treatment with sanocrysin is confirmed as regards thrombopenia and skin reactions, in which ascorbic acid acts beneficially.

(2) Decreased tolerance of carbohydrates can be abolished in many infectious diseases by increasing the amount of ascorbic acid in the blood.

References at foot of next column

A POSTURE FOR THIGH AMPUTATION

WITH A NOTE ON SEPSIS

BY ARNOLD K. HENRY, M.B. Dubl., M.Ch. (Hon.) Cairo, F.R.C.S.I.

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CUSTOM, "who all sense doth eat," has reconciled us to the supine posture for patients during amputation through the thigh. A nurse must then bear the weight of heavy limbs, or else they hang from raised supports; in either case the surgeon operates at awkward levels, inconvenient especially for blocking peripheral nerves when spinal anæsthetics are unsuitable.[1] These troubles disappear when patients are put to lie on the sound side. Then, if the condemned limb will flex, the nurse need never lift the foot off the table but only grasp the leg and use the heel for pivot (fig. 1). In this way she presents each side of the patient's thigh in turn; the knee falling by its own weight across its fellow will give full access to the back of the limb (fig. 2). There, after infiltrating areas of flap or cuff and chosen lines of incision with a ½ per cent. solution of procaine, the surgeon can in comfort expose and block the sciatic trunk; at the same time he can ligate main vessels and so dispense with tourniquets.

Supplementary incision.—For this twin purpose I make a long mesial incision—first outlined by raising a weal—through popliteal skin, from a hand-breadth below the knee to a point three finger-breadths proximal to the line of bone section (fig. 2). This upward extension of a more distal exposure, due to Fiolle and Delmas, depends first on separating the two heads of gastrocnemius opposite the knee after lengthwise division of deep fascia. The finger then works proximally through the popliteal space and helps to part the slight adhesion of medial and lateral hamstring bellies; it serves, too, in tracing the tibial (or internal popliteal) nerve up to the sciatic trunk, which is now injected with 15 c.cm. of a 2 per cent. solution of procaine—first in the sheath, then in the whole thickness of the trunk.

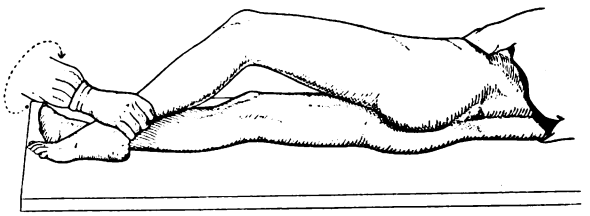

FIG. 1—The flexed limb pivots on the heel, which rests on the table. The nurse holds the leg and rotates it to present the front and sides of the patient's thigh to the surgeon without lifting the limb.

1. Procaine block, used alone or in company with gas-oxygen or minimal quantities of ether, was strikingly employed by Dr. Lofty Abdelsamie in my surgical unit at Kasr el Aini Hospital, Cairo, during work that greatly reduced mortality from crush accidents. Abdelsamie's valuable paper should have new currency at this time of intentional trauma.

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Ligation of femoral vein and artery.—Opportunity is taken of tying the two main vessels. These lie ventral to the sciatic nerve, nearer the bone; and though the femoral artery and vein do not reach the popliteal space officially till they have passed down through the opening in the adductor magnus muscle, yet, as they near this opening, only thin tissue screens them from the posterior compartment. Tracing the vessels, therefore, from below, where one can hook them blindfold off the femur with a finger (fig. 3), it is extremely simple to tie them proximally to the level of bone section.

The *rest of the operation* is now pursued. Incisions of skin run forwards and distally from the mesial cut, and flaps are made and muscles severed according to predilection. The sciatic trunk is left undivided till the time comes to remove the limb. Ten good minutes should elapse between injecting and cutting that large conduit of shock impulse. The method used for trying to burke its later growth will have determined the length of nerve originally injected. I do not venture to say which method is best; no-one knows for certain, but each can distribute the procaine to suit his own convictions. It is at least important, after removing the limb, not to pull out the proximal end of the nerve and cut it short at a point unprotected by procaine, though I have seen this done.

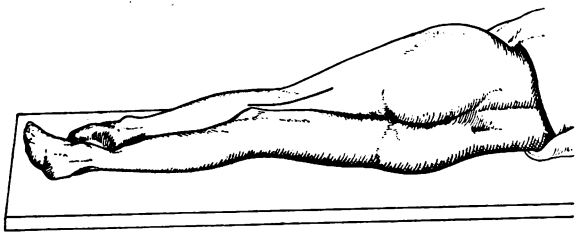

FIG. 2—The knee falling across its sound fellow gives access to the back of the thigh. A long mesial incision exposes the sciatic nerve for high injection and the main vessels for ligature.

There is also the saphenous nerve to deal with. The guide to it is a whitish raphe on the medial side of the thigh—seen on displacing the sartorius—which marks the tendon of the adductor magnus muscle. A nick with Mayo scissors made immediately in front of this will open the canal in which the nerve lies; the nerve can then be traced up the thigh for injection at the same level as the sciatic and divided after the same long interval. I can confirm Abdelsamie's finding (1936):[2] "Amputation under full Novocain analgesia is a benign measure that does not shock the patient."

SEPSIS FOLLOWING THIGH AMPUTATION

I have seen many of these amputations performed with careful technique after scrupulous preparation, but I have also seen, and had myself, too many septic results—perhaps because bacteria from distal foci were travelling up lymphatics during the operation, out of range of chemicals applied only to skin. In my experience sepsis came whether drains were left a long or a short time; if long left they seemed to determine infection; but dangerous pooling of exudate ensued upon early removal. This pooling is prevented by placing ribbon gauze heavily coated with dilute bipp as a loose pack under each layer at the time of suture—for example, between bone and fascia

2. Abdelsamie, L. (1936) *Lancet*, **1**, 187.

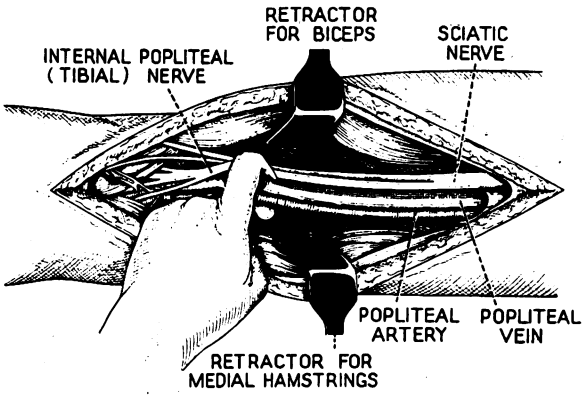

FIG. 3—A finger introduced at the medial edge of the internal popliteal (tibial) nerve hooks the main vessels up from the femur; they are traced upwards and tied proximally to the adductor opening, where they are screened from behind by a thin layer only.

(or muscle), and between fascia and skin. The bipped ends of the ribbon protrude as drains; they do not carry in sepsis from without, as rubber may; and certainly, too, the bipp can check bacterial growth.

The ingredients of dilute bipp are :—

Iodoform powder	2 oz.	Hard paraffin	2 oz.
Bismuth carbonate	1 „	Soft paraffin	12 „

Its preparation requires careful attention to details, of which Mr. R. Atkinson Stoney, of Dublin, has sent me the following note :—

Put the iodoform and bismuth in a large mortar and mix well. Melt the hard and soft paraffin together on a water bath; stir well and cool slowly, stirring all the time. Take a little of the mixture of hard and soft paraffin and rub it up with the mixture of iodoform and bismuth till a smooth paste forms. Add the rest of the paraffin little by little to make a uniform ointment. The bipp should have the consistence of firm butter and should not be greasy. In very hot weather increase the quantity of hard paraffin and reduce the soft.

A relevant example of its use in another field interested some of my co-workers at the British Postgraduate Medical School. The large cavity left by removing a mandibular osteoclastoma was packed with bipped ribbon after thorough treatment of the wall with the high-frequency current. The cavity communicated not only with the surface of the neck but also with the mouth, and the patient ate and drank as usual from the day following operation. When we removed the pack for the first time at the end of a fortnight we found a lining of clean red granulations. The pack—except on its oral surface, where saliva had washed out some of the bipp—was unaltered and fresh like the cavity.

I have no experience of the original bipp, which might be toxic in this quantity, having never used any but the dilute variety, whose value I learnt during the last war by watching the remarkable work of Mr. Stoney. I have not met with any other preparation which could so triumph in the test just described.

My thanks are due to Miss F. M. Collinson for the illustrations.

PELLAGRA, POLYNEURITIS, AND BERIBERI HEART

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PHYSICIAN WITH CHARGE OF OUTPATIENTS AT THE HOSPITAL

IN 1933 we published a short series of cases of toxic polyneuritis with changes in the electrocardiogram (Campbell and Allison 1933). Since then we have seen a few similar cases, but recently a case showed also the typical dermatitis associated with pellagra. Shortly afterwards another patient with pellagra was admitted to the Royal Victoria Hospital by Dr. I. H. McCaw, but with no symptoms of polyneuritis and no abnormalities in the electrocardiogram. These two cases are reported partly on account of their rarity in ordinary civil life and to illustrate the variety of symptom complexes which may develop as the result of a deficiency of vitamin B.

POLYNEURITIS, CHANGES IN THE ELECTROCARDIOGRAM, AND DERMATITIS

CASE 1.—A male iron-sorter in the shipyard, aged 31, was admitted to the Royal Victoria Hospital on May 6, 1939. He was single and lived with his parents and three sisters in a comfortable home. He had had no serious previous illnesses and was quite well till ten days before admission, when he noticed that the back of his hands were swollen and dark brown (fig. 1). His face and neck also became pigmented. Five days later the legs became swollen. From the onset of symptoms he had difficulty in walking and was unable to work. This difficulty increased rapidly, and on admission he could scarcely lift his legs off the bed. There was no dyspnœa, possibly owing to his inability to take any exercise. Sensory symptoms were slight, and he had no pain in the calves or numbness in the hands or feet.

On examination his general condition was good with no evidence of anæmia or undernutrition. His face, neck, and hands were typical of pellagra. He had a few carious teeth, tongue moist and clean, and throat healthy. The liver was slightly enlarged, but the spleen was normal. The heart showed no enlargement, the sounds were normal, and the blood-pressure was 150/80 mm. Hg. The legs were œdematous. The knee-jerks were sluggish, and the ankle-jerks could not be obtained. There were no definite sensory changes. A test-meal showed no free hydrochloric acid, and there was a low total acidity. The cerebrospinal fluid had a pressure of 120, the protein content was 0·04 per cent., and there was no increase in cells or in globulin. The Wassermann reaction was negative. A catheter specimen of urine was sterile and free from albumin and sugar.

No evidence of any dietary defect could be found. The patient's appetite had always been good, and his average daily diet was as follows:—

Breakfast: boiled egg, wheaten bread, 2 slices of white bread, 2 cups of tea, butter and jam.
Dinner: soup, sausages or stew, potatoes, green vegetables.
Evening meal: similar to breakfast.
He also ate bananas, oranges, apples, and other fruits.

After admission to the ward he was given daily Bemax by mouth and injections of vitamin B_1. The condition rapidly improved, and on May 9 the skin on the back of the hands, the face, and the neck had begun to desquamate. The œdema of the legs was less, and he could lift his limbs off the bed. On the 12th—i.e., six days after admission—the œdema had completely gone, and movements of the legs were almost normal. Desquamation was complete on the 16th and he made a rapid recovery. He was discharged on June 1.

Electrocardiograms were taken on several occasions. The first (fig 2), taken two days after admission, showed inversion of the T wave in leads II and III and slight inversion in lead I. These changes became more distinct, and on May 22 the T wave was inverted in all leads (fig. 3). On June 2, the day after his discharge from hospital, the T wave was still inverted in lead I but iso-electric in leads II and III (fig. 4). On July 3 the electrocardiogram was normal (fig. 5), and the patient had resumed work in the shipyard.

DERMATITIS OF PELLAGRA WITHOUT POLYNEURITIS OR CHANGES IN THE ELECTROCARDIOGRAM

CASE 2.—A female, aged 56, who lived in a country cottage by herself, had a history of previous attacks of bronchitis but no serious illnesses. In June, 1939, her legs became bright red and itchy. This condition disappeared in a few hours, but next day a rash appeared on the extensor surfaces of the arms and legs. Four weeks before admission to hospital the back of the hands, the face, and the neck became dull red and later dark brown. There was diarrhœa for five weeks. The appetite was poor, and for many months the patient had been living on tea and white bread.

On admission she had the typical pellagrous rash on the hands, wrists, face, and neck. She was thin and wasted but showed no œdema and no changes in the nervous system. The blood-pressure was 110/70.

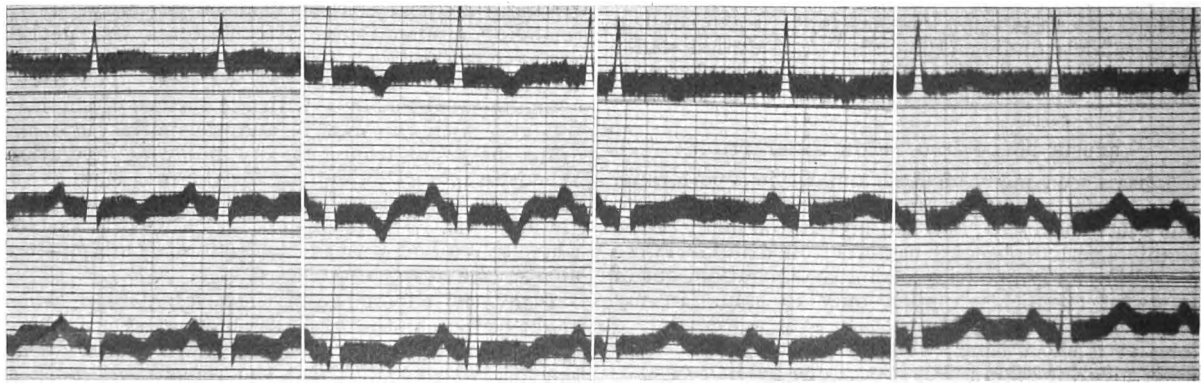

FIG. 2—Case 1: inversion of T wave in all leads (slight in lead III), 8.v.39.
FIG. 3—Case 1: inversion of T wave more distinct in all leads, 22.v.39.
FIG. 4—Case 1: inversion of T wave in lead I only, 2.vi.39.
FIG. 5—Case 1: electrocardiogram normal, 3.vii.39.

A test-meal showed no free hydrochloric acid. The patient rapidly improved after treatment with bemax and nicotinic acid, gained 11 lb. in four weeks, and completely lost the rash.

DISCUSSION

Davies and McGregor (1939), in their review of pellagra in Great Britain since 1934, show that some of the cases were secondary pellagra due to deficient absorption rather than to deficient intake of vitamin-B_2 complex. This point seems to be borne out in our two cases. In the second case there is a clear history of deficient intake, which may also have been aggravated by defective absorption as a result of the achlorhydria and diarrhœa. By contrast, the other patient was accustomed to an average full diet, and there was no obvious deficiency. It seems likely, in this instance, that something must have interfered temporarily with the process of normal absorption. No clue was found to its nature. The patient had had no gastro-intestinal upset, there was no history of alcoholic excess, and, though the temperature was not recorded until he came into hospital (when it was normal), there was no definite evidence of previous fever or of intercurrent infection.

FIG. 1—Case 1, showing swelling and pigmentation of hands.

A further point of interest in this first case is that the clinical picture points to combined deficiency of both vitamin B_1 and vitamin B_2 complex. Though pellagra dermatitis, polyneuritis, and œdema with cardiac involvement have been seen, this is the first case we have met which presented simultaneously the features of both types of deficiency.

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CRIPPLES IN WAR-TIME.—As the able-bodied are called up for service in the fighting forces the possibilities of employment for the less able-bodied increase. In the annual report of the Central Council for the Care of Cripples it is stated that the war has already extended the possibilities of employment for the handicapped, especially for those trained in light engineering and similar processes. It is therefore unfortunate that several training colleges should have had to close their doors for a time, and the council has set up a small subcommittee to consider the whole question of training and rehabilitation in relation to war needs.

TREATMENT OF VARICOSE ULCERS WITH HISTAMINE IONTOPHORESIS

BY S. V. GOULD-HURST, M.R.C.S.
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I HAVE had intractable varicose ulcers referred to me lately for treatment with histamine iontophoresis, and the success that has followed prompts me to record details of the method used. My experience with this substance has far surpassed in constancy of results any other form of treatment that I have tried, including tight binding of the whole foot, ulcer, and leg, both with and without the previous application of strong erythema doses of ultraviolet light, and with and without concomitant injection of the neighbouring varicose veins. In several cases binding with elastoplast caused intense itching and either a pustular or eczematous condition of the skin which took a long time to clear.

Some of the patients who have come under my care have given histories of many years of ulceration. One said that she had never been free from an ulcer for thirty years, another twelve years, several for seven years, and others for three to five years. Most of the patients were obese multiparous working women with varicose veins in both lower limbs. The few men, in contrast, were of the sparse type. Some of the ulcers had varied in size over the periods mentioned, and in those patients with two or three smaller ulcers besides the main ulcer certain treatments had temporarily healed the smaller ulcers, which, however, reappeared almost immediately the treatment was stopped. The main or single ulcer varied in size from that of a half-crown to $3\frac{3}{4} \times 4\frac{1}{4}$ in. The depths of the ulcers also varied greatly, some being just below the level of the skin, and one of many years standing having a maximal depth of approximately 4 mm. In this last case the whole of the outer side of the patient's leg, from 3 in. below the head of the fibula to the external malleolus, had at one time or another been ulcerated. His Wassermann reaction was negative.

One of the advantages that histamine has over other forms of treatment is that the skin over the resultant healed area is less thin and papery than that formed if other methods are employed and so is less likely to crack and break down again.

METHOD

I use the British Drug Houses preparation of histamine containing 2 per cent. of histamine acid phosphate. The method of application is as follows:—

A ring of skin $\frac{1}{2}$ in. wide surrounding the ulcer is cleaned with spirit, and a thin layer of the histamine ointment is spread over half of this, the second half being reserved for the next treatment, because the skin so treated is apt to become a little sensitive. Care is taken at the first treatment not to allow the ointment to "spill over" on to the raw surface of the ulcer, because the rapid absorption of the histamine from a raw surface causes unpleasant symptoms—e.g., flushing of the face, throbbing in the head, headache, palpitation, and even a feeling of faintness. So far I have only met one patient who could not, or perhaps would not, continue treatment because of unpleasant effects.

The semicircle of ointment having been applied, a pad of gauze soaked in warm saline solution is placed over it. The positive terminal of a galvanic battery is bound on to this pad, and the negative electrode is applied to some convenient adjacent area. A constant current of 4–6 mA is slowly turned on, when

most patients will say that they are conscious of a pricking sensation under the pad. This current is allowed to pass either for five minutes or until the patient complains of headache or other discomfort before the 5 minutes has passed.

At subsequent sittings both the amount of current passed and the time of the treatment are increased, but never pushed beyond a point of moderate headache. Head throbbing and flushing are generally pronounced, but the patient soon becomes used to this. I have tried it out on myself, so that I should know exactly what they are feeling, and it is only the first experience of it that is strange. These sensations should be explained to the patient before the current is applied on the first occasion. A current of 10 mA for twelve minutes is about the average application that can be received with only the mildest discomfort, but people vary considerably in their tolerance. After each treatment the patient rests for fifteen minutes. Treatments are given twice weekly. A dressing of sterile vaseline or of cod-liver oil is then applied and the wound covered with gauze and firmly bound over a thin layer of wool.

RESULTS

After two or three such treatments the edge of the skin round the ulcer takes on a fresh pink appearance, and the ulcer begins to heal from without inwards. The skin of the leg in the immediate vicinity also becomes less brittle. Pain, which in some cases was continuous, rapidly diminishes until, after the fourth treatment, it has generally disappeared altogether. While the ulcer continues steadily to heal, the general outlook of the patient greatly improves, for undoubtedly the sight, and in some cases also the smell, of a raw ulcerated area, which refuses to heal, is very depressing and disabling. In two cases I found that healing proceeded normally until only a small ulcer about ¼ in. in diameter remained. This refused to heal until the histamine was spread over the raw area itself. The patients were warned that they would get all the uncomfortable symptoms (with which by now they were familiar) in their full intensity within some forty seconds of the application. They became used to this and made no complaint when it was continued. This method is not, however, usually suitable for the larger areas; but I am using it now on a patient whose ulcer, measuring 3 × 4 in., has proved more stubborn than usual owing to the fact that, at one time or another, most of his leg has been ulcerated, and consequently the blood-supply to this region is poor. This method brought about instantaneous improvement. When these ulcers were finally healed, I often gave half a dozen applications of mild erythema doses of ultraviolet rays to the affected limb, including with the newly healed surface an area of surrounding skin. Now, however, I do this once a week during the treatment with histamine and am certain that it has also speeded up the healing and left a still more supple cutaneous surface.

The results have been uniformly successful, and the treatment seems to bring a sense of general well-being, unless it is pushed too hard. The average time taken for the ulcers to heal has been eight to twelve weeks, and these were ulcers of very long standing which had refused to heal with other methods of treatment. So far there has been no relapse, but this will no doubt happen in some cases, for the limbs of these people are affected by a much lower degree of trauma than are normal limbs; I anticipate that they will again respond readily to treatment.

SUMMARY

Varicose ulcers which have failed to respond to other recognised methods can be successfully treated by histamine iontophoresis, sometimes assisted by the application of ultraviolet light to the ulcer and surrounding skin.

MEDICAL SOCIETIES

SOCIETY FOR THE STUDY OF INEBRIETY

IN his presidential address to this society on April 9, Dr. W. NORWOOD EAST surveyed the

Medical Problems of Inebriety

He quoted a passage from an old papyrus showing that alcoholism was already a problem in the thirteenth century B.C.:

"Whereas it has been told me that thou hast forsaken books, and devoted thyself to pleasure; that thou goest from tavern to tavern, smelling of beer, at the time of the evening. If beer gets into a man it overcomes his mind. . . . Thou knowest that wine is an abomination, that thou hast taken an oath that thou wouldst not put liquor into thee. Hast thou forgotten thy resolution?"

To come to more modern times he thought that during the lifetime of the older members of this society a great change had come about. From his own experience he could testify that during the opening years of the present century the inebriates who were sent to prison for various offences were more numerous and more difficult to manage than those of today. For a few days after admission they were a danger to themselves, to other prisoners and to the staff, and a source of constant anxiety to all who were concerned with their health and safe custody. Many were restless, excitable, uncertain and unreliable, and had lost all sense of decency, apart from those who were suffering from declared delirium tremens, or were in the initial stages of that disorder. A look, a word, an innocent act of one of the staff or a fellow-prisoner was liable to be misconstrued and inadvertently provoke a storm of violent language and a torrent of vituperation, often accompanied by a dangerous assault and the violent destruction of everything within reach. Even after weeks of deprivation from alcohol some remained vindictive, vicious, hostile and dangerous. Today this class of prisoner was steadily decreasing, for as the older die they are not being replaced by a younger generation.

The Home Office licensing statistics for England and Wales for 1938 show that during the period 1913–38 convictions for drunkenness were reduced from 51·16 to 11·31 per 10,000 of the population. The percentage of women among the convicted persons was reduced from 18·94 to 12·91. The consumption of beer per head of the population declined from 27·86 standard gallons to 14·22 standard gallons, and the consumption of spirits from 69·95 proof gallons to 20·65 proof gallons per 100 of the population. The limitations of statistics in regard to convictions for drunkenness as a measure of the real situation at any time is generally recognised, and there can be no doubt that cases of drunkenness coming before the courts represent a proportion only of the total amount which occurs. But we must also remember, he said, that though consumption is lower the world suffers more from alcohol today than it did formerly, for the progress of science, which has altered the tempo of life, has aggravated its dangers. Better housing, advances in education, the wireless, the cinema, the publication of cheap editions of worth-while books and outdoor forms of recreation

effectively have improved the position among the less well-to-do classes. But, Dr. East considers, the most important factor for them, and for those who have always been able to obtain comforts and recreation according to individual tastes, is a general attitude of disapproval towards insobriety. A drunken person is no longer a good companion but a nuisance.

The harmful effects of immoderate drinking may be increased if the alcohol is adulterated, and during 1938 the number of cases in which charges were proved of drunkenness reported to be due to the drinking of methylated spirit was 973; in 848 cases men and in 125 women were involved. Dr. East said that a select committee was appointed on April 9 of that year by the House of Commons, Belfast, to inquire into the composition, manufacture, consumption and effect of drinking what is commonly known as "Red Biddy" or "Tony Wine." They reported that it was probable that "Tony Wine" was a corruption of the well-known description "Tawny Wine," but they were unable to find any origin for the name "Red Biddy." In 1928–29 the consumption of British wine in Northern Ireland was 191,000 gallons and in 1937 the figure was 415,000 gallons. This newly formed habit of wine-drinking by working-class people in Ireland was attributed to its low price, and the committee was concerned to notice that a great many people of both sexes were beginning to drink these cheap wines who did not perhaps realise that they were powerfully alcoholic. They found no evidence to suggest that these cheap wines were sold in an adulterated state, but they did not doubt that some purchasers themselves adulterated the wine to make its effect more rapid and more potent, although this practice was almost entirely confined to habitual drunkards. Dr. C. S. Thomson, medical superintendent in the office of health of the Public Health Department, Belfast, reported to the committee that he suspected, but had no proof, that there is some adulteration of cheap wines taking place in the houses of poorer people with cheaper forms of eau-de-Cologne or, it may be, methylated spirit. In regard to the former suggestion, the Customs and Excise Department state that iso-propyl alcohol, from which cheap perfumery is manufactured, is not an intoxicant as ethyl alcohol (spirits) is, and such perfumery is therefore unlikely to commend itself to seekers after intoxicating drink. Industrial methylated spirit may only be used in the manufacture of perfumery subject to the addition of prescribed further denaturants which they consider sufficient to prevent the drinking of perfumery by any normal person.

It is often said that inebriety is a disease, but it may be no more than a symptom of an underlying mental disease, and Dr. East pointed out that when inebriety or drug addiction appears to be an indication of a faulty temperament, or a defect of character, we may become involved in making distinctions between normality and abnormality, which are sometimes ill-defined and in danger of being appraised by personal preconceptions instead of detached scientific judgments. On the other hand, to regard inebriety or drug addiction as a vice fails to explain the cause of the condition or to promote the cure of the patient, whilst it encourages him to rebut the realities of life by raising a defensive barrier against them. By the Matrimonial Causes Act 1937 a marriage shall be voidable on the ground "that either party to the marriage was, at the time of the marriage, of unsound mind, or a mental defective within the meaning of the Mental Deficiency Acts 1913 to 1937, or subject to recurrent fits of insanity or epilepsy." Dr. East went on to indicate some of the difficulties that may arise in a court of law when supporting the view that repeated bouts of drinking in the past are indications of recurrent fits of insanity or epilepsy. He defined the inebriate or confirmed drug addict as a person with insight who is unable on account of disease, disposition or habituation to forgo the drug of addiction or maintain a reduction of its intake to an innocuous amount, but for practical purposes he thought this definition probably too narrow. If the compulsory detention of an addict was permissible in law and contemplated, it might be necessary to show that whether his addiction had, or had not, resulted in any criminal act it was producing injury to himself, his dependants or society.

As yet, Dr. East observes no general pressure of public opinion for the compulsory control of the drug addict or drunken spouse, and he considers that legislative measures aimed at this objective would be unlikely to be successful.

REVIEWS OF BOOKS

War and the Doctor

Edited by J. M. MACKINTOSH, M.D., D.P.H., chief medical officer, Department of Health for Scotland. Edinburgh: Oliver and Boyd. 1940. Pp. 127. 5s.

DURING the last two years, in fact since it became clear that another European conflict was imminent, a number of books on war surgery addressed to varying audiences have appeared. This one is the product of the Edinburgh school, and the outcome of a series of lectures delivered under the auspices of the Edinburgh branch of the B.M.A. Though it is in the form of eight separate addresses by seven teachers, it covers the whole subject of war surgery very adequately and with unrivalled authority. The wise counsel and helpful advice that have been put into thirteen pages by Henry Wade could only have been marshalled by one of the best clinical teachers of our time, and the reader might well make this, the last chapter, his introduction to the book and the subject. The principles of débridement are clearly set out by Walter Mercer. His chapters, which include the upper limb and chest injuries, and those on facial wounds by J. J. M. Shaw should be read by every surgeon, however experienced, who may be called on to do war surgery, not least by those who did the work themselves in the last war and will all the more appreciate the soundness of the advice. Mercer and W. A. Cochrane, who writes on lower-limb casualties, are both surgeons with orthopædic leanings and therefore plaster-minded, but Cochrane's statement that "The influence of Böhler has been paramount in this matter for the last twenty years, and it is his methods which are acclaimed in modern war" is hardly accurate. Cochrane missed the Franco-Prussian war, where the surgeons were hard at work putting on plasters under the direction of Ollier, but if he had been with the 2nd French Army at Verdun he would have seen Ollier's successors of the Lyons school at the same job in 1916. The skin-tight plaster for fractures and the immobilising plaster for wounds are two different things, and ill-timed Böhlerism at the C.C.S. may lead to many amputations at the base.

Chapters on fear neuroses by J. H. MacDonald, on shock and hæmorrhage by John Fraser, and on first-aid instruction by J. M. Johnston complete a useful and timely book.

Tuberculosis of Bone and Joint

By G. R. GIRDLESTONE, M.A., B.M. Oxon., F.R.C.S., Nuffield professor of orthopædic surgery, University of Oxford; honorary surgeon and honorary clinical director, Wingfield-Morris Orthopædic Hospital, Oxford. London: Humphrey Milford, Oxford University Press. 1940. Pp. 265. 30s.

IN this book Professor Girdlestone gives a clear account of tuberculous disease of the skeleton. In the first chapters there is a general description of the local and general manifestations of the disease. This is followed by an account of the disease as it affects the different joints and bones and the problems of diagnosis and treatment which may arise. The author stresses the importance of general as well as local treatment and strongly advocates the use of carefully controlled heliotherapy. He favours the school of rigid immobilisation, often quoting the dicta of H. O. Thomas and Robert Jones, and tends to describe only one method of treatment for many of the lesions. Thus in discussing the treatment of the tuberculous hip he only mentions the Robert Jones frame, not referring to the simple weight and pulley extension or Pugh's method of extension on an inclined plane. In the description of local treatment of tuberculous disease of the knee there is, curiously, no mention of the use of the Thomas splint which is so useful in the gradual correction of deformity and gives the extension with immobilisation which is so desirable. Professor Girdlestone favours the plaster spica to immobilise the knee, by which means half the patient is excluded from the healing rays of the sun. In treating spinal caries both the Robert Jones frame and the plaster bed are described and an account given of the production of compensatory curves. In the chapter on Pott's paraplegia the author is much less conservative in his treatment than the majority of orthopædic surgeons and favours early operation.

The book is excellently produced and the radiograms are of a high standard. Not all of those treating tuberculosis of the skeleton will agree with the author's views, and they will find this a stimulating book.

Anatomy of the Human Skeleton

(4th ed.) By J. ERNEST FRAZER, D.Sc. Lond., F.R.C.S., professor of anatomy in the University of London. London: J. and A. Churchill. 1940. Pp. 300. 30s.

IN his study of human anatomy the student is usually required to examine the skeletal framework before he begins dissection. This course has been found to be the most economical in time and energy, even though no bone is really comprehensible until something has been learnt of the "soft parts." With this knowledge the student can re-examine the bones of the skeleton and see the real significance of their shape, size and variations, and of their grooves, fossæ, ridges, tuberosities, and other markings. Moreover, such a study provides an interesting method of general revision, since a comprehensive treatise on the skeleton must inevitably take into account all the soft parts with which it is in relation. Herein lies the value of Frazer's book, for it deals essentially with the bones as they stand in relation to surrounding structures. Probably, with changing ideas of the value for practising clinicians of a knowledge of osteological minutiæ, the book will not find such a demand from candidates for the higher medical and surgical examinations as heretofore, and many will regard this as a step in the right direction in the development of medical education. Nevertheless, Frazer's unique book will remain indispensable to those who need a really detailed knowledge of human bones. No physical anthropologist, for instance, who must glean every possible scrap of information from a scrutiny of fragmentary skeletal remains, should feel himself qualified for the task until he has thoroughly mastered this book.

Practical Food Inspection

(2nd ed.) By C. R. A. MARTIN, M.R.San.I., chief sanitary inspector, Whitstable. Vol. I: Meat Inspection. Pp. 316. 15s. Vol. II: Fish, Poultry and Other Foods. Pp. 284. 12s. 6d. London: H. K. Lewis and Co. 1940.

SINCE 1932, when Mr. Martin's textbook first appeared, the technique of meat inspection has altered little, but there have been great changes in the preparation of other foods which require new methods of inspection, and the Food and Drugs Act of 1938 has altered legal procedures. The fundamental rules of food inspection and condemnation in this country have remained unchanged since the Public Health Act of 1875 and generally are biased in favour of the consumer, but in one important matter there has been much development in recent years. The diseases of food animals which render their flesh dangerous to man are mostly infections which do not produce structural changes or much evidence in their carcasses, so their detection is extremely difficult. For this reason antemortem inspection of animals about to be slaughtered is necessary and there is general agreement that for meat inspection the services of a veterinary surgeon should be available, though the general routine of food inspection is best left to sanitary inspectors, who are specially trained for the work. This book is mainly written for food inspectors engaged in everyday practice, so no more of morphology and pathology is given than is necessary to decide the wholesomeness of food. To them its value is high. And students of public health will find in it much practical information not included in manuals of public-health practice. Medical readers may find the pathology elementary, some of the biology questionable and the chapter on food-poisoning too sketchy to be of much value, but they will not read the book for these subjects. The first volume deals only with butcher's meat; the second with all other food inspection and with legal procedure.

Modern Treatment in General Practice Yearbook

Edited by CECIL P. G. WAKELEY, D.Sc., F.R.C.S., F.R.S.E., senior surgeon, King's College Hospital, London. London: Medical Press and Circular. 1940. Pp. 312. 12s. 6d.

WITH this issue Mr. Wakeley has adhered more or less to the plan of previous years, though it is open to question whether in a book intended primarily for general practitioners space need be found for such subjects as osteogenic sarcoma, giant-cell tumour of bone, and the treatment of severe hyperthyroidism. Incidentally a comparison of this last article, written by Dr. George Crile, jun., with that by Mr. E. G. Slesinger on the treatment of thyrotoxicosis reveals striking differences of opinion as to the best line of treatment. On the whole the teaching is conservative, but it is to be hoped that Mr. Gordon-Taylor's article will not result in the wholesale intervention of the surgeon in the treatment of hæmatemesis. Mr. P. B. Ascroft's article on the surgical treatment of arterial hypertension is outstanding for its conciseness and clarity, and Mr. Philip Mitchiner on the treatment of burns under war conditions and Dr. Lionel Whitby on the treatment of septicæmia have written eminently practical expositions. The general practitioner will undoubtedly find the book useful, but he need not feel bound to read it all.

THE LANCET

LONDON: SATURDAY, APRIL 20, 1940

HOBSON'S CHOICE

WE are slowly beginning to grasp in this country that food is rationed far more by price than by the fiats of the Ministry of Food. Rationing by price has been in operation since the beginning of history, and few nations except the Jewish have done much to lighten it. The Manchester school of economy would view with horror any attempt in that direction, but in the long run the communist principle must prevail: "To each according to his needs" in order to obtain "from each according to his ability." For modern war is a totalitarian activity, and if each man is to give of his best to the national cause he must be fed, and not only fed but ensured an optimum diet. "Morale and powers of endurance cannot be maintained unless the whole population is on a diet good enough to maintain it in health"—so write Sir JOHN ORR and DAVID LUBBOCK [1] and no dietitian would gainsay them.

Today we have statutory rationing of butter, sugar, bacon and meat, and margarine may be added before long. This has been done avowedly to make sure that rich and poor alike get their fair share of these commodities. The scheme, with its multiplicity of registration cards, coupons and officials, was intended to prevent the well-to-do from what COMPTON MACKENZIE would call their pleonectic proclivities if not to aid the meionectic. It was meant to assure to each one of us 4 oz. of butter and 4 oz. of bacon a week, but it was forgotten or never known that the poorest third of the population could not afford even in peace-time more than the minimum diet necessary for health, and that they cannot buy 4 oz. of butter or 4 oz. of bacon a week. This accounts for the later increase in the rations and the present derationing of pork. Anyone who makes inquiries in the poorer neighbourhood of town or country will discover that the shops have not been able to sell their full quota in spite of surreptitious extras to their better-off customers. Thus though rationing has no doubt had the desired effect of reducing national consumption of the affected foods by making the cooks of the rich put more kidney and less steak in their pies and modify their more Beetonian receipts, it has not helped the poor to get their share. For them it is Hobson's choice (his customers had to take the horse nearest the door, whether they liked it or not); their diet depends as always on their weekly wage, and the rise in prices has pushed it still further towards inadequacy.

What can be done? We are not quite like a beseiged city in which the authorities would distribute each man's share without reference to cost. Here the method must be by rigid control of food prices combined with instruction of the public as to how they can spend their housekeeping money to the best advantage. Dietitians will agree with ORR and LUBBOCK that "With sufficient milk, vegetables and potatoes there need be no malnutrition. With sufficient bread, fat (butter or margarine), potatoes and oatmeal, there will be no starvation." Apparently there is no insurmountable difficulty in obtaining from abroad a sufficiency of the energy foods, wheat and fat, but there is grave difficulty in persuading the country of the need for concentrating on the production *and* consumption of the protective foods. The Ministries of Food, Health and Education are embarking on a campaign to educate the people in the principles of sound nutrition. And good luck to them. They will need all the help they can get from our profession. It takes the mind of a genius to see truth simply but it would need a craniotomy to ensure getting it into people's heads.

1. Feeding the People in War-time. By Sir John Orr and David Lubbock. London: Macmillan and Co. 1940. Pp. 88. 1*s*. 6*d*.

PREVENTION OF ADHESIONS

MUCH surgical ingenuity has been expended on the prevention and cure of adhesions in various parts of the body, but it has been handicapped by lack of knowledge of why they form or why they disappear. In the peritoneal cavity the glueing together of omentum and intestine about an infective focus, such as a perforated appendix, is secondary to the formation of a fibrinous exudate on the peritoneal surfaces, and often preserves life by localising the infection. On the other hand widespread adhesions may follow an aseptic exploratory laparotomy in which no viscus has been opened and interference has been minimal. This unfortunate occurrence is difficult to understand. Acting on the assumption that fibrin is the usual precursor of adhesions a number of attempts have been made to avoid them by using substances that are held to destroy fibrin, such as amniotic fluid and papain, but these measures have proved disappointing. Another line of attack lies in preventing the formation of fibrin. Heparin possesses such an action in the blood and has met with a greater measure of success when used in the peritoneal and pleural cavities. LEHMAN and BOYS [1] have lately experimented on rabbits and dogs in which peritoneal adhesions were induced either by mechanical damage or by bacterial contamination. In the rabbits both methods were used and from three to five days later the abdomen was reopened and the adhesions divided. In one group of rabbits the abdomen was then closed without further treatment; in a second group 25 c.cm. of normal saline was left in the cavity; in a third group the same volume of amniotic fluid (Amfetin) was substituted for the saline; and in a fourth group the same volume of saline containing 750 units of heparin was used. The same amounts of these various fluids were also injected by paracentesis on the first and second days after operation. A week later the adhesions had re-formed in all the rabbits except

1. Lehman, E. P. and Boys, F. *Ann. Surg.* March, 1940, p. 427.

the heparin group, in which only one rabbit out of the twenty was affected. In the dogs adhesions were produced by bacterial contamination and were divided after six weeks. The same three control groups were established, 100 c.cm. of amniotic fluid being instilled in the third group and the same volume of saline containing 3000 units of heparin in the fourth group. When re-examined a fortnight later all the control animals in the first three groups had more adhesions than before. In the heparin group, however, there were less than before. These results are encouraging, but as LEHMAN and BOYS point out the time has not yet come for their application to human subjects. Whereas no complication of the treatment was observed in any of the rabbits, three of the twenty-four dogs which received heparin died from profuse intra-abdominal hæmorrhage: Further experiments in which scrupulous hæmostasis can be vouched for will show whether this is a risk inherent in this line of treatment.

Another part of the body in which the control of adhesion formation is of paramount importance is the brain and its meninges. The mechanism here differs from that in the pleura and peritoneum since the exudation of fibrin plays no obvious part. Injury to the surface of the brain involves the opening up of the subarachnoid spaces and local disorganisation of the circulation of cerebro-spinal fluid. During healing the leptomeninges are replaced by a granulation tissue which unites the surface of the brain to the more superficial tissues. In time this is converted into fibrous tissue, and when the wound has involved the cerebral convexity the slow subsequent process of cicatrisation is often complicated by epilepsy. This complication is one of the bugbears of neurosurgery and has too often marred the post-operative course of a case that should have been a complete surgical success. As experience in the last war showed, traumatic epilepsy is, too, a common sequel of gunshot wounds that perforate the dura mater. PENFIELD demonstrated thirteen years ago that the production of epilepsy in such cases depends on the formation of a vascularised scar of connective and glial tissue through which an ever-increasing traction is exerted on the cerebrum. Evidence of this pull is seen in the displacement of the ventricular wall towards the scar, and in the inward suction of the dura over the scar when it is released at operation from the bone and adjacent structures.

The importance of any measure that will minimise the formation of adhesions over the surface of brain wounds thus needs no emphasis. A technical investigation which appears to serve this end has just been reported by YI-CHENG CHAO, HUMPHREYS and PENFIELD.[2] They use sheets of specially prepared amniotic membrane which they call "Amnioplastin." The amnion is obtained by dissection from fresh washed human placentas. After again being washed the membrane is placed in 70 per cent. alcohol, then stretched and dried on a smooth glass plate. It is preserved either dry or in 70 per cent. alcohol until required for use, when it is autoclaved and transferred to sterile Ringer's fluid or saline. Pieces of this membrane were laid over the surface of the brain in cats after lacerating the pia or even the brain tissue itself. The bone and dura mater were not replaced, the deficiency in the skull being closed with temporal muscle. After ten days the membrane had undergone a mucoid change; above and beneath it fibroblasts had appeared, but there was no evidence of foreign-body reaction. After thirty days no naked-eye or microscopic evidence of the membrane could be found; its complete disappearance without foreign-body reaction is a remarkable observation. The dural defect had been filled in by a connective-tissue layer which was completely separated from the subjacent pia by what appeared to be a continuation of the subdural space. Animals examined after fifty and sixty days showed a similar picture: in no instance were adhesions present between the regenerated dura and the underlying brain. PENFIELD and his co-workers have compared the action of amnioplastin with a number of other materials which have received attention in this field in the past, including untreated human amnion, insultoic (allantoic) membrane, plain catgut membrane, fascia lata, Cellophane, sheets of various metals, fat and Cargile membrane (ox peritoneum). None of these succeeded in preventing adhesions although human amnion made them "very mild." The worst results were with silver foil. In the experiments on amnioplastin and insultoin the test was made more severe by cauterisation or removal of cerebral tissue down to the ventricles and the emplacement there of excised bits of muscle. The case for amnioplastin thus seems to be very strong and it has already been used in human beings at the Montreal Neurological Institute with results that so far seem beneficial. In the treatment of brain wounds careful débridement must precede the application of the membrane to the surface. During the operation the membrane is kept flat and moist between sheets of glass until required, and when lifted into place it adheres at once to the brain and is not easily dislodged. This new technique for the avoidance of adhesions after craniotomy comes at an opportune moment, and if its promise is fulfilled the method may well be extended to other surgical fields where the menace of adhesions still persists.

2. Yi-Cheng Chao, Humphreys, S., and Penfield, W. *Brit. med. J.* March 30, 1940, p. 517.

WHAT IS PERSONAL HARDSHIP?

THE decision of the Minister of Labour to make medical men within the age-limits of current proclamations liable for medical service with the Forces has simplified the task of the professional committees which no longer have to consider personal hardship or physical fitness in their selection. On the other hand their responsibility is greater, for their decision may now be a factor in compelling a doctor to serve. Local commit-

tees in making up their quotas are not now at liberty to take into consideration the individual difficulties of the medical profession in their areas. If a doctor has cause to worry about army pay not meeting his insurance policies or his interest on mortgages, or about the welfare of a widowed mother who is dependent on him, this is no longer a matter for the local medical tribunal to take into account, nor can it guide in any way the application of compulsion by the central tribunal. Hardship of this kind is now a matter for a lay tribunal just as in the case of any other man of military age. After medical examination the doctor can put his troubles before the hardship committee of the Ministry of Labour and he has the same right of appeal to an umpire. So far the issue seems clear enough. But actually while it may be simple to determine what is personal hardship in the case of a tinker or a tailor, it is no simple thing for a medical man to distinguish between his professional and his private interests. His livelihood is so bound up with his practice that it is impossible for him to discriminate between his personal anxiety and his anxiety about the welfare of his patients.

There are admittedly many occasions where the two factors go hand in hand. This is the case with most large single-handed practices and it will be for the local professional committee to decide whether their hesitation to add a man's name to their quota is on the practitioner's account or on account of his patients. It is not usually the case in a three- or four-handed practice where the younger partner should obviously be released for service with the Forces, leaving the older partners to carry on, with temporary help if need be from a locum outside military age, unless there is some additional factor such as specialist work carried out by the junior. There will certainly be enough left for the local tribunals to do, for in approaching the decision whether to exempt a practitioner from service with the Forces the ruling factor must be the maintenance of an adequate medical service for the civil population. They now have the experience gained during the last six months which should have taught them to know the positions from which practitioners can be spared. It might at the outset have been reasonably surmised that general practice in any district could be carried on efficiently by three-fifths of the peace-time doctors, provided that in reception areas an additional doctor would be available for each 2000 evacuees; but the winter has proved this to be untrue and numbers of middle-aged practitioners have worked at a pressure which cannot be kept up without risk of breakdown and which has led some of them to suggest rather bitterly that for them military service would be a holiday. Many times during the winter local committees were called on to supply help in practices from which a partner had left. The committees have come to know pretty well the type of practices from which practitioners were most willing to be released. Such lists should now be available. It seems clear that in most rural areas, and possibly even in some urban areas where many doctors live in a small district, the single-handed practitioner with a large panel cannot be spared without throwing an undue amount of work on the remaining practitioners whose patients will suffer even though a substitute be provided. Two-handed partnerships in a reception area can get along with a full-time locum to take the place of the partner called up. Larger partnerships could carry on with part-time assistance.

If local committees determine, as one may well hope, to base their recommendations on the experience they have gained we have little doubt that they will be accepted by the central tribunal, unless they run counter to the paramount need of the fighting services. Personal hardship no longer concerns the committees, but professional hardship remains an index of public safety.

LONDON'S WAR-TIME MORTALITY

FEW of us today are as we were seven months ago. Civilians and combatants alike, we have changed our clothes and are leading unfamiliar lives in strange places. What has been the effect of all this on the public health? The prolonged closure of schools in urban areas might well reduce opportunities for the spread of the infectious diseases of childhood, but on the other hand the dispersal of urban children in rural areas would, some epidemiologists feared, have a counter-effect. The necessary reduction, at first, of some of the normal public-health services and of the facilities offered by the large urban hospitals was inevitable but unfortunate. The blackout, the increased nervous tension and the rationing schemes (not wholly disadvantageous judging by the last war) have been amongst the many other components of the revised version of civilised life. A state of war, however, is not conducive to the collection and interpretation of vital statistics, and least of all the present war with its redistribution of the population. Only a statistician in an official position, with inside knowledge of the movements of the population and of the possible effects of changes in the procedure of collecting and tabulating the country's mortality records, could possibly undertake the task. It is, therefore, fortunate that Dr. PERCY STOCKS, medical statistical officer to the Registrar-General, whose study of the war-time mortality in London we publish this week (p. 725), has been able to turn his attention to the problem.

The figures he uses are necessarily confined to the administrative county of London as it is only for this section of the country that the Registrar-General's weekly return provides mortality statistics in sufficient detail by cause and age. His method of approach has been to compare the deaths registered in different age-groups, in 3-weekly periods from the beginning of July, 1939, to the end of March, 1940, with the numbers expected in the estimated populations of each of these periods if their death-rate had been the same as in the corresponding weeks of 1938–39. By these means he reveals that the London mortality-rate for the first five years of life has been singularly low; at the

school ages, 5–14 years, there has been no very material change but generally a slight reduction; in young adult life, 15–44 years, there has been some increase in mortality over the level of the previous year, and this rise is also apparent for the older age-groups. Examination of the causes of death responsible for these changes yields information of much interest. At ages under 5 the chief contributors to the lower death-rate were whooping-cough, measles, pneumonia and diarrhœa, while deaths due to tuberculosis and to violence showed some increase. The number of deaths debited to pneumonia at these ages, between Nov. 26 and Jan. 27, was 73; at the mortality-rate of the previous year there would have been 169 and at the rate of the year before that 291. Part of this fall STOCKS naturally attributes to the new methods of treatment which may also have kept in abeyance deaths due to the secondary pneumonias of whooping-cough. The position as regards measles was still more striking. Since 1917–18 the disease has appeared regularly in London with a two-year periodicity and an epidemic was due in the last quarter of 1939. In the December and March quarters of 1935–36 221 deaths from measles were registered; in the same quarters of 1937–38 there were 137; in 1939–40 there was but one. That this sudden break in the biennial sequence is extremely unlikely to have been due merely to chance is obvious, but in confirmation STOCKS shows that the same phenomenon has occurred in Manchester and Liverpool. By the end of 1939, when the epidemic was due, the child density in London was, he says, not greatly below normal and he is more inclined to attribute the absence of measles to the closing of the schools. The subsequent events of this year will be of great interest, as will be the experiences of reception areas. Dr. ALISON GLOVER has pointed out that they also had little infectious illness. In young adult life the excess mortality in London in 1939–40 over that of 1938–39 lay mainly in the period of the severe weather experienced this winter, mid-December to mid-February. The causes chiefly responsible were diseases of the respiratory system, including tuberculosis. This increase can be explained by the epidemic prevalence of influenza (vide p. 762), which is known to be associated with an increased mortality from respiratory tuberculosis. Withdrawal of the physically fit into the fighting services may also have played a part. It is of interest to note that at these ages deaths from pneumonia showed practically no change in spite of the severity of the winter and the presence of influenza—again evidence of the value of chemotherapy. In middle life and old age the excess mortality of 1939–40 was also a characteristic of the cold spell and the causes mainly respiratory. It can therefore hardly be attributed to the war environment of which frosts and influenzas are certainly not the prerogatives. One special feature of that environment has, however, been the increase in road-traffic accidents, and STOCKS gives a striking demonstration of the effect of the blackout in London. Taking the period Sept. 4, 1938, to March 4, 1939 there were 6 weeks of full moon and in these weeks 39 road-traffic deaths took place; in the six weeks which were 1 week before full moon there were also 39 deaths while in those 2 weeks before full moon there were 37, and in those 3 weeks before full moon there were 44. There was, in other words, no material change in traffic fatalities in London in 1938–39 according to the position of the moon. On the other hand the sequence of deaths in the corresponding weeks of 1939–40 was 63 (full moon), 101 (one week before), 93 (2 weeks before) and 85 (3 weeks before). Moonlight has added value when other light fails.

ANNOTATIONS

SAFETY FIRST

CRITICISM is so stifled by the unquestioned acceptance of any catch phrase that the phrase may become what A. P. Herbert has christened a witch-word, the utterance of which acts as a spell upon thought and behaviour, rendering the one impotent and the other irrational. In the March number (the sixth war bulletin) of *St. Bartholomew's Hospital Journal* [1] Dr. Lindsey Batten makes an uncompromising attack upon one of these witch-words and accuses "safety first" as an influence for evil, especially in our attitude to health and sickness. He finds no support for the principle either in philosophy or religion, declaring that our Elizabethan forbears—and even our nineteenth century grandfathers—would have mocked it, and asks whether doctors are not among the leading and most effective apostles of this pernicious creed. He notes how children brought up on "no risks" are common in the consulting-room and hospital, and that behind the timid parent stands the doctor, who lends the weight of his authority to every shirking of a risk. We circumcise the child "to avoid trouble in the future"; we rightly immunise against diphtheria, but what of our attitude to chicken-pox? Limb pains are, as far as safety first is concerned, equivalent to active rheumatic affection, fidgets to the early stages of chorea, and under the influence of the bewitchery there results curtailment of work, play, freedom and adventure. Some hearts and lives are saved; but at what a cost in spoilt childhood, anxiety, and invalidism!

We must admit that much of this is true; but there are excuses. It is said (but not recorded, perhaps) that towards the end of the last war, when a patient in a shell-shock hospital committed suicide, the officer in charge received a reprimand from the higher powers, who instructed him to take steps to prevent any such happening in the future. He replied that he would not put hundreds of men under restraint as potential suicides and thus hinder their recovery, even if another suicide or two might occur. He was a brave man, but his position rendered him care-free as to a public scandal and there are few of us who could face such chances. We are caught in our own net; we have become apostles of safety and dare be nothing else. Perhaps, says Dr. Batten, the war will break

1. We spell the title out in full because in the same issue the Editor says he is sure that Rahere when answering in a vision the hospital's patron saint did not address him as "Bart."

the vicious circle, and we are happy in knowing that, despite twenty years of "safety first," there remains in our young men the spirit that can express itself in obedience to the alternative "live dangerously."

But we shall not be always at war, and we may be able to return to the wisdom of our ancestors and find the golden mean in the exhortation "look before you leap," for that does not forbid the leaping even if the looking discloses danger. Our attitude is ultimately a matter of our outlook on life in general, and, apart from recognising and avoiding the bewitchery of words, it is well to know that the reasoned and scientific principles of modern civilisation are not beyond challenge when measured against a philosophy that finds satisfaction in something other than "safety first." Lin Yutang, interpreting the philosophy of his country to Western readers, writes:

A modern Confucianist would take city-licensed pasteurised Grade A milk, whilst a Taoist would take fresh milk from the milkman's pail in the country fashion. For Laotse would have been sceptical of the city licence and pasteurisation and the so-called Grade A, which smells not of the natural cream flavour, but of the city councillors' ledgers and bank books. And who, after tasting the peasant's milk, can doubt that Laotse was perhaps right? For while your health officers can protect your milk from typhoid germs, they cannot protect it from the rats of civilisation.[2]

SEIZURES OF CONTRABAND NARCOTICS

THE work of the League of Nations for the international control of the traffic in narcotic dangerous drugs continues without interruption, though with some limitations, during the war. The extent of the seizure of illicit drugs may be gathered from the summary of the figures for 1938 which is now available. No less than 10,000 kg. of raw opium, nearly 2000 kg. of prepared opium, 24 kg. of morphine, 152 kg. of heroin and nearly 5000 kg. of Indian hemp were reported to the secretariat of the League during 1938. For the last quarter of 1939 similar vigilance was exercised. For instance, from New York came a report last October that seven American citizens and four Italians had been arrested as having been engaged in illicit traffic on the s.s. *Vulcania*. Some 7½ kg. of raw opium from Yugoslavia and 375 grammes of morphine were confiscated. In August and September, 1939, some 112 kg. of prepared opium and 44 kg. of raw opium were seized on the wharf and in underground tanks at Hong-Kong in the possession of Chinese subjects. Information given by the Portuguese government in October and November, 1939, disclosed the seizure at Macao of 680 kg. of prepared opium and 998 heroin pills, together with some raw opium and morphine. Most of these drugs were of Chinese origin and the thirty people arrested were all Chinese. Fines amounting to 20,000 dollars were inflicted. These are examples taken from over a hundred cases of seizure reported during the last three months of 1939 to the secretariat of the League; they suffice to show that any relaxation of the control of the international traffic, which tends to increase during the dislocation of war, would seriously impair the results achieved during the last fifteen years under the series of conventions administered by the League of Nations.

WHAT IS A SPORE?

SINCE Robert Koch in 1876 observed and described spore-formation in the anthrax bacillus not much has been learnt about the nature of bacterial spores. It is agreed that by virtue of their great resistance to noxious environmental conditions their function is mainly protective, but little is known about how or what they protect, their chemical composition or their relationship to the mother-cell. Is there, for example, a spore membrane of some highly resistant substance formed round a vital granule of the parent bacterium, or does the spore consist in its entirety of some material quite different from that of the vegetative cell? Howie and Cruickshank[1] have tackled some of these problems. They provide convincing answers to the questions whether the spore is antigenic, and if so whether its antigen is serologically related to the bacterial antigen. Using bacteria that spore readily, a medium that encourages spore-formation and the technique of agglutinin absorption they have shown that in fact bacterial spores are antigenic, and that the spore antigen is distinct from those of the associated bacillus, and is besides remarkably heat-stable. But as a rule bacteria have a complexity of antigens, and the serological nature of the antibody is related, in the case of capsulated bacteria like the pneumococcus, to the chemical make-up of the capsular envelope and not to the contained bacterial cell. May not the spore also consist of a covering protective membrane with a core of bacterial protoplasm, and may not the changes in the staining reactions of the spore observed during the earliest stages of germination be due to a physical rather than a chemical change in the spore? These questions are posed in the hope that Dr. Howie and Professor Cruickshank will continue their investigations and further illuminate the obscurity surrounding the spore.

THOMAS SYDENHAM

THE traditional English view of Sydenham is that he found medicine wandering in a sterile desert of speculation and adherence to the writings of past masters and redirected her footsteps to the observation of Nature as seen at the bedside. This is certainly part of the truth, but Dr. Karcher,[2] viewing him with eyes unclouded by national predilection, recognises a further aspect of the man which we are apt to forget. He reminds us that Sydenham was a Roundhead trooper in the first phase of the Civil War and a captain in the second phase, and that it was not till comparatively late in life that he turned his mind to medicine. In the eyes of his contemporaries he was a rebel, and when political events forced him to another sphere of activity he remained a rebel—the "trooper turned physician" in Dr. Karcher's phrase. In that fact Dr. Karcher finds the explanation of Sydenham's devotion to the ascertainment of natural phenomena, and of his repugnance to the established order of medical science. It is remarkable that a Roundhead with a well-known record of activity in the Civil Wars rose so soon to distinction and lucrative practice in the early days of the Restoration; for there is no evidence that he suffered for his political opinions. His immunity must partly be ascribed to the intimate friendships he had formed at Oxford with some of the distinguished men of the time. Boyle and Locke were his close friends and he seems to have known most of the circle who composed the Royal Society. That Sydenham's military experiences contributed to the formation of his mature ideas is highly probable, but they were hardly the determining factor. It must not be forgotten that Sydenham was well educated—not indeed a scholar or learned in the sense that Willis or Lower, his contemporaries, were learned, but with a fine command of his own tongue. Some of his English writing, of which but little has come to us, is magnificent in natural eloquence and balanced

2. My Country and My People (Heinemann).

1. Howie, J. W. and Cruickshank, J. *J. Path. Bact.* March, 1940, p. 235.
2. Karcher, H. *Schweiz. med. Wschr.* March 16, 1940, p. 233.

rhythm. Moreover, he was an ardent student and admirer of Bacon and Hippocrates, and also, apparently, of Don Quixote. He, too, found tilting at windmills a congenial occupation, and was a far more skilful performer than the Don. Dr. Karcher finds it difficult to admit real greatness in a physician who could ignore the advances of anatomy and physiology, and indeed it is strange that Sydenham never mentioned William Harvey and seems to have been unaware of the discovery of the capillary circulation by Malpighi in 1661. But Sydenham stands in the direct line of progress in his appeal to facts. "Non fingendum aut excogitandum, sed inveniendum quid natura faciat aut ferat," the motto which he adopted from Francis Bacon for the title-page of his Tractatus de Podraga et de Hydrobe expresses the same watchword as Hunter's advice to Jenner: "Do not think; try." In the end Dr. Karcher finds that the trooper turned physician did more to mould the doctor of today than some of even higher reputation, a conclusion with which no Englishman will quarrel. Sydenham was the first clinical investigator of modern times, and his influence is still alive and directing the whole art and practice of healing. For that reason his fellow countrymen claim for him all but the highest seat in the Temple of Æsculapius.

LIVER PUNCTURE IN INFECTIVE HEPATITIS

THE evidence lately summed up by Findlay [1] in favour of the view that the great majority of cases of the common acute jaundice are associated with an infective hepatitis is strengthened by observations made in Copenhagen. As Sir Arthur Hurst points out in our correspondence columns, autopsies in mild jaundice are almost unknown, but, employing the technique previously described by Iversen and Roholm,[2] these workers have now [3] made up to some extent for this lack by carrying out 38 aspiration biopsies of the liver on twenty-six patients with acute jaundice. The patients, sixteen men and ten women, ranged in age from 18 to 53 years, while the biopsies were made from the 3rd to the 51st day after the appearance of icterus. Four of the patients had been treated with arsphenamine for syphilis, one had received the same drug, though not a syphilitic, and two were chronic alcoholics. Incidentally, Roholm and Iversen coin the word "alcoholist" for such people, a pleasing term which raises alcoholism at once to the level of a sport. The pathological changes found in the livers of all the patients were those of a diffuse hepatitis, characterised by the presence of infiltrating mononuclear cells, destruction of the trabecular structure of the liver cells, necrotic disintegration of the parenchymatous cells in somewhat ill-defined areas of variable size and a varying degree of connective-tissue proliferation either in the portal spaces and round the central veins or else diffused throughout the lobule. The interlobular bile-ducts were normal and the whole picture suggested an infective process of hæmatogenous origin rather than a catarrhal condition of the bile-ducts. The predominant cause of the jaundice appeared to be the impaired function of the parenchymatous cells. The hepatitis was already well-defined during the first week of jaundice, and as a rule subsided within a month after the appearance of the icteric tint. In one patient a fatal subacute necrosis of the liver developed during the course of an apparently benign hepatitis. No difference, however, could be found except in degree between this subacute necrosis and the benign cases, while the cases treated with arsphenamine were indistinguishable both clinically and pathologically from the others. Snapper, Ch'in and Liu,[4] in reporting a case of subacute liver necrosis following the administration of neoarsphenamine and mapharsen, also noted no difference in the liver changes from those found in infective hepatitis. Roholm and Iversen believe that both arsphenamine and alcohol lower the resistance of the liver to a subsequent virus infection. The findings of the Danish and Chinese observers in regard to the liver lesions of infective hepatitis and their similarity to, and probable identity with, those of arsphenamine jaundice thus confirm and extend those of earlier observers. They also support the view that the term "epidemic catarrhal jaundice" is unsatisfactory and should no longer be employed.

CAMPS OF TODAY AND TOMORROW

IN the good old pre-the-last-war days the word "camp" suggested soldiers, or perhaps boy scouts, leading a simple but healthy existence under canvas. Since then camps have taken on a more permanent form. Tents have given way to the unsightly converted railway carriage, the admirable youth hostel, or the luxury settlement for holiday-makers sometimes to be found near our brighter seaside resorts. Among these pseudo-hotels Mr. W. H. Hamlyn, F.R.I.B.A.,[5] thinks we were in danger of losing the real camp with its simple open-air life and community spirit. Today there is a fresh danger. Evacuation and military operations have artificially stimulated the rate of building camps. What is done quickly is often done haphazardly and sometimes badly, and Mr. Hamlyn begs us pause to think. Paid holidays lately granted to workers would be a gross extravagance if the worker from the city slum had to spend his holiday in what is often only a seaside slum. At the Sign of the Aspidistra is an uninviting hostelry. Mr. Hamlyn reckons that after the war a quarter of the camps required for our 4 million evacuees will still be needed for holiday-makers of the lower income groups (a body of the population which may then include nearly all of us), while other camps growing up round war-time factories could later be used as nuclei for new settlements in a decentralised industry. But we must tell our architects now what is to be built for permanent use and what for "the duration." With their help the main structures of selected camps can be made flexible and suitable for conversion later to peace-time purposes. A rigid regimented lay-out with careful planning can often be adapted to a more pleasing design without loss of efficiency. In the camp Mr. Hamlyn sees the future solution of the working-class holiday. Under wise leadership he thinks the workers should return rested in body and enriched in mind. And they certainly would from his imaginary camp on the west coast of Scotland, which he describes with nostalgic detail, where walking, bathing, boating, fishing and folk-lore will be combined with more orthodox urban recreations.

SEX-HORMONES AND THE FOÀ-KURLOFF CELL

SINCE its discovery fifty years ago the Foà-Kurloff cell has enjoyed considerable obscurity, and to the few aware of its existence its function has not been revealed. This is not surprising, for it appears to be confined to the blood and spleen of the guineapig and would pass as an orthodox member of the lymphocyte

1. Findlay, G. M. *Jour. R. Army med. Cps.*, February, 1940, p. 72.
2. Iversen, P. and Roholm, K. *Acta med. scand.* 1939, **102**, 1; see *Lancet*, 1939, **2**, 1326.
3. Roholm, K. and Iversen, P. *Acta path. microbiol. scand.* 1939, **16**, 427.
4. Snapper, I., Ch'in, K. Y. and Liu, S. H. *Chin. med. J.* 1939, **56**, 501.
5. Bossom gift lecture delivered under the Chadwick Trust on April 9.

family were it not that its cytoplasm is vacuolated. Within the vacuole is an "inclusion" consisting of material arranged in granules, rods or skeins, and taking nuclear and vital stains. The cell is present in greater numbers in the female than in the male, becoming more plentiful in the mother during pregnancy, and is very scarce in the young. Claims from abroad that the ratio of the Foà-Kurloff cell-count to the total leucocyte-count varies with the supposed concentration of sex-hormone in the circulation stimulated Ledingham of the Lister Institute to renew his interest in the cell after an interval of over thirty years. His results, recently reported,[1] are a clear confirmation of these claims. Using pure hormones, and keeping untreated litter-mates to control his experimental animals, he has demonstrated that after a latent period of a few days the injection of œstradiol is followed by a considerable rise in the number of Foà-Kurloff cells, castration and spaying being followed by their virtual disappearance. The effects of œstrogens are so various and often so unexpected that the findings cannot at present be said to suggest anything with regard to the function of œstradiol. The fact that removal of the testes has the same qualitative effect as removal of the ovaries, while testosterone, though in a minor degree, seems to have a similar action to œstradiol, does not encourage speculation. It may conceivably be significant that the thymus, a lymphatic organ, responds in the opposite direction, its involution being delayed by gonadectomy and hastened by the administration of sex-hormones. This, however, is a reaction common to most animals while the Foà-Kurloff cell is confined to the guineapig. Ledingham does not say whether or not it is found in the thymus. The first practical outcome of these observations will probably be an exploitation of the relatively large number of Foà-Kurloff cells which can now be made available for study. The fact that they respond to œstrogens —a property shared, for example, by smooth muscle and bone—cannot at present be said to have much bearing on the question whether the "inclusion" has an endocrine function.

ELECTROCARDIOSCOPY

THE use of the cathode-ray oscillograph in electrocardiography is now well established in this country as well as in America. For the busy clinician it has the advantage that it can be used under any conditions of room lighting, that the record can be seen on the luminous screen, thus eliminating the necessity for taking actual photographs, and that it is more speedily adjusted than the string galvanometer models. The time thus saved in a busy consulting-room or cardiac clinic is considerable and where a high degree of accuracy is not required, as in the detection of the commoner arrhythmias, there is little doubt about its value. On the other hand it is as a rule an unreliable guide to the finer points of electrocardiography, and where accurate measurements are required there can be no question that the older principle of the string galvanometer still holds the field. Donzelot and Ménétrel[2] now describe a cathode-ray oscillograph of their own design for which they claim certain advantages not possessed by other models, including easier manipulation and observation and less cost. With true Gallic enthusiasm they compare "electrocardiography" with radioscopy, much to the disadvantage of the latter, and dilate joyfully their experience with a patient who, admitted to hospital as an emergency on account of persistent vomiting, accidentally found his way to their department, where as a result of a routine "coup d'oeil" on their electrocardioscope a diagnosis of coronary thrombosis was made two days before there was any clinical evidence of the catastrophe. While few cardiologists would be prepared to subscribe to such enthusiastic support, the cathode-ray oscillograph provides a satisfactory and convenient method of electrocardiography for many purposes. For accuracy and research, however, the older string galvanometer remains supreme.

1. Ledingham, J. C. G. *J. Path. Bact.* March, 1940, p. 201.
2. Donzelot, E. and Ménétrel, B. *Pr. méd.* April 3, 1940, p. 350.

CANCER RESEARCH

AT Wednesday's annual meeting of the Imperial Cancer Research Fund Mr. Hugh Lett made a statement on the work of the fund and Dr. W. E. Gye described the research of the last three years. This turns largely on the artificial production of cancers and Dr. Gye set out the reasons for this preoccupation. The fact that malignant new growths can be induced at will in almost any part of the body proves, he said, that the occurrence of some cancers at least is related to environment which can be controlled. This lends assurance to the belief that cancer can and will be mastered by patient research. It is no longer a question of some mysterious uncontrollable inborn peculiarity. He outlined briefly work shortly to be published by Dr. B. D. Pullinger who has found that the polycyclic hydrocarbons known to induce cancer evoke within two to four days of their application a characteristic reaction which may be specific. Cells and their nuclei swell; cytoplasm becomes vacuolated; multiplication of cells follows, their increase in size being progressive; cytoplasmic degenerations appear in some cells while others show signs of recovery. It seems clear that the chemically related hydrocarbons which do not induce cancer fail to evoke this reaction. Also ready for publication is Mr. A. G. Crabtree's observation of substances which check the utilisation of glucose by tissues. Various chlorine compounds can under different conditions either retard or accelerate the rate of induction of tumours by carcinogenic hydrocarbons. But even the most active chlorine compound did not completely prevent the formation of multiple warts. It is satisfactory to know that work of this calibre is continuing to justify the granting of the Royal Charter almost on the day on which war was declared. Happily there has been no need as yet to surrender the new laboratories for war emergency work.

THE TAVISTOCK CLINIC

AT its meeting on March 20 the senate of the University of London agreed to approve the Tavistock Clinic for a period of five years as an institution at which teachers may be recognised for the instruction of students pursuing courses of advanced study and research. Under present conditions the relevant courses taken by internal students of the university are postgraduate courses for the higher degrees and the course for the academic postgraduate diploma in psychology. The clinic, of course, continues its regular course of postgraduate medical instruction.

Sir COMYNS BERKELEY has been re-elected chairman of the Central Midwives Board for the year ending March 31, 1941.

Dr. HERBERT PENNELL HAWKINS, C.B.E., who died at Horsham on Tuesday was consulting physician to St. Thomas's Hospital. He was in his 81st year.

We regret also to announce the death in Liverpool on April 10 of Mr. HERBERT FRANCIS WOOLFENDEN, senior surgeon to the Royal Infirmary, aged 60. Until his retirement a month ago he was chairman of the United Hospital Medical Board.

PREVENTION AND TREATMENT OF WOUND INFECTION

III

BACTERIOLOGY OF INFECTED WOUNDS

By Robert Cruickshank, M.D. Aberd., D.P.H.
PATHOLOGIST TO THE L.C.C. GROUP LABORATORY, NORTH-WESTERN HOSPITAL, HAMPSTEAD

(*Concluded from p.* 706)

Before discussing the specific prophylaxis and treatment of infection in wounds something may be said about the sources of the particular pathogens concerned, and the general measures which may be adopted to prevent their access to the wound.

SOURCES OF INFECTION

The source of infection may be autogenous or exogenous. Streptococci and staphylococci may be present in the upper air-passages and on the skin, and the sporing anaerobes and coliform bacilli in the bowel of the patient himself; it is infection with the pyogenic cocci which is most likely to be autogenous. Some 2 to 5 per cent. of adults carry *Strep. pyogenes* in the throat, while *Staph. aureus* is present in the anterior nares of 40 per cent., and both of these organisms may be found on the hands, which transfer them to the wound if it is open, accessible and insufficiently protected. In a similar fashion these pyogenic cocci may pass directly or indirectly from carriers—ambulance man, nurse, doctor—who may dress or otherwise attend to the wound. Thus in the last war 15–20 per cent. of wounds were infected with either *Strep. pyogenes* or *Staph. aureus* or both by the time—an average of twelve hours—the patient reached the casualty clearing station,[1] and these organisms must have come from the upper respiratory tract or hands of the patient or his attendants. The recent experience of Devenish and Miles[2] shows that certain skin-carriers of *Staph. aureus* are particularly dangerous in that the organism cannot be eliminated from the hands by "scrubbing-up," and being sweated into the gloves during operation may pass through needle punctures into the wound.

When the patient is transferred to the main hospital he is usually admitted to a large ward where there are already septic cases, and the chances of his wound in turn becoming infected—if it cannot be or has not been closed by primary suture—are high. The conditions are closely simulated by the admission of patients with burns to special wards where it has been found that the incidence of third-degree burns infected with *Strep. pyogenes* rose from 11 per cent. on admission to 66 per cent. by the sixth day.[3] No doubt manual transference has played its part in the spread of hospital infection, but with an adequate and intelligent nursing staff trained in aseptic and antiseptic technique this mode of transfer must nowadays be much less frequent. Evidence has been accumulating of late that the air and the dust of the ward are probable sources of infection, and experience teaches that the hæmolytic streptococcus does not need to be specially invited to attach itself to an abraded surface.

In the case of the sporing anaerobes, although *Cl. welchii* is commonly and the others including *Cl. tetani* are rarely found in the human gut, these organisms are most often carried into the wound by infected soil on the missile or on the clothes or skin of the patient. It is usually stated and believed that gas gangrene occurs most often in battlefields where the soil is well cultivated and manured (e.g., in the last war its incidence in France was much greater than in the East), but in fact there are few data on the natural distribution of the pathogenic clostridia. Zeissler and Rassfeld[4] in an examination of samples of soil collected from various European war-zones found *Cl. welchii* in 100 per cent., *Cl. septique* in 8 per cent., *Cl. œdematiens* in 64 per cent.* and *Cl. tetani* in 27 per cent. of 193 specimens examined. Fildes[5] found *Cl. tetani* in 57 out of 79 samples of soil from the cultivated fields of England but not at all from the "wilds of Scotland." The sporing anaerobes flourish on decaying organic matter, and the presence of such matter in the soil may facilitate infection by increasing the dosage and the activity of these pathogens.

Unsterile and imperfectly sterilised dressings may harbour *Cl. welchii* and *Cl. tetani*, and the risk of infection from such a source in the dressings of large open wounds is obvious. The ineffectiveness of alcohol for the sterilisation of syringes and needles has often been pointed out, and *Cl. welchii* has been cultivated from the alcohol in which syringes were stored. Solutions for hypodermic injection may also, if imperfectly sterilised, be a source of infection; pituitary extract and adrenaline particularly, if not immediately massaged into the tissues, may produce the local ischæmia and tissue-necrosis suitable for the germination of *Cl. welchii*, which may be carried in with the needle or the solution or conveyed by the blood from the gut or a primary infection elsewhere in the body.

GENERAL PREVENTIVE MEASURES

If the habitats of these pathogens and the means by which they reach the wound are known, it is an obvious duty to try to prevent their access to the susceptible tissue. In the case of the clostridia present in the earth or on soiled clothing little can be done. The sterilisation of dressings, syringes and solutions should be under the control or supervision of the bacteriologist. Much has already been learnt and done in preventing spread of infection with the pyogenic cocci. For example, the use of masks and gloves and isolation of the septic case have proved their worth in the prophylaxis of streptococcal puerperal sepsis. Whether masks (with or of Cellophane) and gloves could be used in field-ambulance work is doubtful, but efforts might be made to get the dressers to use masks and a skin-antiseptic such as Dettol cream while actually attending to the wound at the regimental aid-post. Later, when the patient reaches the casualty clearing station, the surgeon should be both masked and gloved and thus by example encourage his lay assistants to do likewise. Further, the surgeon who is a chronic skin-carrier of *Staph. aureus* must try to avoid needle-puncture of his gloves and should wear batiste oversleeves to cover the sleeves of his gown. Repeated dressing of the injured part should be avoided, and apropos the plaster treatment of open wounds there is a great advantage from

1. Stokes, A. and Tytler, W. H. *Brit. J. Surg.* 1918–19, **6**, 92.
2. Devenish, E. A. and Miles, A. A. *Lancet*, 1939, **1**, 1088.
3. Cruickshank, R. *J. Path. Bact.* 1935, **41**, 367.

* A third of the strains of *Cl. œdematiens* were non-pathogenic for laboratory animals whereas all strains of *Cl. welchii* were pathogenic. Yet the high incidence of this anærobe in soil together with the findings of Weinberg and Séguin in gas gangrene suggests that in the last war *Cl. œdematiens* was a more frequent cause of infection than *Cl. septique*. Its isolation, never easy, has been facilitated by a test recently described by J. Gordon and J. W. McLeod (*J. Path. Bact.* 1940, **50**, 167).

4. Zeissler, J. and Rassfeld, L. *Veröffentl. Kriegs. Konstit. path.* 1928, **5**, 199.
5. Fildes, P. System of Bacteriology in Relation to Medicine, London, 1929, vol. iii, p. 321.

the view-point of preventing or minimising infection in a dressing which can be left undisturbed for 7–10 days.

In hospital an attempt might be made to keep the "clean" and the "septic" cases separated, and for this purpose small wards of 4 to 8 beds are much to be preferred. But if, as is likely, clean and septic cases have to be nursed together in large wards, every effort must be made to prevent manual and aerial spread of infection. Overcrowding must be avoided, dust should be removed by damp sweeping and dusting or by vacuum cleaning, while adequate cross-ventilation is an excellent way of cleansing the atmosphere. Unfortunately, with an enforced blackout, natural ventilation has to be restricted, and artificial methods of air-disinfection may become necessary, particularly if the ward is overloaded with infections due to one pathogen—e.g., *Strep. pyogenes*. The use of "aerosols" and ultraviolet light is still in the experimental stage, but if encouraging results are obtained, there seems an obvious field for their application in operating theatres and "septic" wards. Medical or nursing staff with manifest or latent streptococcal infection should, if possible, be debarred from dressing open wounds, and cases of streptococcal tonsillitis among the patients should be isolated. It cannot be too strongly emphasised that in hospital wards the arch-enemy is *Strep. pyogenes*, and every effort must be made to prevent its spread.

SPECIFIC PROPHYLAXIS AND TREATMENT

In this chemotherapeutic era, the place of specific antibody in the prophylaxis and treatment of bacterial infections must not be lost sight of, particularly where the bacteria concerned are actively toxigenic, for example, *Cl. tetani* and the gas-gangrene group, for the sulphonamides have probably little direct neutralising effect on toxin.

Pyogenic infection.—Prophylaxis by specific vaccines offers many difficulties and is not at present a practical procedure. In the treatment of acute severe streptococcal infection, antisera, whether antitoxin of the kind used in scarlet fever or the so-called polyvalent antiserum, have not proved their general usefulness when used alone. For chronic infections, such as the discharging sinus, the infected joint or the non-healing wound, vaccines have been used, and may be helpful either in conjunction with chemotherapy or in cases where sulphanilamide is ineffective or contra-indicated. The vaccine should be autogenous and should be given in doses ranging from one to ten million organisms at intervals of 3 to 4 days. In the treatment of generalised staphylococcal infection or a severe local lesion with profound toxæmia, antitoxin in large doses intravenously (40,000–60,000 units) has given good results, and should probably be combined with chemotherapy. Staphylococcus toxoid, often a better stimulus for antibody production than vaccines, may be used in the subacute and chronic infections.

Gas gangrene.—The usefulness of antitoxins for prophylaxis and treatment is still in dispute. In civil practice many surgeons with a large experience of the treatment of injuries maintain that the prophylactic use of the antiserum is unnecessary. In Spain, Trueta[6] dispensed with its use when dealing with air-raid casualties and other war wounds, and had only one case of gas gangrene among over 1000 cases. It is true that the treatment of gas gangrene is primarily surgical, but we must not forget that the causal organisms are all highly toxigenic and that intoxication is a prominent feature of the disease. Specific antitoxins should, therefore, play their part both in the prevention and treatment of a disease which progresses so rapidly. If routine prophylaxis is not to be practised the surgeon must quickly learn to know the kind of injury in which the prophylactic use of antiserum is indicated. It is particularly required for cases where there is likely to be any delay in débridement. Thus, American observers[7] found that among some 4000 wounded soldiers sent to an evacuation hospital, 5 per cent. developed gas gangrene, and of these 90 per cent. had symptoms of the infection before reaching the hospital, the average length of time between injury and operation being 41·8 hours. By contrast, there was no case of gas gangrene among 349 severe non-transportable cases who were operated on within 24 hours of injury. The British experience in 1918 with prophylactic *Cl. welchii* antitoxin combined with tetanus antitoxin was that the incidence of gas gangrene among cases coming to the base hospitals was reduced and the case-mortality approximately halved.[8] By the kindness of Dr. E. Armigo and his colleagues of the Bacteriological Institute of Chile at Santiago I have seen a preliminary report of the results obtained with specific antitoxins in the prophylaxis and treatment of gas gangrene which followed the earthquake there in January, 1939. Their findings confirm the experience in the last war that specific prophylaxis combined with surgical attention is effective if the patient is seen within 24 to 36 hours of injury. Antitoxin used therapeutically was beneficial if given intravenously in large doses (a total of 40,000–50,000 I.U.).

Since the infection is usually a polymicrobial one, the prophylactic antiserum should contain a mixture of the three common infecting types (in France and America antitoxin to *Cl. histolyticum* is sometimes included). The dosage recommended in this country is 3000 units of *Cl. welchii*, 1500 units of *Cl. septique* and 1000 of *Cl. œdematiens* antitoxin, which is probably adequate for most cases seen within 6–12 hours of injury. If there is a delay of more than 24 hours between injury and treatment, it is advisable to give a full therapeutic dose to the patient in whom, from the nature of his injury, gas gangrene might be expected to develop. Ordinarily one injection given intramuscularly should be sufficient, but late cases of gas gangrene do occur, and pathogenic clostridia have been isolated from sequestra months after the original injury,[9] so that a patient in whom anaerobic infection has been proved or suspected should be given a further prophylactic dose if he is being operated on at a later date.

Therapeutically, gas-gangrene antiserum should be used (*a*) along with surgery either as an adjunct to surgical excision or to render the patient fit for operation; or (*b*) in cases where surgery is impossible. The results in the last war have been carefully analysed by the Committee on Anaerobic Bacteria and Infections,[10] who reported that the "results obtained in France have exceeded expectations." Since then there has been a great improvement in the potency of these antitoxins and a great reduction in volume of the therapeutic dose. For the established case of gas gangrene large doses must be given, and as in other toxic infections, such as diphtheria and tetanus,

6. Trueta, J. *Proc. R. Soc. Med.* 1939, **33**, 65.

7. United States History of the World War. Medical Department of the U.S. Army in the World War. Washington, 1929, vol. xii. p. 413.
8. History of the Great War, Medical Services, Pathology, London, 1923.
9. Douglas, S. R., Fleming, A. and Colebrook, L. *Spec. Rep. Ser. med. Res. Coun., Lond.* No. 57, 1920.
10. *Spec. Rep. Ser. med. Res. Coun., Lond.* No. 39, 1919.

the earlier the serum is given the more effective it is likely to be. The serum should be given intravenously if possible, a difficult task sometimes in a patient with gas gangrene, and since there is usually an accompanying secondary shock it may well be combined with a transfusion of plasma or whole blood. It should also be injected as a "barrage" round the gangrenous area, and this and the intravenous antitoxin should be repeated every four to six hours until the patient is clinically well. The recommended therapeutic dose has been provisionally fixed at not less than 7500 antitoxin units of *Cl. welchii*, 3750 units of *Cl. septique* and 2500 units of *Cl. œdematiens*, but in an established case the initial injection should probably contain 3, 4 or 5 therapeutic doses, and further dosage will depend on the patient's response. As soon as the infecting pathogen has been identified, the corresponding monospecific antitoxin should be used. Full records should be kept of treated patients, and in fatal cases the possibility of other causes contributing to death—e.g., streptococcal septicæmia, or pneumonia—must be carefully considered. Unpublished work by D. W. Henderson and P. A. Gorer of the Lister Institute indicates that for infections with *Cl. welchii* and *Cl. septique* combined treatment with the specific antitoxins and sulphapyridine should give much better results than either alone. A similar combination may also be most effective in prophylaxis.

Tetanus.—Antitetanic serum for the passive protection of wounded soldiers reduced the incidence of tetanus in the last war from 9 per 1000 in 1914 to less than 1 per 1000 in 1917 and 1918. This reduced incidence was accompanied by a lengthened incubation period (from 11·8 to 48 days) and a lowered case-fatality rate (22·6 per cent. in the inoculated and 53·3 per cent. among the uninoculated) in a series of cases treated in England, and an increase of "local" tetanus from 1·1 per cent. to 23·4 per cent. Since then, active immunisation with tetanus toxoid has been introduced by the Army as a voluntary measure and adopted by the Royal Air Force. Two doses of 1·0 c.cm. are given with a six-weeks' interval between; the reaction is slight and the resulting immunity is sufficient to protect the individual for at least two years after inoculation. Since active immunisation is not compulsory, and as an additional precautionary measure, the Army Medical Service recommend that the wounded man should also be given a prophylactic dose of antitetanic serum (3000 international units). For the uninoculated patient with a wound severely lacerated or not surgically excised, a further prophylactic dose of 1000 units should be given weekly for several weeks. The French, with compulsory active immunisation, advocate a further injection of toxoid for the wounded and already vaccinated soldier; the advantages are obvious. For air-raid casualties among the civil population, passive protection with tetanus antitoxin must be the routine procedure. In the treatment of the declared case of tetanus, massive dosage (100,000–150,000 units) should be given intracisternally or intraspinally, intravenously and intramuscularly as well as subcutaneously round the wound. But, as in gas gangrene, the best form of treatment is prevention, and the best form of prevention is specific prophylaxis plus early excision of the wound.

One last point may be made regarding the present-day tendency to treat bacterial infections with the sulphonamides alone. These drugs seem to act directly on the micro-organism or its enzymes, and do not help or stimulate the body's natural defences. Specific antisera neutralise immediately the toxins or specific substances elaborated by the pathogens, while vaccines and toxoids, by stimulating the host's antibody-production, do so more slowly. There is much experimental evidence in support of the view that a combination of the two forms of therapy may be expected to be most effective in holding the invader in check, so allowing the natural defences of the body to complete its destruction.

SPECIAL ARTICLES

THE NEXT B.P.

SOME indication of the contents of the next British Pharmacopœia was given last week by Dr. C. H. Hampshire, secretary of the Pharmacopœia Commission, at an evening meeting of the Pharmaceutical Society. Besides mentioning the items which it is proposed to add to the official book he showed specimens which he invited those interested to inspect; from the fact that these exhibits were presented it may be assumed that it is the commission's present intention to include the substances concerned in the draft Pharmacopœia to be submitted in due course for the approval of the General Medical Council. The efficiency of the B.P. as a book of standards is to be enhanced by the inclusion of standards and assays not only for crude drugs and chemicals but also for as many galenical preparations and compounded drugs as possible. This was recommended earlier in the year by the committee on pharmacognosy (*Lancet*, 1940, **1**, 59). The proposed new monographs are the following:—

Cod-liver oil emulsion, liquid paraffin emulsion, dried extract of witch hazel, liquid extract of senna, glycerin of acriflavine, diamorphine linctus, oily aconite liniment, methyl salicylate liniment, nucleotide solution, compound solution of sodium chloride, acriflavine lotion, calamine lotion, tannic acid paste, compound digitalis pills, compound bismuth powder, compound catechu powder, kino with opium powder, spirit of lavender, adrenaline suppositories, bismuth subgallate suppositories, cocaine suppositories, hamamelis suppositories, hamamelis with zinc oxide suppositories, syrup of codeine phosphate, tincture of gelsemium, gall and opium ointment, hamamelis ointment, diluted ointment of mercury, compound ointment of methyl salicylate—and the following *injections*: calcium gluconate, procaine and adrenaline, quinine and urethane, and sodium morrhuate.

The organic chemicals which it is proposed to bring into the Pharmacopœia are the following:—

Mandelic acid, calcium mandelate, calcium lævulate, parachlorometacresol, urethane, vanillin, sulphanilamide, β-phenylisopropylamine, β-phenylisopropylamine sulphate, cyclopropane, pyridine-β-carboxylic acid diethylamide, and theophylline with ethylenediamine.

Sulphanilamide, said Dr. Hampshire, is provisionally selected as the best-known member of the sulphonamide group which is free from patent complications. The inclusion of parachlorometacresol in the list is because of its use as a bactericide in sterilising solutions for injection and as a bacteriostatic preservative in certain solutions. Calcium lævulate is recommended in order that methods of preparing and sterilising solutions may be defined. Mandelic acid and calcium mandelate are commonly prescribed; Dr. Hampshire said that an elixir of ammonium mandelate was under consideration.

The principal preparations of the vitamin group recommended for description are: standardised concentrated solutions of vitamins A and D; a vitaminised oil standardised to contain vitamins A and D in the proportion contained in a good average specimen of cod-liver oil; halibut-liver oil containing not less than 30,000 units of vitamin A per gramme, and pure crystalline aneurin hydrochloride to replace the adsorbate of vitamin B_1, described in the addendum of 1936.

Inorganic chemicals proposed for inclusion are calamine, bismuth subgallate, dried magnesium sulphate, dried sodium phosphate, dried sodium sulphate, potassium chloride, and sodium metabisulphite. Calamine is described as basic zinc carbonate, suitably coloured with ferric oxide; the test for loss on ignition excludes the form of calamine which contains added zinc oxide. Sodium metabisulphite is introduced as anti-oxidant for addition to solution of adrenaline hydrochloride and injection of procaine and adrenaline. The use of this substance as a preservative may, said Dr. Hampshire, be extended to other preparations.

The following are the items in the category of crude drugs and oils which have been provisionally recommended for inclusion in the next B.P.: Activated carbon, galls, gelsemium, kino, dried lemon peel, volatile almond oil, white essential camphor oil and sodium morrhuate.

The substances classified as sera, vaccines and biologically-tested preparations which are under consideration are: Antitoxinum hystolyticum, toxinum staphyloccicum detoxicatum, toxinum tetanicum detoxicatum, vaccinum choleraicum, vaccinum staphylococcicum, insulinum protaminatum cum zinco, progesteronum. In this field the B.P. is kept closely in line with the regulations under the Therapeutical Substances Act. These regulations provide for the control of biologically tested substances in Great Britain and Northern Ireland and the B.P. extends the control to other parts of the British Empire in which it is accepted as a legal standard.

When the B.P. 1932 was issued it was intended to revise it every ten years, alternating with the decennial revisions of the United States Pharmacopœia; the next Pharmacopœia was to appear in 1941, five years after the appearance of the eleventh revision of the U.S.P. But the U.S.P. authorities have changed their general policy owing to war conditions and the commission has recommended the G.M.C. to delay publication of the new B.P. But the work of revision goes on and in the meantime addenda to the B.P. will deal with special difficulties as they arise.

IRELAND

(FROM OUR OWN CORRESPONDENT)

A PUBLIC HEALTH PROGRAMME

IN a paper published in the *Irish Journal of Medical Science* for February Dr. C. J. McSweeney, medical superintendent of the Dublin Fever Hospital, outlines the main advances he thinks needed in the public-health organisation of Eire. He concentrates on the provision of ad-hoc services intended to benefit the individual citizen, and particularly the individual child, rather than on those for the community as a whole. Dealing first with infectious diseases he notes that the type of diphtheria current in Dublin is particularly virulent, and he regrets that preventive immunisation has not been carried out more generally. Immunisation should be made compulsory. Measles and whooping-cough are also potent causes of child mortality in all large urban centres, and he wished these diseases were notifiable in Ireland. There is a great lack of hospital accommodation for children suffering from measles or whooping-cough, and this lack of accommodation causes an increased mortality. Dr. McSweeney thinks that 100 hospital beds are required in Dublin alone for each of these diseases. Gastro-enteritis is another cause of high infant mortality in Dublin, but as its seasonal incidence differs from that of measles and whooping-cough, it does not call for greatly increased hospital accommodation. Dr. McSweeney recalls that when the extensive suburban housing schemes which have recently been finished in Dublin were being planned, little or no attention was paid to the establishment of schools in the newly inhabited areas. Until such schools have been provided it has been necessary to transport the children by bus from their homes to the schools in the city. Dr. McSweeney remarks that this herding of children into a small space for a journey twice a day is calculated to propagate the spread of infections. Speaking of juvenile tuberculosis he deplores the absence in Ireland of any open-air schools. He next discusses the need for special provision for the care of juvenile rheumatism. At the close of his paper Dr. McSweeney returned to a topic which he has already brought before the medical profession—namely, the danger to the public from the fact that Ireland is entirely dependent on other countries for the supply of sera and other biological products used in the prevention and treatment of disease. He points out that a national emergency elsewhere might easily lead to a shortage in Ireland. Moreover, since infective strains of bacteria differ in different countries, it is reasonable to expect that therapeutic products made from strains prevalent in Ireland would be more potent than those imported from elsewhere.

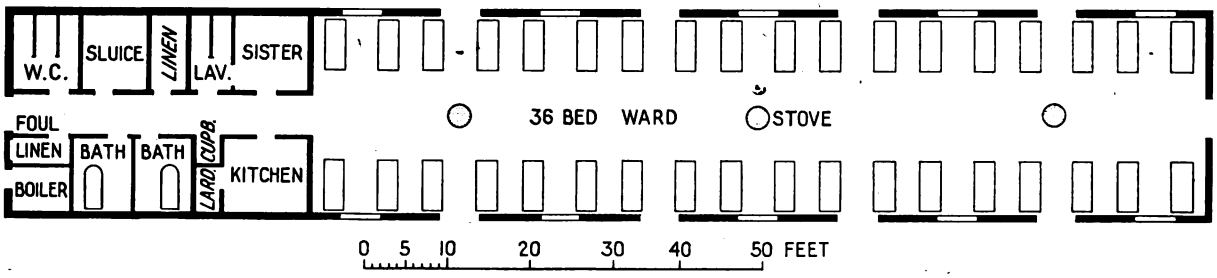
THE IRISH HOSPITAL SWEEPSTAKES

It had been recognised since the beginning of the war that the future of the Irish sweepstakes was uncertain, and, in particular, that the degree of success of the sweepstakes held last week on the Grand National would act as a guide to the promoters as to their activities in the future. As a matter of fact the results of that sweepstake exceeded expectations, and a sum of more than half a million pounds was received. The promoters, however, find an increasing difficulty in marketing their tickets, and the interruption of direct communication with the United States has been specially embarrassing. The Hospitals Committee, acting on the advice of the promoters, Hospital Trust Ltd., has decided not to hold a sweepstake on the Derby, and to leave in abeyance the question of holding one in the autumn. Left in this position, Hospital Trust Ltd. have decided to put that company into voluntary liquidation, probably because if they did not do so they would have remained saddled with the responsibility of a large but temporarily idle staff. This step has given rise to a mistaken belief that the Irish hospital sweepstakes have been definitely abandoned. No such decision has been made. The chairman of Hospitals Trust has issued a statement that it is intended to form another company with somewhat wider powers and capable of promoting sweepstakes if thought proper. It is understood, indeed, that while future sweepstakes may be on a more modest scale, there is good prospect of resuming the series in the autumn.

HUTTED HOSPITAL

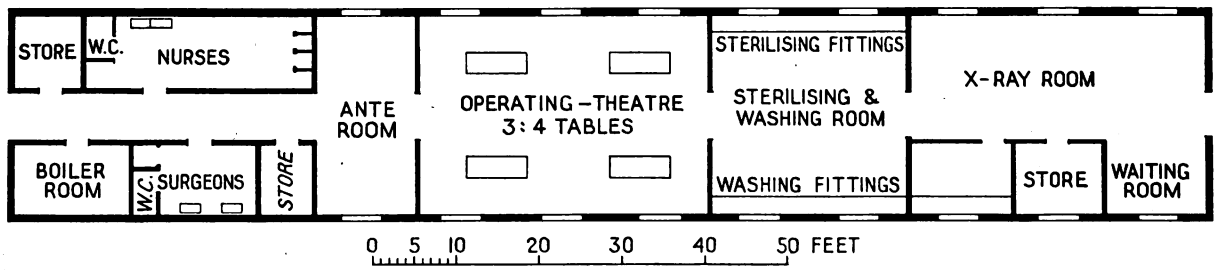
THE hospital huts that have sprung up since September at the behest of the Ministry of Health are no things of beauty, but some say they will turn out to be a joy for ever. The typical hut designed by the Office of Works is 144 ft. long by 24 ft. wide, and is built of brick or breeze blocks on a steel framework, plastered on the inside and covered on the outside with grey corrugated asbestos sheeting. Cedar has also been used. The roof is of asbestos sheeting, coloured according to taste. The outside and inside paint is in pastel shades of pale blue, green, grey or yellow, the yellow being the most satisfactory as being less liable to run into patches on incompletely dried walls. The floor is of concrete covered with linoleum. This standard hut can be adapted as a ward, kitchen, or operating and X-ray block, or its space can be divided up into cubicles to provide sleeping accommodation for nurses or into a dining-room and two recreation-rooms for their use. The original plans reproduced here have been modified to a certain extent to meet local needs or the views of superintendents. In the most usual lay-out the huts are built in pairs with their main entrances opening opposite one another on a central covered corridor, some 30 ft. being left between each pair.

FIG. 1—THE WARD HUT



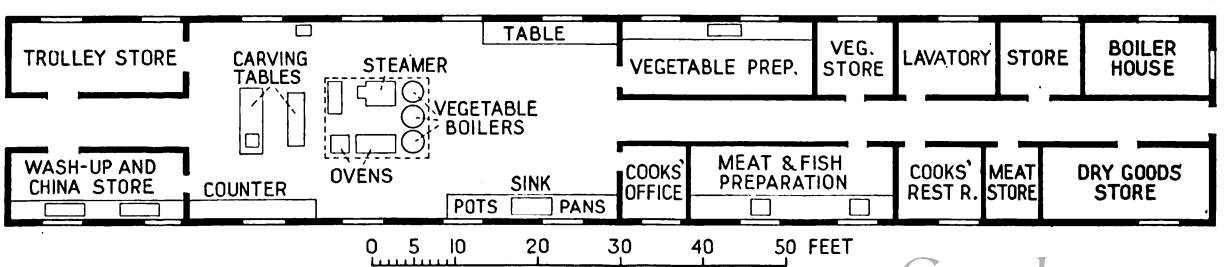
The *ward hut* (fig. 1) is designed to hold a minimum of 36 beds, and this allows three or four feet between beds. There is a double door 4 ft. 6 in. wide at each end and four similar doors on each side, so that the ward can be aired well on warm days and hasty evacuation in an emergency should be easy. The addition of concrete paths surrounding and interconnecting the huts would allow the beds to be moved outside in the summer. The wards are bright, airy and warm and patients say they are comfortable. They are heated by three coke-burning stoves arranged down the centre. These need frequent black-leading and stoking—a noisy and tedious proceeding—four-hourly day and night. Patients are said to sleep through the clatter of the coke-bucket with a little practice. The water is heated in a separate boiler-house for each ward, and these boilers might well have been enlarged to heat the wards. The main entrance (on the left in fig. 1) opens into a short corridor on either side of which are the lavatories for staff and patients, two bathrooms, sluice, cupboards for soiled and clean linen, sister's room and ward kitchen, with a gas stove for making tea and doing the little cooking that is not done in the main kitchen. There is not much provision for patients' clothing and luggage, but air-raid casualties are likely to travel light.

FIG. 2—THE OPERATING HUT



The *operating hut*, which also houses the X-ray room, varies in size according to the size of the hospital it serves. Fig. 2 is the plan for a hospital of 400 beds, with a theatre 36 ft. long. For one with 200 beds and only two tables the theatre is 24 ft. long, and larger hospitals may have five or six tables and a theatre 48 ft. long. It seems doubtful whether a 36-ft. theatre will be found large enough for four

FIG. 3—THE KITCHEN HUT



tables in practice. The nurses' rooms also vary in size. The rigid table lights fitted present some obvious difficulties, and a gutter and drain in the theatre floor would help rapid cleaning after an operation. Where the floors are covered with linoleum, however, a gutter might allow water to creep underneath. Ventilation in the theatres and more particularly in the sterilising and X-ray rooms leaves much to be desired and gas sterilisers are sometimes fitted without a vent for fumes. An exhaust fan in the X-ray room is essential. The boiler for service water sometimes holds only 60 gallons, which will soon be used by surgeons scrubbing up under running water. In some sterilising-rooms, too, all water has to be carried across the room to the sterilisers. A more serious omission, which is noticeable throughout these hutted hospitals, is the lack of covered ways for the patients. Theoretically patients reach the X-ray room by the door at the right-hand end of fig. 2, but since there is no covered way to this door they will often have to be taken through the operating theatre.

The *kitchen hut* (fig. 3).—All food is cooked here and taken to the wards on trolleys. The metal containers have double walls with wood between to make them reasonably heat-retaining. The trolleys can be clipped together so that one man can pull several at once, but he will have to be a strong man where the way from the kitchen is up-hill. In the kitchen inspected cooking will be done by gas, but this varies with the services available. The cooks foresaw no difficulties in satisfying the needs of 300–400 patients.

In criticising these huts it must be remembered that in an emergency it is impossible to emulate peace-time standards. We are undoubtedly getting better temporary hospitals than ever grew out of the last war.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

THE EFFORT SYNDROME

IN his Honyman-Gillespie lecture in Edinburgh last week on the effort syndrome in the present war, Prof. F. R. Fraser said that in civil practice this condition is comparatively rare. In war-time, however, it is common, and the Ministry of Health has already set up a special organisation. The effort syndrome is no new disease, for in 1867 Maclean described cases in the British Army which he ascribed to the strain of heavy packs and their straps across the chest along with too tight uniforms. DaCosta, in America, described a large series particularly among the troops in the American civil war. In his opinion the ætiological factors were infections, particularly diarrhœa, and wounds, but he recognised that the patients had often shown symptoms before enlistment and he advocated that new recruits should be gradually trained and not sent to the front lines too early. Thereafter there was a gap in the literature until 1914–18 when there were so many cases that a special hospital was set up in Hampstead for their study and treatment under Sir Thomas Lewis, together with five centres in France. The system of graduated exercises was developed both for diagnosis and treatment. During the last war about 80 per cent. of the men invalided on account of "heart disease" were suffering from the effort syndrome. Various analyses made during and shortly after the last war showed that slightly more than half the cases had shown symptoms before enlistment. Among this group many gave a history of previous infections but in the majority there was an indefinite gradual onset. This was the method of onset also in most of those who developed symptoms only after enlistment but in them the other common causative factor was trauma. At this period most observers came to consider the condition a purely psychogenic one, with fear or anxiety as the basis, with "constitutional asthenia" also a factor. Paul D. White, however, from a study of civil cases, thought that heredity, strain due to infections, and mental and physical factors, such as prolonged excitement in the presence of fatigue and exertion constituted the basis of the condition.

In justifying the use of the term "effort syndrome" Professor Fraser said that soldiers suffering from this complaint readily acquire a fixation that the heart is affected because of the frequent examinations, always of the heart, to which they are subjected before the final diagnosis is made and by that time it is difficult to convince them to the contrary. The various labels —D.A.H. and so on—which were used provide a subconscious reason for escape from discomfort with a clear conscience. Avoidance of any diagnostic term drawing attention to the heart is imperative if no organic heart disease is present. Recognition of the condition is easy, the difficulty lies in deciding whether or not early organic heart disease, which may give a very similar picture, is present in addition. Although breathlessness is met with in all cases on inquiry, left inframammary pain is the commonest symptom volunteered by the patients. This pain often spreads over much of the left side of the chest or even a wider area and is accompanied by hyperæsthesia of the skin of the affected area. Giddiness is found in 40 and palpitation in 35 per cent. All cases show tachycardia, often 100–120, all day long but the heart-rate drops to normal during sleep. All these symptoms and the tachycardia are accountable on a basis of undue effort, but the tired, anxious look, the tremor, the headache and the mental and physical weariness must be due to a psychological factor.

In this war a few cases of the effort syndrome came home in the first convoys from France and since then there has been a steady stream both from abroad and from units at home. The special measures required for diagnosis include the services of an expert in cardiological diagnostic methods to rule out organic heart disease, and a psychiatrist. Cases are separated into categories as the result of their examintions. 1. Those who have organic cardiac or pulmonary disease; these are of no further use to the Services. 2. Those who are constitutionally feeble mentally or physically; these also are of no further use as fighting men. 3. Those who have led sedentary lives or are not robust physically, and will often be of use if trained slowly and perhaps employed at the bases. 4. Those whose symptoms arose after infections; most of these can be restored to health. 5. Those in whom the psychological factor is predominant; skilled treatment is capable of restoring many in this group to usefulness. The psychological factor overlaps into all the other groups. This aspect of the problem was not tackled to any large extent in the last war. Professor Fraser described the organisation of the special centre for the effort syndrome at Mill Hill school where cases are sorted, the "useless" ones being boarded and the curable ones treated by graduated exercises, games under supervision and remedial occupations in congenial surroundings. In this war, however, there are, more than ever before, other needs than those of the fighting forces. The rehabilitation of men to their skilled civil occupations may be the best way to restore their health and usefulness to the nation.

An analysis of the first fifty cases admitted to Mill Hill showed that the numbers having symptoms before enlistment and the proportional importance of different ætiological factors are almost exactly the same as in the last war. One important point brought out is that the average time spent in other hospitals before admission to Mill Hill is nine weeks, an unfortunate loss of valuable time.

Professor Fraser concluded by advising that a probationary period of at least a month should be instituted for all recruits during which they could be sympathetically observed. In this way a large number could be eliminated who would otherwise become victims and add greatly to the cost of the war by the necessity for providing them with treatment and pensions.

THE JOHN MARTIN HOSPITAL IN SKYE

An appeal is being made for a sum which will yield an additional income of £200 a year for the maternity annexe of the John Martin Hospital at Uig. This hospital with dispensary and accommodation for nursing and domestic staffs sprang from an individual endowment, which also provided the funds for the building of the maternity annexe. No other such unit existed in the island. There is no intention of undertaking surgical work more appropriately done in the large hospitals in Edinburgh and Glasgow. The intention is rather to make it possible for normal cases to have the desired close coöperation with and supervision by doctor and nurse, especially when distance makes adequate observation at home difficult or housing conditions make necessary isolation or quiet impossible. Steady progress is shown in the numbers of patients admitted since the annexe was opened in 1937, and satisfactory vital statistics have been obtained. A charge is made for patients but it must be modest or it cannot be met. It is the practice of the hospital to modify the charges whenever need exists.

IN ENGLAND NOW

A running commentary from our Peripatetic Correspondents

OUR public-assistance institution is at last upgraded. Nine of our ten huts are finished and the tenth only needs paint and internal fittings. The operating-theatres in the old building are actually in action two days a week and our automatic potato-peeler stands ready for the call. But six months ago we had our doubts and it has been uphill upgrading all through. I was one of the first of the older hands to arrive at the circumference of the sector on the day that the Polish invasion started. Within twenty-four hours forty reinforcements arrived—sisters, nurses, senior staff, students and technicians from our mother hospital in London. The men were soon lodged in a casual ward and the ladies were billeted after a fashion outside. We did a lot of improvising in the first ten days. There were many windows but nothing with which to darken them. We borrowed a Rawlplug outfit, picture cord, ladders and hammers, and some old dark blankets. When the old blankets ran out we fell back on the new ones marked G.R. and drew on the first-aid post stock, repulsing the attacks of the A.R.P. quartermaster. Four weeks after our arrival 500 yards of dark material came and the nurses made real curtains. The students undid bales of sandbags, filled them, and barricaded our vulnerable points. The first unit to get into working order was the staff kitchen—complete with cutlery and crockery commandeered from our home hospital's nurses home. About a third of the pathological department from "home" came down with its guineapigs and rabbits. The X-ray department soon followed and by the end of September had accumulated enough films to last them eighteen months at full capacity. An army of workmen began on the huts with a smooth confidence and precision that was a joy to watch. The Office of Works had to be told that patients need a staff to look after them, but in the end they saw the point and agreed to cubiculise two huts for nurses—and a good job they have made of them. Splints came in their thousands by lorry, a few sheets and blankets, collapsing beds, hot bottles, a nightshirt or two, clinical thermometers, porringers and telephone extensions. Quantities of dressings and a few old instruments were here before us. The rest dropped in in surprise packets with no indication of their contents. One crate I remember contained 4 large enamel bowls, 14 small ditto, 2 pairs of tracheotomy dilators, 3 abdominal retractors and much brown paper that had to be searched for small oddments. We had our own leaflet war. Sometimes supplies arrived before their consignment-notes and sometimes afterwards. Long lists had to be checked, counter-checked and entered up in triplicate. By a process of elimination it was possible to sort the pieces out—sometimes. Did they belong to the beds already sent or those to come? Always assuming they were meant for us.

Meanwhile the casual ward, a cold, cheerless place, was slowly being made more habitable for a long campaign. Electricians and plumbers came and went. We were promised floor-coverings and even cupboards. Our mess-room at least was large and airy in spite of its concrete walls and floor. We made ourselves into a club, with a mess-president, officers and rules, and a licence to sell our beer in bottle. We had a piano, a wireless and a notice board. The five students going up for their final had daily coaching in examination tactics. The rest got lectures on the ear, nose and throat, a tour of the neighbouring home for mental defectives and demonstrations on one or two good cases in the local infirmary. The one case of auricular fibrillation was well and truly auscultated. Three woman arrived—paying their own passage—for a Wertheim, but alas our theatre was not up to the strain and they had to be sent elsewhere. We sighed for our lovely operating-table and anæsthetic wagon now parked in the basement in London. Incidentally not a single eye-instrument appeared on the schedule of equipment for a base hospital and there was nothing allowed for such a thing as an aching molar.

Every day brought its alarms, excursions or minor crises. Sector officers arrived, went round, expressed their surprise at our somewhat cold comforts, said something must be done, and departed. We went on hoping and improvising. There were minor crises in the billets too. Mrs. Brown could not manage more than bed and breakfast; her husband had osteo-arthritis and she was not too strong herself. Mrs. Jones would have young doctors but no nurses; their hours were far too irregular. The necessity for some sort of nurses home on the premises became more and more obvious and we began to cast our eyes on one or two Naboth's vineyards. Our dealings with the local authority were characterised by cheerful coöperation within the unavoidable limits of bureau-

cracy. The locals had their own troubles and I look back on their help now with gratitude. The leaflet war went on all the time. Orders came from on high, were countermanded next day, and restored the day after. Authority was worried by the inexplicable delay on the part of the enemy to do what was expected of him. At the end of September we were still an advance party. Our staff was still only a skeleton one though there were rumours that the full establishment would arrive before long; not that there was anything for them to do if they did come. By that time we could have functioned at short notice as a sort of glorified convalescent home, we could have tackled a few very selected surgical or medical cases, and we even had some quite promising equipment for casualties—A.T. serum, M. & B. 693, and a stock of anæsthetics. Nevertheless the dismal fact remained that the only parts of the hospital which were really ready for anything were those staffed and equipped en bloc from our old home in London. I suppose when one is digging a front-line trench one never knows what is happening at G.H.Q., at least until zero hour arrives, so perhaps the doings of our working party begging, borrowing or scrounging, and improvising as best they could, were part of some prearranged plan of which we mere mortals know nothing.

* * *

The health questions of war-time can be divided into three groups: the special problems caused by war conditions, the functioning of ordinary current work and schemes for future development. So far only the first has been touched upon. Ordinary current health work goes on fairly regularly, but it is affected by shortage of administrative staff and by much deviation of function of the officers so that they have less time to devote to routine health work. Unlike the last war, when nearly all the whole-time medical staff were in the Army, most of these men remain and carry on with their normal work. In the last war it was rather a nightmare to maintain even a skeleton efficient service but in this war that side of it has not been difficult. The medical inspection, tuberculosis, venereal diseases, maternity and child-welfare work all go on much as usual, incorporating in their stride our thousands of evacuees. Meat slaughtering and distribution is now done at a few selected centres and most of the slaughter-houses in the county are idle. What effect this concentration of effort will have on the future of meat slaughtering and meat inspection it is difficult to say.

It is as regards future work and immediate new developments that the most striking and in many ways most far-reaching changes are noticeable. The war at once stopped all new developments other than those that were urgent. The demolition of unfit houses and the provision of new council houses to replace them stopped. Only those in course of construction were allowed to be completed. Schemes for new water supplies, sewage-disposal works and the like had to be put into cold storage, to the delight of the slackers and the unprogressive who are only too willing to use the war as an excuse for inactivity. While the exigencies of war warrant and demand this limitation of capital expenditure now, it is imperative for the future of the country that we should look ahead and refuse to regard present conditions as permanent. Of course the length of the war and the financial position at the end of it are paramount factors, but there is more to it. After the war there will inevitably be much available labour unemployed and its steady utilisation is essential. During the war there should be a scheduling of all new work, including such new health work as housing schemes and water-supply developments. There is no reason why these should not be proceeded with now up to the stage of full plans and preliminary arrangements, so that when the war is over they can be put in hand in an orderly stream, regulated according to the materials available at normal prices (as distinct from the absurdly inflated prices after the last war) and the kinds of labour seeking an outlet. If the prices were artificially kept up the types of work affected would not be put into operation until the profiteers brought them down. This anticipation of the requirements of the future is as necessary as our direct war efforts.

Obituary

IVOR RIDGE-JONES

M.C., M.R.C.S.

Dr. Ridge-Jones, who died at Millbrook near Plymouth on Feb. 29, was the third son of Dr. Thomas Ridge-Jones, physician to the Victoria Hospital for Sick Children and for many years resident medical officer at St. George's Hospital. The son was educated at Eton College and Trinity Hall, Cambridge, going on to St. George's from which he qualified in 1912. Two years later he took a tropical diploma and spent some time in Egypt. During the late war he served in Mesopotamia with the rank of captain, R.A.M.C., and later in the North Persian campaign where he was decorated for gallantry. He also received the North Persian Medal with two clasps. From 1922 to 1932 he was Government medical officer in Iraq and was awarded the Order of El Rafudain by the late King Feisal. On leaving Iraq he acquired the practice of the late Dr. J. Currie at Cawsand near Plymouth and carried on an extensive practice in the parishes of Maker, Rame and Millbrook. His death occurred suddenly from a heart attack when he was in his surgery. He was 55 years old and unmarried.

JOSEPH GOODWIN-TOMKINSON

M.D. GLASG.

Dr. Goodwin-Tomkinson, who died in Glasgow on April 12, had retired five years ago at the age of 66 from the active practice of dermatology. He was a native of Alsager, Staffs, and graduated M.B. with commendation at Glasgow University in 1901, afterwards continuing his studies in Paris, Berlin and London. Until a few years ago he was McCall Anderson memorial lecturer in dermatology in the University of Glasgow and consulting physician to the skin department of the Glasgow Western Infirmary, consulting dermatologist to the Glasgow Hospital for Diseases of the Ear, Nose and Throat, to the education health services of Glasgow and the county of Dumbarton and to the county council of Lanark. He was professor of diseases of the skin in the Anderson College of Medicine and a member of the Glasgow and West of Scotland radium committee. In 1928–29 he was president of the British Association of Dermatology and Syphilology and in 1922 he served as vice-president of the section of dermatology at the annual meeting of the British Medical Association. He leaves his wife with one son.

Dr. ARTHUR EDWARD MILLS whose sudden death on April 10 is reported from Sydney, New South Wales, was deputy-chancellor of Sydney University. His whole life had been spent in that city; he qualified there in 1889, straightway becoming R.M.O. at the Royal Prince Alfred Hospital, and retiring as consulting physician in 1929.

LETTERS TO THE EDITOR

SKIN UNITS WANTED IN HOSPITALS

SIR,—In the official history of the last war the section on skin diseases opens with this paragraph. "Diseases of the skin, if syphilis is excepted, are generally regarded as lesser maladies, that is to say, conditions which as a rule neither threaten life nor seriously impair health. For the individual this is true, but in the case of an army the collective results of such minor affections may become of high importance, because for military purposes a man incapacitated from duty is a loss to the fighting force whatever the extent or cause of his personal disability."

The casualty-rate from skin diseases in the British Army in France was considerable, and necessitated the formation in 1916 of special base hospitals. Quoting again from the official history: "In one army in the later stages of the war it was stated that skin diseases and P.U.O. accounted for 90 per cent. of all sickness." (Trench fever was the commonest cause of P.U.O.) Most of the cases consisted of pyodermia, secondary to scabies or pediculosis, infective dermatitis, and seborrhœic dermatitis or eczema. The average duration of incapacity was 61 days. The cases therefore represented a serious drain on the personnel of the Army.

The crowded conditions of trench warfare and the unhygienic conditions associated with active fighting and movement of troops were responsible for this parasitic infestation. Up to now this stage has not been reached in this war, but the rapid increase in size of the Army in England has already given rise to problems in the management of skin diseases in the Services at home. I can only speak from personal knowledge of the conditions in the E.M.S. sector to which I am attached. The emergency hospitals are being used to accommodate skin cases from the Army, Navy and Air Force. In this sector skin cases have been mainly disposed in two hospitals but other hospitals of the sector have been used to take smaller numbers. There is also a military hospital with 70 beds for the treatment of skin diseases.

In spite of the static conditions of the war I have been struck by the large number of skin cases we have been called on to treat, and many of these cases had been in hospital for three months or more. These cases represent a loss in the strength of the Forces, and further, a long stay in hospital with a disease which does not produce a general constitutional disturbance but often disturbs sleep has a bad effect on morale and not infrequently provokes a condition comparable to traumatic neurasthenia. The majority of cases being admitted are seborrhœic eczema and those secondary to scabies, secondary chronic impetigo and pyodermia. The incidence of scabies before this war was apparently rising in many parts of the country, and is certainly increasing as a result of evacuation. It was shown during the last war that troops returning from England were often infected and in their turn infected men in the forward zones. An increase in scabies is then to be expected in the future, both among the civilian population and among the members of the Forces.

Men of about twenty joining the Army are at the seborrhœic age, and their tendency to develop seborrhœic affections will probably be increased as a result of dietetic change. The same dietetic changes may be of importance, together with unaccustomed exercise with friction of the flexures, in cases of flexural psoriasis which have been seen. The incidence of fungus infections of the feet is much greater than it was in 1914. It can be expected that there will be a considerable number of cases in the Army in the summer.

The time has come for the better organisation of the treatment of skin diseases in the Forces in England. The numbers of cases are already considerable and will no doubt be greater in the future. I think it is important to provide skin units in hospitals, either in the Army or under the E.M.S. Such skin units could form part of a general hospital, and it is preferable that they should do so, for the treatment of skin diseases is not divorced from general medicine, and the stimulation and advice of specialists in other branches of medicine should be available. The skin unit could be used as a training ground for doctors. A few weeks' course should give recently qualified doctors a working knowledge of the skin diseases likely to be met with in the Forces, and most recently qualified doctors are anxious to get additional experience in dermatology. The atmosphere of a ward solely intended for skin diseases and the attitude of its personnel is quite different from one in which a few skin cases are treated among other medical diseases. Both sisters and nurses become keen and expert in the treatment of their cases. When there are regular attendances of an expert dermatologist the patients quickly appreciate the definite and competent direction of their treatment. The duration of chronic pyodermia and eczema is shortened.

For a unit of some 200 beds the personnel should include a dermatologist of consulting rank and two additional medical officers, one of whom should have had dermatological experience. There should also be a small department for physiotherapy, including an artificial sunlight lamp, a small diathermy machine, and a superficial X-ray therapy set. The latter is essential for the treatment of many chronic cases of eczema, infective dermatitis and fungus infection. The services of a psychologist should be available for advice on cases of chronic prurigo, eczema and urticaria. If military cases are being treated in a skin unit under the E.M.S., there should be a liaison officer to be responsible for records, to maintain discipline, and to direct recreation and rehabilitation.

I am, Sir, yours faithfully,

Guy's Hospital. L. FORMAN.

PRIMARY SUTURE OF WAR WOUNDS

SIR,—In your issue of April 6 you made some comments on a paper presented by Dr. Roux-Berger to the meeting of the French Academy of Surgery on Jan. 17. You say that at that meeting criticism was made of "The practice employed in the Spanish civil war of treating wounds by primary suture and the application of plaster. . . ."

I am at a loss to understand this interpretation of the views expressed at this meeting, at which the Spanish war was not mentioned. In point of fact, Dr. Roux-Berger denounced the use of the primary suture for war wounds, but his argument was based on his own experience in treating French soldiers. His views on this point are shared by the surgeons of my country, including myself, as may be seen from the statements I have made on various occasions since I came to England. In an article published in THE LANCET on June 24, 1939, I used these words: "In very few cases was the skin sutured." In my book, published in September, 1939, I wrote (p. 26): "It is only in very exceptional cases that the wound of a

gun-shot fracture can be sutured." Again, in a lecture given to the Royal Society of Medicine on Nov. 22, 1939, I said: "In wounds from aerial bombs, which constitute the greater part of my experience of war wounds, one seldom sees cases where suture of the skin is possible." I am therefore surprised to find that such a misconception should exist as to the use of this method in Spain.

With reference to the use of plaster-of-paris, Dr. Roux-Berger did not criticise this at all. In fact, he quoted two cases of severely infected wounds in which he successfully employed the closed method after a very careful operation.

There is one point of surgical technique in which I do not share Dr. Roux-Berger's views—the extremely meticulous resection of the bone splinters which, according to his method, takes two hours to be achieved. I entirely agree with Dr. Maurice Chavassu's views expressed at the same meeting in the following words: "C'est cette esquillectomie soignée qui demande, dit-il, deux heures de travail. En ce moment ou il n'y a par bonheur qu'un nombre infime de blessés, fort bien. Mais en période de fonctionnement tant soit peu intensif, au moment où les blessés affluent, deux heures de travail pour un seul c'est bien long." This was my own experience during the bombardments of Barcelona.

There is another point that I should like to emphasise. When the writer of your article speaks of "The practice employed in the Spanish civil war," I assume he is referring to the technique used by surgeons of the Republican side—*i.e.*, those of the hospitals and medical schools of Barcelona, Madrid and Valencia. I have no knowledge of the methods employed by the surgeons of Franco's army, though I am well aware that many of them were surgeons of great ability.

Although not myself an army surgeon, I am well acquainted with the methods employed by the most distinguished surgeons of the Spanish Republican Army, including the best known orthopædists and traumatologists (Professors Manuel Bastos, Trias Pujol, D'Harcourt, Gonzalez Aguilar, Lopez Trigo, and others). All these surgeons without exception treated war wounds without sutures. I myself have used sutures only in cases of newly-inflicted articular wounds.

I am, Sir, yours faithfully,

Oxford. J. TRUETA.

INFECTIVE HEPATITIS AND CATARRHAL JAUNDICE

SIR,—In his letter of March 30 Dr. Hope Simpson throws doubt on the statement in your annotation the previous week that in addition to the mild jaundice caused by hepatitis a second form exists which is caused by catarrh of the common bile-duct associated with duodenitis. As mild jaundice does not itself lead to death, most of the evidence must be clinical and biochemical, and Keith Simpson and I showed in our paper in *Guy's Hospital Reports* (1934, **84**, 173) that there is quite sufficient of this to make it extremely probable that many cases are truly catarrhal. So far as I know, only a single autopsy on a mild case of infective jaundice has ever been performed. A girl of nineteen died from a fractured skull caused by jumping from a third-floor window the day after admission to hospital in a typical attack of catarrhal jaundice, in which the jaundice was preceded for a few days by symptoms of severe gastritis. Eppinger, who performed the post-mortem, had previously published papers to prove that so-called catarrhal jaundice was a result of hepatitis, and he expressed himself as "disillusioned" (*enttaüscht*) to find the contrary. The mucous membrane of the stomach and duodenum was swollen and showed submucous ecchymoses, and the papilla of Vater was unusually prominent. There was no bile in the duodenal contents, but the common bile-duct, hepatic ducts and gall-bladder were dilated and contained dark sticky bile. The mouth of the common bile-duct was completely obstructed as a result of inflammatory swelling of its wall, and no bile entered the duodenum on compressing the gall-bladder. Macroscopic and microscopic examination of the liver and pancreas showed no abnormality of any kind.

True catarrhal jaundice may occur in epidemic form as well as sporadically. I believe that the Gallipoli epidemic at the end of 1915 was of this nature. I aspirated the duodenal contents in nine cases at Lemnos; the fluid was turbid from the presence of excess of mucus, and Sir Charles Martin found that it contained very numerous coliform bacilli in contrast with the duodenal contents obtained at the same time from healthy men, which was clear and almost sterile on cultivation. I heard of only three post-mortems in Gallipoli cases. In two Sir William Willcox found severe duodenitis, with red swollen mucous membrane of the common bile-duct. I was present at one of these autopsies and was impressed by the intense congestion of the duodenal mucous membrane, which was deep purple and so swollen that it caused obvious obstruction of the ampulla of Vater. In the third case Sir Humphry Rolleston found severe gastroenteritis, and a plug of mucus completely obstructed the orifice of the biliary papilla.

I am, Sir, yours faithfully,

Oxford. ARTHUR F. HURST.

FRACTURED FEMUR IN CONVULSION THERAPY

SIR,—The imputation to me of certain beliefs which are not mine by Drs. A. M. Wyllie and W. Mayer-Gross in your issue of April 6 makes it necessary to reply to their letter in order to make my position clear.

The statement by them that I thought the incidence of fractures in my series of 160 cases is low is quite erroneous and was never implied save in respect to the series of Mr. Gissane, Dr. Blair and Mr. Rank (and, incidentally, is also lower than in the series of Drs. Wylie and Mayer-Gross) and I cited the difference merely in support of my contention that it would "appear to be due" to a difference in technique, more specifically to physical restraint applied to the convulsing patient. I stated: "Details of the activities of the doctor and nurses before and while the patient is convulsing are usually lacking, but one gathers from reading different papers that such activities are directed towards restraining the movement of patients," an altogether different idea than is suggested by Drs. Wylie and Mayer-Gross—"no worker advocates forcible restraint of the patient during the tonic stage of the fit"—as if I had made such a categorical statement.

Their letter considered as a whole tends to shift the main argument to side issues. My main argument was that age or prolonged periods of inactivity are no contra-indications to the employment of convulsive therapy. Secondly, I suggested that the occurrence of Cardiazol fractures might be dependent upon external restraint applied during the convulsion: in saying so, I was not thereby excluding muscular violence pure and simple as a causal factor in their production,

though I am of the opinion that it plays a minor rôle as compared with external restraint.

Furthermore, it is questionable if the figures quoted by them (1·2 per cent. of fractures generally as against my 1·25 per cent. and their own of 2·07 per cent.) detracts from my argument. In practically all reports of fractures in series of cases that I have read the ages of the patients treated is considerably less than the ages of those I have treated, indeed it is uncommon to read of patients over fifty years. Since this is so and if age *is* a factor of importance in the production of fractures, I should have had a much higher incidence of fractures than I actually did have. Also, I stated that most probably the fracture in the lady of fifty-nine *was* due to restraint unwittingly applied. These two points, instead of detracting from my argument, would seem to add considerably to it.

What appears to be a further support for my argument is forthcoming in the figures quoted by Drs. Wyllie and Mayer-Gross themselves (who admit to using restraint, albeit gentle restraint) where in a numerically comparable number of cases (although some of mine were more elderly) their figure for fractures is higher than mine in 25 cases over the age of fifty.

Lastly, I would like to point out how their surmise that "The infrequent occurrence of fractures in epileptics is probably due to the fact that in most cases their bones have been habituated to the strain of fits from youth" is quite inadequate to explain the rarity of fractures in cases of idiopathic epilepsy beginning late in life or in epileptiform attacks (other than those produced by cardiazol) occurring from other causes in the middle-aged or elderly.

I am, Sir, yours faithfully,

Glasgow Royal Mental Hospital. RANKINE GOOD.

LOUSY CLOTHING

SIR,—Recently Professor Buxton [1] described apparatus for determining the critical lethal temperature for lice. He found 53·5° C. for five minutes, 52·0° C. for ten minutes, and 50·0° C. for thirty minutes lethal for eggs. In the case of adult lice he found 51·5° C. for five minutes, 49·5° C. for ten to thirty minutes, and 46·0° C. for forty-five minutes to one hour lethal for both sexes and for immature specimens. A paper he read to the Royal Society of Tropical Medicine and Hygiene [2] stimulated a discussion in which Colonel W. Byam remarked about the infectivity of louse fæces in garments and blankets. The War Office trench-fever investigation committee showed [3] that the infectivity of the louse's excreta is very high; 0·1 mg. has sufficed to give the disease when inoculated into man. The virulence of the excreta is destroyed by dry heat at 100° C. in twenty minutes and by moist heat at 60° C. in twenty minutes.[4] The virus of trench fever seems to be more resistant than that of typhus where the excreta of lice dried in air lose their virulence in a few days.[5] It is a fact, however, that fatalities among research workers who handle the excreta of lice infected with the virus of typhus have been regrettably frequent in the past, before protective vaccination with the preparation of Weigl became possible.

In my own experience, an investigator, a very intelligent man who knew the danger of infection and took full precautions against lice, developed typhus after taking samples of venous blood from five cases who were confined in a small room lacking in ventilation and under extreme conditions of dirt and destitution. The investigator wore protective clothing, which he removed immediately he left the sick-room and placed in a canvas bag for disinfestation. Within an hour he had removed all his other clothing and sent it to the disinfestor, had a bath in dilute lysol and searched his body for lice. After the bath he put on fresh clothing. It was ultimately concluded that this man acquired his infection by inhaling louse fæces released into the air of the room from stirred-up dirty bedding and clothing. At the time there was only the one focus of the disease, and he had no further contact with cases or infective material either before or after the occasion on which he collected the blood samples. In his case the incubation period was thirteen days.

It seems worth considering whether disinfection as well as disinfestation may not be required in the treatment of lousy clothing in areas where trench fever or typhus are endemic.

I am, Sir, yours faithfully,

FRANK MARSH.

Pathological Laboratory, c/o Anglo-Iranian Oil Co., Ltd., Abadan, Iran.

1. Buxton, P. A., *Brit. med. J.*, March 2, 1940, p. 341.
2. *Trans. R. Soc. trop. Med. Hyg.* January, 1940, p. 365.
3. See Trench Fever, by W. Byam, London, 1919.
4. Topley, W. W. C. and Wilson, G. S. Principles of Bacteriology and Immunity, London, 2nd ed., p. 1463.
5. Nicolle, Blanc and Conseil, *C.R. Soc. Biol. Paris*, 1914, **159**, 661.

PEPTIC ULCER IN THE SERVICES

SIR,—The contributors to this discussion ought to set out the evidence that young subjects of peptic ulcer will never be able to resist the rigours of Service cooking. This pessimistic assumption is contrary to the experience of many patients who had a complete remission of symptoms during their war-time service in 1914–18, contrary to German teaching, though admittedly their cooking can't be compared with ours, and contrary to modern ideas on the ætiology of ulcer. Leaving mass destruction of the stomach out of consideration—the Nordic theory that stomachs should be altered to fit the diet instead of the other way round was thoroughly tested on the Continent in the decade after the last war and didn't work—we are advised to turn these patients out of the Forces and send them back to the war-time mental strain of civilian life. If we do so we probably condemn the majority to a lifetime of physical and mental inferiority, as well as depriving the country of the full benefit of men who are possibly more conscientious and intelligent than the average. Even if all our prolific gastroenterological thinkers gave this advice, I should still feel disinclined to accept the opinion of a weak and badly organised branch of British medicine, which year after year grinds out the same old ideas, based on the same fallacy of the selected sample of patients who come to surgery or post-mortem and the same misunderstanding of the radiology and physiology of the gut.

As some of our grandfathers and even great-grandfathers knew, there are two entirely different points to be considered in the treatment of peptic ulcer. The first is: What is the difficulty in the life of the patient which causes the breakdown in gut function? This is no place to argue the pathological chain of events in detail, and of course it varies to some exent from patient to patient, but I believe the commonest answer to this question is that the modern concentrated starchy diet is especially difficult for intestines reflexly irritated by worry and strain, and that this difficulty is exaggerated by sedentary life and vices like aperients, oversmoking and the like. The second point is: How much organic damage has already been done? In practice we start with a bland

diet because experience, experiment and theory all agree that that is the right treatment for a badly damaged or irritable gut. But it is not so obvious until we give unbiased consideration to the results of the last fifty years that a persistent bland concentrated diet promotes the formation of further ulcers. Generally speaking, in elderly patients we neglect the risk of further ulcers forming and concentrate on healing the existing one. But in younger patients we can often equally well afford to neglect the ulcer (unless it is actively inflamed) and concentrate on stopping the process which is causing the ulcers. To do this we must discipline their digestions to cope with bulky meals and that is what we are unable to do under civil hospital conditions where we have to keep the patients in bed.

Is this problem of sufficient importance to try a really large-scale experiment? I should have thought it was, and that now was a time when a large number of patients could be treated on sanatorium lines on a routine of diet and exercise. Ulcer patients are particularly easy to manage once their confidence is obtained, and it should be possible to run an establishment almost entirely by convalescent labour and at the same time have it ready to act as an emergency overflow hospital if sudden need arose.

I am, Sir, yours faithfully,

OPTIMIST.

RESEARCH DEFENCE

SIR,—In view of the renewal of the great efforts made by "antivivisection" societies in the war of 1914–18 to deprive our military forces of the protective inoculations considered necessary for the success of our arms by all military medical experts, may I mention that the Research Defence Society will be glad to forward to any member of the medical profession, who applies to them, a recently published pamphlet entitled Protective Inoculation of the British Military Forces. It would be of special interest to those engaged in the examination of recruits. We can also send reprints of articles, "Twelve Truths about Animal Experiments," "Antivivisection 'Ethics'" and "Prophylactic Inoculations against Animal Diseases in the British Empire." These leaflets will enable medical practitioners to reassure any of their patients whose feelings may have been harassed by the habitual disparagement by the opponents of medical research of all the great advances of the past century due to the experimental methods so essential to the progress of a biological science such as medicine.

I am, Sir, yours faithfully,

LEONARD ROGERS,

Treasurer, Research Defence Society,
11, Chandos Street, W.1.

CEREALS AND RICKETS

SIR,—In an annotation under this heading (*Lancet*, 1939, **2**, 1277) you state that Harrison and Mellanby draw from their work the practical conclusion that the rickets-producing action of cereals can be overcome by increasing the calcium intake—e.g., by drinking more milk. Almost fifteen years ago in a letter to your columns (*Lancet*, 1925, **2**, 205) I gave reasons for suggesting that the pre-eminently pro-rachitic effect of oatmeal amongst cereals was "in all probability due to the very high percentage (6 per cent.) of fat which it contains, and the consequent formation by it in the intestines of insoluble calcium soaps, which are excreted unabsorbed in the fæces." Since Harrison and Mellanby appear so far to have failed to elucidate the cause of the phenomenon in question, I would suggest that the hypothesis put forward by me fifteen years ago might profitably be investigated when a favourable occasion offers.

I am, Sir, yours faithfully,

Cape Town. J. WALKER TOMB.

WEIGHT OF BED-CLOTHES IN CONVULSION THERAPY

SIR,—May I endorse Mr. Gissane's advice against covering bed-clothes during the convulsion? In addition to that, the knees should be raised by means of a pillow, thus preventing the full weight of the leg being thrown upon the femur.

I am, Sir, yours faithfully,

Falmouth. H. PULLAR-STRECKER.

IMPROVISED OXYGEN MASK

SIR,—I have read with interest the note by Dr. Alice Rose and Mr. Holmes Sellors in your issue of April 6 on an improvised mask for administering oxygen. It may be noted that the inventors have used the word "improvised" and with restless patients who require prolonged administration, and who must be fed and expectorate sputum, it seems likely that this model will not be without its drawbacks. Efficient oxygen therapy—always of importance in certain cases—has assumed even greater interest now that we must be prepared to treat war gas casualties. All institutions where oxygen administration is contemplated should surely have equipped themselves long ere this with efficient apparatus, and it should not be necessary to have to improvise it in a hurry. There are several forms of face apparatus of proved efficiency, some of which are illustrated in the British Oxygen Company's film, to which should be added the B.L.B. mask. The results obtained with the improvisation described are most impressive—to attain 50 per cent. O_2 in alveolar air with a flow of 6 litres a minute is no mean feat. But one would like to know what values were obtained for alveolar CO_2. The sampling of alveolar air is full of gins and pitfalls but a high CO_2 figure is good evidence that deep alveolar air is being obtained.

I am, Sir, yours faithfully,

London, W.1. KENNETH ROBSON.

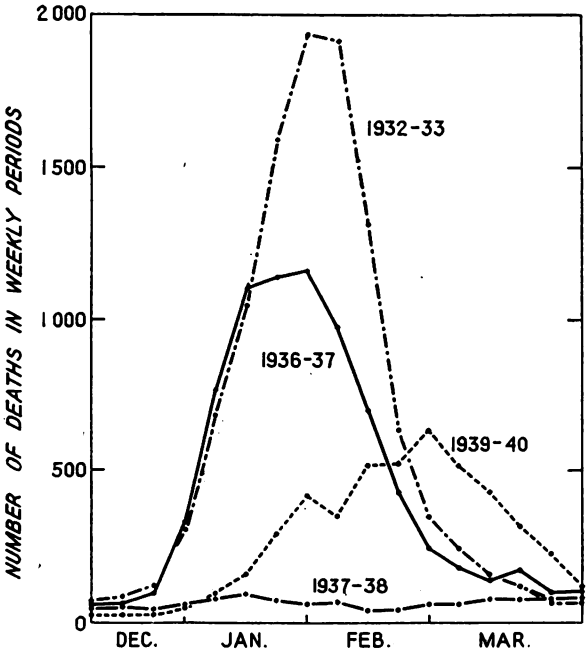
. . . "Like the British Army, medicine and surgery to a large extent have become mechanised. The advances made in medical research in the last quarter of a century in their application have provided means of diagnosis and treatment which can only be made generally available in hospitals. The surgeon requires model operating-theatres with a whole armoury of shining chromium-plated gadgets and instruments to suit his various needs; the anæsthetist is no longer content with a lint mask and a dropping-bottle of chloroform, but needs a whole anæsthetic plant of gas cylinders and glass bottles; X-rays are taken on any and every occasion; electrocardiograms are required almost as a routine; pathological tests increase in frequency and complexity. More and more as the knowledge of these great advantages spreads among the public does the demand come for hospital treatment. This process will be greatly accelerated by the war. . . . But this wonderful armamentarium costs money. That is one of the reasons why the voluntary hospitals find their financial difficulties increasing."—Sir ARTHUR MACNALTY, speaking on Tuesday to the governors of the Royal Free Hospital.

PUBLIC HEALTH

Influenza in Retrospect

THE recurrent epidemics of influenza in this country are, fortunately, almost always confined to the four months December to March. With the issue of the Registrar-General's return for the week ending March 30 it is therefore possible to assess the scale of this year's visitation, as measured by the deaths attributed to influenza in the great towns. In the seventeen weeks from the beginning of December to the end of March there have been 4685 such deaths in the 126 large urban aggregates. In the corresponding weeks of 1938–39 there were 3009, in 1937–38 only 1072. On the other hand, in the epidemic years of 1936–37 and 1932–33 the deaths in the same four months reached 7726 and 10,660. In 1923–33 the peak was reached in the last week of January with over 1900 deaths, in 1936–37 in the same week with 1155 deaths. In the current year the turning point was not till the end of February, the maximum of 629 deaths falling in the week ending Feb. 24.

The epidemic of this year while undoubtedly considerable and expensive has, therefore, not been one of the first magnitude and distinctly slower and later than usual in reaching its climax. The following figures, and graph drawn from them, show its sequence in comparison with that of the non-epidemic year 1937–38 and of the last two epidemic years.



Weekly number of deaths from influenza in the great towns of England and Wales.

DEATHS FROM INFLUENZA RECORDED WEEKLY IN THE GREAT TOWNS OF ENGLAND AND WALES

Weeks in—	1939–40	1937–38	1936–37	1932–33
December	23	46	54	68
	25	52	57	85
	27	46	97	120
	46	59	325	303
January	94	77	768	681
	158	91	1100	1041
	291	73	1137	1589
	416	60	1155	1934
February	350	66	976	1911
	514	40	697	1306
	521	42	423	630
	629	59	242	344
March	512	57	181	242
	429	76	144	157
	315	76	171	119
	221	78	98	65
	114	74	101	65

Closely corresponding weeks have been taken. The last return would be dated March 30, 1940, April 2, 1938, April 3, 1937, April 1, 1933.

DEATHS FROM INFLUENZA RECORDED IN THE GREAT TOWNS OF DIFFERENT REGIONS OF ENGLAND AND WALES

Two-weekly periods ending—	South-east and East	North	Midland	South-west and Wales
Jan. 13	92	87	50	23
,, 27	214	335	121	38
Feb. 10	338	291	180	58
,, 24	412	446	228	64
March 9	284	400	204	53
,, 23	143	262	99	32
Total	1483	1821	882	268
Average weekly death-rate per million on populations of 1938	13·3	20·8	20·8	19·4

Owing to the war-time changes in the distribution of population it is not possible to calculate with any pretence to accuracy the relative incidence of mortality in different parts of the country. The deaths tabulated below for wide areas show that the trend of the epidemic was similar throughout the country, the peak falling uniformly in the two weeks ending Feb. 24, but there appears to have been rather a slow rate of decline in the northern towns. The use of pre-war population estimates gives a rather low rate of mortality in the south-east and east and equality elsewhere, but the difference must, as already stated, be regarded with reserve.

Infectious Disease in England and Wales

DURING THE WEEK ENDED MARCH 30, 1940

Notifications.—The following cases of infectious disease were notified during the week: Smallpox, 0; scarlet fever, 817; whooping-cough, 452; diphtheria, 705; enteric fever, 30; measles (excluding rubella), 4750; pneumonia (primary or influenzal), 1195; puerperal pyrexia, 157; cerebrospinal fever, 521; poliomyelitis, 4; polio-encephalitis, 3; encephalitis lethargica, 7; dysentery, 33; ophthalmia neonatorum, 84. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on March 29 was 1171 made up of: scarlet fever, 135; diphtheria, 180; measles, 8; whooping-cough, 60; enteritis, 64; chicken-pox, 64; erysipelas, 35; mumps, 14; poliomyelitis, 2; dysentery, 9; cerebrospinal fever, 114; puerperal sepsis, 12; enteric fevers, 8; german measles, 271; other diseases (non-infectious), 85; not yet diagnosed, 110.

Deaths.—In 126 great towns, including London, there was no death from smallpox, enteric fever, or scarlet fever, 3 (0) from measles, 2 (0) from whooping-cough, 17 (0) from diphtheria, 37 (5) from diarrhœa

and enteritis under 2 years, and 114 (6) from influenza. The figures in parentheses are those for London itself.

Birmingham reported 8 deaths from influenza, Burnley, Liverpool and Stoke-on-Trent each 5. There were 12 deaths from diarrhœa at Belfast and 6 at Manchester. Manchester had also 4 fatal cases of diphtheria. London reported 7 deaths from cerebrospinal fever.

Dewsbury's Maternity Services

Of the 809 births notified in 1939 in Dewsbury 767 or 95 per cent. came under the corporation's scheme. The four municipal midwives—there are no midwives in private practice in the borough—attended 376 mothers and summoned medical aid on 98 occasions; 290 women entered the Moorlands maternity home and 101 were delivered in Staincliffe county hospital. On April 1 extensions to the maternity home were opened—the council regard this title as less alarming than "maternity hospital"—and next year there may be more than 450 there. Mr. David Currie has been appointed obstetric consultant and Dr. Jacqueline Keighley resident medical officer. The R.M.O. holds four antenatal and one postnatal clinic weekly, the consultant one clinic. Every patient has the choice of having her own private practitioner called in an emergency or of having the services of the R.M.O. free of charge. Last year a practitioner was summoned on 33 occasions, but most patients do not ask to have their own doctor. The services of the consultant are available for all, except private, patients free of charge.

Municipal antenatal clinics are available for all expectant mothers who wish to make use of them, and those who have booked the services of a midwife and who are not under the supervision of a practitioner are urged to attend. Cases who have booked accommodation at the home must agree to attend unless they are under the care of a doctor and even then one attendance is obligatory. Other auxiliary maternity services provided at Dewsbury are dental treatment, sterilised maternity outfits, convalescent home treatment for mothers and babies, home helps, and free meals for necessitous expectant and nursing mothers. Infant-welfare centres are held in four different clinics and 80 per cent. of the children under one year attend. Like other mill towns where married women go to work Dewsbury had a very high stillbirth-rate. But the rates for the three years 1936 to 38—54, 48, and 39·5 respectively—reflect Dewsbury's care for its mothers.

Points from Annual Reports

In Dr. Mervyn Thomas's report to the education committee of *Chelmsford* for 1939 we get the first account of the evacuation of school-children from the point of view of a receiving municipal borough. The average daily attendance at Chelmsford elementary schools in 1939 was 3138. In September 1253 school-children were sent to Chelmsford from a London area, but by December only 766 remained there. In July 1119 children were supplied with milk on payment and 145 free; in December the numbers were 1590 and 240 respectively. Roughly one in twenty of the Chelmsford children require free milk whereas of the visitors the proportion was one in seven. Of the 709 minor defects treated at the clinics during the year, 235 were in the evacuated children. All the scabies (22); 35 out of 83 cases of impetigo, and 57 out of 161 cases of other skin diseases were in extra-borough children; 9072 head inspections amongst Chelmsford children showed 37 unclean, of which 2 were cleansed by the local authority; 394 head inspections amongst the visitors showed 74 unclean, all of which were cleansed by the authority. Apparently there was no ringworm in any of the children. Ringworm appears to be dying out in all parts of Britain, as favus did eighty years ago, but scabies is increasing again and impetigo is always with us everywhere.

Dr. Cecil Herington of *Dagenham* reports that the estimated population of the borough in mid-1938 was 107,400. The birth-rate in that year was 18·06, which though 2·94 above that of England and Wales was the lowest reported locally. The crude death-rate was 6·19, also a low record. Infantile mortality was 50·51, the stillbirth-rate 30·00 and the illegitimacy-rate 2·58 per cent. of all births. These are the statistics of a healthy young population. Dagenham has made some progress in diphtheria immunisation. Like all towns which have grown mainly by immigration of young people it has suffered severely from diphtheria, but in 1938 the numbers of notifications were low, only 124, though the fatality was high, 9·7 per cent. In children Schick-tested between 1930 and 1938, reaction was positive in 3092 and negative in 1671. These are children of all ages under fifteen years. Positive reaction is found in 42·0 per cent. of children over fifteen. The percentages of positive reactors is low at all ages. Of the children immunised only 5 developed diphtheria, all of whom recovered. It is not clear what was the number at risk amongst which these 5 cases occurred, but we are told that 5086 were found to be immune, so presuming that the 5 cases arose in one year we have an annual attack-rate of 1 per 1000 among the immunised.

Dr. Andrew J. Shinnie reports that of the seven maternal deaths in the city of *Westminster* in 1938 six were caused by abortion, four admittedly and the other two probably induced. Westminster, in common with the other 27 metropolitan boroughs which make up the county of London, and the municipal boroughs of the Outer Ring, is not a true population unit but an arbitrary division of the metropolis. It is one of the 3 metropolitan boroughs which have a persistently low birth-rate, 8·3 in 1938, and high illegitimacy-rate, 138 illegitimate births to 900 legitimate births in 1938. Its stillbirth-rate is low, 27·1, and its infantile mortality low, 54·9. There is a suspicion that its abortion-rate is high, though of the six fatal abortions in 1938 three were in married women. The crude death-rate in 1938 was 10·4 and as the adjusted rate was 10·7 it follows that the population of Westminster is of nearly normal age-distribution.

The administrative county of *East Sussex* contains half a million acres with a population of 298,790, almost equally divided between the urban and rural districts. The geographical unit contains the county boroughs of Brighton, Eastbourne and Hastings which are outside the administrative county but have a common industry. Dr. R. Asleigh Glegg records an infantile mortality of 31, the lowest ever experienced in the county. He attributes the decline to better wages with consequent improvement in nutrition, better sanitation and the spread of education in child culture. An important event in 1938 was the decision of the county council to proceed with some drastic alterations to Darvell Hall Sanatorium, including a new men's hospital block, enlargement of the women's pavilion and a new hostel for nurses. At present tuberculous patients have to be accommodated in poor-law institutions, but when the sanatorium is enlarged this will be unnecessary. The death tables of East Sussex tell us that the county is an artificial population unit. In the urban districts, of 2180 deaths registered 835 were in persons over 75 years of age and 587 in persons aged 65–75, leaving but one death in three in persons dead before the termination of the normal

expectation of life. Of the deaths 649 were attributed to heart disease, 128 to cerebral hæmorrhage, 155 to other circulatory diseases, 85 to nephritis and 354 to cancer. The crude death-rate for the whole county was 12·82, the comparable death-rate 10. The comparability factor for the whole county is 0·78. In the three large towns (Bexhill, Hove, Lewes) with a total population of 94,180 the crude death-rate was 15·41 and the birth-rate 10·21. We are not given the comparability factor for the towns, but imagine it must be below 0·7, for the crude statistics of these towns suggest that their populations are biased by an excess of elderly people with a high expectation of life for the rest of the population. Amongst the 156,600 inhabitants of the urban areas only 121 deaths occurred in persons between the ages of 1 and 35 years, of which 23 were due to violence and 19 to tuberculosis. The chief public-health event of 1938 was an outbreak of 32 cases of poliomyelitis, of which 18 occurred in Cuckfield rural district (population 24,440) and 5 in Cuckfield urban district (population 13,600).

MEDICAL NEWS

University of London

On Thursday, May 2, at 5 P.M. at 1, Wimpole Street, W.1, Dr. F. R. Nager, professor of otorhinolaryngology in the University of Zürich, will deliver the Semon lecture. He will speak on the paranasal approach to intrasellar tumours. Admission will be free without ticket.

Royal College of Surgeons of England

At a meeting of the council on April 11 with Mr. Hugh Lett, the president, in the chair, the John Hunter medal and triennial prize were presented to Colonel L. E. H. Whitby. The Jacksonian prize for 1939 was awarded to Mr. F. F. Rundle (Westminster Hospital) for his essay on the pathology and treatment of thyrotoxicosis, and a certificate of honourable mention to Mr. N. M. Harry (Melbourne). Injuries to peripheral nerves, with special reference to the late after-results was chosen as the subject for the prize for 1941.

Sir Percival Nicholls and Sir Richard Needham were elected fellows under the charter which permits the Council to elect annually to the fellowship, without examination, two Members of the College of twenty years' standing.

A diploma of membership was granted to F. V. A. Bosc (Univ. Coll. Hosp.). Diplomas in child health were granted, jointly with the Royal College of Physicians, to the following :—

Mary R. Anderson, Harry Angleman, J. B. Atkins, J. L. Bates, Felix Besser, V. L. Collins, Gerald Comay, Janet F. Cormick, C. F. Cumings, Marjorie B. Curties, E. W. Dunkley, Joan Franklin-Adams, Esther Hendry, F. P. Hudson, Elizabeth Jacobs, D. de la C. MacCarthy, Benjamin Roditi, A. W. Uloth, P. C. S. Unwin, F. P. Wadia, and Ailsa M. L. Whitehouse.

On May 2 at 4 P.M., at the college, Lincoln Inn's Fields, W.C.2, Prof. R. J. S. McDowall will lecture on the circulation in relation to shock. The lecture will be open to medical practitioners and students.

Royal College of Surgeons of Edinburgh

At recent examinations the following were successful :—

L.D.S.

Jack Auckland, T. B. Binns, D. M. Bryant, E. H. Chalmers, J. L. Clark, J. A. Dixon, A. S. Flockhart, E. L. Hardy, Edward Herivel, James Ireland, G. M. Kindness, H. J. F. Mitchell, J. M. Parker, A. J. Serfontein, Julius Spielberg, J. W. Steer, R. H. Sutherland, Margaret Williams, A. M. Wilson, W. S. Wybar.

Bristol's New Dental Hospital

On April 10 Prof. E. L. Sheridan, president of the Dental Board, opened the University of Bristol dental hospital which has cost £83,000 to which the board has contributed. The board, he said, had been greatly influenced by the assurance from the university that they would undertake to see that all the teaching would be carried out under its ægis. Hitherto dental students have had to do their clinical work at Bristol Royal Hospital and mechanical work at the university laboratory and this has meant a considerable loss of time.

In connexion with the reorganisation of the dental school the following appointments have been made: honorary dental surgeons and clinical lecturers in dental surgery: G. F. Fawn, N. H. Kettlewell, F. C. Nichols, F. R. Hogbin, W. J. Lennox, J. Wells, N. H. Simmonds, S. K. Rigg, L. E. Claremont, Trevor Johnson, R. H. McKeag, and J. W. E. Snawdon; senior house-surgeon: R. S. Martin; and junior house-surgeon: G. R. Styles.

Naval Casualties

Temporary Surgeon Lieutenant D. N. B. Morgan, H.M.S. *Gurka*, has been reported missing, believed killed, and Temporary Surgeon Lieutenant A. P. B. Waind, H.M.S. *Hardy*, seriously wounded.

Royal Medical Benevolent Fund

The annual general meeting of the fund will be held at 1, Wimpole Street, London, W.1, on April 22, at 4.30 P.M. Sir Thomas Barlow, F.R.S., will take the chair.

Westminster Hospital

The ladies' association of this hospital will hold its annual meeting at the medical school on Wednesday, April 24, at 3.30 P.M., when Sir Bernard Docker, chairman of the hospital, will speak on the work of the hospital in war-time.

Royal Sanitary Institute

A joint meeting of the institute with the Yorkshire branch of the Society of Medical Officers of Health will take place in the City Museum, Leeds, on Saturday, April 27, at 10 A.M. Prof. J. Johnstone Jervis, medical officer of health for Leeds, will open a discussion on the Garchey system of refuse disposal.

The Egg as Food

On Wednesday, April 24, at 2.30 P.M., the food group of the Society of Chemical Industry will hold a symposium on this subject. The following will speak: Mr. Joseph Needham, Sc.D. (the biological nature of the egg), Miss Ethel Cruickshank, Ph.D. (its chemical composition), Mr. S. K. Kon, D.Sc. (its nutritive value), Mr. R. B. Haines (preservation and storage of eggs), Miss Mary Andross (the effect of cooking on the egg). Non-members may secure invitations from the general secretary of the society at Clifton House, Euston Road, N.W.1.

National University of Ireland

At a meeting of the senate on April 11 the following resolution was unanimously adopted :—

That we place on record our keen appreciation of the signal services which Dr. Denis J. Coffey has rendered to the University. From the foundation of the University up to a few days ago, he was always a member and was many times Chairman of the Board of Studies, he was always a member of the Senate and he was always either Vice-Chancellor or Pro-Vice-Chancellor of the University. He was scarcely ever absent, from any meeting of the Board of Studies, from any meeting of the Senate, or from any meeting of the Finance or Standing Committees of the Senate. At all these meetings, the members depended to a very great extent on Dr. Coffey for information regarding the Statutes of other Universities, and the Regulations of the General Medical Council. There was no important question discussed at any meeting on which Dr. Coffey did not speak. His views were always listened to with the greatest respect and were generally adopted, for his great anxiety to promote the interests of the University was always recognised, and the accuracy of his judgment was seldom questioned. It would be very difficult indeed to exaggerate the greatness of his work for the University. In his retirement, the University has undoubtedly suffered a very great loss. We are deeply grateful to him, and we wish him very many happy years.

As a memorial to Dr. Coffey's services to the University a studentship is to be known as the Dr. Coffey Travelling Studentship in Physiology.

PARLIAMENT

ON THE FLOOR OF THE HOUSE

By MEDICUS, M.P.

WHEN Mr. Winston Churchill rose to make his statement on the war at sea on Thursday of last week he said that the Admiralty "was working under very sharp pressure in these times," and so there might be minor errors of fact or detail in the statement which he was to make. The fog of war has certainly descended over naval and land operations in Scandinavia and only those on the spot can know what is going on in detail. On the previous Tuesday, the day on which Germany invaded Denmark and Norway, the Prime Minister had not had time to correlate detail reports and it was at that time even uncertain whether Narvik, the iron-ore port in the north of Norway, had been attacked by the enemy or not. But if there are any details which contain minor errors the essential facts are always given in Government statements with, perhaps, that incurable tendency to understatement exemplified in Mr. Churchill's summing-up of his answer to the question "What is the Navy doing?" The First Lord said that he hoped he had shown "that the Navy has not been idle or negligent, and that it is actively proceeding on the tasks confided to it by Parliament."

The great-scale naval operations undertaken have at the moment of writing destroyed or very seriously disabled something between a third and a half of the German fleet. The Navy has also laid mines, shutting off the whole of the Baltic coast of Germany from unimpeded passage, thus completing a vast minefield around the Norwegian, Danish and German coasts. How the Germans will react to this laying of mines in the sea they liked to call a German lake remains to be seen. No doubt, however, there will be, as the official French commentator put it, "very interesting military consequences."

An immediate consequence on our supplies is the cutting down of the ration of paper; whether the temporary shutting off of Denmark from our markets will affect the ration of butter or bacon remains to be seen. That there are stocks big enough to meet all present demands we are assured, but if the war intensifies, as seems only logically probable, it may be necessary as a matter of prudence to keep a bigger reserve in hand.

* * *

Considerations of this nature in relation to manpower, foodstuffs, clothing and all our other ordinary needs will become much more sharply defined in the near future. Another proclamation extending the age for the call-up to older groups is coming very soon and the production of war materials is to be increased still further. Before we are able to foresee a time when the war will end the tightening-up process may become much more stringent. One significant fact about unemployment tells its own tale. The fall in numbers of unemployed is obvious, but a considerable number of men usually considered unemployable, certainly considered unemployable before the war, because they have been out of employment for years, have now been reabsorbed into industry. Some of them are miners who, the Ministry of Labour tells me, have been out of employment for long periods. It is not thought that we shall reach a point at which the unemployment returns are nil, because of the numbers temporarily unemployed while changing from one job to another. This basic figure may be put perhaps at half a million. No social and especially no medical problem arises with regard to this half-million because the period between jobs is provided for out of insurance benefit. If wages and rates of insurance benefit are at a level high enough to secure proper nutrition this group of men will present no special problem. But the group of people who are not returned as unemployed and who are not employable—older men and women, invalids and those in receipt of chronic public-assistance or institutional treatment—do constitute both a social and a public-health problem. For this group we may need to make special arrangements to secure a standard of nutrition at a level high enough to resist epidemic infection.

* * *

The large scale of the issues with which the mind of Parliament is concerned make Parliamentary sittings shorter, and speeches terse. When the Prime Minister announced the invasion of Norway with the momentous consequence that "His Majesty's Government have decided forthwith to extend their full aid to Norway," he spoke for about ten minutes. When Mr. Mander asked whether the attack of Germany on Norway would be brought before the League of Nations, Sir William Davison spoke one sentence: "Has not the time gone past for passing any more resolutions?" Mr. Gallacher, the lonely Communist for West Fife, proposed a complete change of Government to bring the war to a speedy end and although interrupted five times he only spoke for two or three minutes and got no sympathy or support at all even from Mr. Maxton's group. Mr. Maxton himself said, while expressing sympathy for the people of Norway and Denmark, "That if the present mood and temper of the world continue, world-wide chaos will be the result." And Mr. Thorne, the veteran Labour M.P. for Plaistow, had the last word: "In view of the present temper of the House I think the best thing we can do is to adjourn now." The House did not adjourn, the motion being withdrawn, but proceeded to discuss the regulation of agricultural wages in a somewhat chastened spirit and passed it and another bill in less than an hour and a half.

* * *

On Wednesday the Army and Air Force Annual Bill went through its stages very quickly and Mr. Pethick Lawrence raised the question of the suspension by the Government of civil-service examinations which prevents boys and girls, who have been preparing for several years, from entering the service in this way. Mr. Maxton described the suspension as having "the making of a first-class racket." Sir Ernest Graham-Little seemed to think that the decision to suspend the examinations was an example of herd panic and said: "The diagnostic marks of panic are, principally, that there is no relation whatever to reason in the reaction which takes place." Sir Ernest gave as another example the enrolment of "the whole of the consulting personnel of the voluntary hospitals in London in full-time service." If examinations were resumed the number affected would be about 15,000 a year, the largest number collected in any one place in London would be about 1000 and this number could easily be divided up into groups of a hundred strong. This process of division was carried out when 1272 London University matriculation candidates were examined in January this year. Mr. Ernest Evans, who represents the University of Wales, supported the resumption of examinations and

quoted a writer in the *Manchester Guardian* who described the Government's attitude as "a Maginot line of official myopia and obtuseness." The criticism which stung, however, and which Captain Crookshank answered as financial secretary to the Treasury, is that the abolition of examinations has opened the way to patronage and corruption. He ended a long speech by saying that he would have a review of the situation made again with a view to determining whether a reversion to examinations is possible.

There is perhaps boredom in some of the Parliamentary debates, but there is no sign of the chaos which Mr. Maxton feared. And the resistance of Parliament to changes in its rules and orders augurs a healthy belief in the solidity of British institutes. When King Haakon of Norway, hunted by German aeroplanes with bomb and machine gun, said, "All civilisation seems to have come to an end" he expressed what must have been in the minds of very many Czechs, Slovaks, Austrians, non-Nazi Germans, Danes and Norwegians. Parliament more and more feels that this war of the Germans is a war against civilisation—and that is one reason why Parliamentary speeches are shorter and action swifter.

QUESTION TIME

Status of V.A.D. Nurses

In the House of Lords on April 10 in reply to Lord DARYNGTON, Viscount COBHAM, Under Secretary of State for War, said that the status of V.A.D. nurses had been engaging the attention of the War Office for several months. He had asked Lord Daryngton if he would raise the question again in the course of the next few weeks, as he hoped then to be able to give him a full reply as to the agreement that had been reached and the differences which it would make in the status and the general welfare of the women who were employed under the Army Council.

Emergency Medical Scheme

Sir ROBERT BIRD asked the Minister of Health if he was aware that 11 house-physicians and house-surgeons of the Royal Hospital, Wolverhampton, were recruited on Sept. 1 last into the Emergency Medical Service, and were informed that they would be retained in their then posts in the hospital for a period of three months from that date, and that one month later their appointments were cancelled without payment of salary; and was it intended that the same three months' salary should be paid to those 11 doctors as that which had been paid to all house-officers recruited under the same class and whose appointments had been cancelled under like circumstances.—Miss FLORENCE HORSBRUGH replied: The practitioners referred to were enrolled in the Emergency Medical Service last September on a three months' contract involving liability to be called up for service in the first instance at the Royal Hospital, Wolverhampton. No occasion arose for calling them up and their contracts accordingly lapsed without any question of remuneration. I am unable to agree that these officers have received different treatment from others in comparable circumstances.

Sir R. BIRD: Is it not a fact that others who were enrolled in like circumstances have received compensation in respect of the cancellation of their enrolment?—Miss HORSBRUGH: These particular officers at Wolverhampton enrolled and were not called up. In other districts officers enrolled and were called up; and because they were called up they have received remuneration. There was no need to call up these officers; and therefore they did not receive remuneration.

Mr. G. MANDER: Is not that point purely a technicality? Is it proposed to deprive these doctors, because they failed to fill in a certain form, of pay which is going to all their colleagues?—Miss HORSBRUGH: No, I do not think it is only a case of failing to fill in a form, nor is it a technicality. Certain officers in Walsall who were called up had particular work to do; and those who were called up were then liable to be sent to any part of the country where their services were required. Those who were not called up, but were merely enrolled, remain in their hospitals, doing exactly the same work as they were doing before. Mr. MANDER: If we bring to your attention cases which are comparable where payment has been made, will you be good enough to look into them? Miss HORSBRUGH: Officers have been called up only when it was thought necessary to utilise their services.

In answer to a further question the following day Mr. WALTER ELLIOT said: I can find no evidence that my regional officer promised payment to the doctors concerned. The only undertaking given was to receive claims for consideration.

Food Value of Milk

Dr. ALFRED SALTER asked the President of the Board of Education why, in circular 1306, dated March 19, on food education, giving particulars as to the intention of the board, in conjunction with the Ministry of Food, to conduct a public campaign on nutrition and the wider use of home-produced foods, there was no mention of milk or as to its importance as a fundamental item in a healthy diet; and whether he would see that this omission was rectified in future circulars and publications on the subject.—Mr. KENNETH LINDSAY replied: The intention of circular 1306 was to acquaint local education authorities with the purpose and organisation of the public campaign; the circular does not therefore deal with particular items of food. The value of milk, particularly for children, has been strongly emphasised in a leaflet issued in connexion with the campaign. Copies have been sent in bulk to local education authorities for distribution to their domestic subjects staff, and for use by them in connexion with courses and demonstrations.

Dr. SALTER: Is the Minister aware that the circular contained references to sugar, meat and other rationed foods, together with suggestions for cooking and so forth, and that no reference whatever to milk was made from beginning to end?—Mr. LINDSAY: I have the leaflet in my hand and I see the word "milk" several times on it. Viscountess ASTOR: In view of the fact that the drink trade are always telling people that drink is good for them, is it not important that we should advertise in order to make it clear that milk is better?—Dr. SALTER: Is it not a fact that milk is not mentioned in the circular in any way?—No further answer was given.

Price of Liquid Milk

Mr. D. L. LIPSON asked the Parliamentary Secretary to the Ministry of Food if his department had any evidence to show in what way the consumption of liquid milk was affected by the price.—Mr. A. T. LENNOX-BOYD replied: Variations in the price of milk over recent years have been such that it has not been possible to detect any marked effect upon consumption of the seasonal changes in price which have taken place.—In reply to a further question Mr. LENNOX-BOYD said: We are fully acquainted with the consequences in general of price increases on the consumption of a commodity. He added that since the introduction of the cheap-milk-in-schools scheme the consumption among the children has increased from 8,000,000 to nearly 26,000,000 gallons.

Mr. T. WILLIAMS: Is it not the case that all the information at the disposal of the Ministry of Food has gone to show that the steady increase in price has militated against increased consumption among the poor people?—Viscountess ASTOR: Is that not the fault of the Minister of Agriculture?—No further answer was given.

School Medical Services in Northumbria

Mr. DAVID ADAMS asked the President of the Board of Education, what proportions of the children of Northumberland and Durham, respectively, were now receiving from education authorities milk and school meals, medical inspection and treatment, and whole-time education, respectively.—Mr. LYNDSAY replied: In the administrative county of Northumberland 6·4 per cent. of the public-elementary-school children are receiving free milk, but there is practically no provision of free solid meals. All the children receive medical inspection and, where necessary, treatment and about 76 per cent. are receiving full-time education. In the administrative county of Durham 26·8 per cent. of the children receive free milk and 0·17 per cent.

free meals. All the children receive medical inspection and, where necessary, treatment and about 93 per cent. are receiving whole-time education.

Hospitals in Wales

Mr. EDWARD WILLIAMS asked the Minister of Health, if he would state the names and accommodation of hospitals in Wales; their special functions and the prospects of increasing outpatient, isolation, maternity and general hospital accommodation in the near future.—Mr. ELLIOT replied: There are in Wales 213 hospitals and institutions of various kinds, providing a total of 14,326 beds. Further schemes now in progress will provide for 385 further beds. Also 800 more beds will be provided by hutted hospitals at Denbigh and Chepstow.

Notification Fees

Mr. GROVES asked the Minister whether the decision to pay a smaller fee for notifications of measles and whooping-cough than the fee normally paid for notifications of other diseases was come to after consulting any body representative of the medical profession; and whether it was agreed to by any such body.—Mr. ELLIOT replied: I consulted the British Medical Association, who represented to me that the fee should be half a crown. In fixing the fee at one shilling I had in mind the large number of notifications likely to be involved and the necessity for avoiding undue increases of public expenditure.

Central Medical War Committee

Mr. GROVES asked the Minister whether, as the secretary and deputy secretary of the Central Medical War Committee were holding similar posts under the British Medical Association, he would consider terminating their appointment, with a view to an independent, impartial and whole-time secretary being appointed in their stead.—Mr. ELLIOT replied: No.

National Health Insurance

Mr. RHYS DAVIES asked the Minister the total funds issued to approved societies for the first quarter in each of the last four years and the current year, respectively.—Mr. ELLIOT replied: The amounts issued to approved societies in respect of members resident in England and Wales during the period from Jan. 1 to March 31, 1940, and for the same period in each of the previous four years are as follows:—

1936 ..	£5,612,000	1939 ..	£6,108,000
1937 ..	£6,680,000	1940 ..	£7,626,000
1938 ..	£5,851,000		

Prof. J. C. Drummond's Appointment

Captain L. F. PLUGGE asked the Parliamentary Secretary to the Ministry of Food what exactly would be the functions of Mr. J. C. Drummond, D.Sc., professor of biochemistry, who had been appointed to his department to assist the campaign to guide the public in the right use of food; what was the present number of persons at the Ministry with scientific qualifications; and whether it was proposed to strengthen the personnel of the department in this respect.—Mr. LENNOX-BOYD replied: Professor Drummond is scientific adviser to the Ministry and is available to give advice and assistance on scientific problems arising in any part of the ministry. He is in constant touch with the various organisations which have been set up to deal with scientific questions in which the Government is concerned.

Cremation of Persons Killed in Air-raids

Mr. LIPSON asked the Home Secretary how many local authorities had asked him to exercise his powers to make possible the cremation of those persons killed in air-raids who had expressed their desire for cremation at death; and if he would accede to the request.—Sir JOHN ANDERSON replied: I have received representations on this subject from the Cremation Society and from twenty-four local authorities, and I am in consultation with other departments concerned as to the best means of meeting the point raised.

Medical Diary

Week beginning April 22

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2.

TUESDAY.—5 P.M., Mr. Gwynne Williams: Ischæmic Gangrene.
THURSDAY.—5 P.M., Mr. Williams: Gall-stones.

ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS, 58, Queen Anne Street, W.1.

SATURDAY.—3 P.M., Mr. Morris Datnow: Blair-Bell and his Contributions to Science, with especial references to Cancer Research. (Blair-Bell lecture).

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1.

MONDAY

Odontology—5 P.M., Mr. C. Naylor-Strong: Pathology and Treatment of Suppurations around the Angle of the Mandible.

TUESDAY

Medicine: at 4.30 P.M., Dr. William Hughes: Reaction. Dr. E. I. Jones: A Pressor Substance in the Blood of Hyperpietics.

WEDNESDAY

Comparative Medicine: 5 P.M., annual general meeting. Mr. A. S. Parkes, F.R.S. and Mr. J. Hammond, F.R.S.: Induction of Fertility by the Injection of Gonadotrophic Preparations. Prof. J. W. McLeod, Mr. H. Burton, Ph.D., Dr. Anna von Mayr-Harting and Dr. T. S. Macleod: Observations on the *in-vitro* Potency of Sulphanilamide and its Oxidation Products considered in their relationship to the respiratory mechanisms of bacteria."

THURSDAY

Urology: 5 P.M., Mr. J. Swift Joly: Fusion of the Kidneys.

FRIDAY

Disease in Children: 2 P.M., cases. 2.45 P.M. Dr. Norman Capon, Dr. Reginald Lightwood, Dr. W. Burton Wood and Dr. Gregory Kayne: Intrathoracic Tuberculosis in Childhood. Dr. Donald Paterson: 1. Genital Dysplasia. Dr. J. B. Atkins: 2. Acute Toxic Polyneuritis of Adult Type in Boy. 3. Macrocytic Anæmia, associated with Macroglossia, Cephalic Abnormality and Cystic Hygroma of neck in baby.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES.

SATURDAY.—2.30 P.M. (11, Chandos Street, W.1.), Col. W. Glen. Liston and Dr. P. A. Clements: Trichomonas Vaginalis Infestation.

EDINBURGH ROYAL INFIRMARY.

THURSDAY.—4.30 P.M., Dr. R. C. L. Batchelor: Modern Therapy in Specific Infections. (Honyman Gillespie lecture).

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W.12.

WEDNESDAY.—11.30 A.M., clinico-pathological conference (medical). 2 P.M., Prof. J. H. Dible; Nephritis (2). 3 P.M., clinico-pathological conference (surgical).
THURSDAY.—2 P.M., Dr. Duncan White: radiological conference.
FRIDAY.—2 P.M., clinico-pathological conference (gynæcological). 2.30 P.M., Dr. C. M. Hinds Howell: ward clinic. 2.30 P.M., Mr. V. B. Green-Armytage,: sterility clinic.
DAILY.—10 A.M.–4 P.M., medical clinics; surgical clinics and operations; obstetrical and gynæcological clinics and operations. 1.30–2 P.M., post-mortem demonstration.

NATIONAL HOSPITAL, Queen Square, W.C.1.

MONDAY.—5 P.M., Dr. E. A. Carmichael: Lesions of the Autonomic Nervous System.
TUESDAY.—5 P.M., Dr. J. Purdon Martin: Epidemic Meningitis.
WEDNESDAY.—5 P.M., Dr. Gordon Holmes, F.R.S.: Spinal Injuries.
THURSDAY.—5 P.M., Dr. J. N. Cumings: The Cerebrospinal Fluid in Cerebral and Spinal Injuries.
FRIDAY.—5 P.M., Dr. Holmes: Spinal Injuries.

FELLOWSHIP OF MEDICINE AND POSTGRADUATE MEDICAL ASSOCIATION, 1, Wimpole Street, W.1.

Medical Society of London, 11, Chandos Street, W.1. TUES. and THURS., 5 P.M., Mr. A. J. Cokkinis: War Injuries.—St. Mary's Hospital, Paddington, W.2. (by permission of the hospital). WED., 5.30 P.M., clinical F.R.C.S. class.—Royal National Orthopædic Course, Brockley Hill, Stanmore. FRI., 2 P.M. F.R.C.S. orthopædic course.—Royal College of Surgeons, Lincoln's Inn Fields, W.C.2. (by permission of the college). WED., 3.30 P.M., and THURS., 3 P.M., F.R.C.S. pathology course.—Brompton Hospital, S.W.3. TUES., 5.30 P.M. and THURS., 5 P.M., M.R.C.P. course in chest diseases.—Royal Chest Hospital, S.W.3. MON., WED. and THURS., 5 P.M., M.R.C.P. course in heart and lung diseases.—Royal Cancer Hospital, Fulham Road, S.W.3. MON., TUES. and SAT., F.R.C.S. practical operative surgery course.

On Sunday, April 21, at 3 P.M. Dr. Bethel Solomons will deliver his presidential address to the London Jewish Hospital Medical Society at the Rose Hertz Hall, Upper Woburn Place, W.C.1. His subject will be conservatism in obstetrics and gynæcology.

Appointments

EADIE, R. J., M.B. Glasg., M.R.C.O.G; assistant resident obstetrician at Epsom County Hospital.

LLOYD, O. C., M.B. Camb., graduate assistant in the department of pathology at the Radcliffe Infirmary, Oxford.

MAGNIER, M. F., M.B. N.U.I., resident medical officer at the Public Assistance Institution (emergency medical hospital) Christchurch, Bournemouth.

O'CONNOR, D. M., F.R.C.S.I. hon. anæsthetist to the Norwood District Cottage Hospital, S.E.19.

British Postgraduate Medical School, London.—The following appointments are announced:—

MALLEK, JOSEPHINE, M.D. McGill, house-physician in the department of medicine;

MORGAN, B. L., M.R.C.S., house-surgeon to the surgical unit;

GORDON, W., M.B. Cape Town, house-surgeon to the surgical unit; and

STRINGER, P. R., M.B. Lond., house-surgeon to the surgical unit.

Royal Liverpool Children's Hospital.—The following appointments are announced:—

HOPPER, GEORGE, L.M.S.S.A., anæsthetist;

WETHERELL, J. H. D., M.B. Lpool, anæsthetist; and

GLICK, MYER, M.B. Leeds, resident casualty officer.

Medical referee under the Workmen's Compensation Act 1925: Dr. W. M. CONLEY, West Hartlepool county-court district (circuit No. 2).

Examining surgeons under the Factories Act, 1937: Dr. R. H. DUNLOP (Grantown-on-Spey district, County of Moray); Dr. G. M. STIRLING (Cowdenbeath district, county of Fife).

Vacancies

Altrincham General Hosp.—H.S., at rate of £120.

Barking Borough.—Temp. asst. M.O., £500.

Birmingham, Little Bromwich Hospital for Infectious Diseases.—Jun. res. M.O., £300.

Brighton, Royal Sussex County Hosp.—Cas. H.S., £120.

Canterbury, Kent and Canterbury Hosp.—H.S., at rate of £125.

Cardiff, King Edward VII Welsh National Memorial Assn.—Asst. res. M.O. for North Wales Sanatorium, £200.

Charterhouse Rheumatism Clinic, 56/60, Weymouth Street, W.1.—Hon. clin. assts.

Cornwall, Redruth Hospital.—Two hon. phys.

Coventry and Warwickshire Hosp.—Res. surg. O., £300. Also H.S.'s and H.P.'s, each at rate of £150.

Dudley, Guest Hospital.—Cas. H.S., at rate of £150.

Essex County Council and Thurrock Urban District Council.—Lady asst. M.O., £500.

Essex County Council, Oldchurch Hospital, Romford.—Temp. asst. res. surgeon, £500.

Exeter, Royal Devon and Exeter Hosp.—H.S., at rate of £160.

Grimsby and District Hosp.—H.P., at rate of £175.

Gt. Yarmouth General Hosp.—Two H.S.'s, each £140.

Ilford Borough.—Asst. dental surgeon, £450.

Kidderminster and District General Hosp.—Jun. H.S., at rate of £100.

Leeds City.—Res. M.O. for St. Mary's Infirmary, £250. Also res. M.O. and res. surg. O. for St. James's Hosp., each £350.

Leicester Royal Infirmary.—Obstet. H.S. to Maternity Hosp., at rate of £150.

Manchester City.—Temp. res. asst. M.O., £350. Also asst. res. surg. O. (Grade 2), at rate of £250, for Withington Hosp.

Middlesborough, North Riding Infirmary.—Cas. O., at rate of £150.

Nottingham General Hosp.—Res. cas. O., at rate of £150.

Oldham Royal Infirmary.—Visiting thoracic surgeon, visiting neurological surgeon, visiting gynæcologist, visiting physician, and two visiting surgeons, each 3 guineas per session.

Oxford, Radcliffe Infirmary.—H.P., H.S., and cas. O., each at rate of £100.

Portsmouth, Portsmouth and Southern Counties Eye and Ear Hosp.—H.S., at rate of £150.

Portsmouth, St. James's Hosp.—Sen. asst. M.O., £550.

Prescot, Lancs, Whiston County Hospital.—Jun. res. M.O. at rate of £250.

Reading, Royal Berkshire Hosp.—H.S. and H.P., each at rate of £150. Also Cas. O., at rate of £150.

Royal Masonic Hosp., Ravenscourt Park, W.6.—Two res. M.O.'s, each £300.

Sheffield Children's Hospital.—Clin. pathologist, £350–£400.

Sheffield Royal Infirmary and Hosp.—Res. ophth. H.S., at rate of £80–£120. Also two res. H.S.'s, each at rate of £80.

Shrewsbury, Royal Salop Infirmary.—Res. H.P., at rate of £160.

Southampton, Royal South Hants and Southampton Hosp.—Res. H.S., at rate of £150.

South London Hosp. for Women, Clapham Common, S.W.4.—H.S., at rate of £100.

Stockport Infirmary.—H.S., £150.

Stoke-on-Trent, City Education Committee.—Temp. asst. school M.O., £500.

Stoke-on-Trent, Longton Hosp.—H.S., at rate of £180.

Stoke-on-Trent, North Staffordshire Royal Infirmary.—Resident appointments at rate of £150.

St. Helens County Borough.—Asst. M.O.H., £500.

Surrey County Council.—Jun. asst. res. M.O. for Surrey County Sanatorium, Milford, at rate of £250.

Swanley, Kent, Hosp. Convalescent Home, Parkwood.—Res. M.O., at rate of £200.

Swansea General and Eye Hosp.—Res. anæsthetist, at rate of £150.

Taunton and Somerset Hosp.—H.P., at rate of £125.

Warwickshire and Coventry Joint Committee for Tuberculosis.—Jun. asst. M.O. for Memorial Sanatorium, at rate of £250.

Weir Hosp., Balham, S.W.12.—Sen. and jun. res. M.O.'s, £200 and £150 respectively.

West London Hospital, Hammersmith, W.6.—Res. cas. O. at rate of £100.

West Malling, Kent County Council, Leybourn Grange Colony.—Asst. res. M.O., £350.

Winchester Royal Hampshire County Hospital.—H.S., at rate of £175.

Wolverhampton, Royal Hosp.—H.S.'s, each at rate of £100.

Yorkshire, Marguerite Hepton Memorial Orthopædic Hosp., Thorp Arch.—Res. H.S., £100.

The Chief Inspector of Factories announces vacancies for examining surgeons at Knowsley, Salop; Keith, Banff; Ystalyfera, Glamorgan; Nottingham North, Nottingham; Prestcign, Radnor; Brenchley, Kent; Market-Bosworth, Leicester.

Births, Marriages and Deaths

BIRTHS

CAUSEY.—On April 11, the wife of Mr. G. W. Causey, F.R.C.S., of Fowey, Cornwall—a son.

DOBSON.—On April 14, at Beckenham, the wife of Surgeon Lieutenant D. C. Dobson, R.N.—a son.

FRANKLIN.—On April 12, in London, the wife of Dr. John Franklin—a daughter.

HOLT.—On April 14, the wife of Dr. L. R. Holt, of Staniford, Lincs—a son.

MARRIAGES

HAYWARD—ACKERLEY.—On April 6, at Worcester, Sydney Thomas Hayward, M.B., to Irene Mary Ackerley, of Llandrindod Wells.

LONG—LEWIS.—On April 11, at Cricklewood, N.W.2, Maurice Long, M.R.C.S., Major, R.A.M.C., to Myfanwy Lewis.

SHEPHERD—HOWELL.—On April 11, in London, George Alexander Shepherd, M.B., to Margot Howell.

TILL—BURNYEAT.—On April 6, in London, Anthony Stedman Till, F.R.C.S., to Joan Ponsonby Burnyeat, Great Missenden, Bucks.

DEATHS

BANKS.—On April 13, Charles Banks, M.D. Glasg., D.P.H., of Barnes, formerly of Calcutta, aged 76.

DAY.—On April 13, at Sandwich, James John Day, O.B.E., M.R.C.S.

GOODWIN-TOMKINSON.—On April 12, in Glasgow, Joseph Goodwin-Tomkinson, M.D. Glasg.

HALLILAY.—On Feb. 14, in Bombay, Herbert Hallilay, M.R.C.S., Lieut.-Colonel, I.M.S. (retd.).

HAWKINS.—On April 16, at Horsham, Herbert Pennell Hawkins, C.B.E., D.M. Oxfd., F.R.C.P., aged 80.

JOHNSTON.—On April 10, at Ditchling, Sussex, Miles Johnston, M.B. Edin., aged 70.

MILLS.—On April 10, in Sydney, N.S.W., Arthur Edward Mills, M.B. Sydney, late deputy chancellor, University of Sydney.

TURNER.—On April 9, in Edinburgh, Richard Turner, O.B.E., M.B. Edin., F.R.S.E., aged 83.

WOOLFENDEN.—On April 10, in Liverpool, Herbert Francis Woolfenden, M.D. Lpool, F.R.C.S., aged 60.

The Lancet 100 Years Ago

April 13, 1840, p. 134.

From a note based on a paper by Professor Dieffenbach of Berlin in the Medicinische Zeitung.

In a late number of THE LANCET we announced that Professor Dieffenbach had successfully applied to strabismus the operation of the division of muscles. The following cases illustrate the efficacy of this simple and most successful operation:—

CASE 1.—The subject of this operation was a child seven years old, whose eye was drawn far into the inner angle of the eyelids so as to produce considerable disfigurement. The operation was performed in the following manner:—The head of the child was held against the chest of one assistant, while another with two hooks kept the eyelids widely apart. The operator then passed a third hook, which he gave to a third assistant to hold, through the conjunctiva, and to some depth in the subjacent cellular tissue at the internal canthus. He next fixed a fine double hook in the sclerotica at the inner angle, and taking it in his left hand, drew the eye outwards. Then cutting into the conjunctiva close to the ball, where it is continued from it to the internal canthus, and penetrating more deeply by separating the cellular tissue by the side of the sclerotica he divided the internal rectus muscle close to its insertion with a fine pair of scissors. The eye was immediately drawn outwards by the external rectus, as if it had received an electric shock; and in another instant became straight, so that there was no difference perceptible between its direction and that of the other eye.

NOTES, COMMENTS AND ABSTRACTS

MOBILE NEUROSURGICAL UNIT

THE mechanisation of modern surgery has added to the difficulty of making the advances in surgical technique, many of which depend on the use of electrical apparatus, available near the battle-front. In the field of cranial surgery the Royal Army Medical Corps have approached the problem by constructing a mobile neurosurgical unit which is virtually self-contained. The vehicle of the unit is a motor lorry which carries a separate petrol engine and dynamo. A cable conveys the current to the operating-theatre where it is distributed to theatre lighting, surgical diathermy, operation-table heaters, and suction-pump; the current also charges a 12-volt accumulator for the electro-magnet. The equipment includes two sets of instruments, two folding operating-tables with special folding head-rests, two folding instrument tables, and modern anæsthetic apparatus. Sterilisation of water and instruments is done by primus stoves and the unit also has a high-pressure steriliser for linen and dressings. The personnel, who also travel in the motor lorry, include a neurosurgeon, a neurologist, an anæsthetist, two surgical assistants, and two theatre sisters. It can work as one or two operating teams. The unit is designed to operate chiefly at casualty-clearing stations, but will depend on a parent base hospital for its reserve supplies. It carries sufficient material for several hundred neurosurgical operations and can thus remain in the forward area for weeks at a time. At the casualty-clearing station it will need only a room or tent to operate in, and X-ray services. Otherwise the unit will require no outside aid either for diagnosis or operating. The ingenious construction of this equipment, in which Lord Nuffield has given financial help, may find application at home as well as at the front and in other fields besides neurosurgery.

CYCLOPS IN INDUSTRY

MINTON[1] has made a study of the difficulties that face the one-eyed worker in finding work and carrying it out efficiently. He has examined and followed-up 100 men and women who during the last eight years have had one eye excised at the Royal Eye Hospital. Men with one eye blind from disease, injury or disuse (amblyopia ex anopsia associated with a concomitant strabismus) are at work in such occupations as automatic tool-setting, and drilling with very fine drills which require accurate depth perception and estimation. Minton found in his series that several men after the excision of one eye had regained confidence in their judgment of distance a fortnight after operation. The degree of depth perception and estimation which one-eyed workers develop depends on their intelligence and previous experience, their age, the young doing better than the elderly, and their sex, women being slow in adjusting themselves to new visual conditions. Loss of the dominant eye causes greater disability and delays an adjustment to monocular vision longer than does removal of the other eye. Minton recommends that convalescence after removal of an eye should not exceed two or three months; many workmen do not return for six to ten months. There is no need for the injured workman to remain away from his occupation until his claim is settled in the courts. In all cases of serious ocular injury or loss of an eye he should register in a court a declaration of liability, and this safeguards his legal and compensation interest when he resumes his work. In the metal and engineering trades the accident record of one-eyed men is not above the average. Some of the larger firms allow a worker who loses an eye to return to the type of work he was doing before the accident, and he is often able to do it satisfactorily; in other cases he has to take over a lower grade of work. Other firms will not give the injured man his former work if it is of a highly skilled nature but appoint him to some coarser and simpler task. If the one-eyed worker becomes unemployed he often has great difficulty in obtaining skilled work. A number of firms will not employ him on account of the greater risk of compensation and damages. When a one-eyed man returns to his work for some months he may make mistakes and suffer from headache and eyestrain. In many instances this is only temporary and with encouragement and understanding he is able to carry on, but wage-earning capacity may be reduced. In the conveyer-line system designed by Henry Ford there seems to be scope for the one-eyed and even the blind worker. Minton comments on the unnecessarily high standard of visual acuity (6/6 or 6/9 in each eye) required by some industrial firms on preliminary examination of an applicant for employment. Many engine drivers on the L.M.S. railway have been found fit, on practical tests, with vision of 6/18 in one eye and 6/24 in the other. The Southern Railway's standards are slightly higher—6/12 in one eye and 6/18 in the other without glasses. It is evident that research into the subsequent fate of a workman who loses an eye will help in finding him work in which he will regain his confidence and interest and will not suffer an unnecessary reduction in his wage-earning capacity. It should also serve as a guide to employers and might bring about some adjustment of the law so that the employer's load of risk does not weigh against the worker.

1. Minton, J. *Trans. Ophthal. Soc. U.K.* 1939, **59**, 337.

LOVE PHILTRES

IN Greek mythology Medea was regarded as the greatest adept in the art of preparing love-philtres, but according to tradition it was her sister Circe who first, by means of a herb-potion, transformed a youth for whom she had conceived a passion into a brutal shape. Old Gerarde in his "Herbal" tells us that Circe used the mullein or hag-taper in her magic potions, but Gower says she employed the herbs feldwode and vervaine, both of which have a reputation for magical properties. The Hebrews used the fruit of the mandrake which they called "Love apples" for promoting love and fertility as is told in the old story of Rachel and Reuben in the book of Genesis. Among nations in the Far East, the Hindus are said to have employed the mango, champac, jasmine and asoka for the same purpose, while the Chinese pinned their faith to ginseng root.

The popularity of live-philtres (pocula amatoria) among the Romans is described by Plutarch and Ovid and an overdose of their potions was capable of producing delirium and even fatal results.

The ingredients of some of the "hell-broths" concocted by old women in the Middle Ages were both disgusting and grotesque, and seem to have been selected chiefly for their nastiness. One in which great faith was placed was the mysterious Hippomanes, a growth or caul said to be found in the forehead of a newly born foal. Others were hair taken from the nether part of a wolf's tail, the penis of the same animal, the brains of a cat, newt or lizard, and the bones of a green frog which had been picked by ants. Young swallows were sometimes buried in the earth and after a time disinterred.

The bodies of those found with open beaks when made into a potion were believed to provoke love, while those with closed beaks had the opposite effect. The blood of a red-haired woman mixed with sugar was supposed to be a powerful philtre. The Sicilians used hemp and a potent plant which the Greeks called *Vorax*; if given surreptitiously this was said to kindle love in the breast of the coldest woman.

Even the learned Van Helmont in the seventeenth century believed in love-philtres. He tells us of a certain plant which "if you rub and cherish it in the hand till it becomes warm and then take the hand of another and hold it until it becomes warm, that person

with forthwith be stimulated with love for you and continue so for many days." Other writers recommend human skull, coral and leopard's dung as being powerful for inspiring passion. Satyrion was another favourite herb with the compounders of love-potions, for even its odour was sometimes effective, while cyclaman, purslain, valerian and the humble periwinkle had their advocates. Cummin, too, was believed to be particularly useful in ensuring fidelity and constancy—the cynic will call it an antiphiltre.

In some parts of the country All-hallow Even is still given up to rites in which the gum-resin called dragon's blood and quick-silver play a part. In the north of England girls used to throw these substances on a bright fire while wishing for their affection to be returned by the man on whom they had set their heart. Only a few years ago a Russian Jewess appeared in a London police-court on a charge of obtaining money under false pretences for selling candles into which a deserted wife had to stick pins to attract her spouse to return. When this charm failed the Jewess prepared a magic liquid which was to be sprinkled about the bedroom. So there is still money to be made out of witchcraft.

THE SMALL TYPHOON

Anne Walter, a member of a well-to-do Southern family, was born and bred at Holly Springs, Mississippi. She might have become a social butterfly but chose instead to read medicine, and despite the headshakings of her relations and friends graduated from Pennsylvania in 1893. She went to Soochow as deputy for a colleague, intending to stay there only for a year or two, but as it turned out she spent 44 years in China, first in Soochow and later in Shanghai, fighting filth and prejudice. She married Dr. J. B. Fearn, and her only daughter died at the age of five from amœbic dysentery in the pre-emetine days. Dynamic energy and an inconquerable spirit enabled her to carry on a busy practice, largely among women and children, and also to cope with such plagues, famines, rebellions, wars and refugee problems as arose from time to time. These qualities earned for her the nickname of The Small Typhoon and prompted her, in middle life and with no money behind her, to found a successful hospital in Shanghai and run it on lavish lines. Not content with these activities she founded the first co-educational medical school in China. All persons and nationalities came alike to her; she was on the best of terms with diplomats, mandarins, government officials, coolies and strumpets. Being herself a good mixer she could not understand social aloofness in others and would not allow those around her to divide themselves into cliques. Thus, to their mutual advantage, she entertained at her house people of all sorts and conditions who would not otherwise have met. A rheumatic heart and persistent overwork found her at sixty experiencing a decline in energy which she found irksome. Accordingly she submitted to and benefited by a course of regeneration treatment under Steinach. These are but a few of the facts revealed in a most entertaining biography[1] packed with enthralling stories and written with cheerful vigour.

ITALIAN RICE-FIELD FEVER

FURTHER details of the Italian rice-field fever, originally described by Mino,[2] are given by Babudieri,[3] who was commissioned by the Istituto di Sanità, Rome, to investigate the disease on the spot. According to him one characteristic, not previously mentioned, of this fever that distinguishes it from Weil's disease is that its pathogenicity towards the guinea-pig is but slight, the lesions consisting of multiple punctate hæmorrhages in the lungs, in contrast with the more massive hæmorrhages produced by *Leptospira icterohæmorrhagiæ*. Working independently of Mino, Babudieri carried out serological tests, which led him to believe that the agent responsible for Italian rice-field fever was serologically a new species, although not differing morphologically from *L. icterohæmorrhagiæ*. He named the new species *L. oryzeti* (meaning "of the rice-field"); but soon afterwards he found that it was serologically identical with the Swart strain of *L. pyrogenes* from Java. At the same time, however, he apparently disproved that the Swart strain belonged to the species *L. pyrogenes*. His final conclusion was that both *L. oryzeti* and the Swart strain belonged to the species *L. bataviæ*. Mino, who at first named his new species *L. mitis*, similarly concluded that it was really *L. bataviæ*. At first sight it seems improbable that two strains of leptospira from such distant regions should be the same species; but two facts support such an identification: (1) in Sumatra and in Lombardy the disease is connected with rice-harvesting; and (2) a species of leptospira has been found in Sumatra that is serologically identical with *L. grippotyphosa*, the agent of mud-fever in Central Europe and Russia.[4] Meanwhile Babudieri is investigating a third leptospira, apparently a new species, from 56 cases of fever from the rice-fields. It will be remembered that Mino found one case caused by *L. hebdomadis*. It is not yet known whether the infection with *L. bataviæ* in Lombardy is contracted directly from the water in the rice-field or indirectly through rats.

RADIOLOGICAL DIAGNOSIS OF ILEUS

WE have lately discussed in these columns[5] the interference of gas in the bowels with radiography and measures for removing it. It is not always advisable to remove it, however, for Del Campo,[6] points out that the behaviour of the gas may be used radiologically as a clue to whether a case of ileus is due to obstruction or to atony. He argues that, apart from the already known signs of a fluid level and of the relative amounts of gas in small intestine and in colon, the differential diagnosis between these two forms of ileus, mechanical and paralytic, can be made by noting whether the gas shifts on changing the patient's position. He claims that in peritonitis affecting the small intestine the loops of gut are more or less held together by adhesions, and therefore the gas does not shift with alteration of the patient's position; whereas in obstruction of the small intestine the loops are free to move, carrying the gas with them.

RELIEF OF SULPHANILAMIDE CYANOSIS

IN the *Journal of the American Medical Association* for March 2 (p. 756) J. F. Doughty mentions a case of facial erysipelas he was treating with sulphanilamide in which the patient developed severe cyanosis with headache, nausea and vomiting. He thereupon gave the patient 20 mg. of nicotinic acid three times a day when the toxic symptoms ceased and it was possible to continue with the sulphanilamide. Since then Dr. Doughty has given nicotinic acid to all patients who develop cyanosis or any other toxic symptoms during treatment with sulphanilamide and the symptoms have usually been completely relieved.

THE REGISTER OF VETERINARY SURGEONS, revised to Jan. 1, 1940, can now be obtained for five shillings from the Royal College of Veterinary Surgeons, 10, Red Lion Square, London, W.C. The register contains 3722 names being 63 more than a year ago. During the year 165 new graduates have been added and 3 names restored; there were 93 removals on evidence of death and 12 for other reasons. The acts and charters of the college, formerly incorporated in the volume, are now published as a separate volume at the same price.

1. My Days of Strength. By Ann Walter Fearn, M.D. London: Robert Hale. 1940. Pp. 288. 12s. 6d.
2. Mino, P. *Policlinico* (sez. med.), Aug. 1, 1939, p. 410; see *Lancet*, 1939, **2**, 863.
3. Babudieri, B. *R.C. Ist. San. pubbl.* December, 1939, p. 755.
4. See *Lancet*, 1939, **2**, 279.
5. *Lancet*, March 30, 1940, p. 605.
6. Del Campo, J. C. *Bol. Soc. Cir. Montevideo*, 1939, p. 311.

ADDRESSES AND ORIGINAL ARTICLES

SCIATICA AND THE INTERVERTEBRAL DISC

By Joe Pennybacker, M.B. Edin., F.R.C.S.

FIRST ASSISTANT TO THE NUFFIELD PROFESSOR OF SURGERY, OXFORD

It is only natural that any new treatment for sciatica should be received with caution because too often claims for new kinds of treatment have been unrewarded by the success promised for them. Rest in bed, immobilisation in plaster or in splints, manipulation of the spine and sacro-iliac joints, stretching of the sciatic nerve, epidural injections, and injections of saline and other substances into the nerve have all had their advocates. Although many cases recover unaided, recurrent attacks are not uncommon and in certain cases sciatica becomes a chronic, disabling affection.

The difficulties have been largely due to our ignorance of the ætiology and pathology of the disease: sciatica is not a fatal affection, and pathological observations have been scanty. Physicians, reasoning from inference, have regarded the condition as a neuritis or radiculitis; surgeons and orthopædists have paid more attention to structural abnormalities of the lumbar spine and sacro-iliac joints. But in the last few years, largely through the work of American surgeons—Mixter (1934), Barr, Love (1939), Adson, Craig—a frequent if not the commonest cause of sciatica has been shown to be compression of one or more roots of the sciatic nerve by a damaged intervertebral disc. At a meeting of the Royal Society of Medicine in April, 1939, Love (1939b) reported some 250 cases of sciatica due to this cause which had been treated successfully by operation at the Mayo Clinic since 1935. The interest manifested by the attendance and discussion at that meeting was fully justified because this was an account of a pathological process observed during life, correction of which relieved a painful and disabling disease.

This report is concerned with 30 consecutive cases of sciatica treated in the Nuffield Department of Surgery, Oxford, since May, 1939. All of the cases have been operated on, and the results have been uniformly satisfactory and consistent with the larger American series. The patients found their way to the department from diverse sources: some came from the general medical and surgical services of the Radcliffe Infirmary, some from the department of orthopædic surgery, and some were referred directly for a neurosurgical opinion.

ANATOMY AND PATHOLOGY

The intervertebral disc is a layer of fibrocartilage which has the dual function of binding together two adjacent vertebræ and of acting as a shock-absorber. The circumference of the disc is composed of tough fibrous cartilage tightly adherent to the vertebræ between which it lies. This fibrous ring, the annulus fibrosus, encircles a mass of softer cartilaginous tissue, the nucleus pulposus, which is confined under considerable pressure. The rim of the annulus fibrosus is bound to the bodies of the vertebræ above and below by strong ligaments which for the most part run in the long axis of the vertebral column; that forming the anterior wall of the vertebral canal is known as the posterior longitudinal ligament. A lumbar nerve emerging through the intervertebral foramen is bounded anteriorly by the intervertebral disc (covered by the posterior longitudinal ligament), posteriorly by the anterior margin of the ligamentum flavum (running between contiguous laminæ), and above and below by the bony margins of the intervertebral foramen. Normally it lies loosely in the foramen, cushioned by extradural fat and loose connective tissue.

Prolapse of the nucleus pulposus.—In these cases of sciatica the annulus fibrosus is believed to rupture as the result of an injury, severe or trivial. The rupture may be complete, and if so a fragment of the nuclear material may be extruded by the pressure under which it is normally confined. The prolapsed fragment will then form a small rounded swelling separated from the vertebral canal and its contents only by the posterior longitudinal ligaments (fig. 1b); but it is only when this swelling is so placed that it compresses a nerve-root that the characteristic features of sciatica become manifest.

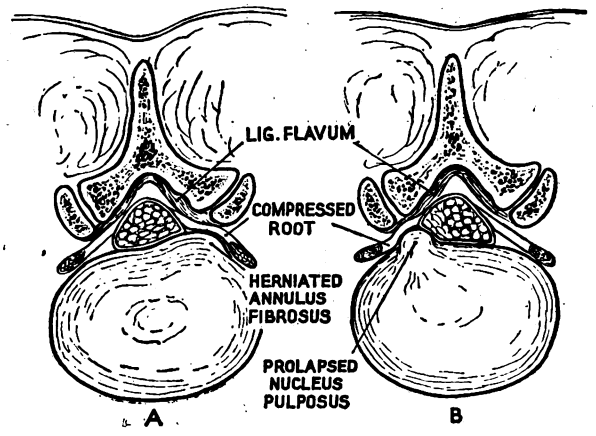


FIG. 1—Transverse sections through vertebral column showing: (A) herniation of annulus fibrosus and (B) prolapsed nucleus pulposus.

Herniation of the annulus fibrosus.—If the initial rupture of the annulus fibrosus is incomplete no nuclear material may escape, but a weak place may be left in the ring through which a prolapse may occur as the result of a subsequent injury. Or this weak place may be the site of a more diffuse bulging of the circumference of the disc which if large enough may compress a nerve-root in much the same manner as does a prolapse of the nucleus pulposus (fig. 1a). In this case the posterior longitudinal ligament covers the bulging annulus fibrosus and not the loose fragment found in prolapse of the nucleus pulposus. This type of lesion will be referred to as a herniated annulus fibrosus.

This conception of the pathology is based on a study of the history and findings on examination, together with observations at operation, at which either of the varieties of the lesion described may be seen. The affected nerve-root is seen to be stretched over a small glistening white swelling which rarely looks to be larger than the tip of one's little finger. In long-standing cases the root is often thickened and may be closely adherent to the swelling by fibrous adhesions. Felt through the posterior longitudinal ligament the swelling itself has a soft rubbery consistence, and when an incision is made through the ligament a loose fragment of nuclear material may protrude. When this fragment is withdrawn it often looks like a tangle of wet string, or, if larger, a shreddy irregular mass of soft cartilaginous material which when flattened out looks surprisingly large in view of the size of the cavity from which it came (fig. 2). In the cases of incomplete rupture of the annulus an incision through the posterior longitudinal ligament

exposes a thinned but bulging annulus fibrosus and no nuclear material may be seen.

In association with each of these types of lesion the ligamentum flavum may be abnormally thickened, and it is said that this hypertrophy can produce the same symptoms as a damaged disc, by compression of the nerve-root from behind, just as the damaged disc compresses it from the front. In a limited laminectomy, where other ligamenta flava are not available for comparison, it is difficult to be certain that there is a pathological degree of thickening, but in some cases the Lipiodol pictures show a deformity which could be explained on this basis. And the literature now contains records of many cases of sciatica which have been cured merely by removal of a thickened ligament. In this series I have not found any cases in which the sciatica could be attributed solely to hypertrophy of the ligamentum flavum. In one case a hypertrophied ligamentum flavum was removed without relief of pain, and at a subsequent operation a prolapsed nucleus pulposus, which had been overlooked at the first operation, was removed with cessation of pain.

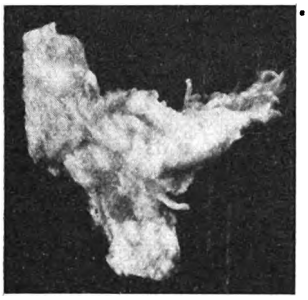


FIG. 2—Fragment of nucleus pulposus removed from the case of which the lipiodol picture is shown in fig. 5. Natural size.

In 23 of the 30 cases (76 per cent.) the lesion was a loose fragment of prolapsed nucleus pulposus. Of the remainder, 5 had herniation of the annulus fibrosus which was demonstrated by lipiodol and confirmed by operation; 1 had a small fibroangeioma in the intervertebral foramen, removal of which has not given complete relief; and in the remaining case no definite abnormality could be demonstrated at operation. The lesion was in the lumbo-sacral disc in 23 cases and in the fourth intervertebral disc in the other 5. In Love's series, over 90 per cent. of the lesions were found in either the fourth lumbar or the lumbo-sacral disc, these two being about equally frequent.

THE CLINICAL PICTURE

The clinical picture of the damaged lumbar intervertebral disc is most commonly that of "ordinary sciatica"—sciatic pain, pain on stretching the sciatic nerve, tenderness of the nerve trunk, diminution or absence of the ankle-jerk, and absence of any gross lesion involving the sciatic nerve or its component roots. There are many variations of this syndrome, any of which it seems from this series may be caused by a damaged intervertebral disc. The following two cases may be contrasted.

CASE 1.—A married woman aged 51. Admitted to the Radcliffe Infirmary under Professor Witts on April 3, 1939, complaining of severe pain in the right leg. In 1924 she had an attack of pain in the lower part of the back radiating to the buttock and back of the left thigh, and down to the calf and instep of the left foot. This pain came on a few days after she had vaulted over a 5 ft. fence while running to give an alarm that her house was on fire. She was not aware of having injured her back at the time. The pain kept her in bed for six weeks, and even then she was not completely free from it although she was able to get about and do her housework. She attended the physiotherapy department of the Radcliffe Infirmary as an outpatient for 18 months before she became completely free from pain. Ever since then she had had recurrent attacks of low-back pain and left-sided sciatica, generally brought on by unusual exertion, which would keep her in bed for two or three weeks at a time. These attacks occurred once or twice a year, although there had been periods of complete freedom from pain for as long as two years.

In the morning of Feb. 19, 1939, when she was stooping to put on her bedroom slippers, she was gripped by a stabbing pain across the lower part of the back which made it impossible for her to straighten up, and it was two hours before she could get dressed. The pain persisted all day and made her walk "crab-wise." Next day the back pain was a little easier, and she was beginning to think that this was just another of her attacks, but for the first time she began to have pain in the *right* buttock and down the back of the *right* leg. Within two days this right-sided sciatica was so severe that she was unable to get up, and she was confined to bed until her admission to the Radcliffe Infirmary. Even after admission to hospital the pain was so severe at times as to require morphia. She complained also of a numbness along the outer border of the right foot and in the lateral three toes. There was no disturbance of sphincter control. She could attain some comfort by lying on her left side with the right hip and knee partly flexed.

On examination there was flattening and rigidity of the lumbar spine, and a slight lumbar scoliosis with the convexity to the right. There was slight wasting and weakness of the muscles in the anterior tibial and calf groups, and the right ankle-jerk was absent. The right sciatic nerve was very tender on pressure in the buttock, and manipulations involving stretching of the nerve caused agonising pain in the buttock and down the back of the limb. There was slight impairment to pin-prick and cotton-wool along the outer border of the right foot and ankle, and in the lateral toes (fig. 3). Postural sensibility was

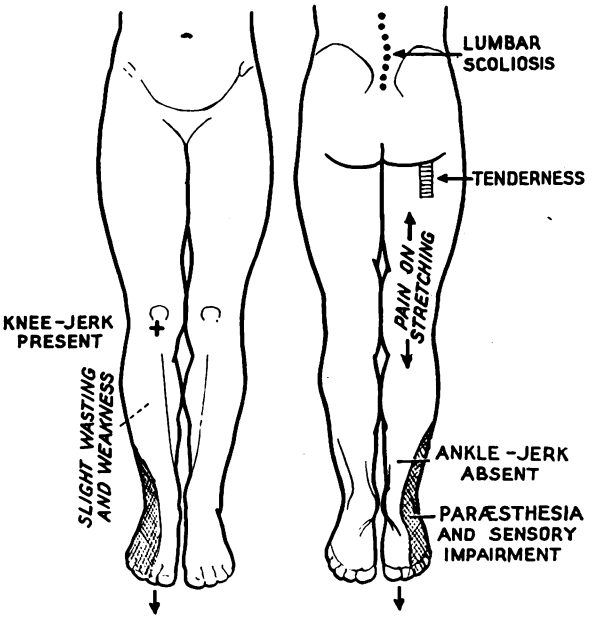


FIG. 3—Findings in case 1.

defective in the little toe. Radiograms showed only the spinal deformities mentioned above. The cerebrospinal fluid contained 65 mg. of protein, but was otherwise normal. A diagnosis of prolapsed intervertebral disc was made, and operation was advised. Lipiodol studies revealed a slight lateral indentation on the right side opposite the lumbo-sacral disc, with defective filling of the sheath of the 5th lumbar root. At operation a prolapsed fragment of nucleus pulposus, compressing the œdematous and thickened root, was removed from the lumbo-sacral disc. The patient was free from sciatic pain when she recovered from the anæsthetic. She walked three weeks after operation. At the end of six weeks she resumed her housework and had been doing it regularly up to the

time when she was last seen nine months after operation, without any recurrence of symptoms.

CASE 2.—A married woman aged 39. Admitted to the Radcliffe Infirmary on August 4, 1939, on the recommendation of Dr. Basil Kiernander in the department of physical therapy. She had been healthy until April 8, 1939, when she attended a point-to-point meeting and spent the day walking on damp ground. That evening at dinner she was aware of a painful stiffness in the lower part of the back, and on the following day the pain was so severe that she consulted her doctor. Short-wave therapy was tried for a fortnight, but the pain increased in severity and began to spread to the right buttock and down the back of the right lower limb. Diathermy was tried for ten days but it seemed to aggravate the pain. She got some relief by staying in bed for a few days, but the dull sciatic ache persisted. Rest in bed for six weeks before admission to hospital had given no appreciable relief.

On examination there was obvious flattening and rigidity of the lumbar spine, with a scoliosis convex to the right. There was pain on stretching the right sciatic nerve, and slight sciatic tenderness, but there was no demonstrable muscular wasting or weakness, no alteration in the reflexes, and no sensory disturbance. The cerebrospinal fluid was normal. A lipiodol study showed a lesion opposite the 4th lumbar intervertebral disc on the right side. At operation a prolapsed nucleus pulposus was removed. The patient was immediately relieved of the sciatic pain and the subsequent course has been satisfactory; she was able to resume her normal activities at the end of six weeks. She has been followed for six months after operation and there has been no recurrence of symptoms.

ÆTIOLOGY

In this series there were 17 males and 13 females. The youngest patient was 19 years old, and the oldest 51 years; most of the patients were in the age-period from 25 to 45 years. They had had symptoms of sciatica for periods varying from 15 years to 8 weeks. There was no special relation to physical habitus or occupation; in fact, housewives and men engaged in sedentary work seem just as liable to this affection as those employed in more strenuous occupations.

In all except 5 cases there was a history of injury to the back. Half of these injuries occurred during stooping, and they ranged from lifting a 3-year-old child over a low fence to lifting a 200 lb. sack. In one case the first symptom was an acute pain low down in the back which came on while the patient was stooping to light a fire. In this, as in other cases, the incident had to be elicited by direct inquiry. Some cases had had axial injuries, such as falling from a height on to the feet, or coming off a horse on to the buttocks. These injuries probably act in the first place by compressing the intervertebral disc, causing the nucleus pulposus to "explode," with rupture of the annulus fibrosus.

THE PAIN

Although it is usually sciatic pain which brings these patients to a doctor, all except 4 of this series have had periods of "low back pain" at some stage of their affection, usually at the beginning and as a sequel to some injury to the back. Although they may have dismissed the back pain as "lumbago," and as unrelated to the sciatic pain if a period of months or years elapsed before the sciatica began, inquiry shows that this "lumbago" is lower down in the back, in the lumbo-sacral rather than in the lumbar region. The low back pain usually comes on acutely, may last for a period of a few days up to two or three weeks, and then may disappear completely; or it may gradually merge into the sciatic pain. The back-pain is probably a symptom of the injury to the intervertebral disc, and the pain is confined to the back until a nerve-root is compressed, when the pain begins to radiate down the limb.

All of these cases have had pain in the distribution of some part of the sciatic nerve. A common story was that the sciatic pain began as the back-pain eased, and passed from the back to the buttock and down the back of the thigh to the calf, ankle and foot. It is the pain rather than muscular weakness or other symptoms which causes the disability. In 10 cases the patient was confined to bed with "acute sciatica"; the remainder were able to get about with varying degrees of discomfort.

Bilateral sciatic pain had been present at some stage in 4 cases, and in 2 others the pain had alternated between the two limbs in recurrent attacks. In the bilateral cases the pain was usually much worse on one side than on the other, and by the time they came for treatment it had settled on one side so definitely that there was no doubt on which side the lesion was situated.

Both the back pain and the sciatic pain have been noticeably variable in incidence and severity: periods of relative remission or complete freedom from pain were common. One patient had had a previous attack of sciatica which incapacitated him for 6 weeks, and thereafter was completely free from pain until 15 years later. Another had had recurring bouts of sciatica for 15 years, with intervals of complete freedom for as long as 2 years. In other cases the sciatic pain had been almost constant but had varied in intensity, being aggravated by exertion, jolting, coughing, sneezing and so on, and sometimes there were acute bouts of pain which could not be ascribed to any cause.

This discontinuity of symptoms may be difficult to understand in light of the pathology described above, but the following explanation is suggested. If the initial low back pain is caused by a rupture of the annulus fibrosus an incomplete rupture may heal (with rest and immobilisation of this part of the spinal column induced by the pain), and there may be no further trouble until a subsequent strain or injury affects the already weakened disc. This may complete the rupture and cause further pain in the back; and some of the nucleus pulposus may be extruded. But there is no sciatic pain until a sudden twist shifts the extruded fragment in such a way that it comes to lie against and to compress a nerve-root. That these fragments may be freely movable under the posterior longitudinal ligament is often seen at operation, and this mobility may explain some cases of sudden spontaneous remissions and relapses, as well as some transient remissions and exacerbations after manipulation and other forms of treatment. Relapses may also be explained by œdema of the protruded cartilage, since this is a common finding in the fragments removed at operation, especially in the cases of acute sciatica.

In general the most striking variability in symptoms has been in the cases of prolapsed nucleus pulposus; the cases of herniation of the annulus fibrosus have been characterised by chronic, continuous pain which is rarely as severe or disabling as the acute pain of a prolapsed nucleus pulposus.

PHYSICAL SIGNS

Skeletal.—Of the 28 cases, 19 showed varying degrees of (*a*) flattening and rigidity of the lumbar spine and (*b*) lumbar scoliosis. The scoliosis when present was convex to the side of the lesion and it may be a reflex attempt to increase the intervertebral distance on the side of root compression. Several of the patients had diffuse tenderness on pressure over

the lumbosacral region and sacroiliac joints, and some had especially tender points in the region between the lumbosacral spinous processes and the crest of the ilium.

Neurological.—The signs were largely concerned with the course and distribution of the sciatic nerve. All of the patients had pain on sciatic-stretching tests—i.e., lifting the extended leg off the bed. This pain is referred to the lower part of the back, and the back of the thigh, knee, calf or ankle. In some acute cases stretching the nerve on the sound side caused pain low down in the back, presumably because this manœuvre produces some flexion in the lumbosacral region.

In all except 5 cases there was *tenderness* over the sciatic nerve, most commonly over the sciatic notch or in the back of the thigh where the nerve trunk is of sufficient size to be palpated. In some cases the common peroneal nerve was tender when it was compressed against the neck of the fibula. It is this tenderness of the nerve trunk in the buttock and thigh which accounts for the characteristic way in which these patients sit in a chair on the sound buttock, and rest in bed on the sound side with the hip and knee of the affected side flexed to relax the sciatic nerve.

Muscular weakness was found in 25 cases, in most of which there was perceptible wasting of the anterior tibial and calf groups of muscles. The degree of weakness was slight and could only be demonstrated in movements against resistance, especially in dorsiflexion and plantar flexion of the foot. The patient had rarely noticed the weakness himself. Diminution or absence of the ankle-jerk was noted in all except 5 cases. The plantar response in all cases was flexor.

As regards the *sensory system*, in addition to sciatic pain 18 of the patients complained of paræsthesia in some part of the distribution of the sciatic nerve: a feeling of numbness or tingling, or pins and needles, most commonly in the lower part of the calf and along the outer side of the ankle and foot. Impairment of cutaneous sensibility was demonstrated in all of these cases, and in 3 others in which there had been no paræsthesiæ. As with the motor loss, the sensory impairment was slight: light touch, although felt, had less of the tickle quality than elsewhere, and pinprick was not quite as sharp as in the normal parts. This sensory impairment was most commonly found along the outer border of the foot and ankle (fig. 3) extending a variable distance up the lateral aspect of the lower part of the leg. Frequently there was impairment of the sense of passive movement of the little toe on the side of the lesion. In all except 2 cases the sensory impairment was slight, and might easily have been overlooked.

In only 2 cases was there any disturbance of *sphincter control* and both of these had well-marked cauda-equina syndromes.

In one of them it was incontinence of urine and fæces which brought the patient to hospital. During recovery from an attack of sciatica he suddenly developed sphincter paralysis. Although there was no muscular weakness or alteration of the tendon reflexes he had some sensory loss in the lower sacral segments and 320 mg. of protein in the cerebrospinal fluid; he was thought to be suffering from a neoplasm of the cauda equina. At operation a large prolapsed nucleus pulposus was found between L 5 and S 1. In the other case a long history of low back pain and recurrent attacks of sciatic pain culminated in the sudden onset of bilateral sensory and motor paralysis in the sacral distribution during a fit of coughing. This patient too had a gross cauda-equina lesion with 500 mg. of protein in the cerebrospinal fluid (above the lesion), and at operation a large prolapsed nucleus pulposus was removed from the lumbosacral disc.

Radiological examination of the spine commonly shows only flattening of the lumbar spine and lumbar scoliosis. Since there is considerable variation in the thickness of the intervertebral discs it is rarely possible to be certain of any diminution in the intervertebral space such as might be expected if any great quantity of nuclear material was prolapsed. The actual prolapsed fragment has not been visualised in any of the skiagrams.

Intrathecal lipiodol has been used for confirmation of the diagnosis and for precise localisation in 25 cases. Amounts of 3–5 c.cm. introduced by lumbar puncture are sufficient to demonstrate the lesion on the fluoroscopic screen or in radiograms. The lesion is shown as a lateral indentation of the shadow with absence of filling of the affected root sheath (fig. 4) and is usually more apparent in the anteroposterior than in the lateral or oblique projections. It may be more definite in fluoroscopy on the tilting table than in the radiograms taken when the column of lipiodol is at rest, and in several cases the defect was very slight (fig. 5). In all cases in which it has been used the lipiodol has been removed at operation by making a small incision into the theca and tilting the patient up and down until no more lipiodol runs out. Control radiograms taken after operation show that it is possible to remove most of the lipiodol in this way, but it has the disadvantage that a considerable quantity of cerebrospinal fluid escapes and the patient may have an exaggerated "lumbar-puncture headache" for 24–36 hours after operation. Against any suggested disadvantages of lipiodol there is to be set the fact that by its use it is possible to localise the lesion precisely enough to deal with it through a very limited laminectomy, with a minimum disturbance of the mechanics of the back. In several American clinics intrathecal lipiodol is considered so innocuous that special efforts to remove it at operation have been abandoned.

Examination of the cerebrospinal fluid has been of no positive help in diagnosis. Of the cases which were punctured, in 17 the protein content was 45 mg. or less; in 6 cases it was between 45 and 65 mg., and in only 2 (those with cauda-equina syndromes) was it over 65 mg. (500 mg. and 320 mg.) and in these cases there were very large protrusions. There was no

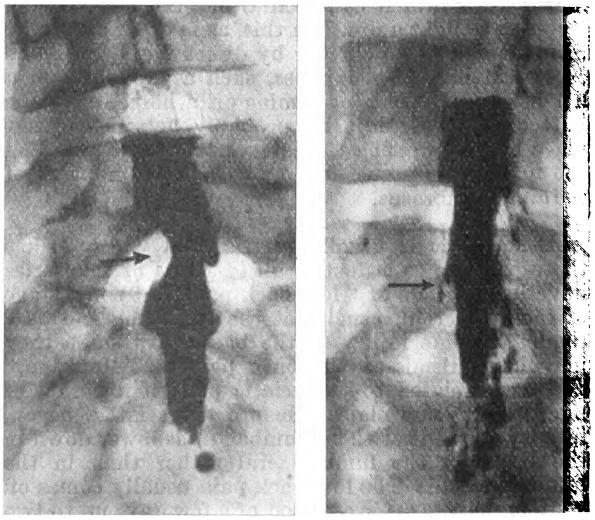


FIG. 4—Radiogram showing lateral indentation of lipiodol shadow by prolapsed nucleus pulposus.

FIG. 5—Radiogram showing defective filling of root sheath at the site of the lesion.

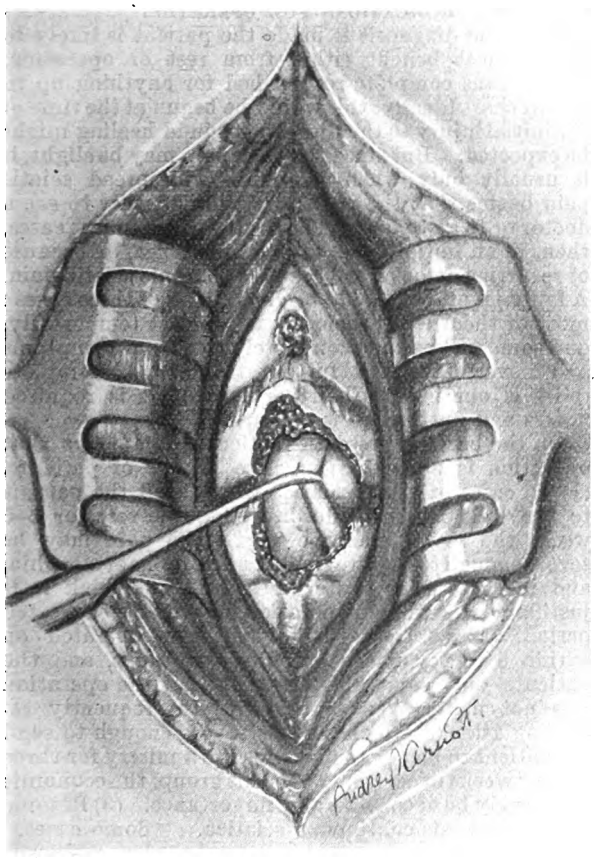


FIG. 6—Laminectomy in case of prolapsed nucleus pulposus. The nerve-root has been retracted medially to expose the lesion.

abnormality in the cell content. In no case was there a spinal manometric block, and although all of these lesions were below the usual site of lumbar puncture in only the 2 cases of cauda-equina compression was the lipiodol arrest of such a character and the lesion large enough to have caused a spinal block. In general the normal spinal fluid may be a point in the exclusion of other causes of sciatica.

OPERATION

The operation which is practised now entails a middle-line incision over the lumbosacral spine. The spinous processes of the vertebræ between which the lesion lies are removed, as well as the contiguous margins of the laminæ on the affected side, stopping short of the intervertebral joint. This exposes the underlying ligamentum flavum which is dissected away to reveal the theca, retraction of which discloses the lesion. When the nerve-root is cleared from the swelling (fig. 6) an incision into the posterior longitudinal ligament covering the swelling may allow a loose fragment of nucleus pulposus to be extracted, leaving a collapsed cavity over which the released nerve-root rides freely; when the lesion is recognised as a herniated annulus fibrosus the disc should be interfered with as little as possible, but in most cases the swelling has been pared down in a search for a loose nuclear fragment. If lipiodol has been used it is removed in the manner described. The wound is then closed with several layers of stitches. The skin stitches are removed on the tenth day, and the patient is allowed to get up 17 days after operation

RESULTS

All of these cases have been operated on within the past nine months, so it is clearly too early to speak of ultimate results. The most dramatic relief was obtained in those 21 cases of severe sciatica in which a loose fragment of prolapsed nucleus pulposus was removed. In almost all of these cases the patient experienced relief of the sciatic pain as soon as he recovered from the anæsthetic. In a few cases there was a slight recurrence of pain in the first few days of convalescence, but it was never as severe as before operation, and it always disappeared completely within a fortnight. There was commonly pain at the site of the laminectomy for the first two or three days, but my impression is that these patients experienced much less of this pain than do patients who have had laminectomies for other reasons, such as the removal of a spinal tumour. They were generally able to move about in bed in relative comfort within 4 or 5 days of the operation. Most of the patients began to walk 17–18 days after operation, and although there was some soreness and stiffness of the back at first, this improved rapidly with graduated exercise, and by the end of a month from operation they were virtually free from symptoms.

Of the cases which had herniation of the annulus fibrosus, 2 experienced immediate relief and had a painless convalescence. In 3 others, the immediate results of operation were not satisfactory: the sciatic pain persisted, and with the additional pain of the laminectomy and the headache and vomiting due to escape of cerebrospinal fluid at operation the patients were miserable for several days; 6 weeks after operation they still had some sciatic pain, although each of them professed improvement on the preoperative state. It may be that they will derive no permanent benefit from the operation, and that what subjective improvement they have experienced is due to the rest in bed enforced by the operation.

The 2 cases with cauda-equina syndrome were completely free of pain after operation, but recovery of sphincter control and of the sensory and motor functions has been very slow. One of these when seen three months after operation was back at work as a bus driver but still had defective control of his sphincters, and the sacral sensory loss was much the same as before operation.

Of the remaining cases, 1 was a negative exploration but the patient has benefited considerably from the laminectomy; in the other, a fibroangeioma was removed from the intervertebral canal but this has not completely relieved the pain. In no case has there been any aggravation of the symptoms or neurological signs after operation.

DIAGNOSIS

It is common knowledge that low back pain and sciatica can be caused by a number of different conditions. To catalogue these would be to list almost all the pathological processes which may affect the lumbosacral spine, the bony pelvis, and the soft parts in the vicinity. But with the recognition of a common type of sciatica which can be relieved by a relatively simple operation entailing no undue risk, the differential diagnosis assumes a new importance.

How are these cases of damaged intervertebral disc to be recognised? Typically there will be the story of a healthy patient who has an injury to the back, followed by a period of low back pain, sciatic pain and paræsthesiæ. On examination he will have a rigid lumbar spine with a slight lumbar scoliosis. There will be pain on stretching the sciatic nerve, tenderness on pressure

over the nerve, slight muscular weakness in the foot and calf, a diminished or absent ankle-jerk, and slight sensory impairment in the distribution of one of the lower lumbar nerve-roots. These symptoms and signs will usually be confined to one limb, and there will be no sphincter disturbance. The cerebrospinal fluid will be normal. But by no means do all cases present all of these features. In 2 cases of prolapsed nucleus pulposus, in which the pain was characteristic, the only objective sign was pain on stretching the sciatic nerve, with no other neurological abnormality.

The exclusion of other causes of low back pain and sciatica may involve extensive clinical, radiological and laboratory investigations. In Professor Cairns's clinical records I found cases of congenital deformities of the spinal column, vascular abnormalities of the cord and cauda equina, inflammatory states of the spinal meninges, spinal tumours and tumours of the bony pelvis, which at some stage of their illness might have been mistaken for the more innocent damaged disc. In general, bilateral signs and symptoms, the steady and often rapid march of the disease, disturbed sphincter control, and striking neurological signs are characteristic of these disorders. Radiological examination often gives additional help, as does examination of the cerebrospinal fluid, at which a manometric block and gross increase of the protein content of the fluid are often found. It should be noted, however, that, as in 2 of the cases in this series some protrusions of the nucleus pulposus are so large that they may behave exactly as a spinal tumour in causing compression of the spinal cord or cauda equina.

A more common and difficult problem is the differentiation of intervertebral disc damage from low back pain and sciatica due to the various orthopædic causes. Sacroiliac strain, sacroiliac arthritis, osteoarthritis of the spine, sciatic scoliosis and other structural abnormalities may all cause pain in the back and lower limbs, and many of the cases in this series have been diagnosed and treated as such. The most satisfactory differentiation will be made in consultation with the orthopædic surgeon; this collaboration between orthopædists and neurological surgeons at the Mayo Clinic led to operations for intervertebral discs in only about 2 per cent. of many hundreds of cases of pain in the back and lower limbs. In general the orthopædic cases show much less in the way of neurological signs than do the damaged intervertebral discs. In doubtful cases which prove refractory to orthopædic treatment lipiodol would settle the problem.

Low back pain and sciatica may be symptoms of various gynæcological and pelvic disorders and a pelvic examination should be made in all cases.

There are some cases of chronic sciatic pain for which no cause can be found and which fail to respond to any kind of treatment. The pain is rarely disabling, but may cause the patient to walk with a limp and to adopt characteristic attitudes in sitting or lying. In these cases the affection is largely subjective; for want of more knowledge, they are often branded as obsessions and the pain is assumed to originate at the psychical level.

There will be left a body of cases in which none of these problems of differential diagnosis arises, and they may be dismissed as sciatic neuritis or neuralgia, depending on whether or not any abnormal neurological signs are found. It will probably be in this group that most cases of intervertebral disc damage will be found, and as the condition is more widely recognised I believe it will be the exceptional case of sciatica that is *not* due to a damaged intervertebral disc.

INDICATIONS FOR OPERATION

Once the diagnosis is made the patient is likely to derive most benefit either from rest or operation. Rest means complete rest in bed for anything up to 5–6 weeks. Ideally, this would be begun at the time of the initial injury to the disc when sound healing might be expected. But since the back pain may be slight, it is usually only when the more widespread sciatic pain begins that the patient is willing either to see a doctor or to go to bed. The doctor will see most cases, then, in an initial acute attack of sciatica, or because of recurring attacks, or because of chronic sciatic pain. A fair trial of rest should be given to all of these cases: most of them will benefit by it, at least temporarily, and some will become completely free from symptoms and never have any further trouble. If complete relief is obtained no further treatment is required unless and until there is a recurrence.

On the basis of present experience, it appears that operation is advisable in three groups of patients. (1) In cases of acute sciatica which send the patient to bed, and in which despite adequate rest for 5–6 weeks the severe pain persists. The pain may be severe enough to require frequent injections of morphia, and in these very acute cases I do not think it is justifiable to withhold operation for even the suggested period. Three such cases have been operated on within 8 weeks of the onset of symptoms, and the patients' only complaint has been that the operation was not undertaken sooner. (2) In frequently recurring attacks, which may be severe enough to send the patient to bed or to make his life a misery for three or four weeks every year. In this group, the economic factor may be of considerable importance. (3) In some cases of chronic continuous sciatica. "Some cases," because some are due to a prolapsed nucleus pulposus in which the results of operation are no less satisfactory than in the acute and severe cases. But others in this group will be due to a herniated annulus fibrosus, and the results in these have not been as uniformly satisfactory as in those due to prolapse of the nucleus pulposus. Until we learn to differentiate these varieties by the history and examination, or by myelography, some doubt must remain about the value of operation. On the basis of the pathology described above, I do not see that any other form of treatment is likely to be permanently effective, although rest in bed may bring some relief. I know of cases almost certainly due to a prolapsed nucleus pulposus which have been relieved by manipulation. But it is undoubtedly a risky procedure: Professor Cairns operated on a case of prolapsed nucleus pulposus in 1936 in which a florid cauda-equina syndrome was precipitated by a manipulation for sciatica, presumably through more of the nucleus being forced out by the manipulation.

Two questions arise in considering the ultimate outlook after operation. First, what are the chances of a recurrent herniation at the site of operation? In the cases at the Mayo Clinic which have been followed over a 5-year period this has been extremely rare. Almost as rare was subsequent damage to another disc after operation, but that is of course a possibility. Secondly, is the back appreciably weakened by the operation? This seems very unlikely. The lesion can be localised so precisely that it can be dealt with by the sacrifice of only the spinous processes of two vertebræ, the contiguous margins of two laminæ on the side of the lesion, and the underlying ligamentum flavum. Much more extensive laminectomies are done for other reasons, such as the removal of spinal tumours, without leaving any appreciable weakness of the back. In this series, of the cases which have been seen as long as three months after

operation, all have had virtually a full range of painless movement of their backs, and have been aware of no weakness.

SUMMARY

1. The pathology of the intervertebral disc is discussed in its relation to sciatica, and it is submitted that most cases of "ordinary sciatica" are due to lessions of the intervertebral disc.

2. Thirty cases are reviewed in the light of symptomatology and findings at operation. In twenty-eight of these, changes in the intervertebral disc were responsible for the sciatica.

3. While many cases of sciatica recover unaided, in others operative treatment is called for. The indications for and results of the operation are discussed.

My thanks are due to Prof. Hugh Cairns for his advice and assistance in the preparation of this report; and to the members of the staff of the Radcliffe Infirmary for their coöperation in assembling the clinical material.

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CARCINOMATOSIS OF BONE

DIFFICULTIES IN DIAGNOSIS

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Many cases diagnosed as chronic rheumatism are examples of other diseases. The 7 patients whose histories are given here were first diagnosed as having rheumatism, but in all of them the pain was caused by secondary carcinomatous deposits from a primary growth which had not caused any symptoms.

METASTATIC CARCINOMA IN BONE

There is evidence that the spread of tumour cells to bone is by the blood rather than by the lymphatics. The bones involved are not necessarily those in close proximity to the primary growth but those which contain the most red marrow, such as the ribs, sternum, vertebræ, and proximal ends of the long bones. Joll (1923) quotes figures from the Cancer Hospital which give a ratio of 34 metastases in bone from cancer of the breast to 1 from cancer of the prostate. This gives a false impression of the incidence of metastases in bone due to carcinoma of the prostate. Joll also mentions that metastases in bone from carcinoma of the œsophagus are not so rare as is commonly thought. The order of frequency in which bones were involved were vertebræ, ribs, sternum, skull, femur, humerus, and pelvis. In his opinion trauma is a predisposing factor, but this is questionable. Secondary carcinomata in bones are not rare, especially when the primary growth is in the breast, prostate, thyroid, lung, kidney (hypernephromata), stomach, tongue, œsophagus, or suprarenal. The following cases illustrate some of these points.

CASE-RECORDS

Case 1.—A draughtsman, aged 60, was admitted to the General Hospital, Birmingham, under Dr. T. T. Hardy, complaining of loss of weight and weakness, on Dec. 5, 1937. About a year previously he was losing weight, but medical examination revealed nothing wrong. In October, 1937, he began to feel out of sorts but had no pain or indigestion, although he had lost his appetite and just before admission had vomited once. He attributed his loss of weight to worry about his work.

Examination on admission revealed an obvious loss of weight but no physical signs to explain it. A blood-count showed a definite microcytic anæmia: red cells 3,660,000, hæmoglobin 68 per cent., colour-index 0·9, and white cells 8200. A differential count of the white cells was normal.

No koilonychia was observed. A test-meal showed achlorhydria, but administration of histamine produced a small flow of acid. Radiograms of the stomach, duodenum, and sinuses were normal. A simple iron-deficiency anæmia was diagnosed, although this did not explain the loss of weight, which was attributed to worry. The patient was discharged on Jan. 12, 1938.

During the next six months he continued to lose weight. He only took iron for about a month, and three months after his discharge he began to have severe pain in his left thigh and lumbar region. This he took to be "rheumatism," for which he tried various proprietary remedies without success. In July, 1938, he was sent to Droitwich with "rheumatism."

He first came to me on July 20, 1938, complaining of an intense and continuous pain in the region of the fifth lumbar vertebra. He was extremely weak, and easily became dyspnœic on exertion. There was an excessive pallor of his visible mucosæ, and a loud systolic bruit was heard all over the præcordium. He had a severe anæmia, and the result of a blood-count was as follows:—

Red cells	2,960,000	Polymorphs	77%
White cells	9000	Small lymphocytes	17%
Hæmoglobin	33%	Large lymphocytes	3%
Colour-index	0·56	Monocytes	2%
		Myelocytes	1%

The red cells showed little variation in size but were hypochromic. No nucleated red cells were seen. The average diameter was 7 μ. These findings led me to diagnose carcinomatous deposits in bone, and the loss of appetite suggested that the primary growth was gastric.

The patient was immediately transferred to the General Hospital again under Dr. Hardy. The diagnosis was partially confirmed by radiographic evidence of a secondary deposit of growth in the fifth lumbar vertebra and a confirmation of the blood-picture. He developed a swinging temperature, and just before his death, which took place on Sept. 10, became incontinent. An unsuccessful effort was made to try and locate the primary growth before death. Radiograms of the chest and skull were normal, and tests for occult blood gave negative results.

At necropsy the primary growth was discovered to be a large annular carcinoma of the lower end of the œsophagus. Secondary deposits were found in the perioesophageal glands, the left femur, and the fifth lumbar vertebra, whose arch had been destroyed by the growth, which was pressing on the cauda equina. Histological sections of the femur showed an invasion by a squamous-celled new growth.

Case 2.—An engineers' fitter, aged 57, was admitted to Guy's Hospital on June 28, 1935, for constant severe pain in both thighs for the previous eight months. Apart from pleurisy at 30 he had been a fit man until December, 1934, when he noticed a dull pain in his right leg, which was persistent, "nagging," and more troublesome in bed. Loss of sleep and this pain made him consult his doctor in January, 1935. He was admitted to Worcester Infirmary, where clinical and radiographic examination revealed no cause for his pain, which was thought to be rheumatic. He was treated with a vaccine and radiant heat. In May a similar pain affected the right leg, and he was sent into Guy's Hospital for investigation.

On examination he was thin and looked anæmic. He walked with difficulty and was very weak. His loss of weight since his pain began had been about a stone. His heart was slightly enlarged. Both

sacroiliac joints were tender on palpation. No tendon reflexes could be elicited in his lower limbs, but this was discovered many years ago when he reported for military service. No other neurological signs were found, and, the Wassermann reaction being negative, no definite cause for the absence of these reflexes was found. The prostate was enlarged and hard. Radiograms suggested either secondary carcinomatosis or Paget's disease in the left femur and pelvic bones. The skull and tibiæ were normal. A blood-count gave the following results:—

Red cells	3,000,000	Polymorphs	61%
White cells	6500	Lymphocytes	31%
Hæmoglobin	62%	Eosinophils	2%
Colour-index	1	Basophils	1%
		Hyalines	4%
		Myelocytes	2%

No abnormal red cells were found, although their average diameter was high. On the evidence of the radiograms and the blood-count secondary carcinomatosis of bone was diagnosed. This was confirmed when the patient developed signs of a malignant prostate about a month later. He died in October, 1935.

CASE 3.—A cooper, aged 58, was admitted to Guy's Hospital in July, 1937, for pain in the low back and right thigh, which had been provisionally diagnosed by his doctor as osteo-arthritis of the right hip-joint. His story was that in April, 1937, his right foot became hot, swollen, and painful, and he was sent to the London Hospital. Synovitis was diagnosed, and after two weeks off work he was able to get about again; but in May he began to have severe stabbing pain in the region of his fifth lumbar vertebra; this pain varied in severity and at times was absent. Latterly opium derivatives were the only thing which relieved it. For a week before admission the pain had involved the right thigh also. Since the onset of the pain there had been a loss of 1½ st. in weight.

On examination there was general wasting, which affected especially the muscles of the lower limbs. The mucous membranes were pale. The prostate was enlarged and firm but not unduly so. Movement of the hip-joints was free and painless, but slight pain was felt on pressure over the sacro-iliac joints. The urine and cerebrospinal fluid were normal. The Wassermann reaction was negative. A test-meal showed achlorhydria. Tests for occult blood gave negative results. Radiograms of the alimentary tract were normal. Radiograms of the pelvis and lumbar vertebræ were normal, apart from slight osteo-arthritic changes in both sacro-iliac joints. A blood-count gave the following results:—

Red cells	2,500,000	Polymorphs	75 %
White cells	11,800	Lymphocytes	14 %
Hæmoglobin	47%	Eosinophils	1 %
Colour-index	1	Basophils	2 %
		Hyalines	2½ %
		Myelocytes	4½ %
		Metamyelocytes	2 %
		Lymphoblasts	1 %

The red cells showed anisocytosis, poikilocytosis, and polychromasia, with 2 per cent. of reticulocytes, many normoblasts, and 150,000 platelets. This anæmia, with a moderately high colour-index and the presence of abnormal red and white cells, indicated some stimulation of the marrow, and the most likely cause was carcinomatosis of bone. Re-examination of the prostate suggested that it might be malignant.

The patient was discharged in the middle of August to be given deep X-ray therapy as an outpatient. He rapidly got worse and had to be readmitted in October, 1937, with continuous pain. There was radiographic evidence of metastases in the sacrum, ribs, and the fourth and fifth lumbar vertebræ. The blood-picture showed even more primitive cells, and the patient continued to lose ground despite deep X-ray therapy. He eventually discharged himself from hospital and died a month later. The primary growth was most probably prostatic, but this could not be confirmed, because there was no necropsy.

CASE 4.—An unemployed man, aged 54, was admitted to the Royal Hospital, Wolverhampton, under Dr. J. H. Sheldon in August, 1938, complaining of pain in the low back of three months' duration. His doctor had diagnosed this pain as rheumatic. The pain was not persistent but was very severe during the attacks. The patient had lost 2 st. in weight and had had some dyspnœa on exertion. A month before admission he had had some difficulty in starting to micturate, and the stream was poor.

On examination he was extremely thin. The lumbar spine was tender on pressure. The prostate was enlarged, hard, and irregular, and radiograms revealed extensive carcinomatous metastases in the ribs, dorsal and lumbar vertebræ, and pelvis. A blood-count gave the following results:—

Red cells	4,240,000	Polymorphs	54%
White cells	6200	Lymphocytes	38%
Hæmoglobin	82%	Monocytes	6%
Colour-index	0·96	Eosinophils	2%

No abnormal cells were seen. The cerebrospinal fluid was normal and the Wassermann reaction was negative.

The foregoing case is much more definite than those previously recorded, but it is interesting to note the normality of the blood-picture despite extensive deposits. The following three cases are recorded more briefly. The patients were all sent to Droitwich as cases of rheumatism.

CASE 5.—An engineer, aged 54, was first seen in January, 1938, complaining of pain in the chest, thighs, and low back. He had had paratyphoid in 1924 but otherwise had been healthy until, six months before coming to Droitwich, he had noticed increasing lassitude and loss of weight. Over this period he had lost 2 st. The pain had begun in October, 1937, and gradually had increased in severity. He described it as deep-seated and gnawing.

On examination he was anæmic and wasted. There was tenderness on pressure over his sixth and seventh ribs in the axillary line. The base of the right lung was dull to percussion, and air entry was poor. On rectal examination the prostate was enlarged, hard, and irregular. Radiograms of the dorsal and lumbar vertebræ, ribs, pelvis, and femur showed them to be full of carcinomatous metastases. A blood-count showed 2,500,000 red cells, 8500 white cells, and hæmoglobin 62 per cent. No abnormal red or white cells were found. The patient was sent for deep X-ray therapy but died in September, 1938.

CASE 6.—A married woman, aged 60, was seen in April, 1938, complaining of intense pain localised to a small area in the lumbar region. She had a long history of vague pains and was obese, highly-strung, and apprehensive. She first began to have pain in November, 1937, and had been radiographed then without any abnormality being found. In January, 1938, she first complained of an intense local pain about ½ in. external to the right sacro-iliac joint. Her doctor suspected malignancy, and she was examined by a London consultant, who could find no abnormality and diagnosed a localised fibrositis.

I first saw her with Dr. J. W. T. Patterson in April, 1938. Her pain had become so severe that she was confined to bed and needed morphia. Her appetite was good, and she had not lost weight. There was no anæmia, and neither Dr. Patterson nor I could find physical signs of organic disease. Radiograms of the lumbar spine and pelvis were normal. We formed the opinion that the case was largely functional, and this was supported by a surgical opinion from Birmingham.

About May 10, however, the patient complained of numbness in the right leg. An extensor plantar reflex and a slight sensory loss were found. She was sent home and afterwards seen by Dr. G. Riddoch, who found a paraplegia and sensory loss below the twelfth thoracic segment, probably due to bony carcinomatosis from an undetected primary growth pressing on the spinal cord. The patient became incontinent and died on June 30, 1938. No necropsy was done.

This case is an instructive example of the difficulties in diagnosing secondary deposits in bone, for

despite careful clinical and radiographic examination in March, 1938, showing no obvious abnormality, this patient was dead by July, 1938. It emphasises the danger of diagnosing any unexplained pain as functional.

CASE 7.—A farmer, aged 75, was sent to Droitwich in June, 1939, because of gnawing pain in the lumbar and cervical region, which had been diagnosed as fibrositis. Until March, 1939, he had been remarkably fit; then he had begun to have pain in the lumbar and cervical region. This pain was gnawing and deep-seated, and the patient got no relief from common remedies for rheumatism. It was unrelated to movement and periodic, but the bouts were becoming more frequent. His appetite had failed, and he had lost a stone in weight and noted increasing weakness and fatigue, which he ascribed to his age.

On examination he was very thin, and there was definite tenderness over the fourth and fifth cervical vertebræ on deep pressure, but movement of the neck did not produce the pain. The prostate was enlarged hard, and irregular. Radiograms revealed secondary carcinomatous deposits in the bodies of the fourth and fifth cervical vertebræ. Examination of the blood showed a hypochromic anæmia with no abnormal red or white cells. The hæmoglobin was 65 per cent. and the colour-index 0·81. The patient died two months later with symptoms of prostatic obstruction.

COMMENTS

These 7 cases were first diagnosed as rheumatism, but in each of them the pain was really due to a secondary carcinomatous deposit. The correct diagnosis depends on the pain, the blood-picture, and the radiograms.

Pain.—Most patients present themselves because of pain. The character of this pain is often gnawing, deep-seated, intense, and usually unrelated to movement. It may be difficult to control with the simple analgesics used to relieve rheumatic pains. In some cases the bones are tender on pressure, as in case 7. Local applications, heat, and physiotherapy tend to make it worse. Freedom of the articular movements may suggest that the joint is not osteo-arthritic. Fibrositis should never be diagnosed in the absence of painful nodules. The pain in fibrositis is often severe in the early mornings but works off with movement as the day progresses, unlike the spasmodic or continuous pain caused by malignant disease.

Blood-picture.—This may be normal, or there may be either hypochromic anæmia or myelogenous (leuco-erythroblastic) anæmia. Case 4 supplies an example of a normal blood-picture with no great anæmia despite extensive secondary deposits. Recently there was a patient in the Royal Hospital, Wolverhampton, who was initially diagnosed mistakenly as a case of Paget's disease, largely because of absence of anæmia and of general signs of malignancy and because the radiograms did not reveal the true condition. Further observation, however, proved that there was carcinomatosis of the bone secondary to a primary growth of the prostate.

Hypochromic anæmia is probably the commonest type found. In case 1 hypochromic anæmia was diagnosed nine months before there was any pain due to deposits in bone. There was no evidence of a primary growth, and, although at necropsy an œsophageal growth was found, occult blood had never been found in the stools. It is most probable that this anæmia was due to toxic depression of the bone-marrow. Before death the picture changed to that of leuco-erythroblastic anæmia.

Leuco-erythroblastic anæmia.—From the point of view of diagnosis this picture is the most helpful. The clarification of our views on blood changes associated with several diseases of bone is due chiefly to Piney (1922) and Vaughan (1934). The anæmia may not be severe, but it is characterised by the presence of immature red and white cells, a variable colour-index, and a low platelet count. Such a picture is not confined to carcinomatosis of bone but is also seen in multiple myelomatosis, myelosclerosis, marble-bone disease of Albers-Schönberg, Cooley's erythroblastic anæmia, and aleukæmic myelogenous leukæmia, but the commonest cause is undoubtedly carcinomatosis of bone. The anæmia is not related to the secondary destruction or the crowding out of the marrow. Small malignant deposits may produce a change in the blood-picture even without radiological evidence, as in case 3, whereas extensive deposits may cause no blood changes. In a case of mine with secondary deposits in bone from a carcinoma of the breast the blood-picture in June showed a hypochromic anæmia, whereas in September myelocytes 1·5 per cent. were found, with numerous normoblasts. Lucey (1939) published a case in which this condition of the blood was mistaken for pernicious anæmia and then acholuric jaundice. In pernicious anæmia immature white cells are rare (Lucey said that myelocytes 4 per cent. were present); this finding, with lack of response to liver therapy, is against the diagnosis of pernicious anæmia. Only in a crisis can acholuric jaundice simulate leuco-erythroblastic anæmia, and Lucey's case, which showed an increased fragility of the red cells and a positive indirect van den Bergh, must be exceptional. He admits, however, that the cells were not typically globular. His case is of importance in showing that carcinomatosis of bone may simulate a hæmolytic anæmia. Lucey mentions also the improvement of his patient after blood-transfusion. This is not unusual in anæmia of this type; Robin (1935), reporting a case, said: "A diagnosis of carcinomatosis of bone-marrow secondary to a recurrence in the stomach of an ulcer becoming malignant was made, but was revised, due to the absence of recognisable bony deposits, the favourable response to blood transfusion, and the failure to have a primary growth." The cases reported here show that these features may be absent in carcinomatosis. Confusion may also be caused by idiopathic steatorrhœa, in which failure to absorb the essential factors may lead to a macrocytic or a microcytic anæmia resembling the leuco-erythroblastic type. The steatorrhœa should establish the diagnosis. The anæmia, therefore, varies both in type and in degree but may be of early diagnostic importance and is due rather to toxic irritation of the bone-marrow than to destruction of hæmopoietic tissue.

Radiology is the most important aid to diagnosis in most cases; but in some, as in case 3 and case 6, the radiological signs are late. The changes due to secondary deposits from carcinoma of the prostate are osteoplastic, as opposed to osteolytic changes due to those from a breast carcinoma. As regards the osteolytic cystic area, the differential diagnosis of diffuse osteitis fibrosa cystica due to parathyroid tumour may have to be considered, but the pain and normal calcium preclude this diagnosis. Paget's disease must be considered in connexion with osteoplastic deposits. The course is longer and relatively painless in Paget's disease, which is unlike carcinomatosis. From a purely radiological point of view the diagnosis may be difficult, but Brailsford (1938) points out "that the detection of isolated areas of destruction of the peripheral bony outline and cancellous trabeculæ, and the recognition that the increased density is not due to coarsened fused trabeculæ but a deposition of calcium within the cancellous

mesh, indicate the malignancy of the lesion." He also says that in some deposits from scirrhous carcinoma of the stomach differentiation may be almost impossible.

In carcinomatosis of bone several other diagnostic points are of value. There are often the general signs of malignancy, such as wasting, loss of appetite, and pyrexia. Pathological fracture of a bone may be the first sign of a deposit in that bone. Metastasis in a vertebra may cause pressure on the spinal cord; in case 7 an extensor plantar reflex was one of the few physical signs.

My purpose has been to show that secondary carcinomata of bone may be wrongly diagnosed as rheumatism, owing largely to the failure to demonstrate a primary growth. Although a correct diagnosis does not allow any hope of cure, it does save the patient unnecessary expense and waste of time undergoing physiotherapy; further, the condition can be at least alleviated by deep X-ray therapy. Any physician working in a spa must be careful not to overlook such cases. The difficulties of diagnosis may be considerable, and, as in these few cases, there may be both normal radiograms and a normal blood-picture in carcinomatosis. Where there is the slightest suspicion of malignant disease it is worth repeating these examinations more than once.

SUMMARY

In 7 cases of carcinomatosis of bone, the initial diagnosis was rheumatism. The chief criteria in diagnosis are pain, anæmia, and radiological findings. It is suggested that, if the condition is suspected, the case should be observed for a prolonged period despite negative early findings in the blood or the radiograms.

My thanks are due to Dr. T. T. Hardy, of Birmingham, for the use of his notes on case 1, and Dr. J. H. Sheldon, of Wolverhampton, for permission to investigate case 4. I am also indebted to the late Dr. E. P. Poulton for permission to report the cases from Guy's Hospital.

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BLOOD VISCOSITY IN CARDIAC FAILURE

ITS MODIFICATION BY ADMINISTRATION OF CALCIUM GLUCONATE

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THE viscosity of the blood is an important factor in determining the amount of work to be done by the heart in maintaining the circulation through the peripheral vessels. Any decrease in blood viscosity lightens the strain on the heart, and this may be of considerable importance when there is cardiac weakness. Markson (1936),[1] reporting investigations on 26 patients with heart-failure, said that in the presence of signs and symptoms of congestion there was an increase in the viscosity of the blood, and that this was reduced as recovery took place. When œdema was severe, he found low values for blood viscosity, which rose as diuresis increased.

1. Markson, A. *Glasg. med. J.* 1936, **125**, 201.

During an investigation on the influence of calcium gluconate on the various manifestations of cardiac failure, I determined the range of blood viscosity in various clinical types to discover whether the intravenous administration of calcium gluconate had any effect on it.

TABLE I—BLOOD VISCOSITY IN CARDIAC FAILURE

Type	Cases	Blood viscosity		
		Maximum	Minimum	Average
Peripheral congestion, no œdema	13	9·1	4·2	6·1
Œdema, no peripheral congestion	2	3·9	3·7	3·8
Œdema and peripheral congestion	18	7·3	3·3	5·1
Neither œdema nor peripheral congestion; dyspnœa and pallor the main features	2	5·2	4·5	4·8

BLOOD VISCOSITY IN CARDIAC FAILURE

The blood viscosity was determined with the Hess viscosimeter in 35 patients with cardiac failure, in 50 people in whom no subjective or objective evidence of heart-disease was obtained, and in 20 healthy people. In all cases the determination was made when the subject was in the postabsorptive state. The average blood viscosity in the 20 healthy subjects was 4·5 (5·4–4·0), whereas in the group of patients with some condition other than cardiac disease—e.g., anæmia, pyrexial diseases, chronic rheumatism—the mean value was 4·7 (6·5–3·8). The patients with heart-failure are divided into four groups: (1) those with peripheral congestion but no œdema; (2) those with œdema but no peripheral congestion; (3) those with œdema and peripheral congestion; and (4) those without œdema or peripheral congestion but with dyspnœa and pallor as the main features. In all these 35 patients the blood viscosity was determined shortly after their admission to hospital. Serial determinations were also carried out on some of these patients during the course of treatment. The viscosities on admission are summarised in table I. These figures show that in patients with heart-failure and no œdema the blood viscosity tends to be raised.

TABLE II—RELATION OF BLOOD VISCOSITY TO DEGREE OF VENOUS CONGESTION AS INDICATED BY CYANOSIS IN PATIENTS UNDER ROUTINE TREATMENT FOR CARDIAC FAILURE

Case	Date	Cyanosis	Blood viscosity	Remarks
A	Dec. 21, 1937	+ + +	6·5	General symptomatic and clinical improvement was associated with the fall in viscosity
	,, 22, ,,	+ +	5·3	
	Jan. 4, 1938	+ +	4·7	
	,, 24, ,,	+	4·6	
	Mar. 9, ,,	−	4·2	
B	May 25, 1938	+	4·9	Worsening of clinical condition and increase of cyanosis associated with an increase of viscosity
	,, 27, ,,	+	4·8	
	,, 28, ,,	+ +	5·4	

Serial estimations indicate that in this group clinical improvement is associated with a fall in viscosity, and clinical deterioration with a rise. This may be illustrated by the findings in 2 patients on routine treatment for cardiac failure (table II).

When there was œdema, but little evidence of venous congestion or stasis, the viscosity was low. It appears, therefore, that in cardiac failure the viscosity of the blood is influenced in opposing directions by

venous congestion on the one hand, and œdema on the other. Accordingly it would be expected that in patients with severe œdema but little or no peripheral stasis the viscosity would rise during the course of successful treatment. This, indeed, is what actually takes place, as can be seen in table III. When both peripheral congestion and œdema are present, the change in blood viscosity naturally depends on the relative importance of these two factors.

TABLE III—RELATION OF BLOOD VISCOSITY TO DEGREE OF ŒDEMA IN PATIENTS UNDER ROUTINE TREATMENT FOR CARDIAC FAILURE

Case	Date	Œdema	Blood viscosity	Remarks
C	Feb. 12, 1938	+ +	3·3	Rise of blood viscosity associated with clearing of œdema
	,, 16, ,,	+	3·4	
	Mar. 10, ,,	—	3·9	
D	Dec. 17, 1937	+ + + +	4·3	Gradual rise of viscosity with disappearance of œdema
	Jan. 6, 1938	+ + +	4·4	
	,, 25, ,,	+ +	4·9	
	Feb. 11, ,,	—	4·9	

EFFECT OF CALCIUM GLUCONATE

The viscosity of the blood was estimated in 6 healthy people and 20 patients with various degrees of heart-failure before and after the intravenous administration of 10 c.cm. of a 10 per cent. solution of calcium gluconate; to prevent toxic manifestations, the time taken for the injection was not less than 2 min. The viscosity was determined at various periods (5 min. to 4 hours) after the injection. In the healthy people calcium gluconate did not produce a difference in the value for blood viscosity greater than 0·2. The results obtained in the patients with heart-failure are given in table IV.

TABLE IV—EFFECT OF CALCIUM GLUCONATE ON BLOOD VISCOSITY IN CARDIAC FAILURE

Case	Date in 1938	Blood viscosity		Case	Date in 1938	Blood viscosity	
		Before calcium	After calcium			Before calcium	After calcium
E	March 28	6·8	6·4	Q	Feb. 4	4·0	4·4
	,, 30	5·4	5·2				
	,, 31	5·7	5·6	R	April 4	4·7	4·7
					,, 5	5·3	4·8
F	,, 25	6·8	6·1		,, 6	4·9	4·5
					,, 7	4·3	4·4
G	,, 18	5·4	5·1				
				S	Mar. 24	4·5	4·1
H	April 21	6·2	5·8		April 5	5·3	4·8
I	March 17	7·1	6·0	T	May 9	3·6	3·6
	,, 18	6·3	6·2		,, 11	3·5	3·1
	April 10	5·9	5·9		,, 12	3·7	3·6
					,, 13	3·6	3·6
K	,, 6	8·2	6·9		,, 16	3·6	3·4
	,, 7	7·4	6·9				
	,, 10	6·3	6·2	U	,, 27	5·4	5·3
	May 16	5·8	5·8		,, 28	5·5	4·2
L	March 7	6·1	5·3	V	Feb. 18	5·3	5·1
					,, 19	5·1	5·0
M	,, 23	6·8	6·2				
	,, 30	5·4	5·4	W	June 3	4·3	4·3
N	March 24	5·9	6·1	X	April 17	4·8	4·8
O	May 7	3·9	3·6	Y	July 8	4·1	4·3
	,, 8	3·6	3·4		,, 9	4·4	4·1
					,, 17	4·0	4·2
P	June 10	3·5	3·8				
	,, 11	3·6	3·8				

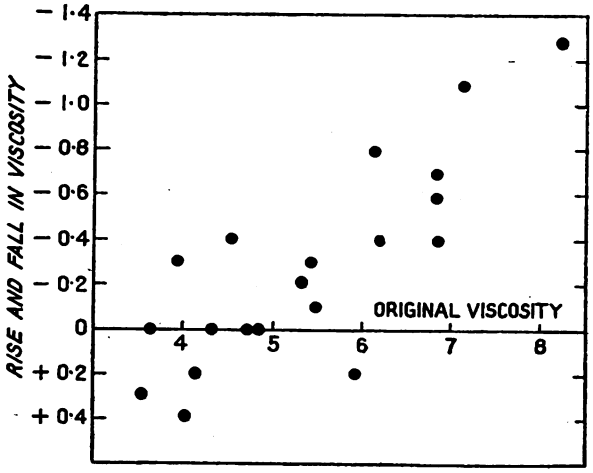
Cases E–M had peripheral congestion without œdema, cases N–Q œdema without peripheral congestion, and cases R–Y both œdema and peripheral congestion.

It seems reasonable to assume that a change in blood viscosity of less than 0·3 is due to a normal fluctuation. On this basis it is seen that in all patients with congestion but no evidence of œdema there is a reduction of viscosity after the injection of calcium. In the presence of œdema the results varied, some showing a reduction, some an increase, and some no change.

TABLE V—CHANGE OF BLOOD VISCOSITY IN CARDIAC FAILURE AFTER ADMINISTRATION OF CALCIUM GLUCONATE

Blood viscosity	Stasis alone	Œdema alone	Stasis with œdema
Fall	8	1	5
No change	—	1	3
Rise	—	2	—

The 2 patients in whom an increased viscosity developed had gross œdema without any evidence of peripheral congestion. These results are summarised in table V.



Correlation between original viscosity and subsequent rise or fall after intravenous administration of calcium gluconate.

The accompanying figure shows that there is a slight degree of correlation between the original value of the blood viscosity and the degree of reduction after the intravenous administration of calcium gluconate.

CONCLUSIONS

As the efficiency of the heart increases it is better able to drive the red cells through the capillaries. To the consequent reduction in the number of stagnating red cells can reasonably be attributed the fall in blood viscosity during a period of improvement. When œdema is severe, another factor has to be considered—namely, the presence of hydræmia. As cardiac action improves, there is a considerable increase in the amount of fluid passing from the blood-stream either temporarily into the tissues or finally through the renal glomeruli; hence the percentage red-cell volume tends to rise, with resultant increase in blood viscosity.

In cardiac failure with or without œdema the changes in blood viscosity after the administration of calcium may reasonably be attributed to the cardiotonic action of this element. It appears, however, that the beneficial effect is greater in patients in whom peripheral congestion is conspicuous. In these subjects the fall in blood viscosity lightens the work of the heart and thus promotes its further recovery.

I wish to thank Prof. Noah Morris for his advice and encouragement; Dr. William Martin, medical superintendent of the hospital, for his interest and permission to publish the results; and the Medical Research Council for defraying part of the expenses.

THE LUMBAR CURVE IN WOMEN

CHANGES PRODUCED BY DISPLACEMENT OF THE CENTRE OF GRAVITY

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Among the causes which lead to a bad posture of the body high-heeled shoes are often included. One of the first to bring to our notice the displacement of the centre of gravity produced by standing on high heels was Fairweather (1921). In the barefoot human being the weight-bearing axis passes through the tibia to the talus (astragalus), where the weight of the body is distributed between the calcaneus and the heads of the metatarsals, these bones helping to form the arch of the foot (Morton 1935). But, if the calcaneus is raised by high heels, the centre of gravity is moved, the weight-bearing axis passes through only the frontal protuberance of the inclined calcaneus, and the heads of the metatarsal bones take over a greater share of the weight than normal. Thus the stability of the whole body is considerably affected. Balance is regained by bending the thorax and shoulders backwards, an action which changes the curve of the spine and the inclination of the pelvis.

There is, however, no universally accepted opinion as to the direction in which this change takes place. Fairweather (1921) thought that the thoracic curvature of the spine was exaggerated and the lumbar lordosis flattened, whereas Stewart (1920) considered high heels to be one of the primary causes of increased lumbar lordosis, the angle of inclination, produced by high heels, pushing forwards the lower lumbar vertebræ, thus deepening the lumbar curvature. Mitchell (1936) pointed out that increased abdominal contents—e.g., during pregnancy—also accentuated the lumbar lordosis. The weight, carried normally by the pelvis and only partly by the abdominal wall, was then borne in a greater degree by the lower part of the abdominal wall. Hellebrandt and her collaborators measured the influence of high heels on the site and stability of the centre of gravity and found that the displacement of the centre of gravity by high heels was counteracted by flexing the knees besides bending the upper part of the body backwards, so that the centre of gravity regained the same position which it had occupied when the person was standing barefoot, or only slightly in front of that position. Merchant (1928) examined the influence of high heels on the posture of the body and drew schematic graphs of 167 young women. In 42 girls who wore high-heeled shoes she found a bad posture of the body: head bent forwards and belly protruding. Roth (1931) denied the influence of high heels on spinal curvature and pointed out that the tibia remained vertical and therefore nothing above the tibia could be affected.

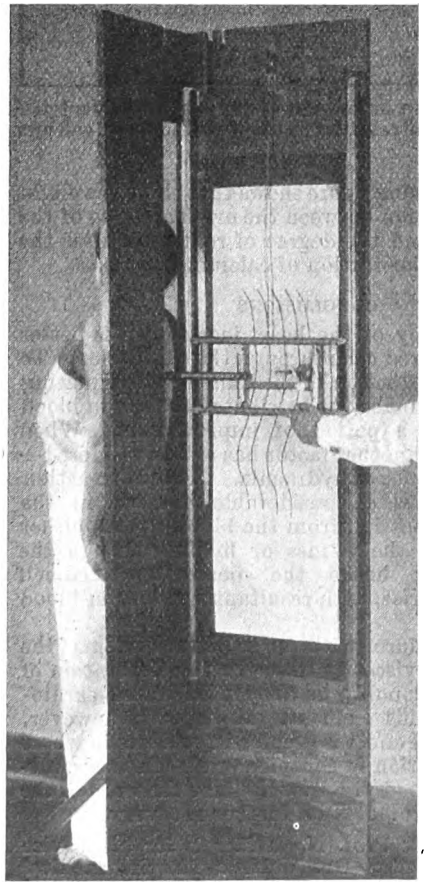


Fig. 1—The dorsimeter used for drawing profiles of the spine.

* Received for publication before the war.

So far nobody seems to have investigated the influence of high heels on spinal curvature on a larger scale. We were interested in it not only from the anthropometric point of view, dealing with changes in bodily structure, but also because of the consequences to health. Whatever the effect produced on the spine by raised heels, it cannot be imagined that it would take place without affecting secondarily the position of the internal organs. Moreover, walking on high heels is unstable, and according to American statistics the high accident-rate of women, especially when getting into trains and walking downstairs, is due to wearing high heels.

METHOD OF INVESTIGATION

To ascertain if and how the spinal curvature in the sagittal plane is changed, we drew with a special dorsimeter (fig. 1) the profiles of 1000 persons, mainly women, standing both barefoot and on heels of various heights.

The dorsimeter consists of two pieces of wood, each about 6 ft. high and about 2 ft. wide, joined together at right angles. One of them has a longitudinal slot about 4 in. wide, through which a rod, fixed in the angle formed by the two pieces of wood, can make contact with the back of a person standing on the other side of the slot. The end of the rod that makes this contact bears a small disk, which can revolve freely on its own axis; the other end of the rod bears a pencil holder with a spring to keep the point of the pencil on the paper fixed on the second piece of wood (the one without the slot). The rod and the pencil holder fit into a frame, which is supported by a pulley and can move freely upwards and downwards along two vertical bars fixed to the same piece of wood as

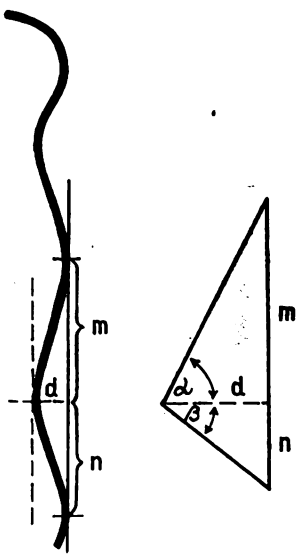


Fig. 2—Calculation of the angle of lumbar lordosis from the coördinates constructed on the spinal profile.

$$\tan \alpha = \frac{m}{d}$$

$$\log \tan \alpha = \log m - \log d$$

$$\tan \beta = \frac{n}{d}$$

$$\log \tan \beta = \log n - \log d$$

$\angle \alpha + \angle \beta$ = angle of lordosis

the paper. The rod is counterbalanced by a weight and can move about 4 in. horizontally through the slot to make contact with the person. When contact has been established, the operator moves the frame (bearing the rod and the pencil holder) vertically, the revolving disk runs along the spine, and the pencil records the spinal curvature on the paper (figs. 1 and 2).

Fig. 2 shows a spinal profile thus recorded, together with the formulæ for the calculation of the angle of lumbar lordosis from the coördinates. The angles α and β express the spinal curves in the simplest way: the angle α the lower kyphotic section of the curve, and the angle β the length and depth of the lordosis.

To obtain conditions as normal as possible we took our measurements in the morning hours between 8 and 12 noon. The person to be measured took off her shoes and some of her clothes to enable us to measure easily the whole of the naked back; then she stood in a natural position, with straightened knees and with her heels, buttocks, and shoulder-blades against the dorsimeter, leaning slightly against the apparatus to keep steady, which was necessary for the accurate tracing of the spinal curve. After seeing that the disk ran accurately along the spine, we made five tracings of each subject to eliminate errors. The arithmetical mean of the five tracings gave a more accurate result than only one. After having tracings taken while standing barefoot, the woman was next measured wearing sandals with heels of increasing height—3, 5, 7 and 9 cm.—and after walking for two minutes timed with a stopwatch. We measured in this way 1000 persons in Prague schools during the school year 1937–38: 934 girls and young women and, for the sake of comparison, 66 boys.

The conditions under which we worked were purely experimental. By raising the heel of the foot to a different height the centre of gravity was displaced from its normal position, and our tracings showed us nothing but the immediate reaction of the spine to that temporary displacement. Provided that a continually repeated contraction of the muscles may bring about a change in different parts of the skeleton, as Tandler (1926) admitted, our experiment would show the directions in which these changes might develop when displacement of the centre of gravity was permanent, if we could exclude all other influences contributing to this reaction, and if we could carry out our observations on an absolutely homogeneous group. Since this is impossible, we endeavoured to ascertain at least some of the factors which could influence the spinal reaction. Thus, in each case we made a note of the general condition and of some anthropometric data, which could reflect the physical fitness and the social conditions of the measured persons.

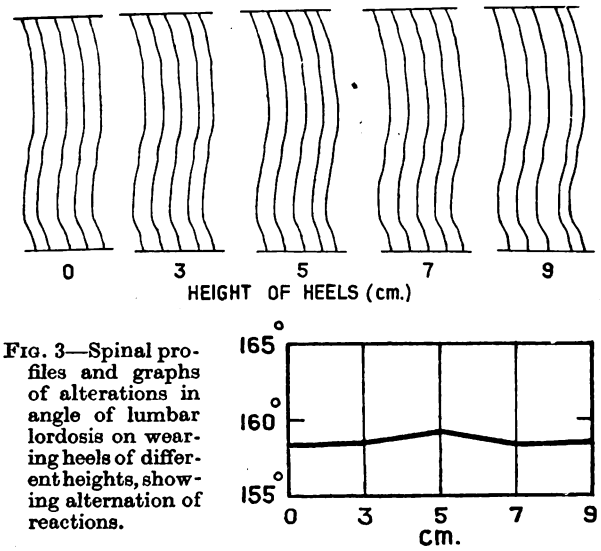
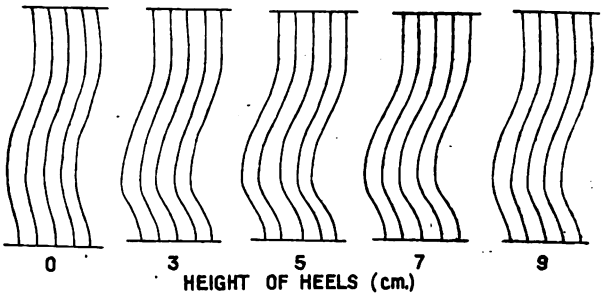


FIG. 3—Spinal profiles and graphs of alterations in angle of lumbar lordosis on wearing heels of different heights, showing alternation of reactions.



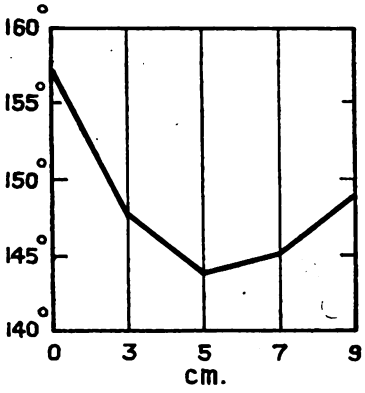


FIG. 4—As described in fig. 3.

RESULTS AND EVALUATION OF MEASUREMENTS

We classified the measured persons according to age, height, weight, and physical index. Most of them were between 15 and 18 years old; the average height of the girls was 5 ft. 4 in., and the average physical index 345·3. Most of the people measured were socially lower middle-class. About three-quarters participated in other gymnastics and sports of various kinds besides the school gymnastics.

Initial tracings.—When we had allocated the spinal profiles in the barefoot subjects to six elementary types—normal, lordotic, sway, flat, and two round types—according to Wiles's (1937) classification, only 54·3 per cent. could be considered normal; about 13·4 per cent. differed conspicuously from the normal. Both types of round back comprised more than 10 per cent. and the sway back only 2·5 per cent. The lordotic type was less common among the boys than among the girls, whereas the flat back was common among the boys. The great variety in the form of the spine was seen also in the angle of lumbar lordosis or the angle of the section marked on the spine (fig. 6). The angle of lordosis varied in the girls from 134° to 188°—i.e., a range of 54°—and in the boys from 149° to 172° the range being only 23°. The arithmetical mean of the angle was 158° 43′ in the girls and 160° 49′ in the boys. In 90 per cent. of the spinal profiles which we denoted as normal the angle of lordosis was 151°–165°; hence this figure can be regarded as a norm for the angle of lumbar lordosis. Asthenic girls usually gave the more obtuse angles. In comparing the values of initial (barefoot) angles of lordosis with the age and the habitual type of shoes worn, we could find only a slight correlation; the habitual position during sleep had no noticeable influence on the form of the spine.

Reaction to displacement of the centre of gravity.—Having measured the angle of lordosis of the spine in the barefoot subject, we traced its alteration when the centre of gravity was gradually displaced by raising the heels to different heights. In no single instance in the 1000 cases did the spinal curve remain unchanged under the four conditions of measurement.

The changes in the whole spine, however, were far greater than that shown by the angle of lumbar lordosis for a limited section of the spine, as may be seen in figs. 3–5, which give, besides the spinal curves, graphs of the alteration of the angle from the barefoot posture to postures with the heels raised to successive heights of 3, 5, 7 and 9 cm. In many cases, as the angle of lumbar lordosis diminished, the angle of thoracic kyphosis increased, and, conversely, an increased angle of lordosis was compensated by a reduced angle of kyphosis. Further, when the angle of lordosis did not change, the amount of kyphosis changed (fig. 3). This last fact explains how the permanent use of high heels sometimes does not greatly change the amount of lordosis found at the initial measurement.

INCREASES AND DECREASES OF LORDOSIS ON WEARING HIGH HEELS

Height of heel (cm.)	Increased lordosis (angle decreased) per cent. of cases	Decreased lordosis (angle increased) per cent. of cases	Lordosis unchanged per cent. of cases
3	51·8	33·8	14·4
5	53·9	29·5	16·6
7	57·1	30·9	12·0
9	52·0	37·6	10·4

The difference (either an increase or a decrease) between the initial angle of lordosis and the angle measured with the centre of gravity displaced was usually 1°–12°. This limit was exceeded in only a few cases. Decreases of the angle of lordosis—i.e., increased lordosis—were more numerous than increases of the angle—i.e., decreased lordosis—in the proportion of 5 : 3 (see table).

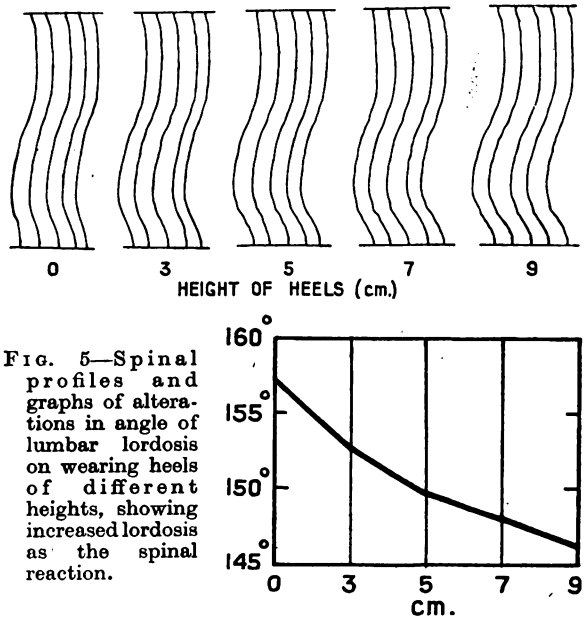


FIG. 5—Spinal profiles and graphs of alterations in angle of lumbar lordosis on wearing heels of different heights, showing increased lordosis as the spinal reaction.

Increased lordosis was commonest with a heel of 7 cm., and decreased lordosis with a heel of 9 cm. The tracings in many cases showed that the lordosis increased or decreased up to a certain limit as the heels were heightened. When this limit had been reached, further heightening of the heels caused the spine to curve in the opposite direction, with the result that the angle of lordosis returned to its original value and even passed it in some cases. The cases in which this opposite reaction was not seen (for example, see fig. 5) were not many.

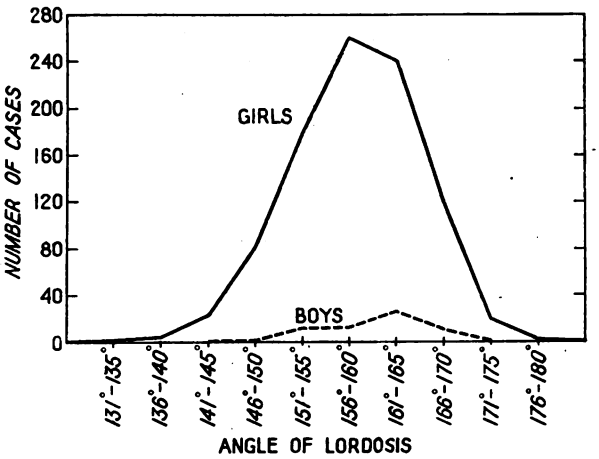


FIG. 6—Lumbar lordosis, as shown by initial (barefoot) tracings, in girls and boys.

The measurements show clearly that in most cases the spine has changed its shape under the influence of the displacement of the centre of gravity, and that the angle of lumbar lordosis, which we have taken as our criterion, has either increased (lordosis flattened) or decreased (lordosis deepened). Both of these reactions have been observed before by other workers. We have further ascertained that some people show the reaction in both directions successively, as already mentioned. The group which showed this twofold reaction would probably in normal circumstances counteract the displacement of the centre of gravity by a simple bending of the knees, an action which in the upright posture against the dorsimeter was impossible. We classified the cases according to the direction of change in the following three groups :—

(1) The positive group, including those cases in which the angle increased (lordosis was flattened) or did not change, comprised 21·2 per cent. of all girls.

(2) The negative group, including all the cases in which the angle of lordosis, unless it remained unchanged, was reduced (lordosis was deepened), comprised 40 per cent.

(3) The positive-negative group, containing the alterations, so far as they have been ascertained, which show alternate reduction and increase in the angle of lordosis, comprised 39·8 per cent.

(To be concluded)

KING EDWARD'S HOSPITAL FUND FOR LONDON.—The annual distribution of the Fund for 1939 is now to be made up to the usual total of £300,000. Part of this distribution had been postponed until more was known of the effects of the war on the finance of each hospital. Since then the hospitals have been able to resume much of their ordinary work for both inpatients and outpatients. For this they are dependent on the normal sources of voluntary hospital income. They therefore need the help of the supplementary grants from the King's Fund, and also increased subscriptions and donations from the public. The area of the King's Fund has also been extended from 11 miles round St. Paul's to the Metropolitan police district, as was contemplated in the Act of Incorporation passed in 1907. Most of the hospitals in Greater London will thus come within the range of the Fund's grants. The area of the district-nursing distribution, which is based on the number of patients referred by hospitals to district-nursing associations in relief of their outpatient departments during the year, will not be extended before Jan. 1, 1941.

PFEIFFER BACILLUS MENINGITIS

UNSUCCESSFULLY TREATED BY CHEMOTHERAPY

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Roche and Caughey (1939) and Sakula (1940) have reported three cases of meningitis due to Pfeiffer's bacillus successfully treated with M. & B. 693. In a recent annotation in THE LANCET (1940, **1**, 463) it was pointed out that this disease is not particularly common, but since the introduction of the sulphonamide drugs we have treated three cases and in all have found chemotherapy singularly useless.

All three cases ran a similar clinical course. All three patients were just under ten months of age, and all died at the end of a fortnight in spite of adequate dosage of the drugs which have proved so efficacious in meningococcal meningitis. In two instances the organism responsible was *Hæmophilus influenzæ* and in the third *H. para-influenzæ*. The points of interest in this type of meningitis are: (1) the relatively low cell count in the cerebrospinal fluid (C.S.F.); (2) the severe damage to brain tissue, shown clinically by the numerous paralyses; and (3) the hæmorrhages throughout the brain tissue found post mortem—well shown in the three cases described here.

CASE-RECORDS

CASE 1.—Female, aged 10 months, admitted to the Isolation Hospital on June 24, 1937, with measles and bronchopneumonia. On July 19 a previously persistent temperature was found to be due to a left basal streptococcal empyema. This was treated by aspiration and was cured by the 30th. Two days later signs of meningeal irritation were discovered, and on August 2 the administration of Prontosil album in three hourly doses was begun, a total of 3 g. being given in twenty-four hours. In a further two days the child showed a well-developed clinical meningitis and had two convulsions. A lumbar puncture on the same day showed a turbid C.S.F. which contained 2080 polymorphs and a gram-negative bacillus, morphologically *H. influenzæ*. The identity of the organisms was later proved by culture.

The clinical condition remained unchanged for the next few days, with marked retraction of the head. The C.S.F. cell counts are given in the accompanying table, where they can be compared with those of the other cases. On August 11 there developed a left-sided squint, with upper motor neurone facial paralysis with a dilated left pupil. By the 14th the child was comatose, with paresis of the left arm, and she died later in the day. This child received a total of 24 g. of prontosil album in twelve days; she also received 15 c.cm. of Prontosil Rubrum in two doses intrathecally early in the disease.

Post-mortem findings (brain only).—The brain tissue was obviously under considerable tension, with flattened gyri. There was internal hydrocephalus, with glairy mucopus within the dilated ventricles. Products of old inflammation round the base of the brain were blocking the foramina. The brain tissue was very thin, with many petechial hæmorrhages in the grey matter throughout the cerebral hemispheres, probably more marked on the right side than on the left. This brain damage was much more severe than in the usual case of chronic basal meningitis.

CASE 2.—Male, aged 10 months, admitted to the City General Hospital, Leicester, on August 11, 1938, as a case of congenital morbus cordis. On admission the child had a temperature of 102° F. and a loud precordial murmur continuous through systole and diastole.

On the 13th the anterior fontanelle was tense and the neck stiff, and a doubtful Kernig's sign was present. The C.S.F. contained 84 cells and a gram-negative bacillus, which was subsequently identified by Dr. T. C. Stamp, of the British Postgraduate Medical School, as *H. para-influenzæ*. Sulphanilamide (B.D.H.) was given by mouth immediately and at four-hour intervals, 3 g. being given daily.

On the 15th, since the condition was unchanged, sulphanilamide 6 g. daily, divided between four-hourly doses, was now given. On the 20th continuous spinal drainage under constant pressure yielded 150 c.cm. of yellow turbid C.S.F. in thirty-two hours and was then abandoned. On the 22nd great difficulty in obtaining C.S.F. by lumbar puncture was experienced, on the 23rd cisternal puncture yielded yellow-green pus, and on the 26th the child died. This child received a total of 78 g. of sulphanilamide in seventeen days.

Post-mortem findings.—The brain was much congested; very thick pus surrounded the base of the brain and filled the lateral ventricles. There was considerable internal hydrocephalus, with softening of the brain tissue. The pus was most remarkable for its thickness and closely resembled sputum. The lungs were normal. The heart showed a patent interventricular septum, with a pulmonary artery rather smaller than normal. The ductus arteriosus was closed.

CASE 3.—Male, aged 7½ months, admitted to the City General Hospital on Jan. 25, 1940, as a case of pneumonia. On the 26th he had a stiff neck and a tense fontanelle. Lumbar puncture yielded a turbid C.S.F. with 4900 cells and a gram-negative bacillus, subsequently identified as *H. influenzæ*, in the direct smear. Sulphapyridine was immediately given by mouth, 3 g. daily at four-hour intervals.

On the 31st, since there was no clinical improvement despite daily lumbar puncture, 4 g. of sulphapyridine was given daily at three-hour intervals. On Feb. 1 a bilateral paracentesis of the ear drums was performed because of otitis media, and on the 3rd there were tonic right-sided convulsions of the body, involving face, arm, and leg.

On the 5th continuous spinal drainage yielded about 120 c.cm. of turbid C.S.F. before blocking, and on the 6th sulphapyridine was discontinued, because of lack of improvement and in the light of our previous experience. On the 9th and the 10th ventricular puncture was performed once daily, and on the 11th the child died, after having received a total of 37 g. of sulphapyridine in eleven days.

FINDINGS IN CEREBROSPINAL FLUID

Day	Case 1		Case 2		Case 3	
	Cells per c.mm.	Organisms	Cells per c.mm.	Organisms	Cells per c.mm.	Organisms
1	—	..	84	..	4800	+
2	—	..	..	..	..	..
3	—	..	..	..	..	..
4	2080	+	..	..	4900	..
5	2417	?	..	..	300	..
6	1087	?	290	+	1920	+
7	—	..	..	..	1880	..
8	—	..	14,650	?	2120	+
9	995	?	—	..	—	..
10	—	..	5880	+	..	..
11	912	+	30,900	+	..	..
12	—	..	—	..	—	..

Post-mortem findings (brain only).—The brain tissue was thinned to a mere shell. There was a large amount of thick pus, and the base of the brain and the dilated lateral ventricles were filled with gelatinous pus. There were no actual brain abscesses or petechial hæmorrhages within the brain substance, but the brain was excessively soft.

SUMMARY

(1) Three cases of meningitis due to *H. influenzæ* or to *H. para-influenzæ* are described, which all ended fatally despite the administration of sulphanilamide or of sulphapyridine. Death took place after fourteen days in all cases.

(2) There were pronounced focal signs in the terminal stages.

(3) At autopsy characteristic changes were found on the surface of the brain.

We wish to thank Dr. E. C. Hadley, medical superintendent of the City General Hospital, Leicester, for his kind permission to publish cases 2 and 3.

REFERENCES

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Sakula, J. (1940) *Ibid*, March 30, 1940, p. 596.

MEDICAL SOCIETIES

MEDICAL SOCIETY OF LONDON

AT a meeting of this society held on April 15 with the president, Mr. ZACHARY COPE in the chair, a discussion on

Anxiety Neurosis

was introduced by Dr. G. W. B. JAMES. In 1895, he said, Freud had detached this illness from neurasthenia and suggested that it arose from a lesion of the sexual life. The war of 1914–18 brought a string of nervous casualties with mysterious mental and physical symptoms which were correlated with anxiety. During those and the following years the term "anxiety neurosis" passed into common medical use. It has, in fact, even become a handy "portmanteau" for nearly any mental disorder. Psychiatric textbooks give little help in definition, and Dr. James suggested that it should be defined as a condition presenting medical and physical symptoms of anxiety for which no organic cause can be found. Freud's work gives the most useful and practical start to the explanation of the illness, but his conception need not be confined to the sexual instinct. It may be extended to the frustration of the herd instinct or the self-preservative instinct, and to conflict between any two or all of them. In soldiers the condition may arise from a conflict between the instinct of self-preservation and the herd sentiment of patriotism.

The essential ætiological factors are to be found in the life situation. The patient's attention is often fixed on his somatic symptoms and he has a curious lack of interest in the psychic elements of his story. He may therefore be wrongly treated for organic disease. Outpatient departments are full of anxiety neurotics; many of them are quite adequately treated by the traditional bottle of medicine, but others make an extensive tour of the special departments and finally arrive with a bulging dossier of notes at the psychiatrist, whose task is rendered formidable by the chronicity of the condition. The patient may also be misled into dating his condition from an infection, operation or accident. These should be regarded as secondary factors; they may lead to a complete overlooking of the real trouble, which may lie in a tangled marital situation or unrecognised resentment against a relative-in-law.

Dr. James showed a diagram illustrating the "anxiety circle"—a vicious psychosomatic circle which, once started, acquires a momentum of its own. It begins with some environmental threat to an instinctive need; this causes a reaction in the central nervous system, and the autonomic nervous system is thrown out of balance. The endocrine chain, especially the pituitary and thyroid glands, are affected; changes take place in the distal vessels and tissues and in the various somatic systems, including the musculature and the head. Fatigue becomes prominent, weight decreases and the patient suffers from bad dreams and insomnia. His illness is reflected in various derangements of conduct, and these bring about further threats from the environment, so that the circle begins again. In addition, autonomic impulses may produce a direct effect on the central nervous system. Dr. James detailed the commonest cardiovascular, gastro-intestinal and genito-urinary symptoms, and mentioned also some common skin lesions. He said there is an almost invariable complaint of sweating, either in the hands alone or over the whole body; blushing or local flushing of the chest and neck; dermographia, patches of piebald skin, leucodermia or eczema. Various forms of headache and other localised head pains may be reported; the patient may say that thoughts race in his head as though driven by machinery. He may be unable to read for long and may complain of spots before the eyes or photophobia; of buzzing or throbbing in the ears. Intolerance of noise may amount to a true hyperacusis. Giddiness is especially associated with locomotion, and the patient may be unable to walk straight and tend to fall down.

Fatigue is constant and purposive, selecting certain activities. One patient became too tired to do any work in a factory but undertook a very arduous domestic occupation with success. Loss of weight may be due to a capricious appetite, irregularity of meals, loss of sleep, an increased metabolic rate, sweating, or excessive exercise taken to induce sleep. It increases the patient's anxiety by confirming his fear of bodily illness. Early cases always present sleep disturbances. The onset of sleep is usually delayed, or the insomnia consists of early waking. Sleep is disturbed by anxiety dreams which wake the patient in terror of death or accident. Conduct disturbances are due to inability to concentrate, forgetfulness, irritability and secondary phobias, the commonest of which is a fear of insanity or of sudden death. The patient may become secluded, rush suddenly into the street for air, or lose his memory and wander. He may be afraid of the dark or of fire, knives, snakes or other animals—typical racial fears. He develops all sorts of phantasies to explain his symptoms. He has a restless desire for constant occupation and distraction, but carries out no occupation for long or with any efficiency. Anxiety neurotics, however, very rarely have to be sent to a mental hospital.

Nothing, said Dr. James, reveals more clearly the unsatisfactory state of the present medical knowledge of anxiety conditions than the array of therapeutic measures used in their treatment—from neurosurgery at the one end to skilfully worded advertisements for patent foods and medicines at the other. Some patients undoubtedly require skilled psychotherapy, especially those whose anxiety symptoms are derived from fear of latent homosexual trends. Psychotherapy, however, cannot be the whole answer to this problem. The social implications of the illness are disquieting. A conservative estimate of its incidence would be 300,000 new patients in greater London and

a million in the British Isles every year. To treat them adequately would require 10,000 skilled psychotherapists. The ideal is for every doctor to learn to become his own psychotherapist. The taking of a detailed history and the making of a careful inquiry take time, patience and practice, though skill and speed may be quickly acquired. Sedatives and hypnotics are useful and patients should always be given adequate sleep if insomnia is a prominent symptom. Good results have been obtained from prolonged narcosis. Of the many substances with which attempts have been made to damp down the sympathetic and stimulate the parasympathetic impulses, preparations of the acetylcholine group have been most favourably reported on. Mixed preparations of the opposite sex hormones have been helpful in some cases, but thyroid should always be avoided. Partial thyroidectomy carried out on a mistaken diagnosis of Graves's disease, is usually disastrous. Local sepsis should be treated as thoroughly as possible, for it not only undermines health but also increases the patient's fears about his body. Symptomatic treatment should never be neglected, and the bottle of medicine can still be made to play a useful part. To sum up, treatment should consist of a methodical and systematic attack on the anxiety circle.

DISCUSSION

Dr. T. C. HUNT said that the physician saw at outpatients an enormous number of cases which he loosely termed anxiety conditions. Are these, he asked, to be dealt with in a general or a special clinic —along with other patients, or segregated? Vomiting is somewhat frequent in outpatients who are otherwise quite well; he had always regarded it conclusively as an anxiety vomiting. Many patients are perhaps not seriously anxious on their first attendance but their initial treatment converts them to a serious anxiety condition. He also asked whether dreams are merely a symptom or whether they do not indicate something of the nature and cause of the condition.

Dr. P. MANSON-BAHR declared that there is no longer a tropical medicine nor a tropical neurasthenia. Patients are not invalided nowadays for tropical diseases; the chief source of invaliding is anxiety neurosis. Every second man sent home from the West Coast of Africa has some form of anxiety neurosis, which usually develops towards the end of his term of duty. Many men join the colonial service to escape from a symptom-complex at home—e.g., a troublesome wife. They are also anxious about what is happening at home, the expense of keeping two establishments or the weight of income-tax; or they may be in trouble with a superior officer, or suffering from the loneliness and inconvenience of a bush station or from the abuse of alcohol. At the root of the condition are monotony, a rigorous climate and the worry of the work. It always begins with insomnia. Men whose physical equipment is not of the highest standard are perhaps better able to stand the strain of isolation than the athlete from the public school and university. Patients usually get better in a cooler climate, when they are able to sleep and see their wives and families again. He had made a rule that a man who broke down twice should not return to the tropics. A large company reduced the illness among its employees by insisting on wives coming out to live with their husbands. Anxiety neurosis is four times as common in the tropics as at home, and calls for investigation.

Sir WILLIAM WILLCOX said that anxiety neurosis could not be separated from disease of the various bodily organs. As a person gets older, the mind obtains an enormous influence over the body. The regular use of toxic drugs over a long period may damage the brain and the nervous system. Insurance practitioners always take a serious view of anxiety patients because of their tendency to relapse and be ill for long periods.

The PRESIDENT expressed the opinion that from the surgical point of view the anxiety circle was not so pretty as Dr. James's diagrams showed it, and was more vicious. He wished he could have Dr. James at his side in at least a quarter of the cases he saw in his routine practice. A mental examination should be carried out in a large number of surgical cases, especially when there is a complaint of pain in the right iliac fossa. Duodenal ulcer patients especially tend to a recurrence when they suffer from an anxiety state, and the surgeon is puzzled to know whether he is dealing with an exacerbation of the ulcer or whether the anxiety is to blame. The same ambiguity is associated with a slight degree of hyperthyroidism. Mr. Cope's difficulty is, he said, that if he sent to the psychiatric department every patient whom he suspected of nervous disorder, he would provide work for half a dozen mental specialists.

Dr. L. CARLYLE LYON asked whether anxiety states were more common among so-called neurotic families and in persons with weak heredity than in the blunter sections of the population.

REPLY

In reply to points raised Dr. JAMES remarked that vomiting is usually a symptom of hysterical rather than anxiety disorders. The patient remains comfortable and placid and is rather proud of the symptom. Allbutt used to say that the sweating patient should always be reassured; should some doctor tell him he had tuberculosis he would develop "anxiety tuberculosis of the lungs." Dr. James did not agree that people who go into the tropical services are generally neurotic to begin with; it is manifestly absurd, he added, to separate a man from his wife and family and expect him to remain healthy. Methods of detecting susceptibility to anxiety have been developed and can be used to test candidates for the tropics. Pain in the back is even more frequently an anxiety substitute than pain in the right iliac fossa, and is often relieved by careful inquiry into the patient's life-situation. Anxiety patients show the same kind of family history as psychotics: sporadic suicides, vague mental deficiency, allergy and alcoholism. The anxiety character shows itself early in life and contains a constitutional element about which very little is known, but it can be imposed on a child from without.

EUGENICS SOCIETY

AT a meeting of this society on April 19, with Mrs. URSULA GRANT-DUFF in the chair, the

War-time Case for Family Allowances

was put by Mrs. EVA HUBBACK. She traced the evolution of the idea from the time when it was advocated only by cranks, through the period in which it awakened general interest to the present time when people were saying they had known it all along. The change in opinion, she said, was due partly to our greater knowledge of nutrition and of the cost of living, and partly to our greater knowledge of population trends. The case could be summed up

under economic, eugenic and feminist headings, and the economic case now held the field. Surveys showed that 25 per cent. of the children in the country were brought up in primary poverty, and the definition of primary poverty used in such surveys was rigorous and did not allow for the mis-spending of a single penny. Since the outbreak of war the cost of living for working-class families had gone up by 20 per cent. This increase could not well be met by giving higher wages because that would lead to the development of the vicious spiral; because wages would go up irregularly in different industries, depending on organisation; and because the self-employed would not be covered. Moreover, proposals for a minimum wage were always based on the assumption that it should be sufficient for a family with three children; a recent survey showed that this applied only to 5 per cent. of adult workers over twenty-one. Many children already received allowances—under the unemployment schemes, as children of civil widows, under the evacuation scheme, as dependants of men in the forces or dependants of those benefiting under the Workmen's Compensation Act. The wage-earners were discontented by the jumble of rates under these various schemes. The amounts paid in unemployment assistance to men with more than two children fell below adequate standards owing to the wage-stop. The eugenic case for family allowances was accentuated by war conditions; the net production-rate of children had fallen from 2·35 in 1870 to 0·78 today; in the last war the separation of husbands and wives led to a reduction of half a million in expected births. In this country the whole social life was drawn up on the "small family" pattern and if this was to be changed larger families must be made economically possible. A good deal of assistance was now available for educating children; there were also income-tax rebates for those with incomes sufficient to profit by them. The London School of Economics and the Wesleyan ministry both had schemes of family allowances, and about twenty firms, including Cadbury's, had started schemes for their workers. The ideal scheme for this country should be adequate, graded and eugenic, not dysgenic. She personally favoured a flat rate of 5*s*. a week for every child, to be raised by taxation. Income-tax rebates would be cancelled, and compulsory mutual insurance schemes should be arranged for those in the higher economic grades. In fact, however, a complicated scheme of this kind had no chance whatever; but there was no doubt that the principle was widely acceptable. The Labour Party was sometimes said to be opposed to it, but actually they had never made any declaration against it, and many of its members and those of the T.U.C. were in favour of it. The net cost of a scheme to cover all children at 5*s*. a head had been estimated at £100,000,000, which was little in comparison with the sums now being paid to keep down prices. If the scheme included only the third and subsequent children it would cost only £25,000,000 but even so would get rid of 80 per cent. of the poverty due to children.

Mr. S. P. DOBBS described the system of family allowances in action at Bournville, under which workers receive 5*s*. a week for third and subsequent children under the age of eighteen years. This costs only 0·3 per cent. of the total wages bill. Cadbury's regarded the scheme as a social experiment, but realised that not all firms could apply it with such small expense. Cadbury's employed large numbers of girls, but industries which employed mainly married men would find such schemes more costly.

Mr. R. B. KERR, Miss E. S. DANIELLS and Mrs. ALICE JENKINS were all opposed to family allowances on the ground that they would stimulate the birth-rate. Mr. Kerr made the revolutionary suggestion that, rather than increase home production, if we wanted more population we should welcome in larger numbers of the intelligent and enlightened foreigners now looking for homes; and Miss Daniells remarked pithily that the working-class mother would rather have a reliable contraceptive than 5*s*. a head per child. Mr. R. M. TITMUSS pointed out that there was no evidence that family allowances had ever had the effect of raising the birth-rate. We wanted the allowances to look after the children we had got already. In war-time not only the feckless and improvident but the prudent and—if you liked—well-endowed were financially affected, and would benefit by family endowment.

In replying, Mrs. HUBBACK remarked that the fool-proof contraceptive was only just round the corner, and when it came it would produce a catastrophic fall in the birth-rate. As to the quality of the children born, the more we knew of heredity the less we could prophesy its effects; but the more we knew of nurture the more effect we knew it to have.

RESEARCH IN PUERTO RICO

THE activities of the School of Tropical Medicine in Puerto Rico in 1938–39 have reached out in many directions. The department of bacteriology under Dr. P. Morales Otero has been studying streptococcal infections in the tropics. In brucella infections it has been shown that there is no correlation between cutaneous allergy and other immunological reactions. In the department of chemistry under Dr. D. H. Cook a handbook of the chemical and nutritional values of Puerto Rico foodstuffs has been completed. The department of clinical medicine and surgery is under Dr. J. A. Pons and an allergy clinic under Dr. Angel Marchand has now been organised.

Drs. Olleros and Morales have conducted researches on gastroscopic and sigmoidoscopic findings in sprue and in an investigation of tropical anæmias it has been found that a megalocytic hyperchromic anæmia, probably of nutritional origin distinct from sprue, is prevalent in the island. In the department of zoology under Dr. W. A. Hoffman, a study has been undertaken of the part played by vitamin A in schistosome-infected rats which suggests that it may play an important rôle in the protective mechanism of the host. It has been found that the adult descendants of a single miracidium are of one sex, and under field conditions the intermediate host, *Australorbis glabratus*, is invaded by more than one miracidium. The disease of horses known as "bloat colic" has been shown to be due to heavy nematode infections of which no less than twenty-four species have been identified. Mycological studies under Dr. A. L. Carrión on chromoblastomycosis has revealed at least twelve hitherto unknown species of fungus. The pathological department under Dr. Koppisch is completing studies on the pathological anatomy of *Schistosoma mansoni*, especially on its pulmonary lesions. Dr. G. W. Kenrick has continued his work on ultraviolet solar radiation. An interesting development has been the establishment on Santiago Island of a private colony where a breeding nucleus of 409 rhesus monkeys (*Macacus mulatta*) has just been released. Dr. C. R. Carpenter has already collected a group of nine gibbons.

The future plans of the school are ambitious and provide for the reconditioning of the university hospital and the construction of a modern animal house for research. A library building is also in process of construction. The *Puerto Rico Journal of Public Health and Tropical Medicine*, first issued in 1932 as a bilingual publication to establish closer contact between the Spanish-speaking peoples, is steadily extending its range of usefulness.

REVIEWS OF BOOKS

A Mirror for Surgeons

By Sir D'ARCY POWER, F.R.C.S., consulting surgeon and archivist to St. Bartholomew's Hospital, London. Boston: Little, Brown and Co. 1939. Pp. 230. 11s.

IN this attractive anthology Sir D'Arcy Power has chosen twenty-two surgeons, from Master John of Arderne in the fourteenth century to Macewen and Halsted. He gives longish extracts from the classical contributions of each author on subjects which they made specially their own—Colles on Colles's fracture, Ambroise Paré on treatment of the wounded, Paget on osteitis deformans, Jonathan Hutchinson on the teeth in hereditary syphilis, and so on. He honours each of these "hero spirits" with a short cameo of appreciation by way of introduction to each chapter. To the doctor, whether he be surgeon, physician or Jack of all trades, this companionable book can be recommended for the bedside; and it will afford the medical student a happy introduction to the history of surgery in terms of great personalities. It leaves the reader hankering after a second helping.

Textbook of Public Health

(10th ed.) By W. M. FRAZER, M.D., D.P.H., barrister-at-law; medical officer of health, City and Port of Liverpool; and C. O. STALLYBRASS, M.D., D.P.H., deputy medical officer of health. Edinburgh: E. and S. Livingstone. 1940. Pp. 504. 21s.

THE ideal textbook of public health has to cover in reasonable space a range of subjects from meteorology to mental hygiene and present their scientific, legislative and administrative aspects in a readable form; a heavy task and perhaps an impossible one. Dr. Frazer and Dr. Stallybrass have overcome many of the difficulties, but like most other writers they have laid too little stress on administration and have viewed the subject too much from the aspect of a county borough. A student would not fully appreciate the peculiar relationship existing between the county medical officer of health and the M.O.H.'s in the municipal boroughs and urban and rural districts throughout his county, which has resulted from environmental hygiene and personal hygiene being largely administered by different authorities. Failure to make this clear has even led the authors themselves into one or two errors. They say, for example, that "public vaccinators are appointed by the sanitary authorities upon whom lies the obligation of controlling an epidemic of smallpox," which is, of course, not true in counties.

This edition contains valuable additions, of which the section on the medical aspects of civil air defence deserves mention. The book is very readable and the student, before or after qualification, will not find it heavy going.

Viruses and Virus Diseases

Lane Medical Lectures. By THOMAS M. RIVERS, M.D., Sc.D., director, Hospital of the Rockefeller Institute for Medical Research, New York City. London: Humphrey Milford, Oxford University Press. 1939. Pp. 133. 14s. 6d.

IT is obviously impossible to deal adequately, as the title of these lectures might suggest, with the whole enormous field of viruses in less than a hundred and fifty pages, and Dr. Rivers has wisely confined his attention to selected topics. In the first lecture he describes the discovery of a new virus disease in man—lymphocytic choriomeningitis—and the steps which were necessary to make certain that the virus was really a human pathogen. In the second he discusses the characteristic pathological changes induced by viruses. The third deals with the serological and immunological phenomena associated with virus diseases, and the last two with the nature of virus agents and the methods so far evolved of preventing and treating virus diseases.

Dr. Rivers adheres to his belief that viruses represent a heterogeneous collection of diverse agents, some of them minute parasitic organisms, others forms of life more or less unfamiliar to us, while still others may be fabrications of their host cells aided by autocatalysis. He attributes similarities in the clinical and pathological pictures of virus maladies to the character of the reactions arising in infected cells rather than to similarity in the nature of the inciting agents themselves. In discussing the interference phenomenon in certain animal virus infections, he does not mention its common association with the viruses of plants. Apart, in fact, from their relationship to crystalline and paracrystalline proteins, he pays little attention to the important questions raised by plant viruses, but these have been adequately dealt with elsewhere. Many of the photomicrographs are unworthy of the stimulating text.

Courmont: Précis d'hygiène

(5th ed.) Revised by A. ROCHAIX. Paris: Masson et Cie. 1940. Pp. 1001. $2·75.

THIS edition of Jules Courmont's textbook has been almost entirely rewritten, though Professor Rochaix of Lyons has kept to the general layout adopted by his distinguished predecessor. French hygiene was born of medicine, English and American hygiene of sanitation and of this each country's textbooks bear evidence to this day. The French are behind the British and Americans in biometrics, but at least equal to them in parasitology, so it is not surprising that the best parts of Courmont are the chapters on parasitic diseases and the least good those on vital statistics. English readers will be surprised to learn that scarlet fever in England is frequent and very severe and that in London several thousands of deaths from it occur annually. Scarlet fever had ceased to be severe in England before Courmont wrote the first edition of his textbook in 1913.

The Electrocardiogram and X-Ray Configuration of the Heart

By ARTHUR M. MASTER, M.D., F.A.C.P., associate in medicine and chief, cardiographic laboratory, Mt. Sinai Hospital, New York. London: Henry Kimpton. 1939. Pp. 222. 30s.

THE greatest value of the cardiogram today is in the diagnosis of acute and chronic damage to the myocardium, but there are many other conditions which alter the size, shape and position of the heart, and at the same time the form of the cardiogram. It is with the object of collecting and emphasising these that Dr. Master's book has been written, and their recognition is important for the effects of some physiological processes are not unlike those of disease. He first considers the influence on the cardiogram of age, body position, respiration, body habitus, and pregnancy. He then passes to conditions which lead to hypertrophy of one or other ventricle, and the cardiograms of axis-deviation. The cardiographic patterns in the advanced stages of these cannot be sharply differentiated from those of muscle damage, and in practice they often merge one into the other. He also dis-

cusses congenital heart disease, chest deformities and diseases of the lungs and pleura. The greater part of the book is taken up with radiograms and cardiograms, all of a high standard, and arranged side by side so that the relation of the tracing to the cardiac configuration is easily seen. The book makes accessible much useful information on an aspect of cardiography sometimes neglected.

The Rise of Embryology

By ARTHUR WILLIAM MEYER, emeritus professor of anatomy, Stanford University. London: Humphrey Milford, Oxford University Press. 1940. Pp. 367. 36s.

THIS book does not greatly overlap Dr. Joseph Needham's "History of Embryology," published in 1934, for the authors have treated the subject from rather different points of view. Needham made a general historical survey of the subject as a whole, but Professor Meyer follows the story of such concrete factors in progress as the development of lenses and more refined optical apparatus, the study of sections, the influence of the "mule" upon ideas of inheritance, and such outstanding contributions to knowledge as the discovery of the spermatozoon and of the human ovum. He opens his study by discussing the sexual knowledge of primitive man. The ignorance of certain primitive peoples of any connexion between the sexual act and reproduction is perhaps accepted by Professor Meyer somewhat uncritically. Malinowski's statements concerning the ignorance of the Trobriand islanders in this regard have not gone unchallenged. As for the Australian aboriginal, it is becoming more and more recognised that although he has many curious legends upon the subject he is by no means unsophisticated. A completely alien inquirer might return from this country with strange stories concerning gooseberry bushes or parsley beds or even of storks or the doctor's black bag. What the native tells the white inquirer is not always what the native knows or even believes.

One of the most interesting chapters is that on early visual and other technical aids. The rise of the modern compound microscope from the "flea glass," involving as it does the history of the telescope and spectacles, is well told and constitutes a fascinating story of discovery. The book is amply illustrated with 97 photographic reproductions of portraits, plates and instruments, of which the series of early optical apparatus is particularly valuable. The only criticism that can be made of this attractive book is that the easy sequence of its reading is sometimes interfered with by the insertion of over-long quotations.

Localisations viscérales et aspects chirurgicaux des brucelloses

By R. MICHEL-BÉCHET, with the assistance of R. PUIG and P. CHARVET. Paris: Masson et Cie. 1939. Pp. 168. $1.15.

THE study of medicine has almost invariably passed from the epidemic to the endemic, from the clinically typical to the clinically atypical, from overt disease to latent infection. Once the obvious manifestations of an infecting organism, of a nutritional deficiency, of a chemical poison, or of some other agent have been recognised, there is a tendency to imagine that our knowledge is complete; and it is usually not for some time—admittedly shorter now than formerly—that attention becomes directed to the less obvious subclinical and latent manifestations. The brucella infections are a case in point. First of all undulant fever was recognised clinically. Then, as the causative organism was discovered, continued fever without the characteristic pyrexial undulations was shown to be of essentially the same nature. More recently "influenzal" attacks, lasting perhaps for only three or four days, have often been traced to brucella infection. Long-standing disability leading to neurasthenia has been found to be sometimes due to the same cause; while here and there the most unexpected conditions have been demonstrably caused by brucella. The authors of this book set out to describe the localised lesions, both medical and surgical, to which this group of organisms may give rise. Many physicians will be already acquainted with the nervous, hepatic and pulmonary disturbances which may be met with in undulant fever; but there will be few surgeons who realise the variety of bone and joint lesions for which brucella may be responsible. This organism must be remembered as a possible cause of both acute and chronic bone disease. To the orthopædic surgeon, in particular, the knowledge that almost every form of tuberculous arthritis and osteitis may be simulated by brucella infection is of considerable importance, since the prognosis and treatment of the disease must be affected by it. How far the authors' conclusions are applicable to this country, where only the abortus variety of brucella is found, is doubtful, but it is to be hoped that orthopædic surgeons after reading this book will test the blood-serum of their patients as a routine, and so find out the real frequency of brucella infection in bone and joint disease in Great Britain.

TROLLEY FOR CASE-NOTES

A TROLLEY designed to carry case-notes is illustrated in the accompanying figure. The front view shows compartments for eighteen sets of notes. A similar arrangement at the back of the trolley provides a further eighteen compartments. The shelves are set at a slope so that the notes do not tend to fall out. The overall dimensions are: width 36 in., depth 18 in., and height, including castors, 39 in. The top forms a useful table on which X-ray folders can be kept. The trolley has proved useful in huts where no provision can be conveniently made for keeping the notes at each patient's bedside.

"... At the present time no textbooks are available which adequately portray the application of anatomy and physiology to the health of the individual person or describe its methods of diagnosis. The opportunity to write such a textbook is open to some one who can describe accurately and convincingly the signs, symptoms and manifestations of health in the well person and the interpretation of the relation of these to the structures and the functions of the body. . . . A golden opportunity awaits the man who undertakes this task."—Dr. E. STANLEY RYERSON in an address to the Association of American Colleges, October 1939.

THE LANCET

LONDON: SATURDAY, APRIL 27, 1940

THE COLOUR QUESTION

IT seems curiously difficult to speak about brown and white bread without getting excited—a clear proof of the presence of repressed complexes. One of the oddest things is that no protagonist in the fight appears to have considered what exactly is meant by brown bread and of what ordinary baker's bread is made. Supporters of brown bread are apt to assume that baker's bread is made from pastry whites or patent flour and that brown bread contains the whole wheat, both of which assumptions are far from the truth. The miller may grind the wheat berry between stones in the old-fashioned way, and sieve out of it the germ and bran, leaving a whitish flour which has some of the oil from the germ adhering to it and possibly a few of the finer particles of bran. Or he may fractionate it more accurately by running it through rollers which alternately crack the wheat berry and then break up the endosperm, separating out white flour, bran and germ wholly one from the other. The fractionation of the white flour may be carried to further extremes in which it is divided into four or more portions, the middle portions being extremely white and representing the central parts of the endosperm, while the first and last "breaks" produce a darker flour. These extra-white flours are popular with pastrycooks but neither pastrycooks nor bakers like the darker flours. The usual flour used for baker's bread is a straight-run flour in which the product of milling is fractionated into three portions only: straight-run flour, germ and bran.

Wholemeal never is the whole of the meal. Sundry hard flinty portions of the bran have been removed, so that wholemeal may represent only about 85 per cent. of the wheat berry. Only in the American Graham bread and in one modern process is the extraction of the wheat berry 100 per cent. White bread is usually made from straight-run endosperm flour. Germ bread is made from straight-run or other flour to which 25 to 30 per cent. of the cooked germ has been added. (The wheat berry contains about 2 per cent. of germ.) Wholemeal bread is made from flour which represents 80 to 95 per cent. extraction of the berry. Brown bread may be almost anything from germ bread to a bread made from a white flour to which a proportion of wholemeal flour, bran, or (in the north of England) rye flour has been added. In buying bread you can be pretty certain of what you are getting if you buy white bread, germ bread or wholemeal bread, but not if you buy "brown" bread. There is something to be said for a complete fractionation of the wheat berry into endosperm flour, germ and bran. You know where you are with the fractions. You can reconstitute wholemeal from it if you wish or make a mixture which will represent any fractional extraction deemed necessary in feeding human beings or pigs, poultry and cattle. Moreover white flour keeps indefinitely, does not encourage weevils, and, because of the absence of wheat-germ oil in it, does not grow rancid. This is an important advantage in war-time economy. Wholemeal, so-called, does encourage weevils and does grow rancid on storage. Neither wholemeal nor white flour are good foods by themselves. They are both deficient in fat, vitamins A, C and D, and in calcium, and their calcium to phosphorus ratios are far from ideal. Nor is it true, except in respect of iron, to say that wholemeal bread is so much superior to white bread. It contains about three to four times as much vitamin B_1, but this means that even if you eat 200 grammes a day—more than the average middle-class person eats—it will yield at best 160 international units of B_1 out of the 500 to 600 supposed to be needed per day. It contains slightly more calcium, but 200 g. of wholemeal bread would still yield only 60 mg. of calcium against the 680 needed per day. It contains three times as much phosphorus, but much of this is present as phytates of sodium, potassium or inositol which militate against the absorption of the meagre amounts of calcium present. It contains more nitrogen, but since it is less available there is no gain on balance. The best case to be made for wholemeal bread, apart from its content of vitamin B_1, is that it yields nearly three times as much iron, so that if 200 g. of wholemeal bread is eaten its contribution to the 10 or 15 mg. needed per day is 5·4 mg.—no small amount.

The disadvantages of wholemeal are that, as has been said, it is difficult to store, it contains little calcium, its calcium to phosphorus ratio is 1 : 7 whereas the ratio should be 1 : 1 or 1 : 2, and it contains phytates which conduce to rickets. Its deficiencies must be made good by extra milk and cheese and possibly a good source of vitamin D such as cod-liver oil. Of course wholemeal contains roughage, whereas white flour does not, and some have held this to be a reason for preferring wholemeal bread to white. But not everyone needs roughage in the diet. In fact to some it is a thing to be avoided, and were the Government to insist on an 80 to 90 per cent. extraction of the berry, as it did in the last war, the coarseness of the bread would again cause alimentary disturbances in those to whom roughage is anathema.

The problem before the Ministry of Food is a difficult one. Shall it continue to feed white flour to the people and the offal to the pigs and hens, or shall it insist on a more complete extraction of the wheat berry as food for the people and scrap the pigs and hens or insist that the latter be made to "live off the land"? We have seen that the dietetic gain from a thorough extrac-

tion is by no means as great as is often maintained. Now that we have the measure of the U-boat menace it may well be that the Ministry will allow commercial interest to predominate over supposed human dietetic merits and maintain the status-quo in the milling world. Whichever way it decides it must press for a greater production and consumption of milk and milk products as well as of home-produced vegetables, for only in this way can the manifest defects of wholemeal and white breads be made good.

MENACE OF BENZOL

BENZOL, which is commercial (90 per cent.) benzene, is one of the cheapest, most plentiful and most efficient of industrial solvents. Unfortunately it is also one of the most deadly. The tendency in most countries to limit or even to forbid its use is giving way to war conditions, for its substitute toluol, which is less toxic, is being diverted to make explosives. Moreover, petrol which is used as a solvent or cleanser in many industrial processes now contains a proportion of aromatic hydrocarbons, benzene among them. Benzol is highly volatile and it is therefore important to determine what is the risk of exposure to the fumes under present-day conditions and in the first place we must rid our minds of the misleading description of their effect on the body which has become current. There is a settled belief that a diagnosis of benzol poisoning is not justified unless the blood-picture shows an aplastic anæmia associated with a leucopenia and a relative lymphocytosis; that a leucopenia is more important in diagnosis than a low red-cell count; that a study of blood-cell volumes will distinguish between the blood-picture of benzol poisoning and that of pernicious anæmia; that at autopsy the bone-marrow is always in a state of aplasia; that cases of benzol poisoning will invariably show purpuric manifestations associated with bleeding gums, epistaxis or menorrhagia; that the spleen is never enlarged in these cases; that young women are more susceptible than men to the fumes of benzol and that a concentration of 100 parts per million or less in the air may be considered to be safe. It is true that some cases of advanced benzol poisoning do show many of these features, but in 1934 when only 30 cases of industrial benzol poisoning had come to autopsy Hamilton [1] prophesied that when the blood pictures in benzol poisoning had been studied as intensively as those produced by radium or X rays they would show the same infinite variety. Despite increasing use as a solvent the notified cases of poisoning are, as Guye [2] recently points out, incredibly few. In 1937, for example, 363 cases were reported in Germany, 4 in Great Britain, and about 60 in New York state. In 1935 there were only 9 cases in France and Italy; between 1934 and 1937, 51 cases came to the notice of the authorities. No doubt strict regulation of the use of benzol in factories—when it is used as such and not as an ingredient in secret solvent mixtures—is partly responsible for the paucity of recorded cases, but the fault lies at the door of the reliance placed on the so-called classical syndrome of the disease, and Dr. Hamilton has not had to wait long to see her prophecy fulfilled.

The cherished beliefs cannot survive the attack in a series of articles published last October. After careful examination of 87 individuals exposed to the fumes of benzol and of histological material from 8 fatal cases Hunter [3] concludes that the blood-picture of chronic benzol poisoning may show such diverse features as polycythæmia or anæmia; leucocytosis or leucopenia; leukæmia or leukæmoid blood-pictures (either lymphatic or myeloid); eosinophilia; megalocytosis or microcytosis and immature bone-marrow elements in an otherwise normal blood. Early diagnosis of poisoning depends on the study of the complete blood-picture and, contrary to the accepted view, the spleen may enlarge when poisoning is slow. In agreement with Dimmel [4] he finds that women are no more susceptible to benzol fumes than men and the first signs of poisoning may be revealed by an infective illness long after exposure to the fumes has ceased. Greenburg, Mayers, Goldwater and Smith,[5] from experience of the colour-printing industry in which benzol is used as an ink solvent, deprecate reliance on the leucocyte count as a rapid means of detecting cases of poisoning; leucopenia, they say, is more often found in severe than in early cases. This observation it is true does not square with Whitby and Britton's [6] that benzol first attacks the platelets and polymorphonuclear cells. Greenburg and his co-workers, however, have been led to regard a reduction in the number and an increase in the size of the red cells as earlier and more sensitive signs of poisoning, and they look with suspicion on a macrocytosis in a benzol worker even in the absence of other abnormalities. Mallory, Gall and Brickley [7] in a study of 14 autopsies and 5 biopsies demonstrate that benzol affects not only the bone-marrow but the whole hæmatopoietic system. The marrow shows all gradations from severe hypoplasia to extreme hyperplasia, the former being commoner in female workers, the latter in male. The spleen shows remarkable cellular activity and at autopsy is often found to be enlarged when it could not be felt during life. Lymph nodes, rarely seen to be enlarged, show abnormal changes under the microscope. Patients suffering from leukæmia were at one time given benzol to reduce the number of leucocytes, but that was before it was realised that benzol may itself be a cause of leukæmia. Animals repeatedly injected sub cutem with benzol in olive oil developed

1. Hamilton, A. Industrial Toxicology, New York, 1934, p. 162.
2. Guye, P. *Helv. med. Acta*, 1939, **6**, 647.
3. Hunter, F. T. *J. industr. Hyg.* 1939, **21**, 331.
4. Dimmel, H. *Arch. Gewerbepath. Gewerbehyg.* **4**, 414, cited from Browning, E. Toxicity of Industrial Organic Solvents, London, 1939.
5. Greenburg, L., Mayers, M. R., Goldwater, L. and Smith, A. R. *J. industr. Hyg.* 1939, **21**, 395.
6. Whitby, L. E. H. and Britton, C. J. C. Disorders of the Blood, London, 1937
7. Mallory, T. B., Gall, E. A. and Brickley, W. J. *J. industr. Hyg.* 1939, **21**, 355.

leukæmias or similar conditions. One of Hunter's patients showed a typical acute leukæmia; he had been heavily exposed to benzol for 4 years, lightly for a further 6 years and not at all for the 20 months before his illness. Mallory tells of leukæmia in a boy of 12 who repainted his toys after taking off the old paint with a solvent found to contain benzol, and he cites[8] 10 cases of leukæmia in patients with undoubted exposure to the fumes of benzol. The evidence that continued exposure to benzol produces leukæmia may be incomplete but it is accumulating at a rate which demands serious attention. Salter[9] suggests that leukæmia may be due to a tumour of the bone-marrow in which benzol plays the rôle of a carcinogen.

It has been commonly accepted that benzol fumes are harmless in a concentration of less than 100 parts per million but Greenburg does not agree and Hunter regards as unsafe any concentration greater than zero over a long period. Bowditch and Elkins,[10] working with the urinary-sulphate test devised by Schrenk, Yant and Sayers,[11] found two cases of definite benzol poisoning in which the average concentration of fumes had been well below 75 p.p.m. This test will show when benzol is being absorbed through the skin as well as through the lungs. Belgian observers[12] also regard it as useless to try to establish a threshold concentration of benzol in the atmosphere above which a risk to health might be expected. It would be better to regard the presence of the characteristic odour of the solvent as a danger signal—and there is much to be said for this attitude towards so insidious an agent. Benzol poisoning could best be prevented by abandoning its use as a solvent. From medical investigators all over the world comes the plea to use one of the substitutes, none of which appears on existing evidence to be as dangerous. Certainly both benzol and its substitutes should only be used under the best conditions of ventilation, local or general, with periodical medical examination of the exposed workers. In France such examination is now compulsory. In this country it is limited to workers in the manufacture of indiarubber, but section 11 of the Factories Act 1937 gives the Home Secretary wide powers to extend such arrangements. It might be difficult at present to regulate the use of benzol because it enters into the composition of many solutions such as quick-drying paints the formulæ of which are kept secret. This difficulty could be partly overcome by requiring the precise labelling of all solutions containing benzol. Guye in Switzerland makes a recommendation to that effect and he adds "il faut supprimer l'usage industriel du benzol." But that may be Utopian.

8. Penati, F. and Vigliani, E. C. *Rass. Med. Indust.* 1938, **11**, 345.
9. Salter, W. T. *New Engl. J. Med.* Jan. 25, 1940, p. 146.
10. Bowditch, M. and Elkins, H. B. *J. industr. Hyg.* 1939, **21**, 321.
11. Schrenk, H. H., Yant, W. P. and Sayers, R. R. *J. Amer. med. Ass.* 1936, **107**, 849.
12. Langelez, A., Peremans, G. and Bastenier, H. *Brux. méd.* Jan. 28, 1940, p. 430.

THE BUDGET

THE income-tax payer may derive some consolation for the loss of his bank-balance from having established a record last year and from being backed by Sir JOHN SIMON to beat it again next year. Income-tax brought in six times as much as it did in the first year of the last war, and the total national revenue pleasantly exceeded the Chancellor's estimate. The costs of a war do not lend themselves to accurate estimation, but Sir JOHN SIMON puts them at £2000 million for the coming year and expects to spend £2667 million altogether. Rather less than half of this is to be raised by taxation. In imposing the necessary new taxes the Chancellor is trying to spread them widely so that all classes pay their share, and to avoid taxing foods or other commodities that will raise the cost of living. Income-tax is to be 7*s.* 6*d.* in the pound, as was planned in the emergency budget of last September, and surtax, payable in 1942, will be charged on incomes over £1500, though the rate has yet to be fixed. The main increase is in indirect taxation, and doctors will be most hit by the rise in Post-Office charges. Letters and post-cards will cost 1*d.* more, telephone charges are to go up 15 per cent. and our sixpenny telegram will cost us 9*d.* The other blows fall mainly on the old stagers—beer, spirits and tobacco—though matches come in for an extra halfpenny. Car and petrol duties stay the same. Sir JOHN SIMON has up his sleeve a "Purchase Tax," to be paid by wholesalers on all non-essential goods not already heavily taxed, but there are some doubts of its practicability. Wars nowadays, we are told, are won by money, and the Treasury does not look like running dry this year. But it is a sad thought how much good could have been done with this wealth if Herr HITLER had kept his ambitions within reasonable bounds.

A. C. Haddon, Sc.D., F.R.S., who died at Cambridge on April 20, was one of the chief moving spirits in the establishment of a school of anthropology at Cambridge. In 1882 he was appointed demonstrator in zoology at Cambridge, and the next year he became professor of zoology at Dublin. He specialised in marine biology, and it was while on a zoological expedition to Torres Straits that he became interested in the natives. On his return to Cambridge in 1894 he began to raise funds to send an anthropological expedition to the straits which left under his leadership in 1898. With him he took W. H. R. Rivers, who applied his knowledge of psychology to anthropology with outstanding results. Dr. Haddon has a picturesque claim to fame apart from his reports on this expedition and his books "The Races of Man" and "The Wanderings of Peoples," for he was the first to point out the ethnological value of cat's-cradle, and with the help of one of his daughters, Mrs. Rishbeth, he raised it to a science of its own.

LONDON HOSPITAL.—The subject for the next award of the Liddle triennial prize will be the clinical manifestations of disorders of the pituitary gland. The value of the prize is £120. Essays must be delivered at the hospital not later than 4 P.M. on March 31, 1942. Further particulars may be had from the dean of the medical college, Turner Street, E.1.

ANNOTATIONS

THE INTERNAL ENVIRONMENT

Bourdillon [1] has given a local habitation and another name—interstitial cell fluid—to Claude Bernard's *milieu interne*. This is the natural outcome of much recent work on the permeability of cell membranes and the distribution of water and salts in the body. The best known exposition of the trend of this type of research and of its importance to the human subject is probably the monograph by J. P. Peters.[2] The thesis is briefly that the fluid in the body can be apportioned between the blood, the intercellular spaces and the cells themselves about in the proportions 9 : 15 : 76. The osmotic pressure of these subdivisions is identical. They are, however, demarcated from one another by physiological boundaries. Thus the walls of the blood capillaries appear relatively impermeable to protein, and this fact determines the partition of volume between plasma and interstitial cell fluid, which, apart from their protein content, are the same. An animal whose plasma is deproteinised shows a relative increase in the volume of intercellular fluid (œdema) for there is no longer any osmotic force to prevent the blood-pressure from forcing the plasma through the capillary walls which are freely permeable to all its remaining constituents. This is in accordance with Starling's work of 45 years ago. As far as they affect the cells of the body, the plasma and intercellular fluid may be regarded as one, the plasma proteins being the means of keeping part of the whole in a system of patent channels through which a rapid flow, and therefore a thorough "stirring," can take place.

The boundary between this internal environment and the cells of the body which it bathes is more important than was formerly thought. The cell membrane appears in a broad sense to be impermeable to nearly all ions, such potassium, calcium, magnesium, phosphate and protein as the cells contain being prevented from leaving and sodium and chloride from entering. Osmotic equilibrium is probably achieved by the transfer of water and bicarbonate ions. Nutrition and metabolism require the passage of certain substances, and glucose and urea, for instance, are known to pass freely. Even the inorganic ions mentioned must presumably be subject to some long-term metabolic exchange. Nevertheless, there are good grounds for believing that one may regard the "body itself" as consisting of the cells and intracellular fluid and as bathed by an "internal environment" of intercellular fluid. This in turn, through its blood-plasma moiety, is in contact with the external environment via the gut, lungs and kidneys. By introducing substances into the plasma which cannot diffuse into the cells of the body and measuring their subsequent concentration, the effective volume of the *milieu interne* can be determined. This lends it a quantitative aspect which may be of great importance for therapeutics, although the details of its behaviour have not yet been fully explained.

HEALTH IN ICELAND

JUDGING from the latest report [3] the people of Iceland —numbering some 117,000 of whom nearly a third live in the town of Reykjavik—enjoy good medical services and good health, and it is to be hoped that they may be left in peace to develop the former and maintain the latter. The crude death-rate of 11·2 per 1000 living in 1937 was slightly above that of the previous year but the rise may be attributed to the influenza epidemic rather than to the reported poor economic conditions. This epidemic led to nearly 22,000 notifications or approximately 1 in 5 of the population, an extraordinarily high incidence, and is said to have been the most fatal since 1918. Indeed, most of the infectious diseases show remarkable yearly variations and epidemiologists may feel tantalised at being limited in the account of them to the short English summary. For instance, in the past ten years the annual cases of measles have varied between none in 1933 and 1934 and 8245 in 1936; in 1929–30 there were nearly 3000 cases of mumps while in the six years 1932–37 there have been only 26 all told; in 1935 there were 8267 cases of whooping-cough, whereas in 1937 there were none. A susceptible population is, it seems, repeatedly built up anew. Diphtheria, however, shows a much less dramatic change, from a minimum of 1 case to a maximum of 68, but relatively wide swings are also shown by acute tonsillitis, scarlet fever, epidemic catarrhal jaundice, and acute poliomyelitis. It is interesting to note the suggestion of a secular change in the incidence of acute rheumatism. In 1928 there were 88 cases while in 1929 and 1930 the figure rose to over 200; since then the level has slowly declined to 90–100 in 1936 and 1937. Tuberculosis has been the subject of special attack since 1935 and the results are shown in the decline both of notifications and of deaths. The number of patients with leprosy has likewise been steadily falling, and this year's figure of 24 is the lowest on record. A record infant-mortality rate was also set up—33 deaths per 1000 livebirths—a figure of which any community might well be proud. One factor may be that 87 per cent. of the infants are reported to be breast-fed. The stillbirth-rate of 24 per 1000 fatal births is substantially below the level of 40 customary in England and Wales. Artificial abortions were legalised under the Birth Control Act of 1935 and in 1937 37 took place (in 1936 there were 32). In 11 of these social as well as health factors were taken into consideration.

PRESENT STATUS OF ELECTROCARDIOGRAPHY

CLINICAL electrocardiography has run the familiar course of medical innovations. Originally used by a select few as a means of investigating certain of the arrhythmias, its existence gradually became more widely known until in the years following the last war it was being used by all and sundry without much discrimination. Lately the pendulum has swung so far in the opposite direction that many sound clinicians have relegated the electrocardiograph to an insignificant position in their diagnostic armamentarium, though according to Willius [1] the apparatus is still abused on the other side of the Atlantic. Of its value in the diagnosis of the arrhythmias there can be no question. Here it has entirely replaced the polygraph as the final court of appeal. In other forms of heart disease, particularly in myocardial and coronary lesions, its place is not so certain. In his monograph on electrocardiographic patterns,[2] Barnes of the Mayo Clinic suggests that in these, although isolated electrocardiograms may be useful, accurate information can often only be obtained from serial records. Inversion

1. Bourdillon, J. *Pr. méd.* Feb. 7, 1940, p. 164.
2. Peters, J. P. Body Water. London, 1935.
3. Public Health in Iceland in 1937. Pp. 175. With an English summary.

1. Willius, F. A. *Proc. Mayo Clin.* 1940, **15**, 143.
2. Electrocardiographic Patterns. Their Diagnostic and Clinical Significance. By Arlie R. Barnes, M.D. London: Baillière, Tindall and Cox. 1940. Pp. 197. 27*s.* 6*d.*

of T with slight deviation of the R-T segment in lead 3, for instance, cannot be considered significant unless the record can be compared with previous or subsequent ones; a changing configuration then helps immensely in assessing the state of the heart. Again, the records obtained in pericarditis may sometimes be confused with those of myocardial infarction, and it is only when several consecutive records have been taken that the true significance of the findings can be decided. Precordial or chest leads, the latest innovation in electrocardiography, are undoubtedly valuable from the point of view of investigation, but, partly as a result of the confusion in nomenclature only recently clarified by the joint report of the Cardiac Club and the American Heart Association,[3] their clinical significance cannot yet be assessed. The danger seems to be that the introduction of multiple precordial leads will make the technique so unwieldy as to remove it from the domain of the practising cardiologist. Let us hope that workers on the subject will establish the significance of what has come to be known as lead 4 before proceeding any further with the question of multiple leads.

Electrocardiographic interpretations divorced from clinical findings are useless and may be actively misleading. "Intelligently used," writes Barnes in the concluding sentences of his monograph, "the electrocardiogram will elucidate as well as raise questions of normal and pathologic cardiac physiologic processes. Progress in its understanding will depend on sound clinical reasoning, on thorough knowledge of the anatomy and physiology of the heart, and last but not least, on a competent conception of the pathology of heart disease." These words might well be inscribed on every electrocardiograph before it left the manufacturer's hands.

AMINO-ACIDS OF TUMOUR PROTEINS

THE work of Kögl and Erxleben[4] gave promise of a distinct advance in our knowledge of the biochemistry of cancer, for their evidence suggested that an essential difference between the cells of normal and of malignant tissue was to be found in the constitutions of their proteins. Whereas the proteins of normal tissue were built up from the amino-acids of the usual $l(+)$ series, those of cancer tissue apparently contained large amounts of amino-acids of the opposite optical configuration the $d(-)$ series. It was therefore concluded that the malignant cell had lost the power of selecting only the "normal" amino-acids in building up its proteins, and that it was no longer bound by the restrictions governing organised cell growth. The fundamental importance of the question has stimulated further investigations by other workers, but until recently with very conflicting results. In a preliminary communication, Chibnall and others[5] reported that they had been able to isolate from three different samples of malignant tissue only the normal unracemised $l(+)$ glutamic acid. But the objection was raised by Kögl and Erxleben[6] that the methods used by Chibnall were unsuitable for demonstrating the presence of the $d(-)$ glutamic acid which they had found present, since there were considerable differences in the solubilities of the calcium salts and hydrochlorides of the two species. Later papers by Chibnall and others[7] show that there is no essential difference in the solubilities of the calcium salts, and furthermore, that the methods of analysis used by Kögl and Erxleben make it possible to obtain the racemised product preferentially, even in the presence of a large excess of the "normal" $l(+)$ glutamic acid. They point out that it is not legitimate to assume that because a small specimen isolated shows a high degree of racemisation it is representative of the whole. The discrepancies in the results of other workers[8] may therefore be attributed to variations in the methods of analysis and to the differences in the yields of material isolated. A representative specimen of the amino-acid is only to be obtained when the yield approaches the quantitative value.

In a study of the glutamic acid present in seven different malignant tumours, Chibnall and his co-workers now find that although the $d(-)$ form of glutamic acid is present it forms a small proportion of the whole, and furthermore that amounts of the same order of magnitude are to be found in normal tissues. They also observe that the plant protein gliadin gives much larger amounts of the $d(-)$ glutamic acid, a result which is confirmed by Town.[9] Small amounts of partially racemised aspartic acid can also be isolated from both normal and malignant tissue proteins. It is therefore evident that the presence of amino-acids of the $d(-)$ series is in no way characteristic of the proteins of malignant tissue. This conclusion receives support from the results of Lipmann and his colleagues[10] who approached the subject from a more biochemical point of view. By utilising the specific *d* amino-acid oxidase system of Krebs they have estimated the *total d* amino-acid content of a representative variety of benign, malignant and normal tissues and of a number of proteins including Bence-Jones protein, gliadin and insulin. The values found, which are stated to be maximum values, show that the *d* amino-acids are present in a uniformly small amount in all the materials analysed, the values being of the same order as those found by Chibnall for the glutamic acid. One may therefore conclude that the proteins of malignant tissue are not specifically characterised by the presence of amino-acids of the "un-natural" $d(-)$ series, and consequently that the main contention of Kögl and Erxleben is no longer tenable.

LOCALISATION OF FOREIGN BODIES

McGrigor[11] has described a fluoroscopic method by which a foreign body can be localised to within a quarter to half an inch in a few seconds, and Clark[12] has shown that by taking certain radiograms its situation can be determined even more accurately in a few minutes. Nogier[13] has now evolved an ingenious technique based on parallax by which when a foreign body is embedded in a limb the radiologist can tell the operating surgeon whether he is moving his exploring forceps in the right direction and whether their point is above or below the foreign body. The position of the foreign body in one plane is first determined by screening. To ascertain its depth a

3. See *Lancet*, 1938, **1**, 221.
4. Kögl, F., and Erxleben, H. *Hoppe-Seyl. Z.* 1939, **258**, 57; see *Lancet*, 1939, **1**, 1049.
5. Chibnall, A. C., Rees, M. W., Williams, E. F. and Boyland, E. *Nature*, 1939, **144**, 71.
6. Kögl, and Erxleben, *Hoppe-Seyl. Z.* 1939, **261**, 154; *Nature*, 1939, **144**, 111; Kögl, Erxleben and Akkerman, *Hoppe-Seyl. Z.* 1939, **261**, 141.
7. Chibnall, Rees, Williams and Boyland *Nature*, Feb. 4, 1940, p. 311; *Biochem. J.* 1940, **34**, 285.
8. Arnow, L. E., and Opsahl, J. C. *Science*, 1939, **90**, 257; Dittmar, C. *Z. Krebsforsch.* 1939, **49**, 397, 444; Graff, S. *J. Biol. Chem.* 1939, **130**, 13; Chargaff, E. *Ibid.* 1939, **130**, 29; White, J. and White, F. R. *Ibid*, p. 435; Konikova, A. *Nature*, Feb. 4, 1940, p. 312.
9. Town, B. W. *Nature*, Feb. 24, 1940. p. 312.
10. Lipmann, F., Behrens, O. K., Kabit, E. A. and Burk, D. *Science*, Jan. 5, 1940, p. 21.
11. McGrigor, D.B. *Brit. J. Radiol.* 1939, **12**, 619.
12. Clark, K. C. *Radiography*, 1939, **5**, p. 195.
13. Nogier, T. *Paris méd.* March 16, 1940, p. 119.

small lead ball with a handle is held on the skin at about the level of the foreign body while the X-ray tube is moved to and fro. If the foreign body and the ball are at the same distance from the screen their images will be displaced to the same extent. The ball is therefore moved round the limb until the shift of the two images is equal, when the position of the ball will indicate the depth of the foreign body. The same principle can be applied when an exploratory incision has been made, the tip of the surgeon's forceps taking the place of the lead ball. It is not easy to judge the displacement of the shadows exactly, but Nogier says it can be done with practice. With his second method he guarantees immediate success. First the tube is arranged so that the shadow of the tip of the surgeon's exploring forceps and the foreign body are superimposed at a point A on the screen which is carefully noted. The tube is then moved slightly to one side. If the forceps and the foreign body are at the same depth (distance from the screen) their shadow will be displaced an equal distance from A. If the shadow of the forceps moves further from A than that of the foreign body the forceps are too deep (i.e., too far from the screen) and vice versa. There are certain disadvantages in this method such as the difficulty in maintaining sterility, and, if many cases have to be examined, the danger of excessive X-ray exposure to both surgeon and radiologist, but it is sufficiently accurate for practical purposes, inexpensive and rapid to perform. For success, however, the surgeon and radiologist must know each other's ways.

YELLOW FEVER AND LEPTOSPIRAL JAUNDICE

BEFORE the modern spate of laboratory tests arose physicians of an older generation were wont to place much reliance on what they termed a natural clinical flair. This flair was largely dependent on long and minute observation of a large number of patients. Actually, anyone who has seen many cases of for instance bubonic plague or exanthematic typhus has little difficulty in making an immediate clinical diagnosis. Nevertheless, one wonders whether clinical flair is always an entirely reliable guide. This doubt is increased by two recent papers which involve the differential diagnosis of yellow fever and leptospiral jaundice.

The last epidemic of yellow fever in the United States, as Bauer [1] has pointed out, is usually regarded as having occurred in 1905 when New Orleans and Pensacola, Florida, were attacked. Several hundred people are known to have died in this epidemic which has always been regarded as an almost classical outbreak. Sellards,[3] however, has drawn attention to the careful pathological investigation of one of these patients by Stimson [3] in 1907 which showed that death was due not to yellow fever but to leptospiral jaundice, since in sections of the kidney prepared by the Cajal-Levaditi method spirochætes were demonstrated identical with those commonly termed *Leptospira icterohæmorrhagiæ*. Incidentally, Stimson called the organism which he described (? *Spirochæta*) *interrogans* so that the correct name for the causal agent of leptospiral jaundice is not *L. icterohæmorrhagiæ* but *L. interrogans*. Some years later Noguchi,[4] investigating the ætiology of what were described as cases of yellow fever by highly competent physicians in South America, also isolated a spirochæte which he named *L. icteroides*. There is now complete agreement that *L. icteroides* is identical with *L. icterohæmorrhagiæ* and therefore with *L. interrogans*. It is thus obvious that in New Orleans in 1905 and in Guayaquil in 1919 cases of leptospiral jaundice were regarded as typical examples of yellow fever. This confusion is due to the fact that in both diseases there may be headache and backache, jaundice, albuminuria and bleeding. "Black vomit," though commoner in yellow fever, is by no means unknown in leptospiral jaundice, while Faget's sign of a constant pulse with a rising temperature or a falling pulse with a constant temperature is sometimes lacking in true yellow fever. Differentiation on purely clinical grounds is thus often difficult, if not impossible. White-cell counts should help, however, to separate the two diseases, for in yellow fever, after the first or second day, there is a leucopenia with relative lymphocytosis, while in leptospiral jaundice a polymorphonuclear leucocytosis is common. Today, on the other hand, highly specific laboratory tests both for leptospiral jaundice and for yellow fever leave little excuse for a confusion which undoubtedly existed in the past when reliance could only be placed on clinical flair.

1. Bauer, J. H. (1940) *Publ. Hlth Rep., Wash.* 1940, **55**, 362.
2. Sellards, A. W. *Trans. R. Soc. trop. Med. Hyg.* 1940, **33**, 545.
3. Stimson, A. M. *Publ. Hlth Rep., Wash.* 1907, **22**, 541.
4. Noguchi, H. *J. exper. Med.* 1919, **29**, 565.

THE OSLO MEAL

IT is difficult to ignore the striking increase in rate of growth in school-children fed on the cold Oslo meal as compared with those given the standard hot luncheon. Dr. Carl Schiotz of Oslo with his famous breakfast obtained a rise in weight 48 per cent. greater in boys and 140 per cent. greater in girls than that recorded previously with an orthodox diet, and his results have been corroborated by the London County Council in an experiment at Mile End. To those already familiar with the potency of protective foods these results will not be surprising, but to most of us they are astonishing. Apart from the difficulty which many would look for in persuading children to eat a meal consisting mainly of wholemeal bread and cheese with raw fruit or vegetables, there is an idea deeply imbued in the modern housewife that a meal is more valuable when given hot than cold. It is, of course, more and more appreciated that foods vary enormously in their ability to promote growth. Normal growth, in fact, cannot take place unless the child is getting enough of the many discovered and undiscovered vitamins, the mineral salts, and not least animal protein. But it is not clear wherein the potency of this breakfast lies. As given in Oslo the meal consists of a third of a litre of unskimmed milk, an unlimited amount of kneippcracker or kneipp-bread with margarine and goat's-milk cheese, half an orange, half an apple and a raw carrot. In London wholemeal bread was substituted for kneippcracker and kneipp-bread and Caerphilly for goat's-milk cheese. Bread and cheese is no uncommon form of midday meal among working-class folk and no startling results have been detected in children consuming this diet. The amount given in the Oslo meal is unlimited and this may mean that appreciably more is consumed than is usually taken to school, and the grain used in preparing the bread is whole and not mutilated by removal of the germ. The results are probably due to the presence of essential protective elements in all three sections of the meal—in the milk, in the bread and cheese and in the raw fruit or vegetable, but a more detailed study should be made to determine what constituent is most effective. It would be unjustifiable to attribute the effect mainly to vitamins, as has been suggested. It is at least possible that unlimited animal protein in the form of cheese is an equally potent factor. Further experi-

ments will have to be conducted in England, since the places where Dr. Schiotz did his work are for the time being in German hands.

THE HABITATS OF *CLOSTRIDIUM WELCHII*

WITHIN recent years anaerobic bacteria which in their general characters are indistinguishable from *Clostridium welchii* have been found to be a cause of certain animal diseases, notably acute entero-toxæmias affecting lambs and sheep. The first of these is lamb dysentery—the name is self-explanatory—the second is "struck," an acute infection of sheep first discovered in the Romney marshes of Kent and since then in Wales, and the third an acute entero-toxæmia of sheep first reported from Australia and associated in lambs with an infection called "pulpy-kidney disease." The clostridia isolated from these various infections were found to differ from strains of *Cl. welchii* isolated from human infections in that an antitoxin to the latter did not neutralise the toxins of the animal-infecting strains. From a study of the toxin-antitoxin relationships of these various strains Wilsdon found that they could be divided into four distinct types, which he called type A, the classical human *Cl. welchii*, type B, the lamb-dysentery bacillus, type C, associated with "struck" and called by MacEwen *Bacillus paludis*, and type D or *B. ovitoxicus*, the type isolated by Bennetts and others from sheep with entero-toxæmia and pulpy-kidney disease. Following up this work, Glenny and his colleagues showed that types B, C and D produced a toxin or toxins additional to that derived from type A, as indicated in the accompanying table.

TOXINS OF THE *CL. WELCHII* GROUP

Types	Toxins				
	α	β	γ	δ	ε
A	+	−	−	−	−
B	+	+	+	±	+
C	+	+	+	+	−
D	+	−	−	−	+

+ toxin produced; − not produced; ± not invariably produced.

Some years ago W. S. Gordon detected the toxin of *Cl. welchii* type D in, and recovered the associated organism from, the intestinal contents of a few horses suffering from grass-sickness. In attempts to assess the significance of these findings Gordon and his colleagues [1] at the Moredun Institute have carried out different investigations, the latest of which is an inquiry into the distribution of the various types of *Cl. welchii* in farm soil and in the intestines of man and domesticated animals. Their findings will interest the medical man because little is known about the natural habitats of *Cl. welchii*, which as the principal cause of gas gangrene is often in our minds these days, and because there is some resemblance between the entero-toxæmias of sheep and non-specific infantile diarrhœa. These workers found that 196 strains of *Cl. welchii* isolated from forty-three samples of soil belonged with 7 exceptions to type A (the remaining 7 were type D and three of the four soil samples yielding these types were from fields on which cases of grass-sickness had occurred); 161 strains from twenty-five human bowel specimens obtained post mortem were all type A, while all but 13 (3 type B and 10 type D) of 986 strains from the intestines of various animal species —cattle, sheep, pigs, dogs, cats, rabbits, guineapigs and poultry—were also type A. Obviously, therefore, type A is the predominant type in soil and in the animal intestine, so that the risk of types other than A being causally connected with gas gangrene in man is minimal—an important point in the prophylaxis and treatment of this infection with specific antitoxin.

1. Taylor, A. W. and Gordon, W. S. *J. Path. Bact.* March, 1940, p. 271.

STOMACH LAVAGE IN THE DIAGNOSIS OF PHTHISIS

IT is forty years since Meunier [1] demonstrated the efficacy of stomach lavage in the diagnosis of tuberculosis, but his work lay forgotten until Armand-Delille [2] in France, Poulsen [3] in Denmark, Collis and Brockington [4] in England and Wallgren [5] in Sweden drew attention to it. The method was first applied to children and in them tubercle bacilli in the sputum can often be found in this way in para-tuberculous conditions previously thought to be closed. Kayne and Hounslow [6] and Stadnichenko and his colleagues [7] have now applied the method to adults, and have been able to detect tubercle bacilli in cases where other methods had failed. In the investigation by Stadnichenko, out of 511 patients over the age of ten years in a municipal sanatorium whose sputum was always found negative by routine methods, 249 gave positive results when sputum was obtained by stomach lavage, and he concludes that "it should be adopted as the ultimate standard for absolute negativity or apparent cure of patients having had or suspected of having tuberculosis." It is not suggested that this elaborate procedure should be employed in all cases: there is no point in using it when tubercle bacilli are found by simple sputum examination. No clinician can, however, afford to overlook the possibilities of this "court of appeal" for suspected phthisis in adults and para-tuberculous lesions in children.

Dr. JOHN TATE, medical officer of health for the administrative county of Middlesex, died on April 21.

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1. Meunier, H. *Pr. méd.* 1898, **2**, 81.
2. Armand-Delille, P. F. *Amer. J. Dis. Child.* 1927, **34**, 547.
3. Poulsen, V. *Ibid*, 1929, **37**, 900.
4. Collis, W. R. F. and Brockington, C. F. *Lancet*, 1933, **1**, 127.
5. Wallgren, A. *Amer. J. Dis. Child.* 1931, **41**, 816.
6. Kayne, G. G. and Hounslow, A. G. *Brit. med. J.* 1939, **1**, 1170.
7. Stadnichenko, A., Cohen, S. J. and Sweaney, H. C. *J. Amer. med. Ass.* Feb. 24, 1940, p. 634.

IRISH HOSPITAL SWEEPSTAKES. — Mr. Ruttledge, Minister for Local Government and Public Health, stated in the Dáil that over £4 million of the £14 million collected by the sweepstakes had been earmarked for hospitals controlled by local public authorities. Large regional hospitals were to be erected in Galway, Limerick, and Cork. The sum available for voluntary hospitals was approximately £6 million. Money had to be set aside for endowment. The four big general hospitals to be established in Dublin would cost over £2 million, while the Dublin children's hospital and fever hospitals would absorb at least another £1 million. As our Irish correspondent announced last week (p. 753), Hospital Trust Ltd. has gone into voluntary liquidation, but it is believed that arrangements are being made for a second series of sweepstakes. Owing to the difficulty of establishing communications with all countries overseas, it is probable that during the war the sale of tickets will be confined to Ireland, and it is not expected that the revenue will do more than meet the annual deficits of the voluntary hospitals.

PREVENTION AND TREATMENT OF WOUND INFECTION

IV

ACTION OF ANTISEPTICS ON WOUNDS

BY LAWRENCE P. GARROD, M.D. Camb., F.R.C.P.
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THE use of antiseptics plays so large a part in surgical practice that a study of their properties might be expected to occupy a place in the curriculum. Since it does not, and some of the basic facts of this subject are consequently not a matter of common knowledge, a necessary preface to any discussion of the merits of different antiseptics is a statement of their known properties and of the factors which govern their action. Adequate data of this kind also enable a judgment to be formed of the probable effect of an antiseptic when applied to a wound. If the judgment is unfavourable on these purely theoretical grounds, practical trial is most unlikely to reverse it; if favourable, confirmation is to be sought in either the animal experimental or the clinical fields. The term "antiseptic" seems the best to use in this connexion, for it denotes the purpose for which these reagents are used in the treatment of wounds. The surest way of preventing sepsis is obviously the outright killing of bacteria in a wound, and any reagent capable of this action is also a "germicide" or "disinfectant." An antiseptic can theoretically act by merely restraining bacterial growth, an action for which a lesser concentration of all such reagents will serve, but in practice such an equilibrium is unlikely to be maintained for long, and positive disinfection therefore underlies useful antiseptic action.

FACTORS GOVERNING DISINFECTANT ACTION

In any bacterial population, even of the highest uniformity obtainable in a pure culture, the resistance of individual cells to all lethal agents varies, and disinfection, whether by chemical or by other means, causes a progressive diminution in the number of living cells. The enumeration of surviving cells during the progress of chemical disinfection enables the velocity of the process to be calculated; the repetition of this experiment with different dilutions of the reagent furnishes a concentration exponent; and its performance at different temperatures yields a temperature coefficient. The mode of action of an antiseptic under simple in-vitro conditions can best be expressed in terms of these three values; but data so obtained are not available for most antiseptics, nor is their significance generally understood. The bulk of the available data consists of experiments to determine the greatest dilution in which an antiseptic will kill, or apparently kill, the whole of an inoculum of bacteria in a given time; such experiments usually employ phenol as a control of the resistance of the culture used, and the result takes the form of a phenol coefficient, obtained by dividing the maximal bactericidal dilution of the unknown by that of phenol. This form of experiment need not, except for certain restricted purposes, adhere to an arbitrary technique, such as that of the Rideal-Walker test; the factors of time and temperature can be varied as well as that of dilution. In terms of data so obtained the action of an antiseptic depends on three simple and fundamental factors: its concentration, time, and temperature. To these three, in any consideration of suitability for the treatment of wounds, must be added two others of overwhelming importance and almost incapable of mathematical statement—namely, behaviour in the presence of "organic matter" and action on the tissues of the body.

Concentration.—It is useful to know the minimum concentration in which an antiseptic will act under given conditions, and the commonest way of expressing its activity takes this form. It affords a rough guide to the concentration to be used; unless this can materially exceed the theoretical minimum it is unlikely to succeed. Dilution affects different antiseptics to vastly different degrees. Phenol, for example, exhibits an astonishingly sharp end-point; whereas a 1 in 100 solution kills most bacteria in a few minutes, they will survive in a dilution of 1 in 150 for hours. Cresols and other antiseptics derived from coal-tar behave similarly, and it is therefore imperative that they should be used in concentrations known to be within their effective range. On the other hand, progressive dilution causes only a gradual reduction in the velocity of disinfection by mercury salts and many of the dyes, and concentrations as low as 1 in 100,000 may suffice at least to inhibit all bacterial activity, although actual killing in such extreme dilutions is unduly slow.

Time.—Concentration and time of action are interdependent; if the concentration is increased, the time naturally diminishes for any given piece of bactericidal work. But there are limits to the effect which concentration can have on the time required for disinfection, and the fact remains that some antiseptics are rapid and others slow in their action. Within the limits of concentration suitable for use the differences in the time required for action are very noticeable, and allowance for these has to be made. The most rapidly acting antiseptics are the halogens and those liberating nascent oxygen; for example, less than 1 part per million of chlorine in pure water will kill most bacteria in under 30 seconds. Mercury salts afford an example of the opposite extreme; one investigator has reported with surprise and concern that a 1 in 200 solution of perchloride of mercury does not kill staphylococci in 15 minutes. This is too short a period in which to secure an adequate effect from an antiseptic of this kind, and it should therefore not be used unless in circumstances permitting prolonged action. A rinse in a solution of mercury perchloride or biniodide, although often recommended and employed, is ludicrously inadequate treatment. Slowness of action is characteristic of two principal classes of antiseptics: the salts and compounds of heavy metals and the dyes.

Temperature.—An increase in temperature accelerates disinfection, although the degree of this effect differs with the nature of the antiseptic; it is small in the halogens and great in phenols. In the treatment of wounds this is a matter of little concern, for the temperature of anything applied to a wound will soon approximate to that of the body. There is nevertheless something to be said for applying antiseptics warm rather than cold when they are expected to produce their effect rapidly, and this applies particularly to coal-tar derivatives, their efficiency being at least doubled by a rise in temperature from that of a cool room to that of the body.

Reaction with organic matter.—That antiseptics do not live up to the promise afforded by the results of simple in-vitro tests is due principally to the complexity of the medium in which they have to act. The killing of bacteria is due to chemical combination between the antiseptic and the constituents of the

bacterial cell, and similar combination often takes place with other materials which may be present. Disinfection therefore demands either that an excess of the antiseptic be provided, so that some should remain after all other demands in the field of action have been satisfied, or that the antiseptic should have a greater affinity for the protoplasm of bacteria than for other material which it may encounter. This other material, in the case of a wound, is the serous fluid which exudes from it, mixed with blood, if the wound is recent, or, at a later stage, with emigrating leucocytes. The organic matter with which an antiseptic has to contend thus consists of the plasma proteins in solution and particulate matter in the form either of blood-cells or of the cells of an exudate caused by inflammation. It is therefore necessary to know how an antiseptic behaves in the presence of these materials: whether it forms an inert compound with proteins, and whether it is adsorbed on to cells, a process which sometimes further reduces a bactericidal activity already impaired by proteins in solution.

Toxicity.—The ideal antiseptic is one which is as much more toxic as possible to bacteria than to the tissues of the body. All are to some extent toxic to both, but the degree of toxicity for tissues varies greatly, and three grades may be clearly defined.

(1) The grossly caustic action of strong acids and alkalis precludes their use except as deliberate escharotics, and the same may be said of phenol. Not only phenol but also cresol preparations cause gross and perceptible damage when used in sufficiently bactericidal concentrations; perception, in the sense of pain, is masked by the anæsthetic action of phenol.

(2) A lesser degree of damage, more superficial and less perceptible but necessarily involving the death of all cells with which the antiseptic comes into contact, is caused by all reagents which precipitate proteins. Spirit, formaldehyde, and perchloride of mercury are all fixatives in the histological sense—that is, they coagulate proteins—and thus inevitably exert a similar effect on the surface cells of exposed tissues with which they are brought into contact, although, if the period of contact is as brief as it commonly is, this effect is likely to be slight.

(3) In the third and least grade of toxicity are antiseptics which cause no general damage, at least of an easily demonstrable kind, but are known nevertheless, from such observations as can be made with tissue cultures, to interfere with growth and other functions of the individual cell. The presence of such an antiseptic may prevent leucocytic activity, and if application is prolonged, delay repair.

(4) There is a fourth category, represented by only one class of antiseptic, the presence of which in a bactericidal concentration does not inhibit leucocytic activity, although this is not to say that it is perfectly innocuous to all varieties of cell.

There is unfortunately no recognised method of estimating toxicity which is appropriate to the needs of the treatment of wounds. The usual proceeding is to determine the minimal lethal dose by the intravenous route, and data so obtained can be misleading, because the result is to bring the substance into full and immediate contact with sensitive and vital structures, such as the medullary centres and renal glomeruli, and the effects on these structures may be of a different order and nature from that produced in tissues with which the antiseptic will come into contact in ordinary use. Alternatives are the subcutaneous, oral, and intraperitoneal routes; these naturally give materially different results, presumably dependent on the rate of absorption. They all have the defect of judging toxicity by various obscure or unknown systemic effects, whereas for the purposes of the treatment of wounds the effects which usually matter are only those on skin, muscle, connective tissue, and leucocytes. These can be studied histologically in experimental wounds or by tissue culture, and the behaviour of leucocytes can readily be gauged by the study of phagocytosis or by direct observations of motility in the presence of the antiseptic. How far the behaviour of one type of cell can safely be assumed to be true also of others is imperfectly known, but there are reasons for suspecting variation. Perhaps the most appropriate test would be a determination of the delay in healing caused either by continued application or by application for a specified period or periods. This is an aspect of the subject which demands much further study, and in the absence of full comparative data obtained by some accepted and appropriate method it is difficult to assess the relative toxicity of antiseptics in wounds, unless they exhibit gross differences in immediate effect.

VARIETIES OF ANTISEPTICS

Substances used as chemical antiseptics fall into nine principal classes, of which six include members with a claim to use in the treatment of wounds. The three remaining classes are acids, soaps, and essential oils. Acids are either too caustic—e.g., hydrochloric acid—or too feeble as disinfectants—e.g., boric, benzoic, and salicylic acids—to have any practical value; the single exception is acetic acid, the employment of which for dressing wounds dates from extreme antiquity and probably has a certain value. The possibilities of soaps for disinfecting wounds have perhaps been unduly disregarded; some, such as potassium palmitate, are notably bactericidal. Their defects are a singular lack of action on staphylococci and a serious impairment of activity by serum proteins. Essential oils may appear also to have been unduly neglected, but their usefulness is limited by considerable inequalities of action on different types of bacteria, staphylococci again being highly resistant. The main characters of the six classes of antiseptic which demand closer consideration are summarised in the accompanying table. It is only possible to describe these characters in general terms, for comparative data which would enable them to be expressed numerically do not exist. Innumerable comparisons have been made between different antiseptics by quantitative methods, but these are incapable of general correlation, because an immense diversity of technique has been employed. The only standardised methods of test are inappropriate to the study of antiseptics used in the treatment of wounds, and it would be of immense advantage if a method yielding significant results from this standpoint were to gain general acceptance. Anyone at all familiar with the literature of this subject must feel that this is altogether too much to hope. There is, however, no a-priori reason why it should not be agreed to compare the activity of surgical antiseptics by determining the velocity of disinfection at 37° C. in a medium containing 50 per cent. of blood, and these conditions alone would secure a valuable degree of uniformity, with results logically applicable to the circumstances of the treatment of wounds. The general statement of characters in this table requires amplification both in the way of conclusions to be drawn from these facts and because in each class there are members with somewhat differing characters.

Oxydising antiseptics.—Nascent oxygen combines instantly on liberation with almost any organic material within reach, and many bacteria are therefore likely to be spared in any medium rich in protein. This is the principal drawback to the use of such

reagents in prophylaxis of infection in wounds. They enjoy some repute for treating infections by anaerobes, and patient application will doubtless incommode such bacteria when they are superficially situated; indolent wounds covered with thin sloughs produced by gram-negative non-sporing anaerobic bacilli—e.g., *F. fusiformis* and "*B. necrophorus*"—should respond to this treatment. On the other hand, it is inconceivable that gas gangrene and malignant œdema can be materially influenced; these infections are widely spread in surrounding tissues by the time they are recognisable, and no application can reach them, nor is thorough infiltration either feasible or likely to succeed. A paste of zinc peroxide is recommended by Meleney, in combination with sulphanilamide by mouth, for controlling the form of spreading skin gangrene caused by a micro-aerophilic hæmolytic streptococcus. Meleney attributes its action to slow liberation of oxygen; but, since his preparation contains ZnO, $ZnCO_3$ and ZnOH besides ZnO_2, it seems at least possible that the zinc ion plays an important part in the effect achieved. It would be justifiable in so slowly progressive an infection to test this hypothesis by treatment with an ionisable zinc salt alone. Meleney recommends this treatment for antisepsis of wounds generally but issues a warning that infections caused by *Staphylococcus aureus* and *Bact. coli* are resistant to it.

Halogens.—Chlorine and iodine are rapidly bactericidal in extreme dilution in pure water but combine indifferently with almost any organic material and are therefore liable to be totally inactivated unless present in excess or patiently renewed. The high protein content of any fluid in a wound therefore offers an unpromising field for their action, unless this action can be maintained by immersion or irrigation. Iodine is the more toxic, and this quality, together with its inefficacy in the presence of blood, makes it ill adapted for the disinfection of wounds, although it is known to be one of the most dependable reagents for sterilising the intact skin. Chlorine is usually applied as a solution of sodium or calcium hypochlorite—e.g., liquor sodæ chlorinatæ, eau de Javelle, and Labarraque's solution—or of hypochlorous acid, formed by the interaction of a hypochlorite with boric acid—e.g., eusol and Dakin's solution. Chloramine-"T" (*p*-toluene sodium sulphochloramide) is both slower in action and slower to combine with organic matter, and still greater persistence of activity in the presence of serum proteins is claimed for Azochloramid (*n-n*-dichloroazodicarbonamidine). The addition of a chlorine atom to cresols and xylenols notably increases their activity. Iodine, when not employed as such, figures in surgery only as iodoform (CHI_3), the penetrating odour of which has so long been associated with the idea of antisepsis that the fact of its being almost inert is simply not credited. It is the supreme illustration of the force of an appeal to the senses, only rivalled by so-called urinary antiseptics which impart some startling colour to the urine. Iodoform is almost insoluble in water and is therefore barely capable even of preventing bacterial growth. When embedded in an oily paste, such as "Bipp," it is not even capable of this; for, if a mass of it is placed in a tube of broth inoculated with streptococci, these will form colonies on its surface. The belief that iodoform liberates iodine when in contact with tissues lacks modern confirmation, and the quantity likely to be so produced could in any case have little effect. It is most improbable that the beneficial effects attributed to iodoform preparations are due to antiseptic action.

Heavy metals.—Mercury, silver, copper, and zinc are the chief metals whose compounds have been used as antiseptics. The metal itself is bactericidal; so minute an amount of metallic silver will sterilise water that the process is economically feasible. It is, however, incredible that this oligodynamic action of metals can be effective in the body, and the practice of placing silver foil in infected wounds has few advocates and little evidence in its favour. The widespread use of mercury salts is based on a partial misconception of their powers; their drawbacks are slowness of action, formation of relatively insoluble and inert compounds with proteins, and a superficial action on the bacterial cell from which in favourable conditions it may recover, although simple cultural tests appear to indicate that it is dead. Many observations on mercury perchloride are proof not of bactericidal but merely of bacteriostatic effect; and, when steps are taken to remove or to neutralise the antiseptic after a specified period of action, it can be shown that concentrations many times greater or periods of exposure many times longer are necessary to ensure killing. Blood is a medium in which this neutralisation and bacterial revival will take place. The use of mercury salts in such concentration and quantity as even to attempt overcoming these drawbacks would cause grave damage to tissue, and they are therefore to be condemned as antiseptics for wounds. The position of some of the complex organic mercury compounds is not so clear; Metaphen (4-nitro-3 : 5-biacetoxymercuri-2-cresol), merthiolate (sodium ethyl mercurithiosalicylate), and phenyl mercuric nitrate are many times more potent than simple mercury salts as germicides and are said to retain a fair proportion of this activity in the presence of serum proteins. Blood is much more severely inimical than serum to their activity. I know of no information about the degree of damage caused by their local application to exposed tissues; information about toxicity is confined to statements of minimal lethal dosage by the intravenous route. Like mercury salts, they are probably more suitable for application to the intact skin and for the treatment of superficial infections, bacterial or mycotic, than for introduction into a wound. Mercurochrome (sodium dibromoxymercury fluorescein) has been unduly vaunted as an antiseptic for almost every purpose; its popularity is due to the appeal of its colour and to the fantastic results of early experiments in which its action was tested in acid media. In a neutral or alkaline medium it is a comparatively weak disinfectant, and numerous experiments have shown that it is incapable of sterilising skin, superficial wounds, or infected blood. It is one of the few possible antiseptics, used in the treatment of wounds, which can be condemned on the ground of deficient bactericidal power alone.

Alcohols.—The bactericidal power of alcohols varies directly with molecular weight and hence inversely with solubility. The same inverse relationship between solubility and bactericidal power is exhibited by ether and chloroform. The optimal bactericidal concentration of ethyl alcohol is about 70 per cent.; in the pure state, or if much further diluted, it loses almost all activity. The uncontrollable degree of dilution by body fluids in a wound will therefore jeopardise its effect. It coagulates proteins and is hence superficially toxic; this effect is also liable to shield underlying bacteria from its action. It diminishes the efficiency for some purposes of other antiseptics dissolved in it, possibly because of this action on proteins. These are unpromising properties for an antiseptic used in the treatment of wounds, and spirit and similar substances have little claim to consideration for this purpose.

PROPERTIES OF SIX MAIN CLASSES OF ANTISEPTICS STATED IN GENERAL TERMS

Variety of disinfectant	Efficiency as measured by maximal bactericidal dilution	Speed of action	Degree of loss of efficiency in presence of organic matter	Toxicity
Oxydising	Varies e.g., H_2O_2—moderate $KMnO_4$—high	Very rapid	Extreme (action abolished if much present)	Very low
Halogens	Very high	,,	,,	Cl, moderate I, high.
Heavy metal salts and compounds	Moderate to very high	Slow	Largely inactivated by forming insoluble compounds with proteins	High
Alcohols	Variable (usually the more efficient the less soluble in water)	Rapid	Largely inactivated by proteins	Moderate to high
Coal-tar derivatives—				
Phenol	Low moderate	Moderate	Little	Prohibitive
Lysol	Moderate	,,	Moderate	Very high
Higher boiling-pt. tar acid emulsions—e.g. Cyllin; Izal	Fairly high	,,	Considerable	Moderate
Halogenated cresol preparations—e.g., Dettol	Moderate	,,	,,	Slight
Dyes:—				
Di- and tri-phenylmethane compounds	Sometimes very high	Slow	,,	Moderate and variable—e.g., brilliant green more toxic than violet dyes.
Acridine compounds	Very high against some bacteria	,,	Comparatively little impairment of action by serum or blood	Extremely low (even leucocytic activity unimpaired)

Coal-tar derivatives.—The distillation of coal-tar at temperatures rising from 180° to 250° C. yields a series of compounds in which boiling-point and disinfectant power vary directly, while solubility and toxicity vary inversely with the two former. Thus phenol has the lowest boiling-point and the least disinfectant power, is soluble to the extent of 15 per cent. in water, and highly destructive to tissue. Cresols come next and are so much less soluble in water that they require solution in soap; lysol is a 50 per cent. solution so obtained of a mixture of ortho-, meta-, and para-cresol. It is about three times more bactericidal than phenol and rather less toxic, but nevertheless it is a caustic substance, the commonest agent of suicide in this country next to coal-gas, and capable in dilutions in clinical use of causing redness and tingling of the skin and even damage to it. The skin is naturally by far the most resistant of all tissues to damage of this kind, and it may therefore well be questioned whether anything capable of so affecting it is fit for application to a wound. The tar acids of higher boiling-point are not available in any official preparation but are sold under various proprietary names as exceedingly complex mixtures emulsified with oils ("black" fluids) or gums ("white" fluids). These substances, of which Izal and Cyllin are well-known examples, have Rideal-Walker coefficients of up to 20 or more; this much greater apparent bactericidal power is partly but by no means wholly offset by a greater reduction of activity in the presence of organic matter. They do not irritate the average skin in the dilutions required for use, and such information as there is suggests that they are much less poisonous than lysol when swallowed. In recent years a fourth class of coal-tar antiseptics has come into use, of which the prototype is Dettol. The active constituent of these is a cresol or xylenol with an added chlorine atom; halogenation approximately trebles the bactericidal power of tar acids but decreases their solubility and involves a greater loss of efficiency in the presence of organic matter. These antiseptics also contain essential oils and spirit, chiefly to secure primary solution of the active constituent. Dettol has a Rideal-Walker coefficient of about 3; but, owing to the diminution of its activity in the presence of organic matter, it requires to be used in greater concentration than this figure suggests, and a 5 per cent. solution is advisable for treating wounds. This is fortunately feasible, for antiseptics of this class possess little gross toxicity; undiluted dettol is tolerated by most skins. Antiseptics either of the type of dettol or of izal and cyllin therefore have a claim to consideration in the treatment of wounds. They do not coagulate proteins, they act with moderate rapidity, and they act in the presence of serum or of blood if used in adequate concentration. Official and other reluctance to recommend their use in the past has been due to the necessity of making a choice between a large number, every one of which is proprietary.

Di- and tri-phenylmethane dyes.—Most aniline dyes are to some extent bactericidal, a property connected with their power of penetration, although it is to be noted that staining does not invariably imply death of the bacterial cell. Among the most powerful are brilliant-green and the violet dyes; these are combined (the variety of the latter chosen being crystal violet) in Bonney's blue paint, which may be taken as representing the most that this class of antiseptic can do, although for some purposes it would be better made up in water instead of in a 50 per cent. solution of spirit. Their action is slow but notably accelerated by increase in temperature, and very high dilutions are effective; the presence of blood or of serum diminishes their activity, but by no means to an extent which renders practicable dilutions ineffective. They are credited with exceptional powers of penetration, but it has to be remembered that penetration by dyes can be seen, whereas that of most antiseptics cannot, and a comprehensive study of this aspect of the behaviour of antiseptics has yet to be made. They are distinctly toxic, brilliant-green especially so, although their application causes neither pain nor any visible change other than staining. Other drawbacks are their comparative inactivity against gram-negative bacteria and their variations in composition and consequently in action; many aniline dyes are by no means pure and single chemical compounds but complex mixtures which no two manufacturers produce exactly alike. With these reservations, dyes

of this type have a strong claim to consideration for purposes of prophylactic treatment of wounds; they are much less suited to the treatment of established wound infections.

Acridine dyes.—Since there is some confusion about the nomenclature and composition of different "flavines," these should first be made clear. Acriflavine, originally known as trypaflavine, is a mixture in unstated and varying proportions of 2 : 8 diaminoacridine hydrochloride and its methochloride, together with traces of other substances which increase solubility. Euflavine, or neutral acriflavine, is a mixture of the two corresponding bases. Proflavine is 2 : 8 diaminoacridine sulphate. Rivanol is 2 : 5-diamino-7-ethoxy-acridine lactate. These substances vary in their physical properties, solubility in water, pH of solution, and degree of stability in saline solutions, and for these and other reasons to be given later they differ in suitability for clinical use, but their chief biological properties are common to all. They will disinfect in short periods of time only in concentrations of the order of 0·2 per cent., but with increase of time the necessary concentration diminishes steadily, and the growth of some bacteria is prevented in culture by as little as 0·0001 per cent. Their action on different bacteria varies; they are rather more effective against *Streptococcus pyogenes* than against *S. aureus* or against *Bact. coli* and have no action whatever on *Ps. pyocyanea*. Their bactericidal activity persists to a degree unequalled by any other class of antiseptic in the presence of either serum or blood, although the belief that serum increases their activity is inadequately founded. They are unquestionably the least toxic of all potent antiseptics; bactericidal concentrations neither kill fibroblasts in tissue culture nor inhibit the motility of leucocytes and the phagocytosis of bacteria by them. No-one who has seen a polynuclear leucocyte brightly stained with one of the flavines but nevertheless in active amœboid movement can fail to be impressed by this proof of tolerance of the tissues, and anyone can see it who mixes the antiseptic with fresh blood and examines it under a microscope enclosed in an incubator. Finally, acridine compounds are alone in having been shown consistently in many series of experiments to be capable of preventing infection in experimental wounds in animals. This, after all, is the ultimate test, short of clinical trial, and in many ways superior to it, because no two accidental wounds in patients are alike in extent or in the amount and nature of their bacterial contamination, whereas identical experimental wounds can be produced in any number of mice and deliberately inoculated with the same amount of a single specimen of pus, infected blood, or bacterial culture. These wounds can then be treated by a single application of the antiseptic after an interval of time not exceeding two hours. It has repeatedly been shown that, when mice are inoculated in this way with *S. pyogenes* of such virulence that their control animals regularly develop cellulitis and a fatal septicæmia, infection can be prevented by applying solutions of acridine compounds in concentrations no greater and sometimes considerably less than those suitable for clinical use. This treatment has been effective when applied at intervals varying from 15 minutes to 2 hours after the infliction of the wound and has succeeded when excision of the wound has not. Another method is the subcutaneous injection of bacteria, followed by an injection of the antiseptic at the same site; these experiments are of interest as illustrating the possibility of successfully infiltrating tissues exposed to infection. Acridine compounds have been shown to be capable of preventing fatal infection not only by streptococci but also by pneumococci and diphtheria bacilli; there is also some evidence of an action in vivo on *Clostridium welchii*. When iodine, phenol, and perchloride of mercury have been used in a parallel series of animals they have always been ineffective. These are the salient facts emerging from the results obtained by workers in at least three different countries; the volume of such work and the uniformity of its findings leave no room for reasonable doubt of its significance.

Some of the acridine compounds used, particularly in more recent work, have been newly synthesised and are not generally obtainable. Of those named here, acriflavine has been used more often than any other, and its efficiency as an antiseptic for wounds has been amply demonstrated. This substance is unfortunately not a single compound but a mixture liable to variation in the proportions of its constituents and contradictory reports of its properties in the past may be attributed to the varying properties of different samples. It is liable to impair the motility of leucocytes (without, however, actually abolishing it) in concentrations in which proflavine has no apparent deleterious action of this kind. In the recent work of Russell and Falconer both acriflavine and euflavine were found to cause damage when applied to the exposed surface of a rabbit's brain, whereas an isotonic solution of proflavine buffered to pH 6·2 produced little more effect than did normal saline. Because both of its constancy in composition and of its minimal toxicity—and, it may be added, of its relative cheapness, for its synthesis is a simpler process than that of acriflavine—proflavine is the antiseptic of choice in this group, especially where the avoidance of damage to the tissues is important. Whether any of the more recently synthesised acridine compounds is its superior has yet to be proved.

(*To be concluded*)

The Lancet 100 Years Ago

April 25, 1840, *p.* 169.

From a review of "Narrative of the Discoveries of Sir Charles Bell in the Nervous System" by Alexander Shaw.

"I shall take the liberty of making a few remarks upon a very curious question, which has particularly excited the attention of physicians in all ages, since the time of Galen—*Why sensation should remain entire in a limb, when all voluntary power over the action of its muscles is lost; or why muscular power should remain when feeling is gone?* The attention of Galen was particularly directed to this question, in consequence of his having been called upon by some of his contemporaries to account for the manner in which he had cured a partial paralysis of the finger, by applications made to the spine. In answer, Galen told them that two series of nerves went to every part: one, to endow the skin with sensibility; the other, to give the muscles the power of voluntary action. . . ."

MESSRS. COW AND GATE have sent us their booklet about toddlers, which contains some simple and sensible talks to mothers about the management of small children. It deals with such matters as food, clothing, first-aid and discipline and is illustrated with photographs which lovers of children will find hard to resist. The author, who is the matron of Cow and Gate, may be forgiven for pointing the moral that the toddler reared on Cow and Gate preparations is less likely to come to harm than others less fortunate. Diet sheets for normal, costive and anorexic children are appended.

SPECIAL ARTICLES

MEDICINE AND THE LAW

Industrial Disability as a "Notional" Accident

AN accident, in the popular interpretation, is something untoward, unexpected and sudden—a fall downstairs or a traffic collision. The House of Lords, in Fife Coal Co. *v.* Young (discussed in this column last month), declared that a slowly approaching and invisibly developing disability like dropped-foot could be an "accident" entitling a workman to compensation. The fuller reports of the decision, now available, indicate that there is still some legal doubt. Young is awarded compensation for his dropped-foot, but Lord Atkin has expressly left undecided certain points of "how?" and "when?" in the case of industrial disability or disease which the law is invited to treat as an accident of employment. In the anthrax case (Brintons *v.* Turvey), and in another where streptococci were derived from bone-dust in artificial manure (Innes *v.* Kynoch), although the date of infection could not be fixed with certainty, the courts could visualise that a bacillus, met in his employment, had invaded the workman's body. This attack was held to be an accident. The question which the acute mind of Lord Atkin has characteristically isolated for further examination is whether every such bacillus (or flight of bacilli) must have its own day or whether the gradual effect of a succession of them in poisoning the human system can legally be called an injury by accident in the statutory sense.

In the Fife colliery case Young was employed for a month as a packer—i.e., as a builder of pillars to support the roof of underground workings. The roof was low, hardly three feet high; he had to crouch with the outside of his knee pressing on the pavement. After 20 minutes of this work on April 27, 1938, his right foot went numb. He finished the shift and was helped by his father in the walk home. The doctor diagnosed dropped-foot; the leg muscles were paralysed in consequence of pressure on the peroneal nerve. Young claimed compensation for injury by accident on or about April 27. He had previously suffered some loss of dorsiflexion in the right foot while engaged in the same work earlier in the month. It was hard to prove the definite moment when the "accident" occurred. The judges were not worried by the difficulty. Something happened to Young on April 27 which transformed him from a man who was not suffering from dropped-foot into a man who was. There was a physiological change due to an undesigned untoward event happening in the employment. If, said Lord Atkin, the elements of suddenness or of the event happening on a specified day are material, those elements exist in this case. "I reserve," he added nevertheless, "any question affecting the necessity of being able to specify an event with details of time and place before concluding that there has been an 'accident.'"

The usual crux in workmen's compensation cases is the dispute whether or no the injury by accident arose "out of and in the course of the employment." If this point was not taken against Young, his disability was certainly within the broad principle that the workman is to be protected against bodily damage occurring in his employment. A change of the law in 1906, as is well known, recognised certain named industrial diseases as "notional" accidents. Had Young's claim failed, it would have been hard to resist the demand that dropped-foot should be inserted in the statutory schedule of industrial diseases so recognised. Logically any disease contracted in the course of employment might well rank as an accident —tuberculosis, for instance, or german measles caught from a fellow-worker.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

SCOTTISH RED CROSS

THERE has been a great increase in the activity and the membership of the Scottish branch of the British Red Cross Society since the crisis in September, 1938. Large reserves of hospital dressings, comforts and equipment have been accumulated, and large consignments have been dispatched to Finland, Poland and Turkey, as well as smaller quantities to hospitals in France and at home. The biggest demand made on the work-parties in the first six months of the war was from Finland. Over £6000 in cash and goods was sent including, up to the middle of February, over 100,000 swabs, dressings and bandages, and about 10,000 hospital garments. In September, 1938, the membership was 4652; today it is 13,198—still some way short of the 19,472 reached in 1918. Of the present total 12,150 are women members or probationers. There are 302 voluntary-aid and red-cross detachments. Motor-ambulance fleets have been formed containing 26 motor ambulances and 15 trailers which can be attached to the back of another motor-car for the accommodation of four lying cases. The chief fleet of ambulances is stationed in Glasgow, but there are also ambulances in Edinburgh, Dingwall, Aberdeen, Greenock and Ardrossan, while six light ambulances have recently been accepted from the Red Cross by the Scottish Command for use in Orkney. These ambulances are all driven by voluntary women drivers and have already been busily engaged in carrying military and naval patients to hospitals and trains. Up to October, 1939, all materials for work-parties supplied by headquarters were issued free and the central war fund paid the expenses of the county branches. Now, however, the county branch work-parties are self-supporting. Nearly 40 sphagnum moss depôts are administered by the Red Cross in Scotland, and large numbers of dressings, pillows and so on have been issued. The Red Cross also supplies wireless sets and complete radio installations to service hospitals. Recently a consignment of electric shock blankets sent to a hospital in Shetland was used a few hours after arrival for the treatment of rescued foreign seamen.

SOME DIFFICULTIES IN EAST LOTHIAN

The East Lothian public health committee has been finding considerable difficulty, like many other authorities, in obtaining enough nurses to staff their hospitals. This scarcity has been felt among the higher trained nurses and even more among the probationer nurses. As a result the scale of wages, especially for probationers, has had to be increased, and the committee recommended the following scale for hospitals up to 100 beds: ward sisters £90 rising to £105; staff nurses £70 to £85; probationer nurses £35 to £50.

Dr. John Milne, assistant medical officer of health for the county, has been refused permission to take up military duties. Dr. Milne was on military service during the last war. It was announced that it was not a question of money, since Dr. Milne's Army

pay would be considerably less than his present salary and he was anxious to join up. However, a report from the county medical officer gave the opinion that public-health work could not be carried on by two medical officers instead of three. If Dr. Milne was relieved for Army duty a substitute would have to be found, and the committee preferred not to grant Dr. Milne's application.

BRITISH EQUIVALENTS OF FOREIGN DRUGS

SINCE war began the Medical Research Council have taken steps, in consultation with Government departments and the Association of British Chemical Manufacturers, to ensure that we shall not be deprived of important synthetic drugs hitherto obtained from abroad. Some of the British substitutes can be adequately tested for identity and purity by chemical means so that no question of their equivalence can arise. In other cases, however, the council thought it desirable to arrange comparative clinical trials to make sure that the British drugs were equivalent in all respects to proprietary products previously imported and known under trade names. The following four substances have already been the subject of such clinical trials.

Proprietary name	*Pharmacopœial name*
Avertin	Bromethol
Atebrin	Mepacrine hydrochloride
Evipan sodium	Soluble hexobarbitone
Uroselectan-B	Iodoxyl

Comparative trials of other substances are likely to be undertaken in the future, and these will be reported from time to time.

The General Medical Council is to publish in an addendum to the British Pharmacopœia, 1932, monographs dealing with other foreign drugs which are now being produced or are likely shortly to be produced by British manufacturers. These have hitherto been known under registered trade names, but they are now given the following official pharmacopœial titles.

Proprietary name	*Pharmacopœial name*
Atebrin musonate	Mepacrine methanesulphonate
Cardiazol	Leptazol
Coramine	Nikethamide
Doryl	Carbachol
Fouadin	Stibophen
Germanin (Bayer 205)	Suramin
Plasmoquin	Pamaquin
Prominal	Phemitone

It is hoped that these official names will be generally adopted.

"... War, in its proper sense of organised intraspecific group fighting, is a very peculiar phenomenon. So far as is known, it is confined to men and to a few species of ants."—Dr. JULIAN HUXLEY, F.R.S., *Science*, Feb. 16, 1940, p. 151.

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE. The annual malaria-control course for laymen will be held at the school (Keppel Street, W.C.1) from June 24 to 28 under the direction of Sir Malcolm Watson. Additional lectures have been arranged on water-supplies, conservancy and sewage-disposal, insulation against heat and cold, and air-conditioning for comfort in the tropics. Further particulars may be had from the organising secretary of the Ross Institute of Tropical Medicine at the school.

IRISH MEDICAL RESEARCH

IN its report for 1939 the Medical Research Council of Ireland laments the necessity of drastically reducing the number of new grants to research workers, its own grant having been cut down from the expected £10,000 to £5000 for the year. Most of the existing grants will, however, be continued. The findings of the council's workers are, of course, published in a variety of journals, but they are briefly summarised in the report. Dr. Patrick FitzGerald has investigated the control of respiration by the hypothalamus and the innervation of the cardiac sphincter of the stomach. Mr. P. J. Boyle, M.Sc., has studied the balance between the content of the tissues in various salts and the concentrations of these salts in the surrounding fluid, and he has put forward a basis of a new conception of the diffusion occurring through the cell membrane. Mr. T. G. Brady, Ph.D. and Mr. R. P. Cooke, M.Sc. have been working on the mechanism leading to the appearance of ammonia in shed blood. The ammonia has been shown to arise from various compounds of adenine which play a central rôle in the chemical changes that take place in the contraction of muscle.

Prof. J. B. Gatenby and Miss O. E. Aykroyd, Ph.D., after completing a study of the human uterine glands in the gravid and non-gravid stages, have studied human gametes and have shown that the sensillæ amœboidæ of Popa in the human sperm are broken ends of the spermatid cell wall, and inadmissible as normal parts of the human male gamete. Dr. N. McL. Falkiner has been working for several years on the placental circulation and the structure of the villous tree. Dr. E. S. Duthie, with Dr. Chain, has isolated a polypeptide which increases capillary permeability and leucocyte infiltration, and has also isolated a mucolytic enzyme from the testis, malignant tissues and pathogenic bacteria which causes increased permeability of the dermal layer of the skin. Dr. O. T. D. Loughnan has investigated the effect of intravenous heparin in the prevention of intravascular thrombosis in animals and in the treatment of thrombosis in man. No conclusions could be drawn from the human cases investigated but at least heparin had no unpleasant or harmful effect. Prof. Hans Sachs has determined the blood-group of 2500 people in Ireland and has found a much higher proportion of group O and a lower proportion of group A than is found in other countries. Mr. Robert Press, M.Sc., working with Prof. W. R. Fearon and Prof. R. W. Ditchburn has continued his spectroscopic analyses of biological material, using a new spark method with rotating conical electrodes. Dr. D. M. Mitchell has followed up his discovery that pigs fed on a deficient diet develop ataxic paralysis due to posterior-column demyelinisation. It now seems that the cause is a deficiency in some mineral constituent of yeast.

Miss E. J. P. Steel has been trying to devise a simple and rapid clinical test for vitamin-A deficiency. She has had some success with a test in which the patient's eyes are subjected to a bright light and the time is measured between the switching-off of this light and the detection of a faintly illuminated object. Prof. T. W. T. Dillon has found that the renal threshold is raised by narcotics. Dr. P. J. H. Clarke has conducted a survey of juvenile rheumatism in Dublin and attributes the high incidence there to overcrowding and an unhygienic environment. Dr. Cecil Mushatt has found that in 34 per cent. of cases of tuberculosis in Irish children the causative organism is of the

bovine type. Dr. R. A. Q. O'Meara has been inquiring into the high incidence of the "gravis" type of diphtheria bacillus in Dublin. Dr. J. C. Shee reported in 1938 that more than a quarter of the children in the South Riding of Tipperary had goitre, and the Council is making a grant this year for further study of the ætiology and prevention of this condition. Finally, Dr. T. C. J. O'Connell has investigated the utility of various tests of kidney function in renal tuberculosis both in man and rabbits.

This is not an exhaustive list of the grantees' activities but it is enough to show the width of their field.

PUBLIC HEALTH

Public-health Officers in the Forces

UNDER the Local Government Staffs (War Service) Act, 1939, which came into operation at the beginning of the war, local authorities are empowered to make up the balance of civil pay of their employees undertaking war service, and the superannuation rights of these employees are preserved. In the debate in the House of Commons on this measure the Minister of Health expressed the hope that local authorities would interpret its provisions in a fair and reasonable spirit, and most authorities have accepted the recommendations in full. The British Medical Association has now asked those who have not done so to reconsider their decision. The association points out that junior public-health officers are as a rule recruited as lieutenants and paid about £500 a year, whereas senior men are given the rank of major and paid about £800. The amount of the supplement payable is therefore not likely to be large.

Points from Annual Reports

Dr. W. M. Ash in his report for *Derbyshire* mentions that the cost to the county of the compensatory clauses of the Midwives Act 1936 was estimated at £1000, but up to July 30, 1939, on which day the right to compensation ceased, the actual disbursements were £19,465. All this money was given to midwives who voluntarily surrendered their certificates. Hardly a month passed before the Ministry of Health empowered local authorities to make an order which in effect meant to give back to the midwives the certificates for the surrender of which £19,000 had been paid. Dr. Ash recalls that in 1936 he said that the assumption that there was a superfluity of midwives willing to take full-time appointments was erroneous and that experience would show that there was a dearth of such women. He instances the case of a midwife to whom the county council paid £1348 in July to relinquish practice and in September empowered her to return to practice. "It cannot be argued that the outbreak of war has anything to do with it." This is not wholly true, but it is true that the troubles which came from the Midwives Act 1936 and the consequent action of the Central Midwives Board were due to inherent defects in the act, which failed to take account of local variations in the supply of midwives and the state of development of the midwifery service. In 1915 midwives in Derbyshire attended 10,139 confinements and summoned medical aid for 818. In 1938 they attended 5346 and sought aid for 2249. In the former year the maternal mortality was 3·97, in the latter it was 3·65.

Dr. John Ritchie in his report for *Dumfries* expresses the opinion that the special problem of the owner-occupier of an insanitary house has been largely overlooked in drafting housing legislation because it is of more importance in rural than in urban districts; but we think he explains the silence of the law better by the "remedies" he himself suggests. In urban districts an insanitary house is always part of a communal problem, but in rural districts it may be a purely personal one and can be treated individually. Dr. Ritchie suggests that where the insanitary house represents the whole property of the occupier and he has no means to carry out the necessary repairs, he should, if the house is reasonably fit, be left in possession and the house condemned only when he has ceased to occupy it. Such owners in rural districts are mostly elderly people whose families have left them. The sale of insanitary houses is a different matter which troubles all workers in rural housing, for our laws of property are relics of a past age; they offer many opportunities to the unscrupulous to unload on the unwary, and give local health authorities powers which are far too restricted.

The most important subject in Dr. W. F. W. Betenson's report of *Breconshire* is a critique of his investigations into maternal deaths in the county. Breconshire is the fourth largest county in Wales but its population is only 53,000, or one person per nine acres. It has no towns of any size, is remote from any large hospital, and the greater part of the county is inaccessible in emergency. There are about 750 births annually and Dr. Betenson says he expects an average of four maternal deaths a year. In 1938 there were seven, giving a maternal mortality of 8·86. This is by no means the highest recorded in Breconshire, and the numbers being very small individual annual rates have little significance. But the rate is always high because of difficulties that are permanent. Reports on maternal deaths required by the Minister of Health are secret documents, so it is not usual for medical officers of health to make more than the briefest reference to them in their annual reports. Dr. Betenson wisely departs from this rule, for his seven deaths would be lost in the Ministry's pool, whereas considered in their local setting by the man on the spot they reveal a story of great interest to the practice of midwifery. One of the deaths was a transfer, the other six were all theoretically preventible. Dr. Betenson says that two deaths were entirely, two primarily and one secondarily due to lack of coöperation of the patients. Two deaths might have been prevented by better antenatal supervision, two by better facilities at delivery, and two by specialist treatment in hospital. Thus baldly stated it seems that the women of Breconshire are stupid, the local authority behindhand in supplying what they ought to supply and the local talent in obstetrics of poor quality. But the real cause of failure is inaccessibility. The lack of coöperation of the patients is largely dependent on their isolation, it is a lengthy and complicated business to get patients to hospital, and though the county council employs two obstetricians one lives at Cardiff and the other at Swansea, and though available in emergency these can seldom reach their destination in time. Dr. Betenson says of the lack of coöperation of the patients: "I am inclined to think that this voluntary business of being able to please yourself against the advice of those who know better is often fraught with real peril to the nation's welfare." But if he had the power of compulsion Dr. Betenson would still be in difficulties, for though he can offer hospital treatment or specialist's advice, he cannot guarantee that these can be utilised in time.

IN ENGLAND NOW

A running commentary from our peripatetic Correspondents

IT was on New Year's Eve that I went to visit the elderly consultant who lives, in a state of semi-retirement, in our neighbourhood. Seated in an armchair, in his dressing-gown, before a good coke fire, surrounded by forms, envelopes, and cheques that he had just made out ready for the morrow, he was revelling in toothache and in paying his income-tax. Owing to the skill with which a friend had extracted one of his few remaining molars the toothache was not as bad as he had expected it to be. That was why he was enjoying it so much. It was an excuse for inertia but not enough to interfere with his fireside pleasures of books, gossip, and income-tax. He has never known real illness, so he delights in a minor malady. Since he had measles at school he can, over a period of thirty-five years, only remember a twisted internal semilunar, acquired in the Cambridge match, that kept him quiet over Sunday, a tonsillitis as a house-officer and a boil as a registrar. Over many years he has been putting aside books into which he has dipped for reading when he has a long illness—Gibbon, the Golden Bough, and Carlyle's Frederick. But now he realises without admitting it that he is too old. Even if he did fall ill the list would be too long; and he would be too tired to read even one. And that is why he revels in a minor malady. The income-tax is different. He has funny views on that. He says he would sooner steal penny stamps across the P.O. counter than put down anything as business expenses to which he is not entitled. True, he is the person that decides on the entitlement for odd shillings, and admittedly certain of the family ointments, cough mixtures, and even tooth-brushes find their way into the druggist's bill, but he is careless in such things and very few of these bills get into the accounts any way. Of one figure only is he certain: his takings. Never having had a great practice, and that chiefly among persons of small estate, he gets as much kick from entering a guinea in his accounts as from putting it in his pocket-book. He has never employed an accountant or solicitor in making up his return, saying he sees no reason to employ an amateur when the state provides an expert free of charge. And so he goes to the inspector of taxes with any debatable item of expenditure, and is pleasantly surprised to find how often it is allowed. In this way, over the course of years, he has come to know the income-tax regulations better than many with far bigger incomes. His wife is quite convinced he pays too much, and that he ought always to be getting some back, like their Aunt Jemima does. She argues that Aunt Jemima has a smaller income than theirs so they ought to get more back than she does. He is unable to convince her, and so, when a kindly inspector returns him some, as happens from time to time, he hides it in the P.O.S.B. and forgets it. One thing he will not do, and that is put down as expenses sums that he does not, in fact, pay out. His indignation was aroused by the story of an anæsthetist who learning that a great physician with a mansion in H——y Street was allowed thirty pounds a year for flowers in his consulting- and waiting-room, put down the same sum for floral decoration of his own flat in the mews behind that august thoroughfare from which he conducted his own business by telephone. That was twenty years ago but his indignation hasn't subsided yet.

My old friend says he will owe no-one except his usurer, which is the name he gives to his bank manager. He does not even call it owing; he calls it buying cash; and so he treats the bank as he does any other store along the High Street, walking in with the confidence of a good customer, as indeed he is, for how would banks exist if it were only people with comfortable balances who traded there? And so he pays off every account on the first day of the year. He was worried that he could not help to win the war by paying his income-tax promptly for he had been doing that for the past twenty years. Instead he resolved to complete his income-tax return and send it in by the end of April. He has made this resolution annually for many years without success. But last week he told me that where New Year resolutions have failed war-time determination has succeeded.

* * *

The adjective at the head of this column was originally coined to describe Aristotle's pupils who were always on the move following their teacher. Aristotle himself was an exacting, restless person, with a short body on spindle legs, who was goaded on by his own insatiable intellect and did most of his teaching as he walked. He had none of the serenity of Plato, and his aggressive drive would have been good material for the author of "Mental disease as a guide to normality" in last week's LANCET.

The modern trend in medicine is certainly back towards many of the Greek tenets, and actually we hear a good deal of the neo-hippocratic approach. The fundamental concept of psychosomatic monism is difficult to apply, especially when one has been brought up in the "organic" or "functional" school. Despite this difficulty, psychogenic causation of much illness is being increasingly appreciated and has quite lost the ridicule that surrounded it in orthodox circles twenty years ago.

Reverting again to the Greeks, Plato in the Dialogues epitomises the situation for us in the words that he attributes to Socrates: "and, therefore, if the head and body are to be well you must begin by curing the soul"; that is the first thing, and he who taught me the cure and the charm added a special direction. "Let no one," he said, "persuade you to cure the head until he has given his soul to be cured, for this is the greater error, that physicians separate the soul from the body." With medical education on its present materialistic basis it is difficult to see how this is going to be achieved, unless social medicine is taught in conjunction with hospital practice. It may sound blasphemous, but medical units should undertake this work, and train the students to go into their patients' homes and workplaces to find out *why* they had developed a duodenal ulcer or a low back pain. At least one member of all unit staffs should have received proper training in psychological medicine, which would thus become integrated with physical treatment. What excellent training it would be if they had to work out a diet that was practical politics in a bus-driver's home and in coöperation with his wife, rather than just handing him a printed sheet when he goes out from hospital. Of course Time is the great enemy, but at present the students spend many hours learning about the obscurities of biochemical investigation, much of which is forgotten shortly afterwards. Anyhow it is another idea that your special commissioner, or commissar, might care to develop; it is certain to raise plenty of opposition, which is probably a good sign.

A prophet is not without honour. . . . Two problem nieces have been staying here recently and all the best advice of the child-guidance world would have been lavished in vain on their mother, who is of course the real problem. We may know more about mental mechanisms than did our forebears fifty years ago, but we haven't solved the problem of parental resistance to advice that conflicts with universal urges.

* * *

There must be many reasons for the lag between scientific knowledge and its application by those who should benefit by it. Perhaps the most important is the lack of biological training among people in authority. To most medical people, biology suggests dog-fish and the reproductive technique of the earthworm, while to the average layman it is a completely closed world, illuminated by patent medicine advertisements and their diagrams. Biology can and should be taught as part of our own lives, in the course of general education. Unfortunately, human physiology and genetics come up against a number of our racial prejudices: physiology of the brain stirs religious antagonism, while the lower regions of the abdomen are by no means persona grata in many schools. As a result, people are continually dealing with biological problems in their daily lives without any sound foundation, and making many other people ill in the process. This is particularly liable to happen today with its plethora of combines and controls. More and more people are being employed by large-scale organisation and often finding themselves at the mercy of some unstable neurotic. The Services, with their emphasis on training for leadership, have faced these problems, which are not yet realised in civil life. We cannot alter the trend of economic development, but we can see that people are trained to deal with its problems in their early days. Let us hope that the day will come when human biology is a compulsory hurdle in the school certificate.

* * *

Discussing the sordid topic of fees a note in the *Manchester Guardian* describes how a suburban doctor had been agreeably surprised to find that the bulk of his practice which voluntarily scattered last September had returned to the fold and that his bills were now being paid more regularly than ever. Instead of the usual six months' delay, cheques were coming in almost at once, and there seemed to be a gratifying tendency among his patients to adopt the motto "pay as you go." Here in the country we have had a similar experience. We are accustomed more to slow debts than bad ones, for in a farming community there widely exists a pernicious belief that it is unlucky to pay the doctor until you want him again, so that he may have to wait years for his fees knowing that the money is perfectly safe. Our accounts for the first quarter of this year have certainly been paid more expeditiously than usual. No doubt the impetus given to agriculture by the war has put more money into circulation in rural areas as elsewhere, but whether the farmer is paying his doctor on a basis of "pay as you go" or of "pay while you can," it is hard to say. One thing is certain—that the farmer has not lost his proverbial ingenuity in the evasion of income-tax.

LETTERS TO THE EDITOR

THE E.M.S. TODAY AND TOMORROW

SIR,—I must thank Sir James Walton for his courteous reply to my letter in your issue of April 13. I agree with him that the main point of difference between us in our visions of the hospital service of the future is as to the desirability of permitting heads of departments to engage in private practice. He goes on to say in his letter: "I believe this to be essential because the best men in the profession should be incorporated in the new service and it seems extremely unjust that those capable of paying should be deprived of the services of such men; nor can I see why those providing the skilled medical help should be denied the reward of their skill and labour."

There are two points in this argument which I should like briefly to touch on. I agree that it is essential that the best men in the profession should be incorporated in the new service, and that it would be most unjust if those capable of paying were deprived of the services of such men, by being excluded from the benefits of the new hospital service. But why should they be? In the L.C.C. municipal hospitals, persons of all social classes are admitted: knights, baronets, lords, and for aught I know millionaires as well, and the service undoubtedly benefits by their presence. A service for the poor only is always liable to be inefficient, for the poor have become much too used to putting up with things which the well-to-do would never tolerate. Moreover, the critical faculty of better-off and more highly educated people is of great value when applied to any service.

What Sir James is really demanding, whether he realises it or not, when he asks that those capable of paying should not be deprived of the services of the best men, is a better standard of treatment for the rich. A kind-hearted doctor may do his level best to treat all his patients, hospital and private, equally well, but he cannot do it. Inevitably there is a more careful and prolonged examination, greater courtesy and less waiting in connexion with private work. If private patients had not good reason to expect this, whatever would induce them to seek a private consultation with a doctor whose advice they could obtain in the public service, either without payment or for a much lower fee?

Of course it would be wrong if those providing skilled medical help should be denied the reward of their labour, but this can be achieved as well by an adequate salary as by guineas paid in the doctor's consulting-room. I would go further and say it can be achieved much more equitably, for in private consulting practice the guineas come in most quickly when they are least needed. I am one of those who gave up the best years of his life for forty pounds per annum as a full-time surgical registrar at a voluntary hospital. Of course I had the kind permission of the authorities to see private patients, but they never came. This meant that I had to give up that spare time which should have been used for the study of my profession to making a living in many and devious ways. How much more fortunate are the young men of today who can take an appointment in a municipal hospital at a decent salary and have time really to learn their job.

I am, Sir, yours faithfully,

Devonshire Street, W.1. SOMERVILLE HASTINGS.

PEPTIC ULCER IN THE SERVICES

SIR,—The recent letters on peptic ulcer in the Services appear to be largely theoretical and concerned little with the actual results of present Service conditions on the man with an established ulcer. Of nearly 1000 sent back from France and sent to me for

X-ray examination for various complaints, approximately a fifth have proved to be suffering from duodenal or gastric ulcer, and as the time advances and more of these cases recur so the percentage is rising. The majority of these men were doing moderate work before the war, and were keeping well on light diet and alkalis, but they have broken down under the increased muscular exertion, the nervous strain and unsuitable food which are in fact the very conditions against which ulcer patients are usually warned. It is therefore logical to suppose that any known case of peptic ulcer, even if quiescent, should be exempted from active service; many no doubt could render valuable home service and keep well. The suggestion that chronic cases should undergo partial gastrectomy, which is not without its mortality and recurrences, seems very undesirable, as Sir Arthur Hurst pointed out. With adequate medical treatment many chronic cases should become quiescent, and younger cases be cured, and some will necessitate surgery, but it is surely inadvisable to readmit them to the Army where their conditions will once more be aggravated by the unsuitable circumstances.

I am, Sir, yours faithfully,

Botleys Park War Hospital. G. DOEL.

HOLIDAYS AND COMMON SENSE

SIR,—As one familiar with the coal-mining industry I read with pained surprise in THE LANCET of March 30 your comment on the action of the Bolsover miners in foregoing part of their holiday in order to further the national cause in this grave hour in our national history.

It may seem quite straightforward to the writer to deal in general terms with such an important matter, but in doing so he conveys a most unfortunate impression. Thus after a reference to "short holidays or none at all," he says: "Added to this, they are required to work longer hours than sedentary workers." And again, the heading in one report "Miners give a lead" is described as a "lapse from common sense."

These observations applied to the Bolsover case indicate quite clearly that the writer is not well informed regarding the conditions in this and other of the newer coalfields. Machine mining has very greatly reduced the amount of manual labour underground. Owing to the operation of the quota system and reduced demand, short-time working has for long been a regular feature of the working of the mines in these areas. Thus, so far as the "longer hours" are concerned, the fact is that under normal conditions the working week is a very short one. In the first six months of 1939 the average number of shifts worked per week in the Notts coalfield was only 4¾. The length of the shift is 7½ hours, plus one winding time, or 8 hours in all from bank to bank. Time consumed in travelling to the coal face and a short break for a meal reduce the "effective working time" at the face to approximately 6½ hours; 4¾ shifts of 6½ hours each give an actual average working week of 31 hours, and even the full time of 8 hours gives only an average working week of 38 hours. This means that 38 hours were devoted to work out of 168 in the week, leaving 130 out of the 168 for sleep and leisure. With 8 hours sleep per night, there are left 74 hours a week or 10½ a day for recreation and amusement.

The truth is that the miners have welcomed the additional employment provided by the increased demand for coal and responded patriotically to the call of the Government for an intensive effort to produce an extra 30 or 40 million tons of the commodity (coal) which is our greatest material asset in the struggle in which we are engaged. Thousands of them have "enjoyed" too much enforced leisure during the last few years and are glad of the higher earnings the fuller employment brings to them. Even when working full time (5½ shifts below ground) they have a 44-hour week, and on THE LANCET'S own showing they are not only willing but physically well able to stand this without any injury to health after such a long spell of short-time working. There is no validity in the argument that men who have not been able to get as much work as they would like are being "persuaded to surrender their leisure."

As for holidays, the "holidays with pay" system is now an established feature of the industry. Regarding health and social welfare, no industry does so much for its workers as coal-mining. In the last 20 years over £19 million has been provided by the industry for these purposes. Of this, approximately £4 million has been devoted to health services (apart from pithead baths or recreation) by grants to hospitals, ambulance and nursing services and the establishment of convalescent homes for miners and their wives. The latter have cost over £2 million, and in addition three-quarters of a million pounds has been set aside as a trust fund for sending miners and their wives to other homes.

In view of these facts it seems singularly unfortunate that the splendid gesture of the patriotic Notts miners should have called forth such a commentary from an influential medical journal like THE LANCET.

I am, Sir, yours faithfully,

J. P. DICKIE,
M.P. Consett 1931–35.
Norbury, S.W.16. Author of "The Coal Problem."

EXTRACRANIAL LIGATURE OF THE MIDDLE MENINGEAL ARTERY

SIR,—In THE LANCET for April 6 Dr. M. Wassermann describes an operation for ligaturing the middle meningeal artery before it enters the skull. His paper ends with the statement: "The subdural hæmatoma could be removed by a second operation at a later date if necessary." Apart from the fact that the middle meningeal artery and the hæmatoma which results from its rupture are extradural, it is usually the brain compression which matters in this injury, not the arrest of hæmorrhage, which may have ceased by thrombosis by the time the skull is opened. If intracranial hæmorrhage is present craniotomy is called for to relieve the brain of the ill effects of compression by blood-clot. In such circumstances ligation of the middle meningeal artery outside the skull would appear to be both futile and dangerous and if survived by the patient to have the added risk, which Dr. Wassermann admits, of some damage to branches of the facial nerve and to the auriculotemporal nerve. If extracranial ligature of the middle meningeal artery is ever required for primary hæmorrhage in the absence of brain compression Dr. Wassermann's description of his procedure is marred by numerous inaccuracies—e.g., the facial nerve is described as passing "behind the styloid process." This is apparently a portmanteau word for the styloid (to which the nerve is superficial) and the mastoid process (to which it is deep). Again he states: "All the other important foramina of the cranial base in this region—ovale, rotundum and lacerum—are placed more medially, with the important vessels and nerves that enter the cranial cavity through them, such as the mandibular part of the trigeminal nerve, the internal jugular vein, the hypoglossal nerve, the accessory nerve and the internal carotid artery." Only the first of these structures is correctly placed. Finally

Dr. Wassermann remarks that as far as he knows the method suggested in his article has never been followed. Might not the reason for this be that the operation described is very rarely, if ever, called for?

We are, Sir, yours faithfully,

GRAHAM JESSOP,
LAMBERT ROGERS.

The Surgical Unit, Cardiff.

LILY-RASH

SIR,—Those of your readers who have cases of lily-rash, and have been wondering whether the treatment by inoculation does really prevent its occurrence, may be interested to hear the sequel of my previous notes in your columns (*Lancet*, 1934, **2**, 755, 1937, **2**, 1279) on the subject. One of my worst cases (referred to as G. Y.), who had for some years kept himself free from the trouble by preventive inoculation before the picking season started, this last winter foolishly omitted to have his inoculations. As a result, after a week of handling daffodils he was down again with the characteristic eczema on his face, arms and hands. If any further proof were needed as to the efficiency of this preventive treatment of the rash his experience supplies it.

I am, Sir, yours faithfully,

W. H. PALMER.

Hayle, Cornwall.

QUASSIA FOR LOUSINESS

SIR,—From personal experience with the Canadian Garrison Artillery and the R.A.F. in the last war, I can amply confirm your remarks (*Lancet*, March 2, p. 414) on the louse being hurtful to the health and morale of the fighting forces. The words of a comrade-in-arms still stand vividly in memory against a background of the ruins of a French village: "I wouldn't care a thing for the risks of war if only I could get rid of these cursed lice." I was freed of these pests permanently and by a very simple method. My mother had prescribed the use of quassia chips as a possible remedy. Some of my comrades were using gauze shirts. At my suggestion mother in Canada sent me, with fortnightly or weekly letters, these garments, first dipping them in a strong infusion of quassia, without wringing or ironing but drying in the open air. The shirt or jersey is of muslin or cheesecloth, sleeveless, buttonless, hip length. It is worn next the body, its quassia becoming active by the warmth and perspiration of the body. It kills the louse and its eggs unfailingly. Complete freedom from the pest was my experience within a week or two of commencing the use of this method. Wide publication and use of it will, I am sure, minister greatly to the comfort of the troops.

I am, Sir, yours faithfully,

RAYMOND CLIFFORD ROGERS.

United Presbyterian Church, Elizabeth, Pennsylvania.

INSTINCTS AND DIET

SIR,—In your review of "The Newer Knowledge of Nutrition" by E. V. McCollum and others of Johns Hopkins (*Lancet*, Jan. 20, p. 129), you state that the authors "are sceptical of the value of instinct in teaching animals and human beings what food they should eat." They ask "champions who believe in the reliability of appetite as a guide to eating to explain why a flock of chicks will fill their crop with grains of rocksalt where an icecream freezer has been emptied." This is one of the most remarkable statements that I have come across in a medical textbook. Surely it is clear that instincts on food are completely reliable, but only so far as they play upon natural substances. Any wild animal may, and does, trust its instincts on food implicitly, as long as it is using them on those substances found in the animal's natural environment, and which have been responsible for the evolution of those very instincts. And similarily with man. Thus the taste instinct will protect a man from (bitter) strychnine, which occurs in his natural environment, but will not protect him from (tasteless) arsenic, which does not so occur, having been extracted from mines well below the earth's surface. The same argument is applicable to the chicks and the rocksalt. In its natural occurrences it is not taken to excess by any organism (incidentally, the only reason man requires salt in concentrated form is because of the large quantities of it lost in the boiling of potatoes and other vegetables).

The difficulty is not to explain facts like these but to place the limit beyond which natural foods are so altered by civilisation as no longer to be safe when chosen by the instinct. Moderate heating is probably this limit so far as man is concerned; more extensive alterations, such as those produced on wheat and sugar-cane by mills, pass this limit. By the natural law, the more a food is altered from its natural state the more dangerous to health it becomes.

I am, Sir, yours faithfully,

T. L. CLEAVE.

R.N. Hospital, Hong-Kong.

VITAMIN E AND NEUROMUSCULAR DISEASES.—In reply to the letter from Mr. H. J. W. France in our issue of April 13, Mr. H. C. H. Graves points out that it was Dr. Bicknell who laid stress on the rôle of the myo-neurotrophic factors of wheat germ, agreeing in this respect with the experimental work of Goettsch and Ritzmann.

TRANSATLANTIC PUBLIC-HEALTH WORK

MUCH of the public-health work undertaken in this country by local authorities is done in Canada and the United States by voluntary agencies, and members of the Women's Public Health Officers Association who visited Toronto, New York, New Haven and Boston last summer were impressed with the close coöperation existing between the city health departments and these voluntary bodies. The report [1] of their visit, made up of notes contributed by individual members, is primarily of interest to child-welfare workers, though it does raise points in public-health administration. Child-welfare activities were found to resemble those in Britain, but presented some features new to the visitors. The compulsory pasteurisation of milk, the almost universal practice of diphtheria immunisation, the excellent methods of visual education in hygiene, and the methods adopted in the study of child development and psychology all find a place in the report.

A visit was paid to the unique training-school for nurses founded in 1923 by the Rockefeller Foundation at Yale University to raise the level of nursing education. As a preliminary to admission the student must possess a bachelor's degree from an approved college or university. After a course of thirty-two months, the student proceeds to the degree of master of nursing. She may then sit an examination for state registration, though in some states a further period of hospital training is required. Certain universities, including Harvard and Yale, award a degree of master of public health to both medical and non-medical graduates, including nurses, after two years' postgraduate study. The public-health nurse in America appears to undertake more actual treatment than does the health visitor in this country.

Special features of certain Canadian and American hospitals are described, particularly the New York Hospital of 1055 beds rebuilt in 1932. They were impressed by the elaborate precautions in all children's hospitals against the admission and spread of infection.

1. Public Health and Social Welfare in Canada and the United States of America. Obtainable from the association, 7, Victoria Street, London, S.W.1. 1s.

OBITUARY

HERBERT PENNELL HAWKINS

C.B.E., D.M. OXFD, F.R.C.P.

Dr. H. P. Hawkins, whose death on April 16 we announced last week, was born at Lamberhurst in Kent in 1859, where his father Robert Hawkins was vicar. He was educated at Eton, Oxford University and St. Thomas's Hospital. He qualified in 1887, and a Radcliffe travelling scholarship enabled him to spend three years of postgraduate study in Vienna. In 1889 he returned to St. Thomas's where during four years of house-appointments he prepared himself for the honorary staff. As R.A.P. he was already interested in what is now known as appendicitis and he published the results as his M.D. thesis in 1894. The same year he was elected F.R.C.P. Three years later his classic monograph on diseases of the vermiform appendix appeared and he was fairly launched. In 1896 he was appointed dean at St. Thomas's and two years later lecturer in medicine. Soon he was ranked with Sharkey, Clutton and Makins among the best teachers of his time. Contrasting Hawkins with Sharkey M. C. writes: "It was in those days the ambition of every right-minded St. Thomas's student to clerk for Hawkins and to go on Sharkey's class on the latter's round days. Both were memorable teachers, and their methods were essentially distinct. Sharkey drove the lesson home with a sledgehammer. He ragged and he bullied you, but you enjoyed it and never forgot what he taught you with those smashing blows. Hawkins on the contrary was suave, if sometimes bantering, and methodical. On a blackboard by the bedside he would summarise the salient features of history, physical signs, and such scanty laboratory findings as were then available. The differential diagnosis would next be discussed, and also epitomised on the blackboard, till finally the inevitable diagnosis would be inscribed in his neat handwriting. He made it all so simple and easy that one could not forget it. And curiously enough he was almost always right. He taught, as did Sharkey, with equal facility on any type of case, whether abdominal, thoracic or neurological. He was an unforgettable figure, tall and slim, wearing the then fashionable frock-coat as to the manner born, fresh complexioned, with sandy hair and a humorous bright blue eye, one arm outstretched impressing upon you that 'this can only be a left-sided subphrenic abscess, consequent on a perforated diverticulum' and right he was once again, with no X rays to help him." He served on the council of the Royal College of Physicians, and examined in medicine both for the college and the University of Oxford. He wrote well and clearly and he contributed sections on diseases of the alimentary canal to many standard textbooks.

Though he had all things necessary to mount to the top Hawkins seemed more interested in the thing in hand for itself than in using it as a ladder, and after a time he became restless. He felt the call of the wild and for a time migrated to British Columbia where he bought a tract of land. He looked forward to a life there as a settler but after a second visit the plan fell through and the estate was sold. Some years later his life was again unsettled, this time from without. In 1915 St. Thomas's Hospital became No. 5 Territorial Hospital and remained so till 1919. During the whole of this time Hawkins, with the rank of lieutenant-colonel, was commanding officer, and he proved himself an admirable administrator. His work was later recognised by the C.B.E. He gave up his large private practice and he never resumed it. He tackled his new duties with energy and thoroughness and soon no regular colonel could give him points in military administration. A colleague recalls visiting him at his home in Portland Place and finding him immersed in a book finding out how to deal with a returning drunk.

Apart from his profession he was a man of one idea at a time, and he was in turn an enthusiast for fishing, cycling and golf. This enthusiasm for the matter in hand served him well in his retirement and he found all he wanted in his Sussex home.

He married in 1910 Hester, daughter of Flettwood Rynd, and they had one son who followed his father at St. Thomas's and Oxford and qualified in 1937.

J. S. F. writes: "Hawkins liked to go into detail in diagnosis, perhaps to a degree too advanced for some students, and was ever ready to laugh at his own efforts when subsequent events proved he had gone too far. An instance that I have never forgotten provides a good example of his clinical method. A woman admitted as an emergency was seen and examined and the usual retirement made from the bedside to the blackboard where the main clinical features were set out for discussion. The resulting diagnosis was obstruction in the large intestine which had become complete, thus producing the urgency. Sir George Makins operated on the patient and discovered a hernia (? Richter), due to a bulge of small intestine into the ring. Hawkins was greatly tickled at the fate of his adventure into the precise site and nature of the obstruction, particularly that it proved to be small intestine and incomplete. There is no question that his effort to take diagnosis a step or so beyond clinical exactitude was a move in the right direction and that his careful consideration of all factors as set out before his students served to enhance the impression made on them. His was a delightful personality that made work under him a real pleasure.

HERBERT FREDERICK WILFRID ADAMS

M.B. EDIN., D.P.H., MAJOR R.A.M.C.

ON Dec. 31 Major H. F. W. Adams, medical officer of health for the East Gloucestershire united districts, died in a Cheltenham nursing-home from the results of a fall. As medical officer of the Royal Gloucestershire Hussars he was mobilised on the outbreak of war, but he was home on leave at the time of his accident.

Dr. Adams was born in Edinburgh in 1888 the youngest son of the late Prof. Laird Adams, and educated at Merchiston Castle and Edinburgh University, graduating M.B. in 1912. He was house-physician at the Royal Infirmary when the last war was declared, and he volunteered at once and held a commission in the Gloucestershire Regiment. He was wounded in December, 1914, and invalided home from Gallipoli. But he was soon sent abroad again, this time to France with the 20th Light Division. His courage and endurance were conspicuous, and a contemporary recalls a typical incident when himself wounded he

helped in a wounded Ghurka sepoy. After the war he returned to Edinburgh, and in 1920 he obtained his D.P.H. He held appointments there as assistant medical officer of health and tuberculosis officer for Leith before he went to Gloucestershire in 1921 to take up what was to be his life's work. He had played rugby for Merchiston Castle and Edinburgh Wanderers and the Scottish selectors had often considered his claim for international honours. His interest in the game remained, and many friends used to meet him every year at Twickenham and Murrayfield. He spent a large part of his annual holiday in camp with the Gloucestershire Hussars, among whom he had won a unique position of affection and trust.

ARTHUR NEVILLE COX

M.D. LOND., M.R.C.P.

Dr. Neville Cox, who died at Brighton on April 9 aged 53, had spent his life in the tuberculosis service there. Born and educated at Derby, he qualified in 1910 from Guy's Hospital, where he remained as outpatient officer until he went on to the Brompton Hospital as house-physician. He then secured the appointment of tuberculosis officer at Brighton with charge of the borough sanatorium and the municipal chest clinic in Sussex Street. His opinion was sought by practitioners throughout a wide district, for himself handicapped by asthma, and atop his own disability, he had the knack of helping others to surmount theirs. He had also a profound clinical instinct and wide knowledge of what was being done for tuberculosis elsewhere. In 1921 he was an agreeable member of a party taken by Sir Henry Lunn to study the health resorts of Switzerland. He leaves a widow, who is active in the social life of the two towns, a daughter and three sons.

WILLIAM WRIGHT HARDWICKE

M.D. ST. AND., M.R.C.P.E.

Dr. Harwicke, who died on March 30, was born in 1848, the second son of Junius Hardwicke, F.R.C.S., of Rotherham, was educated at the Royal High School, Edinburgh, St. Andrews University and St. Mary's Hospital, Paddington. He qualified L.R.C.S.E. in 1875 and joined his father in practice. In 1884 he went into partnership with Dr. Harold Gurney at Dovercourt, and he practised for some years in Harwich, becoming medical officer for the borough and port authority and a justice of the peace. Like his younger brother, Dr. Herbert Hardwicke, he was a man of varied enthusiasms, but while Herbert travelled extensively and wrote mainly about his foreign experiences, William's interests lay in advocating a decimal system for our coinage and weights and measures, in evolution, religion and Sunday observance. He also contributed articles to the medical journals, mostly on infectious fevers, and was the author of a manual of science, philosophy and sociology and a booklet on sight-testing. He was twice married but had no children.

PARLIAMENT

ON THE FLOOR OF THE HOUSE

By MEDICUS, M.P.

THE debate on man-power in the House on Tuesday of last week and the debate on the budget opened by Sir John Simon set the scale of the nation's war effort in its proper proportion. It is true that Mr. Ernest Brown deals with that labour and that national service which mans the Navy, the Army, the Air Force, the civil defence and supply services and does not so directly touch the organisation of voluntary labour. But it is becoming clearer and clearer that before long we shall need to call in to service paid man and volunteer man alike in one vast effort. To help this effort the Chancellor presented a budget which was the steel-frame structure of the war-time economy under which we live and in which we must work. The budget does not balance in money because a huge part of it must be made up in loans. The national effort at saving becomes a public duty of the first importance. But despite the heavy increases of taxation there has been kept in mind the necessity of avoiding such taxation as will damage our chief asset, the health and well-being of the population. The amount to be raised in taxation, £1234 million, is the largest which has ever been raised. But there is a still larger sum to be found by loan or other taxes, nearly £1433 million. What the proposed sales tax will do is not yet accurately known in money. But that it will control and limit spending and thus—as Mr. Attlee said—direct the channels into which production flows is clear. But there is to be no sales tax on food or drink—beer and spirits are specially provided for by special increases of taxation of their own—and there is to be no tax on public services or on fuel, electric light or water. The sales tax will thus be all of a piece with the Government's existing policy of maintaining food prices at relatively low levels by subsidies which the Chancellor said were now costing £60,000,000 a year.

Combined with the policy of food rationing this subsidising of foods and the proposed exemption of foods and the other items mentioned from the sales tax will go some way towards guaranteeing us all a sufficiency of the essential needs of life while drastically taxing the luxuries or less necessary things. It will be interesting to see in a year's time what the steep increases of taxation on beer, spirits and tobacco produce. The fact that existing taxation, much increased over pre-war level, has yielded more than was expected in the case of tobacco is probably symptomatic.

* * *

The question that remains is how far this new economic structure imposed on us will affect the health of children and of the aged. More and more workers will be absorbed into industry and more and more will our war production grow. How far will the process go? How far shall we be able to feed and feed rightly the mighty working and fighting host of men and women into which the nation is being transformed? It certainly seems that our own agricultural production will need to be increased and we may need to restrict our imports to essentials still further, although Sir John Simon told us 75 per cent. of imports are now controlled. Every year the budget raises the question of next year's budget in the mind. Income-tax at 7*s.* 6*d.* in the pound, the limits for surtax to be reduced in the future to £1500, war dividends to be limited to 4 per cent., the direction of spending on clothing, boots, furniture, ironmongery and many other things to be made a matter of Government policy—these and the other proposals are taking us over the next twelve months. But for the twelve months after that? Will it be necessary to take a bite at other things and how can it be done?

* * *

The House took the Chancellor's statement soberly but yet cheerfully. It was not a very full House for

so many members are engaged in matters of even more immediate war concern than the budget. And the most notable absentees were the Prime Minister, the First Lord of the Admiralty, the Minister for War and the Secretary of State for Air.

Even this budget reaching up to a total of expenditure of £2677 million is only the foundation for something still greater. Sir John Simon, when dealing with the direction of production, laid emphasis on the order of priorities: (1) the war effort, (2) the export trades and (3) civilian uses. But the civilian as producer may be thankful that his basic needs are to be met and there is no doubt that whatever sacrifices of comfort or convenience have to be made the civilian population will be ready to make them.

Workmen's Compensation Bill

In the House of Commons on April 18 Sir JOHN ANDERSON, Home Secretary, presented the Workmen's Compensation (Supplementary Allowances) Bill, a measure to provide for the payment of supplementary allowances in respect of wives and children to male workmen entitled to weekly payments under the Workmen's Compensation Act 1925.

QUESTION TIME

Emergency Medical Scheme

Sir HENRY MORRIS-JONES asked the Minister of Health whether, in view of the drain of the services upon medical practitioners and the fact that in some districts civilian doctors were overworked, he would discuss with the Home Secretary the question of admitting to the British medical register some refugee doctors of approved eminence and qualifications and would grant to some others facilities to study for a British qualification with a view to their practising here or in the Dominions.—Mr. WALTER ELLIOT replied: I am in consultation with the Home Secretary and the General Medical Council on this matter.

Sir ERNEST GRAHAM-LITTLE asked the Minister if he would take steps to remedy cases of individual hardship among London consultants of great experience and of senior rank who volunteered for the E.M.S. before the outbreak of war but who still remained on the deferred list unpaid, while at the same time consultants of junior rank who had applied for permission to join one of the fighting services in a medical capacity had been informed that they could not be released from the E.M.S.—Mr. ELLIOT replied: The decision whether practitioners are to be called up for employment in the E.M.S., or whether members of the service are to be released to the armed forces, must depend on the needs of the Emergency Hospital Scheme in relation to other demands on medical personnel, including those of the armed forces.

Sir E. GRAHAM-LITTLE: Is the Minister aware that a medical consultant, enrolled for whole-time service in August last, finding when called up for service practically nothing to do, accepted through his sector officer payment on a sessional basis in accordance with clause 4 of his original contract, but, on applying for an appointment on a part-time basis on the terms offered last November to a large number of consultants, was refused on the ground that by taking sessional payment he had forfeited the option of part-time service?—Mr. ELLIOT: The practitioner to whom it is understood you refer was enrolled on a whole-time basis, but at his own request the enrolment was cancelled in favour of enrolment on a sessional basis, under which payment is made as and when services are required under the scheme. The subsequent offer applied only to those who were employed for whole-time service at the time of the offer.

Mental Stability of Recruits

Mr. RHYS DAVIES asked the Minister of Labour and National Service whether he was aware that representations had recently been made to his north-western divisional officer by the South-East Lancashire Association for Mental Welfare who submitted several cases of men conscripted into the forces of doubtful mental stability who might prove dangerous to their comrades, and asked that persons with proper qualifications for testing this type of case should sit on medical boards; and what action he proposed to take in this matter.—Mr ERNEST BROWN replied: I am aware of these representations and have received a communication from the association to which I am giving consideration. The association have not, however, provided identifying particulars of men of doubtful mental stability who have been enlisted. I have recently drawn the attention of medical boards to the importance of the examination of mental and nervous stability, and their instructions provide that in cases of doubt a specialist's opinion should be obtained. I am advised that it would be impracticable to include doctors with special qualifications of the kind indicated on every medical board. The association can best help by giving advance information before the men concerned are due to be medically examined, and I understand that this will be done for the future.

Holidays in War-time

Mr. ROLAND ROBINSON asked the Minister what was the policy of the Government with regard to the maintenance of reasonable hours of work, rest days and annual holidays for the staff of industrial undertakings throughout the country, particularly undertakings engaged on Government contract work; and whether, in view of the approach of the summer, he would indicate that it was the wish of the Government that firms should not take steps to reduce the annual holidays of their employees where these were not normally of more than two or three weeks duration.—Mr. BROWN replied: A pamphlet recently published by the Industrial Health Research Board entitled Industrial Health in War-time stresses the desirability of providing for adequate rest periods, including holidays. With the views expressed in that pamphlet, as with similar views expressed in earlier reports of the board, I am in entire agreement.

Cost of Living Index

Mr. J. J. LAWSON asked the Minister whether he was yet in a position to announce the composition of the committee which he proposed to appoint in connexion with the revised cost of living index.—Mr. BROWN replied: I have decided that the further action required in connexion with the revised cost of living index can best be carried out by the existing advisory committee, whose previous assistance in connexion with the methods to be adopted in the conduct of the inquiry was so valuable.

Maternity and Child-welfare Clinics

Mr. DAVID ADAMS asked the Minister of Health if he would give the latest figures as to the numbers of maternity and child-welfare clinics which were wholly, or in part, occupied for service purposes or commandeered for any other uses, with special reference to such clinics in Durham county and Tyneside.—Mr. ELLIOT replied: According to the information at my disposal, 316 maternity and child-welfare clinics in England and Wales are in use for civil-defence purposes. This, of course, does not necessarily imply that they are not available for their normal use. In the area specially referred to 10 clinics are in joint occupation for civil defence and maternity and child-welfare purposes. One clinic is used wholly as a first-aid post, and alternative premises have been found for the work of the clinic.

Unemployment among Nurses

Mr. ROSTRON DUCKWORTH asked the Minister of Labour and National Service if he could state the measure of unemployment among fully trained nurses and where such unemployment mostly existed.—Mr. BROWN replied: On March 4 there were registered at local offices 237 wholly unemployed men and 993 wholly unemployed women for employment as nurses, of which 54 men and 310 women were in the London area. I am unable to say without special inquiry how many of these were fully trained nurses.

Welsh Board of Health

Sir HERBERT WILLIAMS asked the Secretary to the Treasury if he would give particulars of the proposals now before the Treasury for increasing the salaries

attached to any of the posts in the Welsh Board of Health, and for creating new posts; and whether, in this connexion, he would take into account the Government's decision to suspend the extension of administrative services during the period of the war and of the effect on junior staff now serving in the forces of the promotion of those not so serving.—Miss HORSBRUGH, Parliamentary Secretary to the Ministry of Health, replied: The decision to exercise through the Welsh Board of Health at Cardiff certain powers now administered from London gives effect to the desire expressed in all parts of the House that essential health services in Wales should be vigorously administered. Certain blocks of work are being transferred to the Welsh Board, and this has necessitated the addition of four senior and certain junior posts to the Board's staff, and the regrading of three other posts, while some reduction will be effected in the establishment in London. In reviewing the matter the closest attention has been given to the need for economy in public expenditure, and all proper consideration will be given to the claims of officers serving in the Forces.

Medical News

University of Oxford

In the Nuffield Institute on Fridays at 8.30 P.M. from May 3 to 24 Prof. K. Koffka will deliver four lectures on human behaviour, which will give a brief survey of psychology with some reference to pathological phenomena. At the same time on the following three Fridays (May 31, June 7, and June 14) Dr. P. del Río-Hortega will lecture on the cytology of the nervous system in normal and pathological conditions.

University of Cambridge

At recent examinations the following were successful:—

D.M.R.E.

Part I—R. R. Browne, J. C. Davidson, J. L. Feuchtwanger, and J. P. Hayes.

Part II—J. O. Y. Cole, C. W. C. Gough, J. A. G. Hair, T. H. Hills, John Innes, R. I. Lewis, I. G. McIntyre, E. B. P. Madden, Siri Mahananda, H. S. Murray, J. O. Salik, D. M. Scrimgeour, A. C. R. Wakeman, Joseph Walter, and A. B. Wayte.

University of Glasgow

On April 20 the following degrees were conferred:—

M.D.—Theodore Crawford, A. S. Rogen, and A. T. M. Wilson (with honours); J. N. M. Chalmers and W. J. B. Riddell (with high commendation); J. B. Wallace (in absentia), R. B. McMillan, and A. M. Wyllie (with commendation); A. K. Boyle.

Ch.M.—I. M. Orr.

B.L.—A. B. Walker, M.D.

M.B., Ch.B.—J. W. Chambers (with honours); W. S. Aird, Eileen F. Baird, T. H. Crawford Barclay, P. O. Beatton, J. H. Bell, T. D. Brown, D. I. Buchanan, John Chambers, D. H. Clark, J. W. Cook, R. A. Corbett, Elizabeth M. Dale, J. W. Dent, J. M. Dunlop, Margaret W. Ferguson, R. G. Forrest, Anne F. Fyfe, Margaret D. Giles, Thomas Gray, W. F. Harper, H. P. C. Harrison, J. E. Hooker, A. B. D. Hunter, John Irvine, J. B. Jack, J. C. Jeffrey, James Kennedy, Helen P. Kilpatrick, I. D. Leitch, J. T. MacBrayne, C. J. R. MacDonald, John MacDonald, John McGregor, W. L. McGregor, I. D. Macintyre, D. A. MacLean, David McNicol, Myra F. E. Neish, T. W. Palmer, J. M. Peden, A. A. Pow, J. H. Ramage, A. F. Ritchie, B. J. Smith, Samuel Smith, W. A. Souter, W. P. Soutter, Robert Taylor, W. W. Tennant, J. T. Thompson, R. T. Thomson, L. S. H. Thornton, and A. D. Young (in absentia).

Bellahouston gold medals, for eminent merit in M.D. theses were awarded to Dr. Jane O. French (Mrs. Richard D. Millar), Dr. J. H. Hutchison, and Dr. Robert Kirk.

A Struthers gold medal was awarded to Dr. G. M. Wyburn.

The Nation's Larder

Last Tuesday Prof. J. C. Drummond, D.Sc., gave the first of a series of lectures bearing this general title. Other lecturers will be Major-General Sir Robert McCarrison, M.D. (the medical aspects of the use of food); Sir John Orr, F.R.S. (national food requirements); Sir Frederick Keeble, F.R.S. (the development of the home production of food); Mr. L. H. Lampitt, D.Sc. (the manufacture, preservation and distribution of food); Prof. V. H. Mottram (food and the housewife); Dr. J. C. Spence (the feeding of children).

The lectures, which are sponsored by the Ministry of Food, will be held weekly on Tuesdays till June 4, at 5.15 P.M. at the Royal Institution, Albemarle Street, London, W.1.

The King has granted Sir StClair Thomson permission to accept and wear the insignia of commendatore of the Order of the Crown of Italy, conferred upon him by the King of Italy and Albania.

Memorial Service to Mr. George Waugh

A memorial service to the late Mr. George Waugh will be held in the chapel of the Hospital for Sick Children, Great Ormond Street, on Wednesday, May 1, at 4 P.M.

Course in Malaria

An international course in malaria will be held at the Istituto di Malariologia in Rome from July 15 to Sept. 10. Further information may be had from the director of the institute.

Research Defence Society

The annual general meeting of this society will be held at 11, Chandos Street, London, W.1, on Tuesday, May 7, at 3.30 P.M. Owing to the war the Stephen Paget lecture will not be delivered this year.

Society of Public Analysts

A meeting of this society will be held at 5.30 P.M. on Wednesday, May 1, at the Chemical Society's rooms, Burlington House, Piccadilly, London, W.1, when Mr. J. R. Edisbury, Ph.D., will read a paper on the spectrophotometric estimation of vitamin A, with special reference to margarine. Mr. N. T. Gridgeman, Mr. H. Lees, and Mr. Wilkinson, Ph.D., will speak on the estimation of vitamin D in margarine.

Maternity Home for Officers' Wives

Maternity accommodation for officers' wives is available at Fulmer Chase, Slough, and at the Middlesex Hospital. The board of management of St. Mary's Hospitals, Manchester, has now also set aside a large house in Victoria Park as a maternity home for officers' wives. The house will accommodate some 20 patients. There will be several wards with 3–4 beds each for which the inclusive fee will be 5 guineas a week with a moderate guaranteed maximum however long the patient stays. The honorary staff of St. Mary's Hospitals are offering their services free. An appeal is being made for £9000 to alter and equip the premises and cover any loss there may be in the first year.

Royal Society of Medicine

The house and library of this society will be closed from Saturday, May 11, to Monday, May 13.

Infectious Disease in England and Wales

DURING THE WEEK ENDED APRIL 6, 1940

Notifications.—The following cases of infectious disease were notified during the week: Scarlet fever, 841; whooping-cough, 581; diphtheria, 711; enteric fever, 29; measles (excluding rubella), 4069; pneumonia (primary or influenzal), 951; puerperal pyrexia, 144; cerebrospinal fever, 436; poliomyelitis, 8; polio-encephalitis, 0; encephalitis lethargica, 3; dysentery, 48; ophthalmia neonatorum, 92. No case of smallpox, cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on April 5 was 1060 made up of: scarlet fever, 130; diphtheria, 160; measles, 5; whooping-cough, 67; enteritis, 62; chicken-pox, 70; erysipelas, 24; mumps, 18; poliomyelitis, 2; dysentery, 12; cerebrospinal fever, 100; puerperal sepsis, 20; enteric fevers, 7; german measles, 194; other diseases (non-infectious), 79; not yet diagnosed 110.

Deaths.—In 126 great towns, including London, there was no death from smallpox or enteric fever, 3 (0) from scarlet fever, 3 (0) from measles, 3 (0) from whooping-cough, 15 (0) from diphtheria, 31 (4) from diarrhœa and enteritis under 2 years, and 102 (15) from influenza. The figures in parentheses are those for London itself.

Manchester reported 7 deaths from influenza, Bristol 4. There were 5 fatal cases of diphtheria at Liverpool. Birmingham had 5 deaths from diarrhœa.

Medical Diary

Week beginning April 29

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2.

TUESDAY.—5 P.M., Mr. Gwynne Williams: The Spread of Malignant Disease.

THURSDAY.—4 P.M., Prof. R. J. S. McDowall: The Circulation in relation to Shock.

UNIVERSITY OF LONDON

THURSDAY —5 P.M. (1, Wimpole Street, W.1), Prof. F. R. Nager (Zürich): The Paranasal Approach to Intrasellar Tumours. (Semon lecture.)

ROYAL INSTITUTION, 21, Albemarle Street, W.1.

TUESDAY—5.15 P.M., Sir Robert McCarrison: Medical Aspects of the Use of Food.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1.

WEDNESDAY

History of Medicine—5 P.M., Dr. F. Saxl: Melancholia Generosa—The Classic Conception and its Revival in a Renaissance Philosophy and Art.

FRIDAY

Otology—10.15 A.M., *annual general meeting:* Dr. A. Sand: The Mechanism of Acoustico-lateral Sense Organs in Fishes. Sir Edward Mellanby, F.R.S. and Mr. C. S. Hallpike: The Effect upon the Ear of Experimental Avitaminosis A.

Laryngology—4.45 P.M., *annual general meeting: Opener:* Mr G. F. Stebbing: The Position of Radiotherapy in the Treatment of Malignant Disease of the Upper Respiratory and Alimentary Tracts, excluding the Tongue and Œsophagus. Mr. Lionel Colledge will also speak.

Anæsthetics—4.30 P.M., *annual general meeting:* Dr. A. Canonico: Apparatus for administration of Cyclopropane and Oxygen.

Dr. T. B. Jobson: New Ether Apparatus.

Surgeon Commander H. Parry-Price: Simplified Absorption Circuit.

Dr. E. A. Pask: Morphia and Alcohol as Anæsthetic Agents (film).

Mr. L. Carnac Rivett and Dr. George Quayle: A Method of Administering Continuous Intravenous Anæsthesia for Abdominal Surgery.

PADDINGTON MEDICAL SOCIETY.

TUESDAY.—2.30 P.M. (Paddington L.C.C. Hospital, 242, Harrow Road, W.9), clinical meeting.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W. 12.

WEDNESDAY.—11.30 A.M., clinico-pathological conference (medical). 2 P.M., Mr. E. J. King, Ph.D.: Van Slyke Urea-clearance Test. 3 P.M., clinico-pathological conference (surgical).

THURSDAY.—2 P.M., Dr. Duncan White: radiological conference.

FRIDAY.—2 P.M., clinico-pathological conference (gynæcological). 2.30 P.M., Mr. V. B. Green-Armytage: sterility clinic.

DAILY.—10 A.M.–4 P.M., medical clinics; surgical clinics and operations; obstetrical and gynæcological clinics and operations. 1.30–2 P.M., post-mortem demonstration.

NATIONAL HOSPITAL, Queen Square, W.C.1.

MONDAY.—5 P.M., Dr. J. Purdon Martin: Meningitis.

TUESDAY.—5 P.M., Dr. J. St. C. Elkington: Traumatic Epilepsy.

FELLOWSHIP OF MEDICINE AND POSTGRADUATE MEDICAL ASSOCIATION, 1, Wimpole Street, W.1.

Medical Society of London, 11, Chandos Street, W.1. TUES., 5.0 P.M., Mr. Harold Dodd: Hernia. St. Mary's Hospital, Paddington, W.2 (by permission of the hospital), WED., 5.30 P.M., F.R.C.S. clinical class. Royal Cancer Hospital, Fulham Road, S.W.3, MON., TUES. and SAT., F.R.C.S. practical operative surgery course. Royal Chest Hospital, City Road, E.C.1, MON., WED. and THURS., 5.0 P.M., M.R.C.P. course in heart and lung diseases.

Vacancies

Barnsley, Beckett Hosp. and Dispensary.—Cas. O., £300.

Bath, Bath and Wessex Children's Orthopædic Hosp.—H.S., at rate of £120.

Belgrave Hosp. for Children, 1, Clapham Road, S.W.9.—H.S., at rate of £100.

Birmingham City.—Three temp. M.O.'s, each £10 per week.

Blackburn Royal Infirmary.—Res. H.S., £175.

Bradford, Royal Eye and Ear Hosp.—H.S., £180.

Brighton County Borough.—Tuberculosis officer and asst. M.O.H., £800.

Brighton, New Sussex Hosp. for Women.—Hon. clin. asst. to eye dept.

Brighton, Royal Sussex County Hosp.—Cas. H.S., £120.

Bristol Royal Hosp.—Res. anæsthetist, £250.

Burton-on-Trent General Infirmary.—Cas. O. and H.P., £150.

Carlisle City.—Asst. M.O., £600.

Cardiff, King Edward VII Welsh National Memorial Association. Asst. res. M.O. for South Wales Sanatorium, £200.

Central London Throat, Nose, and Ear Hosp., Gray's Inn Road, W.C.1.—Hon. assts. in outpatient dept.

Devon County Council.—Deputy county M.O., £750.

Durham County Council.—Temporary asst. school M.O., £500.

Essex County Hospital, Broomfield.—Second asst. M.O., £440.

Hereford, Herefordshire General Hosp.—H.S. for cas. and ear nose, and throat depts., £120.

Hull Corporation.—Sen. res. M.O. at Municipal Maternity Home, £450.

Lancashire County Council.—Jun. H.S. for Biddulph Grange Orthopædic Hosp., at rate of £200.

Leeds City.—Res. M.O. for St. Mary's Infirmary, £250. Also res. M.O. and res. surg. O. for St. James's Hosp., each £350.

London County Council.—Temp. asst. M.O., Class I, £350.

Liverpool County Mental Hosp., Rainhill.—Asst. M.O., 8 guineas per week.

Liverpool Hosp. for Consumption and Diseases of the Chest.—Res. M.O., £150.

Manchester City.—Res. asst. M.O. for Crumpsall Hosp., at rate of £200.

Manchester, Duchess of York Hosp. for Babies.—Sen. res. M.O., at rate of £175.

Middlesex County Council.—Temp. A.M.O.'s, each £600. Also res. A.M.O.'s, each £400.

Middlesbrough, North Riding Infirmary.—Cas. O. and H.S., at rate of £150 and £140 respectively.

Newport County Borough.—Jun. asst. res. M.O. for public assistance hosp., at rate of £200.

Newport, Mon., Royal Gwent Hosp.—Cas. O., at rate of £175. Also H.P. and H.S.'s, at rate of £160 and £150 respectively.

Northampton County Mental Hosp., Berrywood.—Med. supt., £900.

Nottingham City Hosp.—Two jun. res. H.P.'s, each £250.

Nottingham General Hosp.—Res. cas. O., at rate of £150.

Nottingham Hosp. for Women.—H.S., at rate of £150.

Nottingham, St. Ann's Emergency Hosp.—H.P., £150.

Oldham Royal Infirmary.—Visiting thoracic surgeon, visiting neurological surgeon, visiting gynæcologist, visiting physician, and two visiting surgeons, each 3 guineas per session. Also res. surg. O., £400

Portsmouth City.—Two jun. asst. res. M.O.'s for Saint Mary's Hosp., £250.

Portsmouth, St. James's Hosp.—Sen. asst. M.O., £550.

Preston and County of Lancaster Queen Victoria Royal Infirmary.—Two H.S.'s, each at rate of £150.

Reading, Royal Berkshire Hosp.—H.S. and cas. O., each at rate of £150.

Royal College of Physicians, Pall Mall East, S.W.—Charles Murchison scholarship in clinical medicine, 20 guineas.

Royal Northern Hosp., Holloway, N.7.—H.P., at rate of £70.

Sheffield Royal Hosp.—H.S.'s to spec. depts., £80 and £120 respectively.

Southampton Free Eye Hosp.—H.S., at rate of £150.

St. Helens County Borough.—Asst. M.O.H., £500.

St. John's Hosp., Lewisham, S.E.13.—H.P., at rate of £100.

Stockport Infirmary.—H.S., £150.

Stockton-on-Tees, Durham County Mental Hosp.—Locum tenens asst. M.O., 1 guinea per day.

Stockton-on-Tees, Winterton Emergency Hosp.—H.S.'s, each £200.

Stoke-on-Trent, Longton Hosp.—H.S., at rate of £180.

Surrey County Council.—Res. M.O. for Richmond Public Assistance Institution, £450.

Swanley, Kent, Hosp. Convalescent Home, Parkwood.—Res. M.O., at rate of £200.

Warwick, Warwickshire and Coventry Mental Hosp., Hatton.—Locum tenens, 8 guineas a week.

Warwickshire and Coventry Joint Committee for Tuberculosis.—Temp. first asst. M.O. at Memorial Sanatorium, £350. Also jun. asst. M.O. for Memorial Sanatorium, at rate of £250.

Winchester Royal Hampshire County Hospital.—H.S. at rate of £175

Wolverhampton Royal Hosp.—H.S.'s, each at rate of £100.

Births, Marriages and Deaths

BIRTHS

ADDISON.—On April 15, the wife of Dr. G. M. Addison, Westgate-on-Sea—a daughter.

DALZIEL.—On April 19, at Enfield, the wife of Dr. John Dalziel—a son.

FABER.—On April 15, in London, the wife of Dr. Hamilton S. Faber—a son.

NESFIELD.—On April 22, at Sandhurst, Kent, the wife of Lieutenant J. C. B. Nesfield, R.A.M.C.—a son.

WALTON.—On April 17, at Barnstaple, the wife of Dr. J. F. Walton—a son.

MARRIAGES

BOURDILLON—ROBSON.—On March 27, at Livingstone, Northern Rhodesia, Victor Edmund Bourdillon to Marjorie Caroline Agnes Robson, M.B., of Paignton, Devon.

RIDLEY—ANSELL.—On April 17, in London, Frederick Thomas Ridley, F.R.C.S., to Josephine Rose Ansell, of St. John's Wood.

ROSS—BOOTH.—On April 20, at Warblington, Hants, Kenneth Macdonald Ross, M.B., Major, R.A.M.C., to Betty E. M. Booth, of Emsworth, Hants.

DEATHS

CLARK.—On April 19, at Berkhamsted, Herts, Francis William Clark, M.D. Durh., barrister-at-law, late professor of medical jurisprudence, University of Hong-Kong.

COVERNTON.—On April 15, in Adelaide, South Australia, Hugh Selby Covernton, M.R.C.S., aged 70.

DOBELL.—On April 17, at Cheltenham, Clarence Brian Dobell, M.D. Edin., F.R.C.P.E.

JOY.—On April 14, Arthur Holmes Joy, M.B. R.U.I., Surgeon Captain, R.N. (retd.), medical superintendent, East Lancashire Home for Disabled Soldiers and Sailors.

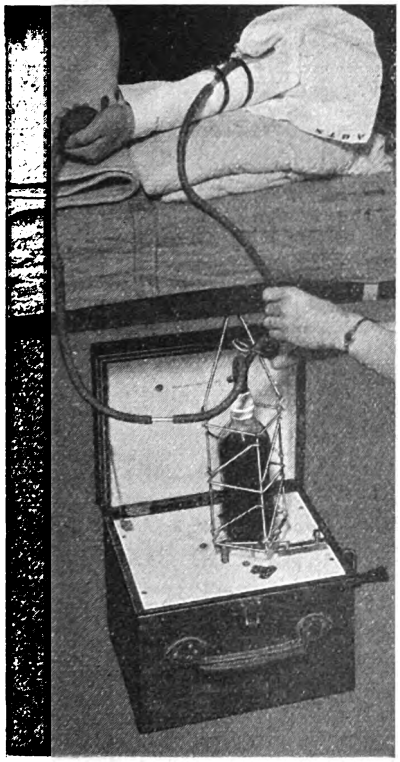
TATE.—On April 21, John Tate, M.R.C.S., D.P.H. of Stanmore, Middlesex.

NOTES, COMMENTS AND ABSTRACTS

A MECHANICAL BLOOD SHAKER

By B. W. Lacey, B.Sc., M.B.Lond.,
CAPTAIN, R.A.M.C.
(*From the Army Blood-Transfusion Service*)

A mechanical method of shaking blood, while being taken from donors for storage or for transfusion, has numerous advantages over the usual manual method. When large quantities of blood have to be taken as quickly as possible by a small personnel, it is almost a necessity. The apparatus described here has been used during the last five months in the Army Blood-Transfusion Service and was designed primarily with the exigencies of this service in view. Thus it is particularly strongly made and easily portable without risk of damage, while all parts are readily replaceable, obtainable in quantity, and inexpensive. Having a gramophone spring motor it can be used anywhere.



Photograph by Norman K. Harrison. Courtesy of Topical Press Agency.

FIG. 1—The apparatus in use.

CONSTRUCTION

The apparatus (fig. 1) consists of three parts, each structurally independent of the others: (1) a spring hook permanently attached to the couch on which the donors lie; (2) a wire basket suspended from the hook and holding the bottle into which the blood is collected; and (3) a spring gramophone motor placed on the floor and moving the wire basket.

Spring hook.—The swivel of a nickel-plated brass dog-lead is sawn off and the loop thus made soldered to form a complete ring. It is screwed 28½ in. from the head of the couch and to the inside surface of the side frame, so as to protect it from damage when the couch is moved. A hook is fixed to each side of the couch, so that the apparatus may be used with either arm.

Wire basket.—This is constructed of iron wire twisted together and tied at the main joints with fine wire, the whole being galvanised. After some experiment the following gauges were found to be the best: handle, 11 s.w.g.; frame, 12 s.w.g.; foot, 10 s.w.g. The handle is freely movable on the frame and thus allows the bottle to be placed in the basket without removal from the hook and the foot to be placed easily in the correct hole in the crank of the motor. By being brought to an acute angle there can be

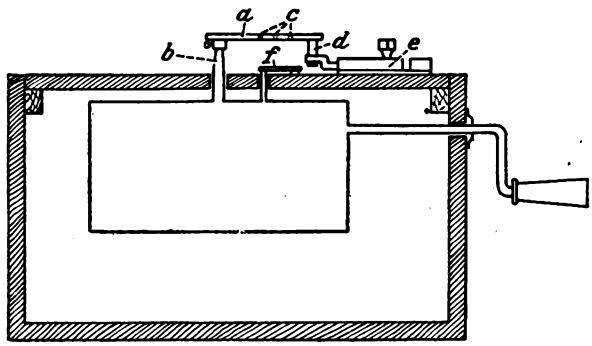


FIG. 2—Diagrammatic cross-section of gramophone spring motor housed in box: (*a*) perforated crank; (*b*) spindle of motor; (*c*) three holes in crank; (*d*) pin; (*e*) offset bolt, to act as stop and release; (*f*) speed control.

neither extension of the basket by the weight of the bottle nor more than slight oscillation of the basket on the hook. The frame is just large enough to get the bottle easily in and out. Any play between the basket and the bottle is taken up by pushing a piece of cloth between the two. The basket is designed to work with a foot about 1½ in. long. To allow for the unavoidable inaccuracies of hand-made wire work, it is advisable to make up the basket with a foot 3 in. long and then to cut the foot down, when everything is assembled, to give the necessary ¼–⅜ in. clearance above the base of the motor. Evidently, if all three parts are to be interchangeable (as is desirable), the heights of the hooks on the couches, the motor bases, and the baskets must all be kept accurately to a standard.

Spring gramophone motor.—A Garrard No. 10B, with the standard fittings, is used. This gives 1000 revolutions with one winding and, therefore, will run for approximately eleven minutes at 90 revolutions a minute. The movement is housed in a box (fig. 2) of particularly heavy construction to allow for the strain of continuous travel and to prevent rocking on the floor when in use. All outside surfaces are stained and spirit varnished. The top of the base (fig. 3) and the inside of the lid are enamelled white, so that the blood level can be seen easily and spilt blood readily removed with a wet cloth. The bottom of the box is raised off the floor by ½-in. diameter "domes of silence." Further domes are fixed to the back and sides, and aluminium plates 1½ in. square

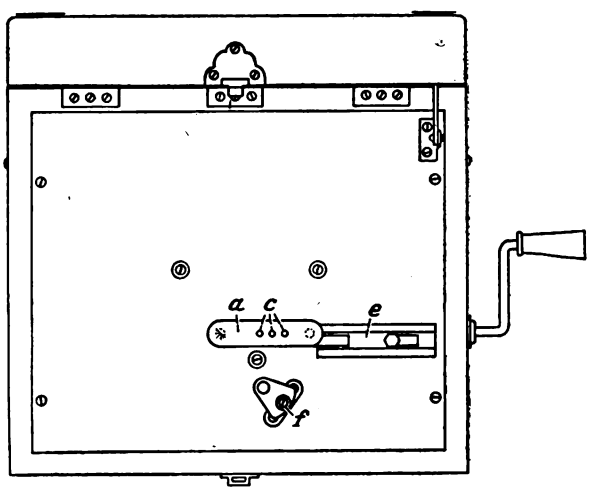


FIG. 3—The motor seen from above with lid raised: key as in fig. 2.

are nailed to the lid. During carriage in the lorries to and from bleeding-centres the motors, in groups of four, are placed on their backs, like suitcases, in a plain deal rack screwed to the floor of the lorry. In this position they cannot injure themselves or one another. The turn-table is replaced by a perforated crank 3⅛ in. long (*a*) screwed through its boss to the motor spindle (fig. 2, *b*). There are three holes (*c*), in the crank into any of which the foot of the basket can be placed, thus giving a choice of amplitude of rotation. A pin (fig. 2, *d*) extending downwards from the free end of the crank is covered with rubber tubing and can be caught against an offset bolt (*e*), which will thus act as a stop and release. The normal speed-control segment (*f*) supplied with the motor is placed on the spindle upside down with the boss let into the base, the unwanted portion of the spindle being sawn off. In this way the segment lies as flatly as possible and does not obstruct the foot of the revolving basket. A bolt passed through the slot in the segment and screwed to a plate fixed to the base enables the speed to be fixed at any figure between 40 and 120 revolutions a minute.

METHOD

A basket is clipped into a hook on either side of the couch. The motor is wound up, opened, and pushed out of the way under the couch. The inner surface of the bottle is wetted with citrate solution already in the bottle, which, when the medical officer is ready to insert the needle, is placed in the basket, care being taken that the tubes are not twisted and that the 540 c.cm. mark is in front. When the needle is fixed and the flow of blood properly established, the motor is brought forward until the centre spindle is vertically beneath the hook; the foot of the basket is placed in the selected hole in the crank and the brake released. No blood need run on to the sides of the bottle before mixing with the citrate solution. Shaking should be even, without frothing, and absolutely silent. The optimal throw of the crank is 1⅛–1⅜ in. and the optimal speed 90 revolutions a minute. Shaking is continued for thirty seconds after the flow of blood has been stopped.

COMMENTS

While using the apparatus, the nurse assisting is far less fatigued than when shaking the blood manually. With no bottle to hold and two hands free she has both the means and opportunity to ensure unaided a satisfactory flow of blood. These factors help to produce a high percentage of full bottles and make the whole procedure go smoothly and quickly. After the medical officer and the nurse have together fixed the needle, the nurse alone can attend to the bleeding, while the medical officer is inserting needles in further donors. In this way one medical officer and four nurses can bleed four donors at once. Mechanically, the apparatus has proved reliable and simple to use. During its use no red-cell or frothy plasma clot has been found.

I am indebted to Colonel L. E. H. Whitby for his helpful advice and criticism.

SEX IN WAR-TIME

"YOU cannot ignore sex either in peace or war . . . in war particularly it creates specific problems and difficulties." This quotation is from the preface to Mr. George Ryley Scott's book, "Sex Problems and Dangers in War-Time" (T. Werner Laurie. 1940. Pp. 85. 3*s*. 6*d*.), and we are in full agreement with it. With the rest of the book we are not. Many of its statements which can be checked are fallacious—for instance, that with which the book starts: "A feature of the war of 1914–1918 was the phenomenal rise in the incidence of marriage." The truth is that after a rise in 1915 there was a fall in 1916, 1917, and 1918, and if the word "phenomenal" can be applied at all it is to the figures for 1917 which were lower than any since the close of the last century. So also with Mr. Scott's alleged rise in the birth-rate of illegitimate children. There were fewer illegitimate births in 1915 than ever before bar two exceptions. The war was followed by a transient rise which temporarily checked the steady diminution of illegitimate births that has been going on for the last fifty years. What are we to think of other statements in the book that cannot be checked statistically? For instance, Mr. Scott asserts: "In nine cases out of ten the 'war marriage' is a failure. At least half the total number of such marriages end in divorce or separation; the others, for the most part, drag along in circumstances of the greatest unhappiness." Marriage is considered as a problem of sex along with venereal disease, prostitution, and sexual vice. Discussion of these general problems is inappropriately interspersed with such practical details as instructions how members of either sex should wash their external genitalia, how the man should test his preventive appliances on purchase and where he should buy them, and how a woman can improvise a contraceptive appliance if she finds her stock run out. Prostitution and venereal disease in war-time are difficult and important problems but they are not solved by omitting the good and exaggerating the evil, and many of Mr. Scott's subjective statements on their incidence in the last war seem to us one-sided.

SULPHONAMIDES AND SPERMATOGENESIS

Prof. Mario Truffi[1] of Padua has examined the spermatic fluid of rabbits and guineapigs before and after a course of large doses of sulphanilamide. The fall in the number of spermatozoa was so slight as to be within the limits of possible error in most of the animals, and the number rose again to normal soon after the drug was stopped. The motility of the spermatozoa was diminished in very few animals, and their fecundity was in no way affected. In 27 gonorrhœal patients the number of spermatozoa fell throughout treatment with sulphanilamide, but rose again to what it was before soon after the course was finished. Here it must be remembered that gonorrhœal patients often show a diminution in spermatozoa apart from any treatment.

PHARMACISTS AND AIR-RAID CASUALTIES

CORRESPONDENCE has passed between the Ministry of Health and the Pharmaceutical Society about payment for surgical dressings and other materials which may be supplied by pharmacists to casualties in air-raids. The society reminds the ministry that when the A.R.P. scheme was in the making pharmacists were advised, on the authority of the Home Office, that "they would be rendering their most useful service if they were to remain in their own pharmacies to render such help as the public might require." The society, having been pressed by its members for information as to who will reimburse them for the cost of goods supplied, passed the inquiry to the ministry; several letters were exchanged and so far the final word has been said by the ministry. The ministry says that they are not aware of any ground for assuming that the provision made at first-aid posts will prove inadequate for dealing with casualties if serious air-raids come, and that if pharmacists render first-aid to casualties they must make their own arrangements for payment. In view of what they were told by the Home Office pharmacists are surprised at the attitude of the Ministry of Health, which they regard as unsympathetic. It is understood that the Pharmaceutical Society intends to press the Home Office for a declaration that payment for goods supplied will be made by local authorities according to a tariff such as that laid down under the National Heath Insurance Act. It is conceivable that air-raid casualties would be in no condition to discuss the delicate question of who pays, and pharmacists could hardly direct injured persons to the cash desk before supplying their needs.

1. *Medicina internaz.* March, 1940, p. 57.

CONSERVATIVE OBSTETRICS AND GYNÆCOLOGY

Dr. Bethel Solomons began his presidential address to the London Jewish Hospital Medical Society on April 21 by saying that obstetrics is more difficult than gynæcology, and that those who undertake the more complicated obstetrical cases are often insufficiently trained. Among such should be included gynæcologists who perform obstetrical operations without a sufficient background of obstetrical experience and diagnostic judgment. If a man is to be a sound practitioner postgraduate training for at least 3–6 months (preferably in Dublin) is, he said, essential. Attention during that time should not be confined to abnormal cases, for a profound knowledge of normal uterine action and the mechanism of descent is indispensable to the obstetrician. Conservatism does not necessarily imply delay. Prompt treatment, as in the case of ectopic gestation, may be the most conservative.

As far back as 1920, said Dr. Solomons, the Rotunda Hospital could show a case-mortality of 8 per cent. for eclampsia against a prevailing 20 per cent. or more. This was by the use of conservative methods on Strogonoff lines. Cæsarean section should be ruled out. The other toxæmia, hyperemesis, presents a difficult problem. In the early stages vomiting can usually be controlled by judicious treatment. Only in advanced cases should the ovum be removed, and in these the results are even then not uniformly favourable. Obstetric conservatism should be applied also to cases of intercurrent disease, such as tuberculosis or heart failure. Dr. Solomons felt that usually the wisest course was to treat the disease to full term, and then deliver with a liberal use of morphia and a shortened second stage. In cases of abortion the doctor must make quite sure the case is inevitable before interfering. For ectopic gestation, on the other hand, immediate operation is necessary, performed simply and speedily. The administration of fluids is essential, and saline should be given if blood-transfusion means delay. Dr. Solomons's series of cases were not transfused. For accidental hæmorrhage anti-shock treatment combined with rupture of the membranes and the administration of Pituitrin gives the best results. More active methods, such as plugging the vagina and cæsarean section with or without hysterectomy, were not so successful and have been discarded by Dr. Solomons. In placenta prævia, on the other hand, cæsarean section has a place—for primigravidæ, or multiparæ in which the placenta is central. Between version and the use of Willett's forceps Dr. Solomons favours version, always postulating slow delivery without traction or oxytocic drugs. During his mastership there were only 2 deaths in 138 cases of placenta prævia. Conservatism in the treatment of fibroids complicating pregnancy is well recognised, although occasionally myomectomy must be performed for severe pain, and with careful operating the pregnancy should continue undisturbed. On the other hand, ovarian cysts, unless quite small, require to be removed.

Of malpresentations, Dr. Solomons urged that the occipito-posterior should never be manually rotated during the first stage of labour, because of the large number of cases in which spontaneous rotation takes place. Face presentations also should be left alone, since the persistent mento-posterior is a rarity. Breech presentations should be turned in primigravidæ, but a radiogram should always be obtained first. Dr. Solomons recalled two cases in which the fœtal heart sounds ceased after attempted version. For a breech with extended legs in primigravidæ over forty he advocated cæsarean section, although this might seem a violation of conservative principles. Forceps, he said, have been considered an enemy of conservatism, but properly applied, remembering the four cardinal conditions, the low forceps operation can be of great use. Forceps applied in the mid-pelvis are sometimes necessary, at risk of vaginal lacerations, but high forceps, applied with the head above the brim are unjustifiable. Craniotomy should never be performed on a living child, and lower segment cæsarean section, with drainage if necessary, offers less risk to the mother. He deplored the increase in cæsarean sections, for the mortality-rate is higher than for vaginal delivery, although one must remember that the more serious cases come to operation. Induction of labour may be used conservatively or not, and should not be used for the patient's or doctor's convenience, since every manipulation, however slight, adds to the risk of delivery. In cases of delayed labour due to inertia or disproportion it is essential to be able to differentiate between the two, although patience is needed in both conditions, and it is desirable to wait until a low forceps delivery can be safely accomplished. New radiographic methods of mensuration are helpful in disproportion, although Dr. Solomons maintains that eyes and fingers are still the most reliable guides. In ruptured uterus the possibility of plugging the rent as an alternative to cæsarean section should be considered in some cases. Better results in cases of puerperal sepsis have followed the adoption of conservative methods, no intrauterine manipulation except the instillation of glycerin being now used. After manual removal of the placenta sulphanilamide should be given as a prophylactic.

Dr. Solomons said he was not sure whether the transfer of gynæcology from medicine to surgery has been entirely beneficial, although some of the operative procedures have been an enormous advantage. As in other specialities, unnecessary operations are sometimes performed—for example, one lady could record 7 curettings in two years done by five different operators. Diagnostic curetting for menopausal bleeding is important, but afterwards, in non-malignant cases, endocrine therapy can often replace hysterectomy. Dr. Solomons deplored the performance of hysterectomy for menopausal nervous symptoms, which can only be enhanced by operation, and in cases of uterine fibroids he feels that myomectomy should suffice for most patients under forty. On the other hand, the vogue for diathermic cauterisation for cervical erosion has not displaced the operation of trachelorrhaphy, which carefully performed is still the best treatment and does not interfere with subsequent labours. Dr. Solomons also advocated operation for retroversion of the uterus, except when it was immediately post partum; pessaries only correct the displacement temporarily and have a bad psychological effect. Patients consult a doctor for symptoms, and if a retroversion is found, especially when the complaint is sterility, the position should be corrected. Sterility due to blocked tubes should be investigated with Lipiodol for the site of the block. Plastic surgery on the tubes is disappointing, but should be attempted when the block is near the fimbriated end and the patient wishes to take the chance of success.

In reply to questions Dr. Solomons said he considered that ceasing any control of the fundus for thirty minutes after delivery has materially reduced the incidence of post-partum hæmorrhage at the Rotunda Hospital, and he recommended the injection of saline into the umbilical vein for removing the stubborn placenta. Asked about the endocrine treatment of menstrual irregularities, he said that as a broad principle the treatment should be directed to producing a normal ovulation, and he had found the best results followed the administration of œstrin in appropriate doses for the two weeks following the period.

THORACIC BLOCK

Lian and Tardieu [1] describe what they consider to be a new syndrome affecting middle-aged men suffering from chronic bronchitis. It is characterised by sudden attacks of an overpowering sensation of suffocation brought on by exercise which may be

1. Lian, C. and Tardieu, G. *Bull. Soc. méd. Hôp. Paris*, April 4, 1940, p. 76.

accompanied by transitory unconsciousness. The victim feels as if his lungs were blocked so that he cannot breathe. The attack lasts only a few minutes and is relieved by rest. The absence of pain differentiates it from angina pectoris, a differentiation which is important in view of the favourable prognosis in this "blocage thoracique d'effort." Lian and Tardieu found that in subjects who had suffered from the syndrome similar attacks could be induced by pressure on the eyes or over the carotid sinus. They therefore suggest that the attacks are due to vagal activity, possibly induced by the state of the pulmonary mucous membrane. Unfortunately the results of adrenaline administration were equivocal owing to the brevity of the attacks and their immediate response to rest, two features which, with the suddenness of the onset and the invariable relationship to exercise, differentiate the syndrome from bronchial asthma. Lian records two cases, but further investigation has been interrupted by the war, and the relationship of this syndrome to vaso-vagal attacks has yet to be explained.

REGISTRATION FOR MILITARY SERVICE

THERE is reason to believe that a number of young doctors have broken the law by failing to register under the National Service Act. The Ministry of Labour and National Service points out that male doctors and male medical students are in exactly the same position as other men in so far as registration is concerned. The fact that a man comes under the schedule of reserved occupations does not affect his liability under the act or relieve him of his obligation to register with his age-group in the normal way. All male British subjects within Great Britain (including medical men and students) not specifically exempted under the act, who were born between Jan. 1, 1914 and April 6, 1920 inclusive, should have registered by April 6, 1940. Those who have not registered should do so without delay at a local office of the Ministry of Labour and National Service without waiting for the next registration day. The day fixed for the registration of the next age-group (men not already registered born between Jan. 1, 1913, and April 27, 1920 inclusive) is Saturday, April 27, 1940.

GREEN OR ORANGE

THE suggestion has been made to us by Mr. T. Miles-Price, a Birmingham pharmacist, that doctors should use two distinct prescription forms for insured patients, one green and the other bright orange. Green would indicate that the prescription might be dispensed the day after the date on the form and orange would show that it should be dispensed immediately. The idea is to facilitate earlier closing, but while all over-worked people will be in sympathy with this object it is doubtful whether the present is an opportune time to aim at it. The convenience of patients who cannot call on the doctor until their day's work is done must be considered, and it must be remembered that the bottle of medicine is the tangible and visible sign that treatment has begun. There is always the possibility too that between tonight and tomorrow the patient will recover, and the green paper would then be but a memento of something that never happened.

ARMY MOBILE X-RAY UNIT

A mobile X-ray unit has been presented to the British Army by Miss Iris Michaelis in memory of her father. The unit, which has been designed by Lieut.-Colonel D. B. McGregor, is housed in a shock-proof lorry, and it is fully equipped for making radiograms of all parts of the body. In the rear compartment casualties may be examined either lying on a couch or standing against a separate cassette stand. The X-ray tube is energised by a high-tension transformer which in turn is fed from a rotary converter. The electrical power is generated by an air-cooled petrol-electric apparatus which, when in use, stands outside the ambulance. This generator is equipped with a special voltage-compensating system which ensures that the supply to the X-ray apparatus is maintained almost constant. A winch and ramp are provided for returning the petrol-electric generator after use. If a main electricity supply is available, it may be used instead of the generator. The temperature of the interior can be regulated by fan-heaters which circulate warm or cold air as required. The front compartment is the dark-room, fitted with tanks for the developing solutions, a sink fed from a 30-gallon tank stored under the body, dark-room lamps, and cupboards for storing accessories and chemicals. A hatch connects the rear compartment and the dark-room, and through this the exposed films in their cassettes can be passed without allowing light to enter. The radiographer can communicate with the dark-room attendant through a speaking-tube. The ambulance was constructed by Watson & Sons (Electro-Medical), Ltd., and Lagonda Motors, Ltd.

NEW PREPARATIONS

RADIOSTOLEUM.—Concentrated Radiostoleum in 1 c.cm. ampoules has been introduced by British Drug Houses (London) to provide a suitable vehicle for the administration of vitamins A and D by injection. It contains 69,000 international units of vitamin A and 13,800 I.U. of vitamin D per c.cm.

CARBAMINOYLCHOLINE CHLORIDE.—Savory & Moore Ltd. inform us that stocks of "Doryl" Merck are still available in most forms. They have been granted a licence to manufacture it and will continue to supply it under their own brand as stocks of the Merck product become exhausted.

SUPAVITE.—A product of the Angier Chemical Co., Ltd. (86, Clerkenwell Road, London, E.C.1). Supavite is a combination of vitamins A, B_1, B_2, C, D and E with ferrous iron, calcium and phosphorus. It is presented in amber and black capsules, one containing the fat-soluble and the other the water-soluble substances. Each amber capsule contains 6000 I.U. of vitamin A, 600 I.U. of vitamin D, and one minim of wheat-germ oil. Each black capsule contains 200 I.U. of vitamin B_1; 25 g. of riboflavin; 300 I.U. of vitamin C; 0·017 g. of iron (ferrous); 0·043 g. of calcium; and 0·033 g. of phosphorus.

QUINACRINE AND PRAEQUINE.—These synthetic products are now manufactured by Pharmaceutical Specialities (May & Baker) Ltd., of Dagenham under licences to work the enemy patents of the I.G. Farbenindustrie Aktiengesellschaft, and they have issued a booklet on the treatment of malaria with these two preparations.

CHEMOTHERAPY WITH STREPTOCIDE.—Under this title Evans Sons Lescher & Webb, Ltd. (Liverpool and London) have issued a 40-page booklet which summarises the literature of the last few years on the sulphonamide drugs.

Appointments

JOHNSTON, ALICE, M.B. St. And., temporary school medical officer for Brighton.

RILEY, IAN, M.D. Leeds, M.R.C.P., resident medical officer at the Royal Victoria Infirmary, Newcastle-on-Tyne.

TOWERS, AGNES E., M.B. Birm., resident obstetric officer at "Glenroyd" Maternity Hospital, Blackpool.

WORRALL, R. L., M.B. Sydney, temporary school medical officer for Brighton.

The Countess of Dufferin's Fund has made the following appointments to the Women's Medical Service of India:—
CHACKO, A. W., M.B. Madras, L.R.C.P.;
KING, E. M., M.B. Lond., D.T.M. & H.;
MOHAMMED, Ghulam, M.B. Punjab, F.R.C.S.; and
CHAUDHURI, M., M.B. Punjab.

Examining Surgeons under the Factories Act, 1937: Dr. J. B. JACK (Alford district, county of Aberdeen); Dr. WILLIAM MEARS (Leuchars district, county of Fife); Dr. D. I. EVANS (Aberystwyth district, county of Cardigan); and Dr. E. W. M. WILLIAMS (district of Harrow, county of Middlesex).

ADDRESSES AND ORIGINAL ARTICLES

DEATH IN THE FIRST MONTH AND THE FIRST YEAR

BY CHARLES MCNEIL, M.D.Edin., F.R.C.P.E., F.R.S.E.

EDWARD CLARK PROFESSOR IN CHILD LIFE AND HEALTH IN THE UNIVERSITY OF EDINBURGH

I—Neonatal Deaths

INFANT mortality is expressed as the number of deaths in 1000 live births throughout the first year of life. The Registrar-General now also gives death-rates in the same way for the first month, and this is often described as the neonatal death-rate. These death-rates are our best measure of the efficiency of protection of infant life and allow a rough comparison of infant health in all countries which keep and publish these figures.

During the present century there has been a steady fall in the infant death-rates for the first year in all countries; this has been accompanied by a general fall in the birth-rate. The fall in the neonatal death-rates has not been nearly so great. The causes of death in the first month (neonatal) are quite different from those in later months. Broadly they are due to morbid conditions in the mother during pregnancy, to the risks of birth, and to diseases developing in the first week or two after birth. If our infant death-rates in the first month and in the first year are separated and compared with those of other countries, as regards our neonatal death-rate we take a fairly high position; but our death-rate for the whole year brings us down to a much lower place and makes a poor showing with Holland, Sweden, Switzerland, Australia, and New Zealand. I shall try to show that our high death-rate throughout the first year is due to serious defects in our nursing and medical control of the baby after birth. These defects are manifest already in the first month of life and continue to operate throughout the first year; and they can be put right.

The phrase "infant mortality" has a deceiving simplicity which hides one of the most complicated and inter-twisted of medical problems. It does not include the big and difficult problem of stillbirth, which is closely associated; but it deals with the great mass of infant deaths, which begins to pile up immediately after birth and goes on accumulating throughout the first year. These deaths are due to many different pathological processes often acting in combination; and there are predisposing conditions which favour the pathological factors. It is only when these pathological factors and predisposing conditions are laid bare, and their cause and nature understood, that treatment and control can become more effective.

A HOSPITAL SERIES OF NEONATAL DEATHS

As a contribution to the pathological study of infant deaths in the first month of life, I give figures from the pædiatric section of the *Clinical Report of the Royal Edinburgh Maternity Hospital* for 1938. These figures are set out graphically in fig. 1. While numbers are also given, the mass of each set of figures is accurately shown by blocks of 100 units or less. The mature births are shown above the base line, the premature births below. The standard of maturity is one of weight—5½ lb. at birth, as recommended by the International Committee at Geneva in 1937 and accepted by the British Pædiatric Association. The lower limit of viable prematurity is one of age—the twenty-eighth week of pregnancy. Stillbirths, premature and mature, are shown on the left of fig 1. This collection of hospital clinical material is not a fair sample of the general maternity population and gives a much higher infant death-rate than that of larger regional units—e.g., the city, the state. Also the material does not extend over the first month of life, the great majority of mothers and babies being discharged in the latter part of the second week. But the value of this hospital clinical material is that it is under clinical observation and under a uniform medical and nursing control, and that the causes of death are checked by necropsy. It ought therefore to throw light upon the principal causes of infant death in a maternity hospital during the first two weeks after birth.

Stillbirths.—The stillbirth-rate in this series is high—79 per 1000 viable births. Prematurity (68 cases) plays an important part in it. In the 97 mature stillbirths some abnormal condition of pregnancy and some abnormality of labour were present in 76.

Live births.—Here fig. 1 shows the main results in death, disease, and health. The health group carries

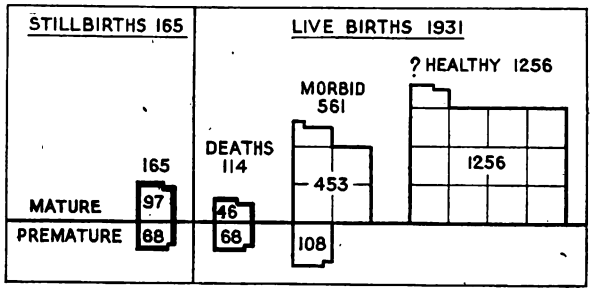


FIG. 1—Neonatal record of 2096 viable births.

a question mark; it only expresses health on discharge from hospital, but we know well that during the remainder of the first month health can readily slip back into disease and death. The neonatal death-rate for this series is 59 per 1000 live births; the neonatal death-rates for Edinburgh and Scotland in 1938 were 34 and 38 respectively. But these hospital neonatal deaths, numbering 114, were the subject of necropsy in 101 cases; therefore the cause of death can be given for the great majority, with information also about pregnancy, labour, and maturity—all predisposing conditions which are valuable data to be placed alongside the actual cause of death shown by necropsy. Prematurity takes more than half of the total deaths among live births, and the death-rate among the prematures is 38·6 per cent. The standard of prematurity in this series is the new one of weight only—5½ lb. Prematurity is the greatest single predisposing factor in neonatal deaths; it can be reduced in two ways, by better antenatal care of the mother and by more skilled nursing and dieting of the baby.

CAUSES OF NEONATAL DEATHS

The causes of neonatal death in 108 cases out of the 114 are shown in fig. 2. In 101 cases the cause of death was determined by necropsy, and in 7 cases by some obvious congenital defect, such as spina bifida. These causes fall into three main groups: intracranial hæmorrhage, infections, and a miscellaneous group made up of asphyxia, congenital defects, and other conditions. The three groups are approximately equal: intracranial hæmorrhage 40; infections 43; and the miscellaneous group 39. The figure also shows by attached blocks the common incidence of double or multiple lesions in neonatal pathology—e.g., intracranial hæmorrhage associated with pneumonic

infection or with asphyxia. The remarkable feature of this series of neonatal necropsies was the large number of infections; among these pneumonia easily took first place.

Intracranial hæmorrhage.—In this group of 40 cases, 10 were associated with some serious infection, such as pneumonia or meningitis, the infective process being the probable cause of death; and 4 with asphyxia. Premature babies were shown to be more liable than mature babies to intracranial bleeding—28 to 12. Further, the site of hæmorrhage was subdural in most of the mature babies, whereas in the premature group subarachnoid and intraventricular hæmorrhage were commoner than subdural. In this series intracranial hæmorrhage is easily the largest single factor among causes of neonatal deaths; this fact is brought out in most series of neonatal necropsies.

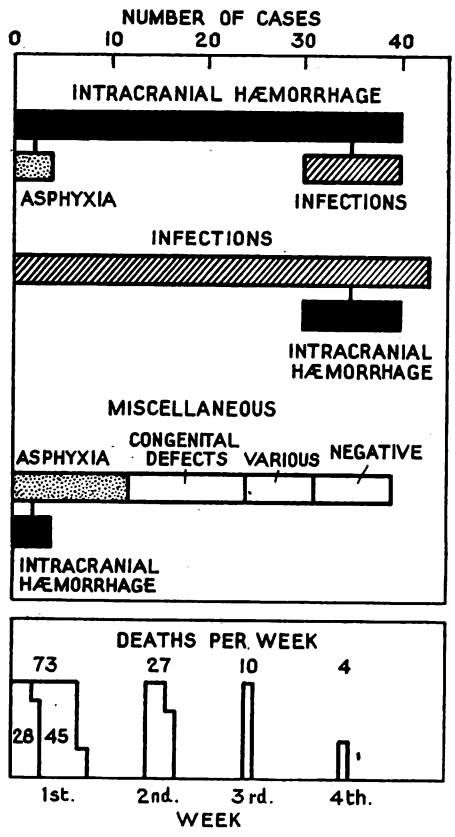


FIG. 2—Causes of neonatal deaths in 108 cases (101 necropsies, 7 congenital defects without necropsy).

Infections formed the largest of the three main groups of the aggregate. There were 43 cases of fatal infection, of which 10 were accompanied by intracranial hæmorrhage. Of these infections pneumonia was easily first, with 25 cases; meningitis and septicæmia each numbered 7 cases, and the remaining 4 cases were made up of gastroenteritis and pyelonephritis. This number of infections is much greater than in the important series of Chicago necropsies made by Bundesen et al. (1938); it is probably much greater than in modern British maternity hospitals. These figures of infection were obtained in an old hospital, where babies and mothers occupied the same crowded wards and were nursed by the same staffs—conditions that provided easy communication of infection to the babies. This series, it is to be hoped, marks the end of this heavy list of infection, for the old hospital is now transferred to the new maternity pavilion of the Royal Infirmary. But lessons can be drawn from examination of these figures, which will show that modern premises and separate nurseries in maternity hospitals are not enough. There is still required of the medical and nursing staffs a high and strict standard of antiseptic routine, if the newborn baby in hospitals and nursing-homes is to be protected from infection. Before Lister, surgical hospitals were riddled with deadly infection; so were maternity hospitals with puerperal sepsis before Semmelweis. There still remains infection of the newborn as a blot to be removed. Of course a great deal has been done; the umbilical stump no longer causes its thousands of deaths from septicæmia and tetanus; infection of the eye and resulting blindness have been brought under complete control. These are areas of danger on the surface; they are now known and they are protected; but there remain other danger areas—the mouth, the nose, any trivial lesion on the skin which can easily allow infection to enter the body. And in the first few weeks of life the natural immunity of the infant to every kind of infection is low; so at this time we meet with *Bacterium coli* meningitis and pneumonia, which are almost unheard of in later infancy or in later life. Infection on the hands or in the breath of the attendants can easily reach the baby's mouth and nasopharynx. Neonatal pneumonia has been investigated by Macgregor (1939), whose thorough histological and bacteriological study is likely to remain the classic investigation of the problem and the basis of protective nursing routine. Obstetrical pneumonia, produced by inhalation of infection during birth, is very difficult to prevent. But in her large series of cases she has shown that many of the cases of pneumonia developing in hospital after birth are due to droplet infection of the baby's nasopharynx from the air. Her findings prove beyond doubt the necessity of protecting babies in wards and nurseries by a strict nursing routine. Pneumonia, meningitis, and septicæmia seldom appear in certificates of death in the newborn that are based on clinical observation; most of these certificates, bearing labels such as prematurity or congenital debility, are worthless. It is only by necropsy that the true cause of death can be revealed in the newborn. Symptoms of intracranial hæmorrhage, pneumonia, and other fatal conditions are often either absent or of a most misleading kind; and, where necropsies are often done, the clinical diagnosis is again and again completely upset by them.

Thrush is a common mycelial infection of the newborn, both in maternity hospitals and homes and in private practice. Often it is trivial; but it is always potentially dangerous and not seldom rapidly fatal. It is easily recognised in the mouth, but when it is confined to the œsophagus, stomach, and intestine its symptoms are misleading. The following examples are typical of rapidly fatal thrush.

CASE 1.—A boy, born in the hospital, was discharged on the tenth day breast-fed and thriving; he was then ½ lb. heavier than at birth, and the mouth and tongue were clean. Vomiting began at home, but breast-feeding was continued; a week later the weight taken at a baby clinic showed a loss of 2 oz. The mother weaned the baby and fed it with a dried milk. The vomiting improved, but the baby began to refuse its feeds, and diarrhœa developed. Weight and strength rapidly declined. On his admission to hospital, aged 22 days, the weight had fallen to 6 lb., a loss of 14 oz. in six days. Rapid decline in hospital and death in five days, without evidence of thrush. Necropsy showed extensive thrush, œsophagitis and slight gastritis.

Infection with thrush probably took place in hospital but at this early stage was without symptoms or signs. Weaning cannot have helped matters; but the next case shows that thrush may soon be fatal even with the advantage of breast-feeding.

CASE 2.—A boy, born in a maternity home, began to vomit on the fourth day, but this did not interfere with nutrition, and at the end of the first week he had almost regained his birth weight. Vomiting continued throughout the second week, with failure of appetite and loss of weight. Pyloric stenosis was considered, but satisfactory evidence was not obtained. Breast-feeding had been maintained. Admitted to the Edinburgh Children's Hospital on the fourteenth day, he showed extensive thrush of mouth and tongue. Thrush soon disappeared from the mouth, but there was no general improvement, and blood was often seen in the stools. He died a week later, aged 3 weeks, and necropsy showed extensive thrush

of the œsophagus, with inflammation of stomach and small bowel.

Blood in the vomit and stools is a common and significant symptom of extensive thrush in young infants.

Thrush in the newborn as well as in older infants is probably widely prevalent in Britain. Ebbs (1938) has written a valuable paper on fatal cases; but the subject requires further thorough investigation.

Infection of the newborn is a less difficult problem to solve than intracranial hæmorrhage; the key to its solution is the trained and conscientious nurse, taught the manifold sources and channels of infection and thoroughly drilled in the practical technique of guarding the baby against them. The nursing drill in the nursery of a maternity hospital or nursing-home should be as strict as that in a surgical operating-theatre. That will seem to many an exaggerated statement, because the facts of neonatal infection are not widely known. When they are known and translated into practice, we shall save many infant lives now thrown away by the ignorance and carelessness of the nurse.

Miscellaneous group.—This is made up of 12 cases of asphyxia; 12 of different types of congenital defect; 7 cases of various other morbid conditions; and 8 cases, nearly all premature babies, in whom no definite pathological condition was found at necropsy. Of the 12 cases of asphyxia, 10 were premature (under 5½ lb.). We have already noted in this series the greater liability of premature babies to intracranial hæmorrhage; their liability to asphyxia is also pronounced. Here we are dealing with pathological asphyxia with its post-mortem signs. But there are also lesser degrees of asphyxia, both during and after birth, whose effects are seen in a train of sequelæ: untimely breathing during birth causing aspiration of septic material into the lungs and pneumonia; atelectasis; hæmorrhage into the lungs and brain. Asphyxia is important as an actual cause of death; its importance as a predisposing condition, leading to various other fatal pathological processes, is difficult to measure but is probably even greater. Asphyxia should be regarded as one of the major factors in the neonatal part of infant mortality.

REVIEW OF CHIEF CAUSES OF NEONATAL DEATHS

This study of neonatal deaths in a large maternity hospital deals largely with the first two weeks after birth. Before passing on to the second fortnight, let us review the principal direct agents of death in the early period. These are four: congenital defects, asphyxia, intracranial hæmorrhage, and infection. These pathological conditions are the actual lethal agents, but behind some of these stand important predisposing conditions, such as maternal disease in pregnancy, difficulty in labour, and, most important of all, prematurity.

Prematurity.—With the new and simpler standard of maturity—a weight of less than 5½ lb.—we can more easily collect and compare the numbers and mortality-rates of premature infants; but, if the collected data are to be exactly comparable, it will be necessary to have an accepted lower standard limit to mark off the non-viable from the viable birth; this lower standard, like the upper, should be one of weight and not of age and might be fixed at 3 lb. In these hospital figures of premature babies, weighing less than 5½ lb. and older than twenty-eight weeks, the incidence-rate is almost 1 in 10 of live births (9·6 per cent.). The death-rate among the prematures was 38·6 per cent., as compared with a death-rate of 2·7 per cent. among mature babies. The importance of prematurity as a predisposing factor in neonatal deaths is clearly shown by these figures. There are two methods of attack on the problem: the more radical one of prevention by improved antenatal care of mothers; and improvement in the nursing and feeding of the premature babies.

Congenital defects have an appreciable share in the aggregate of all series of neonatal deaths and, in the present state of our knowledge, are not likely to decrease.

Asphyxia is an important factor as a direct agent and, as has been said, probably plays an even larger part in minor degrees of transient asphyxia by predisposing to other fatal conditions. Again this presents a hard problem, difficult to control.

Intracranial hæmorrhage is the biggest single factor in neonatal deaths, especially if we consider not only the fatal cases but also those babies that survive with crippled minds and bodies. It is again a formidable problem; but it is receiving from obstetrical science the attention it requires. Here again indirect attack may be helpful, especially since these hospital figures show the greater liability of premature infants to intracranial bleeding; the reduction of the numbers of prematures would immediately reduce the fatal cases of cerebral hæmorrhage. The new remedies for the control of bleeding—e.g., vitamin K—may also do something to help. But all these conditions—congenital defects, asphyxia, and fatal hæmorrhage into the brain, lungs, and elsewhere—represent the hard central core of the neonatal infant deaths, which perfecting of the obstetrical art may reduce but can hardly hope to cut out.

Postnatal infection.—The part played by infection in the early weeks after birth must vary. In many institutions the part is small; in this series of hospital cases it is large. But the material of infection is everywhere and close at hand. It is therefore important that the imminent dangers of infection of the newborn should be recognised and taught to all medical students and especially to nurses. The counter-measures are simple: to place round the newborn, by strict and detailed nursing hygiene, an iron ring of defence sealing the skin surfaces and blocking the entrances—the mouth and nose—to the interior surfaces of the body of every kind of infection, bacterial or mycelial.

First and second fortnight in the first month.—In this hospital series the number of deaths week by week is shown in the lower part of fig. 2; and in the first week there is a subdivision of the first day and the remainder of the week. This time-analysis shows that 100 of the 114 deaths (five-sixths) took place in the first two weeks. The Chicago workers in their investigations into the causes of neonatal deaths have concentrated on this first fortnight; and Dr. H. N. Bundesen, president of the Chicago Board of Health, has given me in a personal letter the figures of infant deaths for Chicago in 1937: the first fortnight, 23 (per 1000 live births); the first month, 25; the first year, 38. The corresponding figures for Edinburgh in 1937 are: the first fortnight, 32; the first month, 38; the first year, 70. Comparison of figures is dangerous; but it is at least safe to say that in Chicago the wastage of infant lives falls to a small trickle after the first fortnight, while in Edinburgh it continues as a steady stream. I have selected Edinburgh as the best of large Scottish towns as regards the infant death-rate. In most of our English and Scottish industrial towns this continued wastage of infant lives after the first fortnight is still heavier.

We can make a general statement: in the first fortnight after birth the antenatal and natal causes of death have spent their force; after this, another and different lethal agent begins to operate. This new factor is mismanagement of feeding in the first month and afterwards, or, in other words, failure in the management of breast-feeding, followed by failure in artificial (cow's milk) feeding. This raises a new and important problem, which will be dealt with in the next paper.

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TREATMENT OF CERTAIN TYPES OF EXTERNAL HERNIÆ*

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ALTHOUGH the treatment of the commoner forms of hernia has been established for many years, the advisability of stereotyped operations is often called in question. Since many patients with hernia are operated on in the prime of life, the results of treatment are of especial importance, and it must be kept in mind that recurrence and disability caused thereby may cost an adult his livelihood. With this end in view I have studied the subsequent histories of 2020 patients on whom I have operated for hernia during 1915–39.

The cases fall into the following groups:—

	Cases
Inguinal hernia	1232
Sliding hernia of the sigmoid	15
Sliding hernia of the cæcum	5
Femoral hernia	610
Umbilical hernia	155
Obturator hernia	2
Sciatic hernia	1
Total	2020

The medical student first learns about herniæ in the dissecting-room and naturally concludes that they are of little importance, especially because in most anatomical textbooks the various forms of herniæ are described in small print. The student should study the anatomy of herniæ in the operating-theatre; there alone can he obtain a true picture of the anatomical conditions. That so little interest is taken in the cure of a hernia is a pity. The various operations are usually regarded as of minor importance and to be undertaken by a house-surgeon, being beneath the dignity of a surgeon. A surgeon can do more for the community by operating on hernia cases and seeing that his recurrence-rate is low than he can by operating on cases of malignant disease.

ÆTIOLOGY OF INGUINAL HERNIA

Most cases of indirect inguinal herniæ are congenital, only a few being of true traumatic origin. In many young adults operated on for this condition large sacs are seen which could not have been produced by trauma; yet no symptoms are forthcoming until after some special effort which leads to an increase of intra-abdominal pressure and causes sudden pain and the appearance of a hernia. That stretching of the parietal peritoneum causes pain and shock is a matter of common knowledge, and it is conceivable that, if a large acquired hernia were produced by the excessive stretching of the peritoneum to form a sac, the patient would die of shock before the condition was diagnosed. Another fact which should be taken into consideration is that some patients who undergo a routine barium-meal examination are found to have an inguinal or femoral hernia where no knowledge of such a hernia pre-existed. I have known men passed as fit for the public services after a thorough medical examination who, within a month or so after having been given a barium meal for some abdominal condition, are found to have an incomplete indirect inguinal hernia. Radiologists who are au fait with the possibility of the existence of such a condition can by careful manipulation make the barium pass into a coil of ileum which is in the inguinal canal. As a rule the manipulation should be made two hours after the barium meal. If, however, the lower coils of the ileum are not well filled, the examination should be performed at hourly intervals. Henle, working at the Newark Beth Israel Hospital, was surprised to find how often unsuspected inguinal herniæ could be discovered by this means.

TREATMENT OF INGUINAL HERNIA

Inguinal hernia provides most of the cases and is found in three distinct age-groups: infants, young adults, and elderly people.

In infants inguinal hernia can in some cases be cured with an improvised truss, but in many cases, thought to have been cured in infancy, hernia recurs as the patient reaches manhood, when an operation has to be performed. Such cases are not recurrences at all, because the hernial sac has been present all the time and has never been obliterated. The commonest operation performed in our children's hospitals today is the cure of inguinal herniæ, and rightly so, because operations for inguinal herniæ in infants have a negligible case-mortality, the hernia being cured in every instance, a result which cannot be claimed for any operation for hernia performed on adults. The operation is simple and requires no reconstruction of the inguinal canal. It is to be deplored that medical men often pander to the wishes of parents of children with herniæ and advise against operation at a period of life in which operation gives the best results. One has only to study the records of naval and military hospitals to see how many hernia cases are operated on each year. At the Royal Naval Hospital at Haslar the yearly average number of hernia operations during the last twenty years is 168. Many of these ratings give a history of having worn a truss in infancy. The best treatment, therefore, for inguinal hernia in infants is operation.

In young adults inguinal hernia is congenital and indirect. Operation is the method of choice as regards treatment. Trusses and appliances can never cure the condition and can only make the hernia larger, because the continued pressure brings about compression atrophy of the abdominal muscles. Yet how often surgeons are confronted with patients who have worn a truss for several years and at last desire an operation when the whole musculature of the inguinal region has been reduced to fragile and attenuated fibrous tissue. Operation in such circumstances cannot lead to a high percentage of cures. The operation of choice varies with different surgeons, but the operation, whatever it be, must restore the structures in the inguinal canal as closely as possible to their normal condition. Gentleness is the secret of success. It is the floor of the inguinal canal which is at fault, and in a large percentage of indirect inguinal herniæ there are small direct herniæ present also. If recurrence is to be prevented, these small direct herniæ or, as some would call them, pseudo-herniæ must be treated at the time of operation. In studying a series of recurrent inguinal herniæ, the one fact which becomes obvious is that most of the recurrent herniæ are direct, although the first operation was performed for an indirect inguinal hernia.

During the last few years fascial grafts for the repair of an inguinal hernia have come into vogue, and it has been claimed that the results are better than by other methods. I cannot agree with this view, because the results obtained by ordinary

* Hunterian lecture delivered before the Royal College of Surgeons of England on Jan. 31, 1940.

operation are uniformly good if certain conditions are carried out. The patient should remain in bed for at least two weeks after operation, should have a month's convalescence, and should not do any hard manual work for at least six months. How often are these essential conditions insisted on? In my visits to various hospitals up and down the country I find that the patient is usually discharged from hospital after eight days or less and only given two weeks in which to convalesce before his return to duty. Nearly all the recurrences are seen in the first two years after the operation. In my collection of cases 75 per cent. of recurrences took place within the first year. In my series of 1232 cases of inguinal herniæ there were 1140 primary cases and 92 recurrent cases. The recurrence-rate found as the result of an extensive follow-up is shown in table I.

TABLE I—RECURRENCE IN PRIMARY AND RECURRENT HERNIÆ

Type	Cases	Traced	Recurrence	Percentage
Primary ..	1140	851	46	5·4
Recurrent ..	92	59	23	38·6

In my early cases the suture material used was catgut, but of later years silk has taken its place, because it is easier to sterilise, better tolerated by the tissues, and much easier to use. Further there is no fear of the knots working loose. In my opinion the use of silk ensures neater surgery. The technique of the operation is similar to that of Bassini with certain modifications. The inguinal canal is opened from end to end by incising the external oblique muscle. The sac is carefully dissected off from the anterior surface of the cord. Subsequently the sac is pulled on and, as its neck becomes fully exposed, the extra-peritoneal fat surrounding it comes into view. An opening is made into the sac and the forefinger is passed into it and thence into the peritoneal cavity to discover any adhesions. The finger is then passed downwards beneath the floor of the inguinal canal to ascertain if there is any weakness or bulging in this region. By this procedure a direct hernia, which would otherwise have been missed, is often revealed. Having made certain that the sac is empty, the surgeon twists it so that its lumen is completely obliterated. It is then transfixed at its base. The floor of the inguinal canal is now carefully inspected and any fatty tissue, lipomata, or fatty diverticula removed, for if left they serve as sources of recurrence by dragging on the peritoneum and so causing a bulging to take place. Since it is the floor of the inguinal canal which is weakened by a hernia, it is this structure which needs repair. Bassini's operation of joining the conjoined tendon to Poupart's ligament is unphysiological, for it is impossible for muscular tissue and tendon to unite. On the other hand, if the fascia transversalis is attached to the deep aspect of Poupart's ligament below the cord, the floor of the inguinal canal will be restored (fig. 1). The lower part of the external oblique muscle is then sutured to the fascia transversalis, thereby further reinforcing the floor of the canal (fig. 2). The upper flap of the external oblique muscle is now sutured to the lower sutured flap of the external oblique muscle, thus still further reinforcing the floor of the inguinal canal (fig. 3).

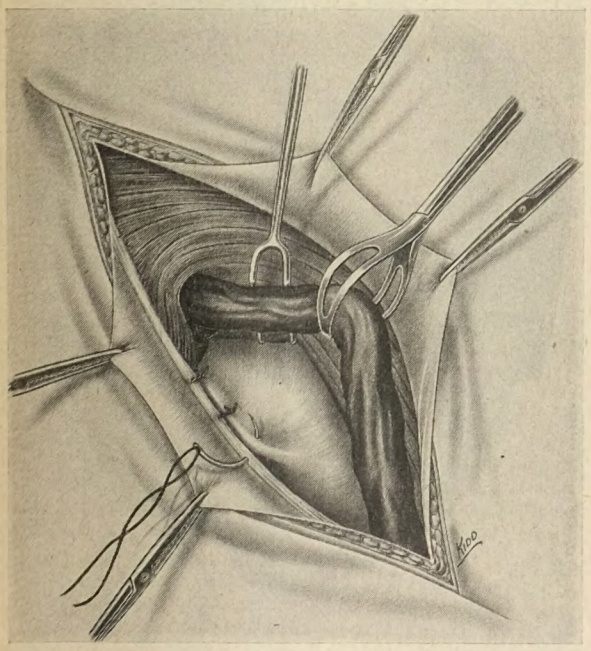

FIG. 1—Radical cure of right inguinal hernia. After the sac has been transfixed and removed, the fascia transversalis is attached to the deep aspect of Poupart's ligament.

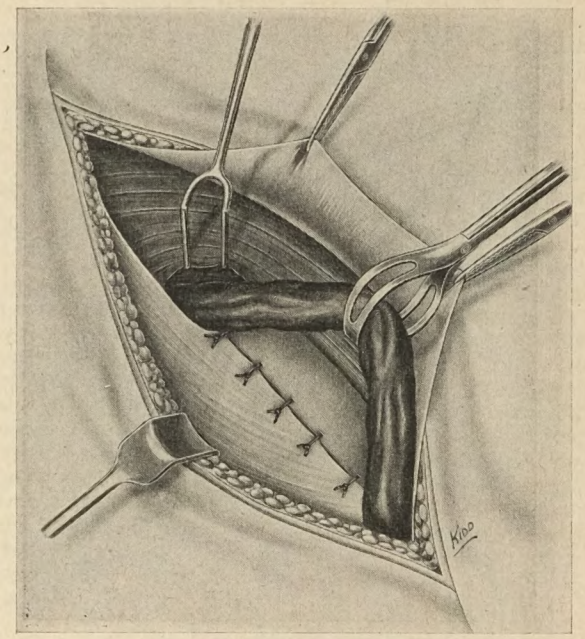

FIG. 2—Radical cure of right inguinal hernia. The lower part of the external oblique muscle is sutured to the fascia transversalis.

The question of operation for direct inguinal hernia is not so important, because many patients are content to wear a truss. Operation is not nearly so satisfactory as in the indirect type, and the recurrence-rate is higher; moreover there is no tendency to strangulation as in the indirect type. If, however, operation is contemplated in a case of direct hernia, it is important to remember that such a hernia consists of a bulging of the posterior wall of the inguinal canal, and any operation for its cure must consolidate the posterior wall and re-form the internal and external abdominal rings. If fascial sutures are used at all, strips of external oblique aponeurosis cut from

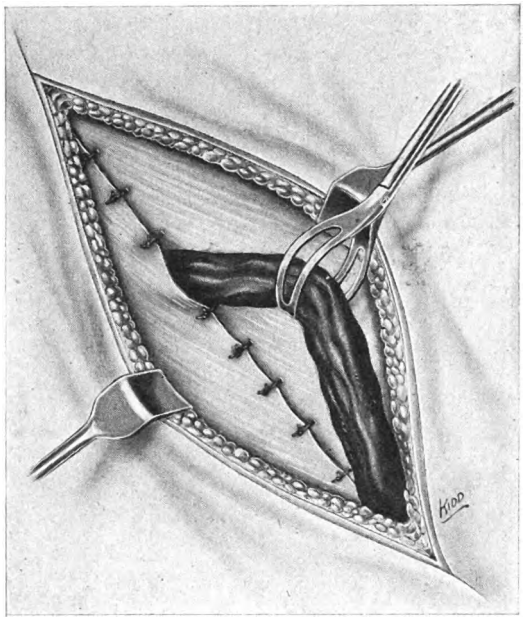

FIG. 3—Radical cure of right inguinal hernia. The upper flap of the external oblique muscle is sutured to the lower sutured flap of the external oblique muscle.

either side of the incision in this structure, made when the inguinal canal is opened at the start of the operation, are by far the best. Such strips of fascia retain their connexions with the aponeurosis below and can be so crossed as to re-form the pillars of the external abdominal ring. The fascial strips can be used to approximate the internal oblique muscle and the conjoined tendon to the deep aspect of Poupart's ligament, without causing any strain. The lower flap of the external oblique muscle is then stitched to the internal oblique muscle, and the upper flap of the aponeurosis finally overlaps the lower and is secured thereto with interrupted fine silk sutures.

The use of fascia lata is deprecated, although I know it is in vogue with a number of surgeons, and a fasciatome is popular. Strips of fascia lata are covered with fat, which must be removed if the graft is to be a success, and for their insertion a large needle is requisite. Such needles injure the already weakened Poupart's ligament and may cause hæmatomata. Hernia of the vastus lateralis muscle through the opening left in the fascia lata is a real disability in some cases. It is true that unless a surgeon follows up his cases he will not see these disabilities, because the patients do not complain about them while in hospital; it is only when they are back at work that this condition becomes manifest. Again, if infection should develop in these cases, a sinus forms and will not close until the whole of the fascial graft has come away as a slough, and this may necessitate several months of inpatient treatment. There can be no doubt that, if the same care and attention both to the preparation of the patient and to the operation were given to the straightforward radical cure as to the modern Gallie fascial grafting operation, the results would be universally good; but, as it is, a radical cure is looked on as a minor operation suitable for the inexperienced to perform, while the extensive fascial grafting operation is looked on as a major procedure which is not beneath the dignity of a surgeon.

As regards recurrent herniæ, every effort should be made to make the patient fit before operation. Any focus of infection in the mouth is to be eradicated and any chronic pulmonary congestion or infection treated. It is only by taking every precaution before operation that good results can be obtained. A chronic cough may often mar a good operation and be responsible for a recurrence of the hernia. The tissues in cases of recurrent herniæ are stretched and attenuated, and muscular tissue is often converted into fibrous. In such cases fine but strong silk gives just as good results as do fascial strips. The conjoined tendon is often composed of fibrous tissues and in these cases can be successfully stitched to the deep aspect of Poupart's ligament. Patients with recurrent herniæ require definite preoperative treatment and, after the operation, should be kept in bed for at least three weeks to allow the tissues to consolidate. While in bed the patient must be encouraged to move about and perform regular breathing exercises to obviate so far as possible thrombosis, embolus formation, and pulmonary collapse. At the present time there is a tendency to neglect to give advice about convalescence and the routine to be followed by these patients when they leave the hospital. The surgeon expects the house-surgeon to do it, while the house-surgeon considers it is the sister's duty, while she in her turn thinks the dresser of the case is the person responsible. The result is that the patient is too often given no instructions whatever. It is always worth the surgeon's while to give a few minutes' advice to the patient, before he leaves hospital, on the importance of exercise, especially walking, a suitable diet, and the avoidance of constipation or of any sudden strain.

The extraperitoneal approach to inguinal herniæ has been advocated by Cheatle and Henry. I have assisted the former in many operations in the past when this method has been used, and I am convinced that it is an unsound operation. On anatomical grounds it may seem logical, but it is a difficult operation, and the sac is sometimes so adherent that the

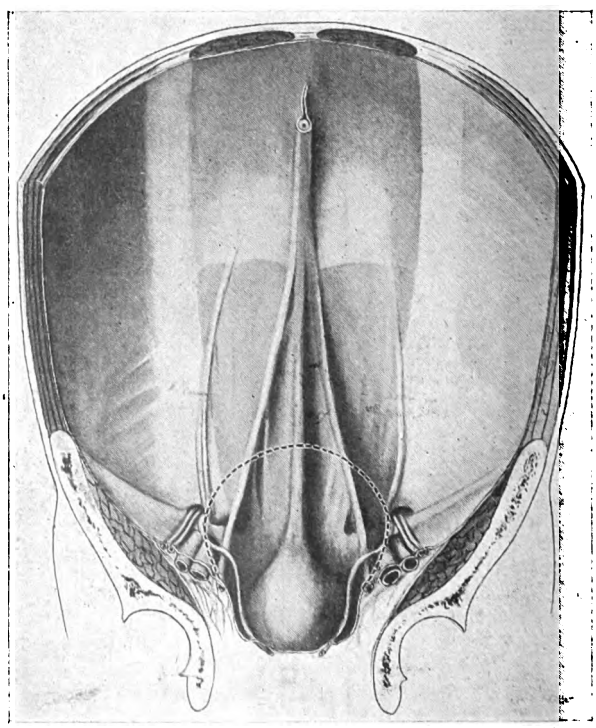

FIG. 4—Anatomy of the posterior surface of the lower part of the anterior abdominal wall. The dotted line shows the relation of the distended bladder to the inguinal fossæ.

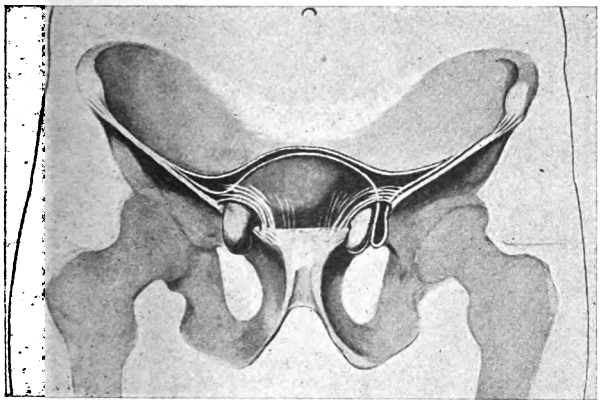

FIG. 5—Diagram showing an extraperitoneal hernia on the right side and a paraperitoneal hernia on the left side.

fundus may have to be left in the inguinal canal. To gain sufficient exposure to enable the surgeon to see what he is doing requires great retraction of the tissues, which are therefore considerably injured. The recurrence-rate is very high—about 45 per cent. of the patients, operated on by Sir Lenthal Cheatle at King's College Hospital, whom I was able to trace. This approach is most unsatisfactory and in my opinion should not be employed.

ANÆSTHESIA IN HERNIA OPERATIONS

In the past anæsthetics have played their part in the production of recurrent herniæ. My routine is avertin anæsthesia followed by a minimal amount of gas and oxygen. I have never seen any ill effects from avertin anæsthesia, although other surgeons may not have been so fortunate. Spinal anæsthesia gives excellent relaxation, and some hundreds of my patients were operated on under this anæsthesia. However, since one patient developed paralysis of the legs after the operation, this form of anæsthesia was abandoned. Inhalation anæsthesia is responsible for more complications after hernia operations than any other form: ether pneumonia and bronchitis and wound hæmatomas which appear three or four days after operation. The constant coughing leads to the slipping of a ligature or the tearing through of a suture and produces a small hæmorrhage. Chloroform anæsthesia is excellent, but anæsthetists are chary of using it lest the coroner might have something to say if the patient should die; yet no word of complaint is ever levelled at the anæsthetist when ether is used. Chloroform inhalation is the best form of anæsthesia for children. Local anæsthesia has its advocates, and in some cases it is the only justifiable form of anæsthesia.

HERNIA OF THE BLADDER

Hernia of the bladder is far commoner than is generally supposed; and, when the condition is not recognised and dealt with, recurrences take place, the bladder itself being the factor mainly responsible for the recurrence. In a series of 5000 cases of inguinal herniæ operated on at King's College Hospital and the Belgrave Hospital for Children in 1908–37 there were 75 cases of hernia of the bladder: 3 extraperitoneal, 48 paraperitoneal and 24 intraperitoneal. It is surprising that these herniæ are not common, and that surgeons take but little notice of them.

If the posterior surface of the lower part of the anterior abdominal wall is examined, three inguinal or vesical fossæ can be seen on each side, all of which are in relationship with the distended bladder (fig. 4). These three fossæ are bounded by the urachus, the obliterated hypogastric artery, and the deep epigastric artery. The urachus, being a single median structure, intervenes between the two medial inguinal fossæ, the lateral boundary of the internal inguinal fossa being the obliterated hypogastric artery. The external inguinal fossa lies lateral to the deep epigastric artery.

Herniæ of the bladder may be divided into three varieties according to the relationship of the hernia to the parietal peritoneum: extraperitoneal, paraperitoneal, and intraperitoneal. The commonest variety is the paraperitoneal (fig. 5). The treatment of these bladder herniæ is important, and the surgeon should always keep in mind the possibility of such a complication when he is operating on a direct hernia. Should a paraperitoneal hernia be discovered during an operation, the bladder should be carefully separated from the hernial sac by gauze dissection (fig. 6) and the protruded part of the bladder invaginated into the abdomen and kept there by the insertion of a purse-string suture through the floor of the inguinal canal.

FEMORAL HERNIÆ

Femoral herniæ are not nearly so common as the inguinal variety, and their treatment must be surgical, because it is far too dangerous to apply a truss, which never can be made to fit properly, and which may cause strangulation. As in the treatment of inguinal hernia, many operations for femoral hernia have been advocated and described. In my series of 610 cases of femoral herniæ there were 535 primary cases and 75 recurrent cases, and the recurrence-rate found as a result of the follow-up is given in table II.

TABLE II—RECURRENCE IN PRIMARY AND RECURRENT FEMORAL HERNIÆ

Type	Cases	Traced	Recurrence	Percentage
Primary ..	535	436	20	4·6
Recurrent ..	75	51	31	60·7

These figures show that the recurrence-rate after operation for femoral hernia is not so great as that for the inguinal variety, and I am sure that in my figures the high operation or inguinal route for femoral hernia was responsible for most of the recurrences, and not

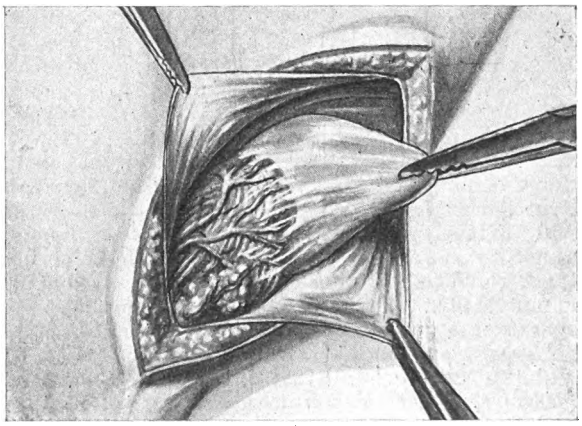

FIG. 6—Paraperitoneal hernia of the bladder as seen at operation. The bladder is separated from the hernial sac by gauze dissection.

only so but in a large percentage of cases a direct inguinal hernia followed this high operation. It is only by making use of an extensive follow-up over a period of several years that such facts are forthcoming. Once a femoral hernia has recurred, it is difficult to cure it by operation, a second recurrence being likely to take place in 60 per cent. of cases operated on. In the Royal Navy medical service there is an excellent follow-up system for all hernia cases, with a special card for primary cases and another for recurrent cases. In the R.N. Hospital at Haslar the average number of hernia operations is 168 a year and the recurrence-rate is under 5 per cent., a tribute to the operative technique and treatment by the naval surgeons. Here again a patient with hernia is kept in bed for three weeks and then given sick-leave and returns to light duty for at least three months, a rational form of treatment which surgeons in civil hospitals might well follow.

The low operation for femoral hernia has several points to recommend it. A more direct access is obtained, and the sac is easily found, isolated, opened, explored, and transfixed, and its distal part removed. The femoral ring can be closed with a series of interrupted silk sutures introduced through the fascia clothing the pectineus muscle, the inner end of Poupart's ligament, and the falciform ligament (fig. 7). Recurrence after this simple operation is less than 2 per cent. In the high operation an inguinal incision is used and the posterior wall of the inguinal canal is incised to expose the sac. The dissection and delivery of the sac above Poupart's ligament may be difficult and occasion some bleeding. In my figures the recurrence-rate after this operation was nearly 9 per cent., and some patients developed a direct inguinal hernia afterwards. In my opinion the so-called old-fashioned low operation still gives excellent results.

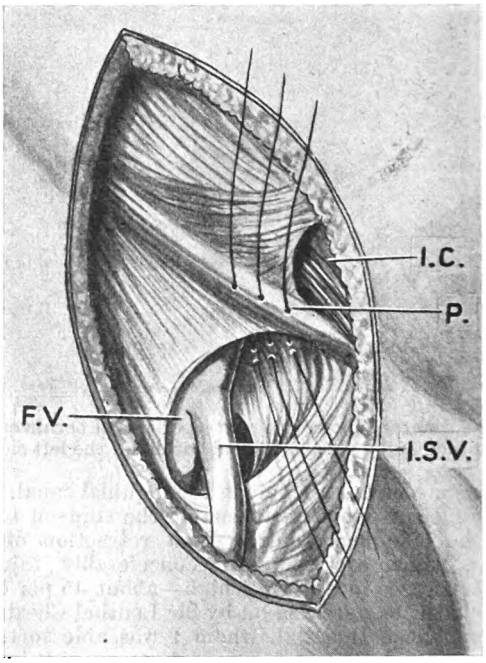

FIG. 7—Anatomy of the region where femoral hernia develops: F.V., femoral vein; I.C., inguinal canal; I.S.V., internal saphenous vein; P., Poupart's ligament. Three stitches have been inserted through Poupart's ligament and the pectineal fascia.

UMBILICAL HERNIA

There are two age-groups in the treatment of umbilical hernia in my series of 155 cases: infants and adults. Table III gives the results of the follow-up.

TABLE III—RECURRENCE AFTER OPERATION FOR UMBILICAL HERNIA

Type	Cases	Traced	Recurrence	Percentage
Infants	98	90	Nil	Nil
Adults	57	45	10	22·2

No infant with umbilical hernia was operated on until every effort to cure the hernia by other means had been adopted. In many children a large umbilical hernial sac is present and does not disappear even after prolonged treatment with trusses of every make and originality. In such cases a simple operation to excise the sac is all that is required, no reconstruction whatever being necessary. It is suggested that, if this simple operation were more commonly performed in infants with large umbilical herniæ, there would be far fewer cases appearing or recurring in middle life. Again, there is no recurrence after this operation, a great argument in its favour. It is not necessary, and indeed it is wrong, to excise the umbilical cicatrix; all that is necessary is a curved incision above the cicatrix and isolation and transfixion of the sac. Probably every surgeon will agree that the best operation for umbilical hernia is Mayo's, and rightly so, for it gives excellent results with a low recurrence-rate. My figure of 22·2 per cent. of recurrences is due to the fact that it includes cases operated on by overlapping the recti muscles, a method followed by a high recurrence-rate.

The after-treatment in cases of umbilical herniæ in adults is most important. They should be nursed in the Fowler position, and twice a day Carbogen should be inhaled, for there is a definite tendency in these cases for the lower lobes of the lungs to undergo collapse. Regular contractions of the recti muscles should also be encouraged. The patient should undergo careful preparation, and particular care should be taken to make the skin of the abdominal wall surgically clean, for it is only by strict observance of detail that good results can be obtained.

In conclusion it is suggested that more interest should be taken by the surgical profession to ensure good results in the treatment of herniæ, as a consequence of which fewer patients will suffer recurrence and incapacity.

OUR Budapest correspondent writes: Dr. Szemkeö has drawn attention to the effect of sugar on obstinate ulcers. A patient of his had a big aphtha in the mouth for which the usual remedies were tried in vain. He discharged himself from hospital and returned two days later with the ulcer completely healed. One of the neighbours in his village had suggested rubbing the ulcer with cube sugar, and this his wife had done, with dramatic success. Szemkeö then tried this remedy on varicose ulcers, boils and ulcers of the palate due to dental plates, and all these yielded to sugar treatment. For aphthæ he simply rubs the base of the ulcer with a lump of sugar—a second application is rarely necessary. For varicose ulcers he uses an ointment made of powdered sugar and vaseline, or where there is deep ulceration he fills the cavity with powdered sugar and applies a bandage over it.

THE LUMBAR CURVE IN WOMEN

CHANGES PRODUCED BY DISPLACEMENT OF THE CENTRE OF GRAVITY

By L. K. Klinderová

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(*Concluded from p.* 784)

Sex.—Fig. 7 shows the proportional distribution of the groups in the two sexes. In the girls the negative group (lordosis deepened) was the largest (40 per cent.) and the positive group (lordosis flattened) the smallest (21·2 per cent.). In the boys the positive group (30·4 per cent.) was larger than the negative group (28·8 per cent.). The positive-negative group in the girls is almost equal to the negative group. Perhaps this difference between the sexes is due to differences of the body structure. As a rule boys have broader shoulders and thorax than girls, and it may be that they counteract the displacement of their centre of gravity by bending forwards, thus compensating the reduced depth of their lumbar lordosis by their increased thoracic kyphosis. Girls, on the other hand, have a stronger pelvis than boys; as soon as the inclination of the pelvis increases with the raising of the heel, a girl regains her balance by bending back her shoulders and head, while again her lordosis is deepening.

Age.—Fig. 8 shows the proportional distribution of the three types of reaction in girls grouped according to age. There is not much difference between the first three age-groups, comprising girls aged 15–20, but in the girls aged 21 or more the positive reaction (lordosis flattened) is commoner than in the girls taken as a whole (fig. 7). There is little reason to suppose that the spines older than 21 years are not supple enough and therefore counteract the displacement of the centre of gravity by forming a simple arc. Nevertheless it is possible that age is a factor in this incidence of flattened lordosis.

Physique.—The boys came from the socially lower classes of a Prague suburb and were of weaker physique than the girls. It was therefore interesting to observe how girls of different physique reacted to the displacement of the centre of gravity. Since girls with a lower physical index showed a relatively greater frequency (29·1 per cent.) of positive reactions compared with that of the girls as a whole, we consider that they have a greater tendency to counteract the displacement of the centre of gravity by flattening their lordosis. The less fit condition of the boys was also reflected in the greater incidence (25·8 per cent.) of traces of rickets among them than among the girls (8·4 per cent.). When these girls were measured, we found that they also had a greater tendency to react to displacement of the centre of gravity by flattening the lordosis.

Anthropometry.—We also considered the relationship of anthropometrical data, such as the height when sitting and the length of the sole of the foot, to the total height of the person measured. The greater the percentage of the total height taken by the height when sitting, the lower the centre of gravity when standing and the smaller its displacement on wearing high heels. On the other hand, a high centre of gravity will, owing to the lesser stability, need a greater effort to counteract its displacement. Fig. 9 shows how girls with a long trunk and those with a short reacted to displacement of their centre of gravity. The three middle groups, which measured when sitting 52, 53, and 54 per cent. of their total height, include three-quarters of all the girls and show no remarkable differences from the girls taken as a whole (fig. 7). The two extreme groups, with a short trunk (46–51 per cent. of the total height) and with a long trunk (55–57 per cent. of the total height) differ greatly in their reaction. The group with a short trunk, which we had supposed to be less well balanced because of its high centre of gravity, reacted mostly (45·2 per cent.) by the deepening of lordosis. It therefore seems that this reaction is the most important. Of the girls with a long trunk 46·4 per cent. reacted by alternate reduction and increase of lordosis, only 14·4 per cent. by flattening of lordosis, and 39·2 per cent. by increased lordosis.

If we consider the sole of the foot, raised by high heels, as an inclined plane, whose slope depends on the length of the plane and on its height at one end, we must admit that not only the height of the heel but also the length of the sole of the foot can influence the displacement of the centre of gravity. The shorter the sole of the foot in relation to the whole height, the steeper is its inclination to the ground and the greater is the displacement of the centre of gravity, and conversely. Fig. 10 illustrates the findings when the girls are arranged in groups according to the proportion of the length of the sole of the foot to the total height. The girls with the relatively longest soles (16 per cent. of the total height) counteracted the displacement of the centre of gravity by deepening lordosis in 30·6 per cent. of cases only. The girls with the relatively shortest soles (14 per cent. of the total height) showed this reaction in 41·3 per cent. of cases. This observation confirms to some degree the importance attached by us to this reaction.

Gymnastics.—Since muscular contraction plays a great part in counteracting the displacement of the centre of gravity, we worked out the figures for groups of girls according to the amount of gymnastics practised (fig. 11). The first group practised no gymnastics except at school; the second practised regularly in gymnastic clubs; the third attended, besides gymnastics, also courses of rhythmics and, in several cases, ballet-dancing; and the fourth came from the course of gymnastics organised for gymnastics teachers of the secondary schools. No other grouping shows such a regular arrangement of reactions as this (cf. figs. 8–10, 12, and 13). The positive (flattening) and twofold (alternate flattening and increase of lordosis) reactions are commonest in the group which practised only in school; then they gradually decreased and are least in the group that attends the course for gymnastics teachers. Negative reactions (increased lordosis), on the other hand, are least (34·8 per cent.) in the girls practising gymnastics only at school; then gradually they rise, until they reach 51·2 per cent. in the group attending the course for gymnastics teachers. There is no doubt that the future gymnastics teachers, some of whom were already in the third year of their studies, which besides theory included much gymnastics and sports, had the greatest physical development of all the girls measured. We may therefore assume that their control of muscles was the most perfect, and that their way of reacting to the displacement of the centre of gravity was the most natural. Most of them were of an athletic constitution and had a normal or almost normal type of spine.

Type of spine.—The reactions of different types of spine are shown in fig. 12. The girls with lordotic spines, whose angle of lordosis was already very pronounced, increased and flattened their lordosis

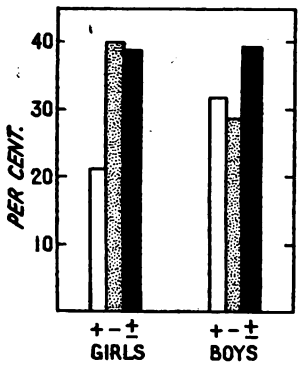

FIG. 7—Proportional distribution of different types of spinal reaction in girls and boys. Positive reaction = flattened lordosis; negative reaction = increased lordosis; positive-negative reaction = alternate increase and flattening of lordosis.

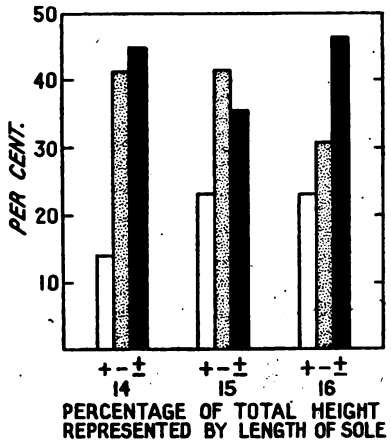

FIG. 10—Proportional distribution of different types of spinal reaction in girls grouped according to relative length of sole.

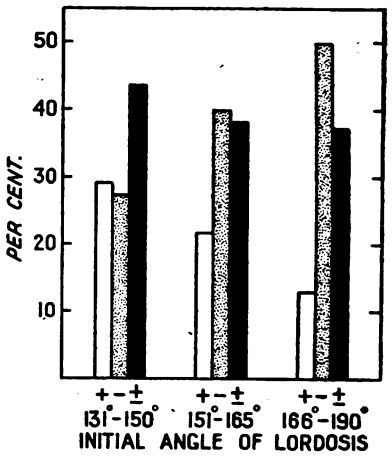

FIG. 13—Proportional distribution of different types of spinal reaction in girls grouped according to their initial (barefoot) angle of lordosis.

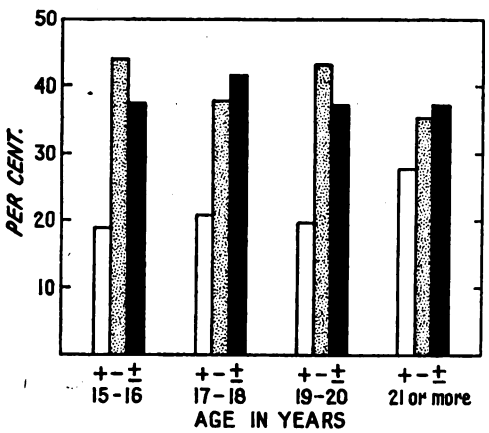

FIG. 8—Proportional distribution of different types of spinal reaction in girls grouped according to age.

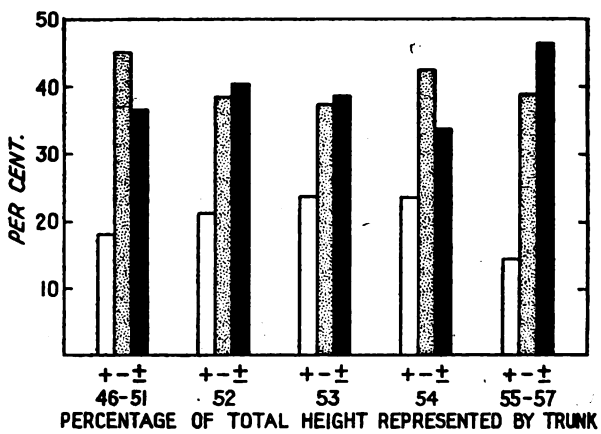

FIG. 9—Proportional distribution of different types of spinal reaction in girls grouped according to relative length of trunk.

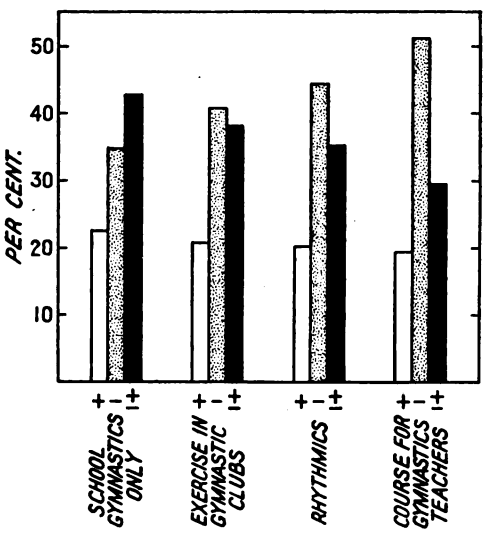

FIG. 11—Proportional distribution of different types of spinal reaction in girls grouped according to amount of gymnastics practised.

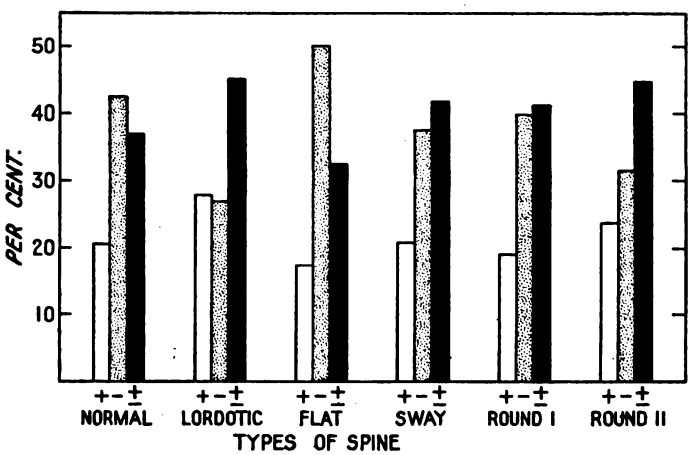

FIG. 12—Proportional distribution of different types of spinal reaction in girls grouped according to type of spine—Wiles's (1937) classification.

in almost equal numbers (about 27 per cent. of cases); the greatest number (45·1 per cent.) showed alternate increase and flattening. The girls with a flat spine deepened lordosis in 50 per cent. and flattened it in 17·5 per cent. of cases; 32·5 per cent. of the girls in this group alternately increased and decreased their lordosis.

In fig. 13, the girls are grouped according to the values of their angle of lordosis when standing barefoot. The group 151°–165°, which we have denoted as the norm, reacted much like the total number of girls taken together (fig. 7). The girls with the initial angle below the norm deepened their lordosis in 27·3 per cent. of cases and flattened it in 29·09 per cent.; most often they gave a twofold reaction. The girls with the initial angle above the norm deepened their lordosis in 49·6 per cent. of cases and flattened it in only 13·1 per cent. The frequency of a twofold reaction did not differ much from that of all the groups taken together (fig. 7).

COMMENTS

The spine always reacted to the displacement of the centre of gravity; but, since its upright posture is maintained by a complex mechanism, so many factors contribute to the preservation of balance on a change of posture that the variability of the reaction should not occasion any surprise. By grouping and regrouping our cases we have shown how different factors seem to cause the spine to react to displacement of the centre of gravity sometimes by deepening, sometimes by flattening and sometimes even by alternate deepening and flattening the lordosis. The type of spinal curvature seems to be the deciding factor in the type of reaction, for we observed that girls with lordotic spines reduced their lordosis more than girls with normal spines, whereas girls with flat spines deepened it more than girls with normal spines. It would need a specialist to judge whether this observation can be put to practical use in remedial orthopædics.

SUMMARY

With a specially constructed dorsimeter we have taken tracings of the profiles of spines of 934 girls and young women and 66 boys and have observed the way in which the angle of lumbar lordosis changed when the centre of gravity was displaced by wearing heels of gradually increased height (3, 5, 7, and 9 cm.).

The spine reacted in one of three ways. In 21·2 per cent. of all the girls measured the angle of lordosis was increased (the lordosis was flattened) and in 40 per cent. the angle of lordosis was decreased (the lordosis was increased). Both of these reactions had already been observed by other workers. We found also, however, that in 38·8 per cent. both reactions took place successively—i.e., in the same person the angle of lordosis increased at one height of the heels and decreased at another. Thus, we could see that the angle of lordosis was increasing, or else decreasing, until a certain height of the heels had been reached, whereupon further heightening of the heels caused the spine to bend in the opposite direction. Limitation of lordosis was especially noticed in those girls who had lordotic spines.

Factors which seem to determine the type of reaction of the spine include the physical index, the degree of physical training, and the shape of the spine (which is reflected in the angle of lordosis ascertained by the initial tracing made with the subject standing barefoot).

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INSULIN SUPPOSITORIES

By B. Brahn, Ph.D. Tübingen

(*From the Veterinary Faculty of the State University at Utrecht*)

Ever since the introduction of insulin for the treatment of diabetes, methods of administering it other than by injection have been investigated. Insulin given by mouth is destroyed by the digestive ferments. Lasch and Schönbrunner (1938) demonstrated in vitro that insulin could be protected against digestion by the addition of dyes, one of which precipitates trypsin and the other pepsin. In the long run, however, such a precipitation of the digestive ferments seems hardly possible without serious digestive trouble. Cutaneous, lingual, nasal, and vaginal applications of insulin have also been abandoned.

The absorption of insulin from the digestive tract was studied by Walton and Bassett (1933) in dogs with Thierry loops about 12 cm. long and 50–60 cm. above the end of the ileum. Insulin, dissolved in alcohol or in a salt solution, placed in the duodenum gave good results. Salvioli and Corbini (1930) tried to administer insulin through the rectum and found that in babies and young children insulin was absorbed from a salt solution. With older children and adults the insulin was effective only when introduced into the more proximal parts of the intestine. On the whole the therapeutic results obtained were not encouraging. Other authors also have confirmed that insulin administered through the rectum remains ineffective.

When given by mouth insulin, before being absorbed, is destroyed in the stomach by the peptic ferments in an acid medium and in the intestine by the tryptic ferments in an alkaline medium. When introduced into the rectum insulin is destroyed by the tryptic digestive ferments operating in an alkaline medium. Therefore our object was to protect the insulin against these ferments, which can only act in an alkaline medium, by adding acids to it and to accelerate its absorption by adding substances that increase the surface tension. As vehicle for these various substances we chose suppositories of cocoa butter.

EXPERIMENTS

The tests were carried out on rabbits and healthy human beings (figs. 1–4). The rabbits were kept on a diet of oats, water and hay. The blood-sugar estimations were made by the Hagedorn-Jensen method at intervals of 15–30 min., beginning 30–40 min. after the introduction of the suppository. About 150 tests on rabbits and as many on human beings were carried out. (Tests on dogs, which also gave positive results, were abandoned because of technical difficulties connected with the necessity to draw blood at short intervals).

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The following results were obtained :—

(1) Suppositories consisting of cocoa butter and insulin had no effect on rabbits or on man. Rabbits were given up to 15 U. and human beings up to 150 U.

(2) The addition of acid preserved the efficacy of the insulin in cocoa-butter suppositories. Of inorganic acids, hydrochloric acid was tried; of organic, lactic, tartaric, citric, palmitic, and acetic acids. A combination of lactic and palmitic acid proved most effective. However, since palmitic acid melts only at 60° C., it was necessary to melt it first with cocoa butter in the proportion of 15 to 85; this yielded a mixture with a melting-point of 33° C.

(3) In rabbits the addition of certain saponins preserved the efficacy of the insulin in the cocoa-butter suppository. It did not do so in man.

(4) The addition of saponin increased the intensity and duration of the action of an acid-containing insulin suppository in rabbits and man. Tests were made with white saponin from saponaria root, from the bark of guaiacum and of horse-chestnut, and from liquorice root. It was found that the saponaria saponin, which, according to Kofler, is innocuous when taken by mouth, may, when introduced into the rectum, cause the rabbit's death through hæmolysis, whereas all the other saponins were innocuous. For this reason we abandoned our experiments with white saponin.

The action of insulin introduced in suppositories sets in very soon, attaining its maximum after 30–40 min., when the action subsides again rapidly. Bigger doses of insulin not only increase the intensity but also the duration of the action. The effect of insulin suppositories may be varied either by increasing the insulin content in an otherwise unchanged composition, or by modifying the quantity of acid and saponin without changing the amount of insulin, or by varying the quantity of each substance. Laboratory experiments showed a correlation between the insulin content, the other components being equal, and the effectiveness. To what extent this correlation will be maintained when the insulin content has to be increased for diabetics remains to be discovered.

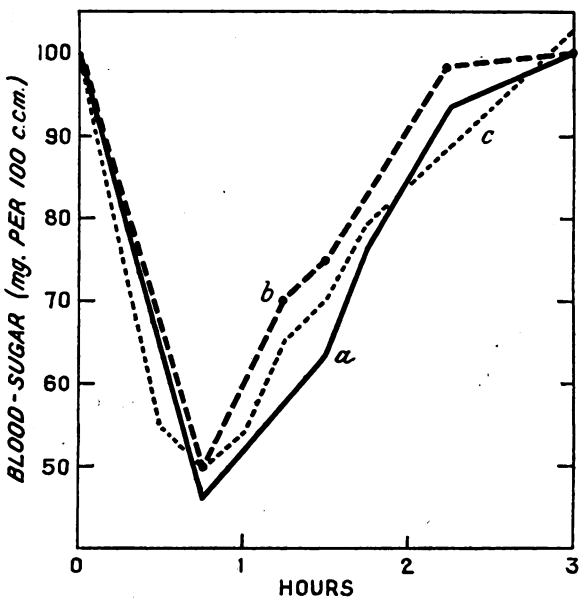

FIG. 1—Average values of blood-sugar in many experiments on rabbits given suppositories of (*a*) cocoa butter, insulin, lactic acid, palmitic acid, citric acid, and saponin derived from bark of guaiacum; (*b*) cocoa butter, insulin, lactic acid, palmitic acid, citric acid, and saponin derived from horse-chestnut; (*c*) cocoa butter, insulin, lactic acid, palmitic acid, and glycyrrhizin.

To avoid irritation, a certain quantity of acid and saponin, differing for each substance, should not be exceeded. A small quantity of added Anæsthesine does not reduce the efficacy of the insulin suppository.

Average values of blood-sugar in many experiments on normal *human beings given insulin suppositories*

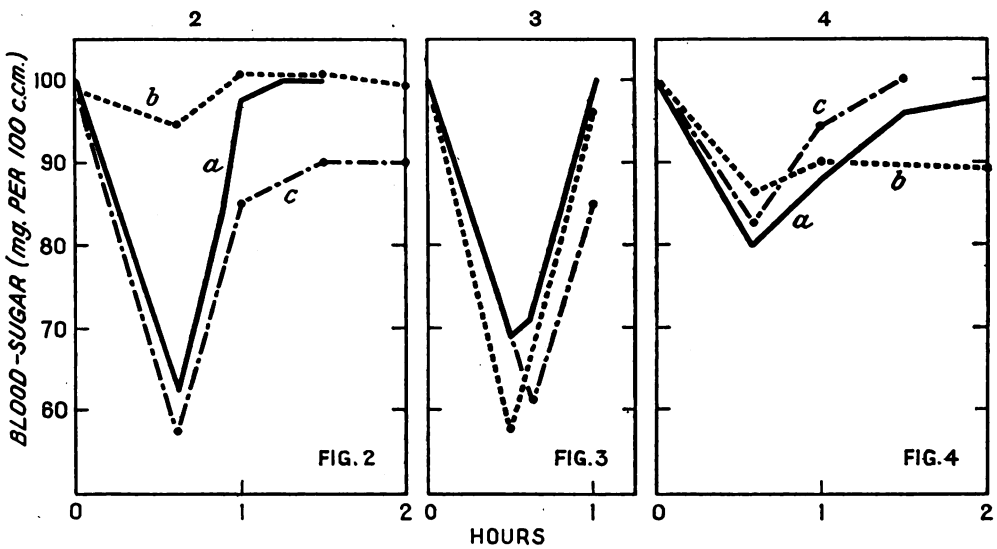

FIG. 2—(*a*) Cocoa butter, insulin, and lactic acid; (*b*) cocoa butter and insulin; (*c*) cocoa butter, insulin, lactic acid, and saponin derived from bark of guaiacum.

FIG. 3—Cocoa butter, insulin, lactic acid, and saponin derived from horse-chestnut. The only difference between the curves is that different quantities of saponin were used, the amounts of insulin and of lactic acid remaining constant.

FIG. 4—(*a*) Cocoa butter, insulin, and hydrochloric acid; (*b*) cocoa butter, insulin, acetic acid, and palmitic acid; (*c*) cocoa butter, insulin, and lactic acid. The quantity of insulin remained constant.

CLINICAL TESTS

Wuhrmann (1939) has clinically tested insulin suppositories and found them to be of value. One suppository unit is apparently equivalent to about ten injection units. Contrary to all expectations, insulin suppositories have a prolonged action, up to eight hours. Further investigations will be necessary to judge of the practical and

wider application of these suppositories in the treatment of diabetes.

SUMMARY

Tests with insulin suppositories made on rabbits and healthy human beings are reported. The action of the insulin sets in very soon and subsides rather rapidly. It is possible to vary the intensity of the action at will. The suppositories proved to be of clinical value.

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SUBENDOCARDIAL HÆMORRHAGES IN SHOCK

By H. L. Sheehan, M.D., M.Sc. Manc.

DIRECTOR OF THE RESEARCH DEPARTMENT, GLASGOW ROYAL MATERNITY AND WOMEN'S HOSPITAL

Most of the literature on shock deals with experimental or clinical studies, and relatively little has been published about its morbid anatomy. I have previously pointed out that subendocardial hæmorrhages are among the most regular pathological findings in shock due to obstetric causes (Sheehan 1939). These hæmorrhages are found characteristically on the left side of the interventricular septum, about half-way down from the aortic cusps. They may also be found on this surface further down towards the apex or may involve the base of the musculi papillares or some of the trabeculæ on the posterior wall of the ventricle. Large lesions may extend upwards on the septum to about 1 cm. below the aortic cusps. The lesions vary from pin-head petechiæ up to enormous hæmorrhages covering almost the entire septum. They are usually superficial, but grosser hæmorrhages may spread for some distance into the muscle. Their general distribution is thus very similar to that of the Purkinje fibres from the left branch of the auriculoventricular bundle. They are not found on the right side of the heart.

INCIDENCE

No figures of their exact incidence were given in the previous paper (Sheehan 1939) because some of the autopsies on which that study was based had been done before specific attention was paid to the presence or absence of the hæmorrhages. The collection of reliable data on this matter requires an ad-hoc investigation. The lesions are commonplaces of pathology, and there is perhaps a tendency to pass them over as merely terminal changes which, unless they are large, are hardly worth noting in routine autopsy records. Besides, small hæmorrhages are easily obscured by post-mortem hæmolytic staining of the endocardium.

The figures in the present paper are from the routine obstetric autopsies, made in this hospital in the last 2½ years, in which a systematic search for the hæmorrhages was made in every case. The examinations were always made soon after death, to avoid autolytic changes. The findings, arranged according to the cause of death, are shown in the accompanying table.

The cases of shock in the series resulted from the usual obstetric causes: dystocia in 16 cases, retained placenta in 12, uteroplacental apoplexy in 9, rupture or inversion of the uterus in 5, and other conditions, including cases where hæmorrhage played some part, in 10. The shock deaths are grouped in the table according to the duration from the onset of the shock to the time of death. It will be seen that patients who died within a hour had usually no subendocardial hæmorrhages, but that after this time the incidence and the size of the lesions increased steadily. All the patients who had continued in shock for 5–8 hours before death had the hæmorrhages, usually large ones. After this time there were 6 late deaths in which various complicating factors, such as early sepsis, were associated with the shock and played an important part in causing death; the incidence and size of the lesions were much less in these cases. Nevertheless, all these fatal cases of shock being taken together, it will be seen that subendocardial hæmorrhages were found in over three-quarters of the autopsies. This raises the question of whether they occur in non-fatal shock. There were 8 patients in the series who had recovered from shock at delivery but died from other causes in the puerperium. Definite small hæmorrhages were found in 1 of these patients, but they were rather faded, as if they were a few days old, and in 2 other patients there were rather doubtful small lesions of this sort.

POST-MORTEM FINDINGS IN OBSTETRIC CASES

Type of death	Cases with subendocardial hæmorrhages			
	None	Small	Moderate	Large
Shock lasting: ½–1 hour	4	1	—	—
1–2½ hours	2	2	4	—
3–4½ ,,	1	3	5	4
5–8½ ,,	—	2	3	7
9–19 ,,	3	2	1	—
Recovered shock	5	3	—	—
Eclampsia	3	2	1	4
Hyperemesis	6	2	—	—
Other cerebral lesions	10	1	1	—
Other causes	55	—	—	—

Subendocardial hæmorrhages were often found in patients who had died of eclampsia; the 5 moderate or large lesions were all in patients who had had cerebral hæmorrhages of various kinds. They were also found in 2 patients who died of hyperemesis, possibly in relation to the Wernicke's encephalopathy which is usually present in these cases. Besides these there were 2 cases among the 12 patients who died of other cerebral lesions such as thrombosis, embolism, encephalitis, or meningitis. Among the other types of death, non-shock and non-cerebral, there was not a single case with subendocardial hæmorrhages. These included sudden deaths, such as under anæsthesia or from heart disease; deaths from hæmorrhage without shock; and more gradual deaths of various kinds. Purpuric diseases can affect the endocardium in the same way as any other part of the body, but it so happened that no cases of this sort were included in the present series.

DISCUSSION

These subendocardial hæmorrhages form a specific pathological lesion with a very definite localisation and cannot be considered as merely one aspect of generalised damage to the capillaries. They are not to be confused with the widespread hæmorrhages in mucosæ and serosæ which some authors record in animal experiments, but which have not been found in the present series of cases of shock in human beings.

They cannot be dismissed as "agonal lesions" which may occur in any kind of death; on the contrary, they are restricted to certain special types of death. Further, the close relation between their incidence in cases of shock and the duration from the onset of shock to the time of death suggests that they usually take some time to develop. In patients who die some days after recovery from shock there are usually no remaining lesions, or, if present, they are quite small. It appears, therefore, that the hæmorrhages take place not in the lesser degrees of shock but only in severe or fatal cases. Besides the references given in the previous paper (Sheehan 1939) on this subject, it may be noted that Dean and Webb (1924) found the lesions in the hearts of 19 out of 33 dogs after anaphylactic shock. On the other hand, Moon (1936) does not refer to them at all in his description of the pathological findings in shock.

Identical lesions are recorded in non-obstetric autopsies in general hospitals, usually in patients with cerebral conditions, such as fractured skull, cerebral hæmorrhage, or meningitis. They have been described in the coma deaths due to heat stroke (Wilson 1940) and in the coma deaths of delayed chloroform poisoning (Sheehan 1940). In the present series they were found often in eclampsia and occasionally in the encephalopathy of hyperemesis or in other cerebral deaths. This suggests the possibility of a similar nervous mechanism in their production, both in the cerebral and in the shock deaths. Acute dilatation of the stomach in some cases of shock may be a related nervous phenomenon, but the lesions found in other viscera in shock are probably not associated with this nervous aspect of shock.

These hæmorrhages under the endocardium are probably not serious lesions in themselves; but they appear to be a post-mortem indication that a local vascular disturbance has been present for some time before death in this important region of the heart. Such a vascular disturbance could be of serious consequence, but it is not clear whether it plays a significant part in the production of the syndrome or whether it is only one of the effects of severe shock. The present figures deal only with shock in obstetric patients; sufficient evidence is not yet available to discuss the exact incidence of subendocardial hæmorrhages in other varieties of shock.

SUMMARY

Subendocardial hæmorrhages, localised to the left side of the interventricular septum and less often also to the musculi papillares and trabeculæ of the left ventricle, are almost invariably present in obstetric deaths from shock, except when the patient dies rapidly. The fact that they are also found in deaths from various kinds of cerebral lesions suggests a possible nervous mechanism for their production in shock. They are presumably a post-mortem indication that a vascular disturbance in this region has been present for some time before death, but the relationship of this vascular disturbance to the syndrome of shock is not yet elucidated.

I have to thank Dr. M. D. Crawford for continuing these observations since the outbreak of the war and for providing details of the autopsies during that period.

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WOUNDS OF THE CHEST TREATED BY ARTIFICIAL PNEUMOTHORAX

By Carol H. Kretzschmar, M.D. Graz.

The treatment of wounds of the chest by artificial pneumothorax was introduced into the Italian army in 1916 by Major Morelli. It was not used in the British or the French armies during the last war, and the method was not developed after the war because wounds of the chest are uncommon in civil practice.

In the Spanish war it was found that many wounds of the chest could be satisfactorily treated by conservative measures—rest and sedatives. But the number of thoracic wounds which require early operation has increased with the greater use of modern projectiles. There are also some thoracic wounds which heal spontaneously if allowed to do so, but impair the efficiency of the lung later.

CLOSED PENETRATING WOUNDS

In the closed penetrating wound the opening in the chest wall or in the lung is insufficient to allow air freely to enter the pleural cavity. In this type there is likely to be only a small pneumothorax, but hæmothorax is common. Therefore in these cases our chief aim must be to treat hæmorrhage and its consequences. The bleeding may be from an injured vessel in the chest wall, which can be controlled by ordinary surgical methods, or may be from the lung or from both. The severity of hæmorrhage from the lung depends on the extent of the wound and the size of the vessels injured. Typically, in wounds caused by modern fire-arms the internal damage is greater than the external wound, which is often only a small puncture. Radiography may show multiple splinters of metal (*Lancet* 1939) distributed over 10–15 sq. cm. of lung.

Even if there is not a large wound of the lung, or an injury of large vessels, a massive hæmothorax may be found. Such profuse slow hæmorrhages are dangerous and easily overlooked.

One young soldier I saw in the Spanish war had a small wound in the chest and, when first seen in the front line, did not appear to be severely wounded. Seven hours later, however, he was dead from intrathoracic hæmorrhage.

Steinke reports 2 among his 87 cases of stab wounds and gunshot wounds of the chest admitted to the Akron City Hospital (Ohio) in which death took place two days after admission; 1 of them died of hæmothorax and shock, and the other of hæmothorax. Similarly, in the Official History of the Great War, Gask (1922) wrote: "Many people died from comparatively small hæmorrhages, which could have been easily stopped."

The hæmorrhage is intensified or prolonged by the negative pressure in the pleural cavity. It is incorrect to say that the pressure of the blood in the pleural cavity checks the hæmorrhage; in many cases with a wound in the upper part of the lung the hæmothorax does not even reach the level of the wound. Since the introduction of about 2000 c.cm. of air into the pleural cavity is needed to collapse the lung, it is easy to see how harmful a negative pressure will be to a wounded lung with a closed traumatic hæmothorax. Since in all penetrating wounds of the chest pneumothorax is usually present, spontaneous cessation of hæmorrhage from the lung is more probably due to the pneumothorax, which partially or completely collapses the lung, thus abolishing the negative

pressure in the pleural cavity; making the blood-vessels of the lung shrink and become tortuous, so that the blood-pressure in the pulmonary vessels, which is normally only a third, or even less, of that in the systemic vessels, is not sufficient to expel the blood *; and mechanically diminishing or closing the wound in the lung.

Sometimes the hæmorrhage continues after the induction of artificial pneumothorax; therefore the pulse-rate, respiration-rate, and general condition of the patient must be carefully observed. At first the pulse may be surprisingly strong, but often this is a false sign. A slow pulse-rate results often from an irritation of the vagosympathetic nerves and therefore is not a sure sign of sufficient cardiac action. If the hæmorrhage continues in spite of artificial pneumothorax, early operation is definitely indicated.

A closed pneumothorax should never be regarded as a complication, and it does not need treatment, unless there are signs of infection or there is excessive tension. Artificial pneumothorax can therefore be performed without introducing a complication or creating a new danger. Besides stopping the hæmorrhage artificial pneumothorax immobilises the lung, thus helping it to heal, and after healing the lung can expand to its normal position. When there are sharp splinters in the lung, immobilisation is of the greatest value. Further, collapse of the lung prevents the formation of adhesions between the visceral and parietal pleura.

The presence of blood in the pleural cavity is harmful and dangerous; the blood provides a medium for the growth of micro-organisms, with a risk of empyema, and absorption of the blood takes two to three months. Its coagulation leads to fibrinous adhesions and obliteration of the pleural sinuses. Organisation of the clot is associated with great thickening of the basal pleura, with the result that normal function of the lung and diaphragm is subsequently impeded.

A Canadian, aged 55, wounded in the lower part of the right lung, had a massive hæmothorax. He was treated expectantly and recovered, but with almost complete fixation of the diaphragm and some retraction of the thoracic wall. Radiography showed only partial expansion of the lung and great thickening of the pleura. Deep respiration was associated with great pain, and even slight bodily exertion caused dyspnœa.

In this case an artificial pneumothorax, combined with aspiration of the blood, would have produced a better result. For all the above-mentioned reasons it is necessary to aspirate the blood in the pleural cavity as soon as possible and simultaneously to substitute air for the blood by inducing an artificial pneumothorax.

OPEN PENETRATING WOUNDS

In an open wound of the chest there is an obvious pneumothorax, with a tympanitic sound on percussion, due to the communication of the pleural cavity with the exterior through either the thoracic wall or a bronchial tube. Injury of a large bronchial tube was very rare in Spain; possibly the projectile pushes aside the resilient bronchial tubes. Moreover, if a large bronchial tube were injured, the wound would usually be fatal, because the large vessels lying close to the tubes would also be injured, producing a massive hæmorrhage, possibly into the bronchial tree, which would cause suffocation.

Every open wound of the chest should be transformed as soon as possible into a closed one by careful excision of the wound and by airtight suture, because the intrapleural negative pressure sucks the infected exudate of the wound into the pleural cavity. If the lung is wounded, artificial pneumothorax should also be induced, unless a complete pneumothorax is already present. It is most important that the blood should be removed as completely as possible from the pleural cavity as a precaution against the development of a pyohæmothorax. Bastianelli sterilised the pleural cavity by thoracocentesis and cleansing with isotonic solution of sodium chloride.

The opening in the thoracic wall may be so large that the air enters and leaves the pleural cavity freely. Breathing soon ceases and the heart quickly fails owing to "fluttering" of the mediastinum. During the Great War Morelli advocated the use of rubber bags which, when inflated with air inside the wound, seal the opening and stop the intercostal hæmorrhage. In Spain a provisional dressing of airtight oiled silk and Elastoplast was provided, which could be easily applied over the thoracic wound by any first-aid man.

VALVULAR WOUNDS

In this type of wound there is a valvular communication between the pleural cavity and the external atmosphere through either the thoracic wall or the upper air-passages, allowing the air to enter the pleural cavity but not to escape again, with the result that a high-pressure pneumothorax develops, which is accompanied by surgical emphysema, often extending into the mediastinum. The affected side of the chest is motionless, and the intercostal spaces bulge outwards. Movement of the sound lung is impeded by the displaced mediastinum. The affected lung is compressed against the mediastinum. Such a pneumothorax is worse on the right side than on the left, because of the compression of the large veins and the right heart. Increasing dyspnœa and deep cyanosis appear, with shallow inspiration, slow expiration, and a weak pulse with a fast rate. Reduction of the intrapleural pressure produces a rapid improvement, and most of the symptoms disappear immediately if there is no mediastinal emphysema.

When a high-pressure pneumothorax is accompanied by a hæmothorax, the blood should be aspirated and air allowed to escape through the needle until atmospheric pressure is reached in the pleural cavity. If the pneumothorax is due to a valvular communication with the upper air-passages, the intrapleural pressure will rise again after it has been lowered; therefore continuous aspiration must be used. To effect this a cannula is inserted into the affected side in the posterior axillary line; the cannula is connected through a length of rubber tubing to a bottle of sterilised water. As soon as the intrapleural pressure is equal to the atmospheric pressure, a little air will escape only during expiration. In doubtful cases such a pneumothorax can be tested for with the pneumothorax apparatus (manometer).

NON-PENETRATING WOUNDS

The blast of high-explosive bombs commonly causes compression or concussion of the chest wall and may rupture the lung without producing any penetrating wound. The rupture may involve only internal alveoli and not extend to the pleura. The patient will then often have no symptoms except a mild hæmoptysis and cough, which can be treated simply with morphine, codeine and rest. If the rupture involves the pleura and a hæmothorax is present, the spontaneous pneumothorax should be supplemented by an artificial pneumothorax to prevent traumatic pneumonia and stop the hæmorrhage.

* Radiograms of collapsed tuberculous lungs often show a sharp angulation of the large vessels.

PROPHYLACTIC USE OF ARTIFICIAL PNEUMOTHORAX

When an operation on a lung is definitely indicated, artificial pneumothorax can be of great value to collapse the lung as early and as completely as possible. If the patient has to be transported to a distant hospital, artificial pneumothorax should be induced before he is moved. A complete pneumothorax puts the lung at rest and abolishes pain, thereby reducing shock. At the same time, the heart and opposite lung have time to adapt themselves to altered conditions, and the patient reaches the operating-table in better condition. When a great loss of blood has already been sustained, a blood-transfusion must be given before the patient is moved. Anæmia is more severe when one lung does not function and the other lacks an adequate supply of blood through hæmorrhage. Steinke (1939) and Sauerbruch (1930) have reported good results from the use of autogenous transfusions.

SUMMARY

Nearly all penetrating wounds of the chest cause pneumothorax. A traumatic pneumothorax is not an indication for operation, unless it is valvular or complicated by an infected effusion or by progressive hæmorrhage from the lung. When there is progressive hæmorrhage from the lung, and when there are foreign bodies in the lung, a complete artificial pneumothorax should be induced to cause entire collapse of the lung. The hæmothorax, if large, should be cleared out by thoracocentesis as completely as possible, because its absorption takes a long time, causes thickening of the diaphragm and pleural adhesions, and impedes the cardiac action and the expansion of the sound lung, and there is a risk of pyopneumohæmothorax, with a doubtful prognosis.

The artificial pneumothorax has its therapeutic effect on the wound of the lung, stops or reduces the hæmorrhage from the lung, prevents the obliteration of the sinuses and the formation of adhesions between the visceral and parietal pleura, protects the lung from further damage due to movement of foreign bodies, and prevents inflammation of the lung caused by these foreign bodies. Therefore artificial pneumothorax should have a permanent place in thoracic surgery, especially in war-time.

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MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

PHYSICAL MEDICINE

AT a meeting of this section held on April 19, with the retiring president, Dr. J. B. MENNELL, in the chair, a paper on the organisation of

Physical Medicine in the Emergency Medical Services

was read by Sir ROBERT STANTON WOODS. At the outset of the war, he said, physical medicine already occupied an important place in the emergency medical scheme of the Ministry of Health. It was organised on a national scale and was represented, like general medicine, general surgery and other specialties, by a consultant adviser to the minister. Its organisation falls naturally under three main heads: medical personnel, auxiliary personnel and technical equipment. The group officer of each of the ten sectors has selected a specialist in physical medicine for his sector, and these specialists are now employed on the "retainer" basis which applies to specialists in all the sectors. In the majority of the regions a similar choice has been made. London is apparently ahead of the rest of the country in its application of physical medicine; in several of the most important regions no medical practitioner has devoted himself mainly to this specialty.

In 1938 the Chartered Society of Massage and Medical Gymnastics recognised the necessity of organising in a special corps those members who were willing to serve. The corps now numbers between 5000 and 6000, out of a total membership of 11,000. The register contains names in alphabetical order, in three grades according to seniority, and in three classes according to mobility, immobility and existing employment in the emergency medical scheme. The probable demand for these auxiliaries is assessed on the number of beds of certain grades for which responsibility is assumed by the Ministry of Health, and on the probable nature of the casualties which may occupy those beds. Mobile members can be transferred to meet sudden local demands. During 1939 hospitals had almost ceased to replace their old equipment of apparatus, and its manufacture had ceased; in September the stocks in the hands of the makers was negligible. On Sept. 8 a specification for quantities of essential units was placed with the Ministry of Health, and the bulk of this order has now been delivered. Its distribution will be entirely in the control of the hospital equipment officer at the ministry.

Treatment carried out in a suitable department is, said Sir Robert, more economical in time, equipment and finance than treatment at the bedside. A large proportion of the E.M.S. hospitals already possessed physiotherapy departments. It would be impracticable to provide all the other E.M.S. hospitals with departments, but these are being supplied to all the orthopædic centres. Each group and hospital officer has supplied a further list of hospitals in which new departments are likely to be needed. Gymnasium exercises and occupational therapy are prominent in the organisation, and facilities for them are being provided at orthopædic centres.

A discussion followed, and in reply to questions, Sir Robert said that his office was confined strictly to advising the Ministry of Health on matters concerning physical treatment in the E.M.S. hospitals, and that his duties in no way concerned hospitals under the care of the Admiralty, War Office or Air Force. It was therefore impossible for him to make any statement as to the provision made for physical treatment other than under the E.M.S. In answer to another question he added that there was a liaison officer between the Ministry of Health and the War Office.

Physical Treatment of Nerve Injuries

Dr. JOHN COWAN, in a short paper, said that nerve injuries were plentiful during the last war. They can be divided into preoperative and postoperative. Preoperative injuries include atrophy, stiffness, vasomotor disturbances, sepsis and causalgia. If the nerve injury causes degeneration, definite atrophy will result. Nerve irritation will produce the same result

even if there is no reaction of degeneration. If atrophy is severe and prolonged the muscle-fibres may almost completely disappear, and then it will be of little avail to restore conductivity to the nerve. Efficient massage and galvanic stimulation will retard wasting and should be begun as early as possible, but galvanism should not be overdone or the muscles will become fatigued. Masseuses are perhaps insufficiently instructed that the stimuli should be the weakest which will cause a response. Over-strong stimuli will delay recovery. If the indifferent electrode is badly placed other muscles may respond instead of the affected ones, but this can be overcome by the bipolar method of applying an electrode at each end of the muscle belly. Surging instead of interrupted currents will often effect a cure. Stiffness should be prevented by full-range passive movement of all joints, and if it is already present it can be counteracted by gradually increasing passive movement. It is a mistake to put a joint forcibly through its full range of movement. Masseuses are prone to maintain the relaxed position during the treatment; this is a serious error, for the controlled joint quickly becomes stiff. Joints should be put through their full range of passive movement at least once a day. True passive movement involves no muscular contraction and will do no harm.

In the vasomotor disturbances slow sinusoidal or surged galvanic currents give the best result. The vasometer mechanism is slow in action, and so the stimulus also should be slow—2 to 4 per second. Contrast baths have not been found very useful. Sepsis should have disappeared before the nerve is sutured. Before operation the part should be subject to deep massage, for this will cause a flare-up of any latent sepsis and prevent premature operation. The anodal galvanic bath is most effective in clearing up septic wounds. Causalgia is intractable to physiotherapy.

Operative measures include neurolysis, suture, transplantation of nerve, nerve anastomosis and tendon transplantation. Neurolysis often gives rapid recovery and a better functional result than nerve-suture, the end-results of which vary considerably and are never perfect. The fewer the sensory fibres associated with the motor fibres, the better the results. Massage, passive movement and galvanic stimulation should continue until good voluntary movements are obtained, and then faradic stimulation should replace galvanism. There is no advantage in interposing a period of combined currents. As soon as voluntary movements are obtained, the patient should be instructed in suitable exercises. When the nerve is sutured, many fibres will regrow down foreign nerve-sheaths, and the patient must adapt himself to the new conditions. Before transplanting tendons the muscles concerned should be given surging faradism twice or three times a day in consultation with the surgeon. The secret of success lies in the complete taking-up of all slack. Physiotherapists should constantly supervise the work of their auxiliaries, as some modification of the routine technique will often improve the result, especially in re-education.

Balneological Treatment of War Injuries

Dr. A. R. NELIGAN said that certain types of war neuroses were treated twenty years ago by prolonged deep baths at about 90° F. Rheumatic conditions in which trauma plays a part are bound to increase during the war, especially as a result of trench warfare. Gonococcal arthritis has been successfully treated by hyperpyrexia induced by steam-baths. Circulating baths are of benefit in vascular disorders. Whirlpool baths may play a useful part in the post-operative treatment of injured soft tissues. After adequate rest, activity may be quickly restored by graduated movement in a pool, together with the application of heat. Convalescence after fracture, and perhaps bony union, may be hastened. The after-treatment of joint injuries, dislocations and wounds, and of bone operations, may be well carried out in pools. Salt-water pools have been used in America in the treatment of chronic sepsis of bone or joint. Sir Henry Gauvain has successfully treated all forms of osteomyelitis and surgical tuberculosis in children by sending them into the sea. After manipulation, one of the pleasantest and most successful ways of preserving and increasing movement is exercise in a warm therapeutic pool: Dr. Neligan referred to Dr. Matthew Ray's paper on this subject (*Lancet*, April 13, 1940, p. 683). No doubt, he said, the authorities intend to house as many war casualties as possible who need bath treatment in or near existing centres where other methods of physical treatment are available; unfortunately many spas, owing to their safe position, have had their proper activities seriously impaired. Perhaps public swimming-baths could be adapted. A pool for adults should be large enough to allow patients to swim a few strokes: 24 to 30 by 12 to 15 ft., with a maximum depth of 4 or 5 ft. They should be furnished with seats, gymnastic apparatus and under-water douches; shower-baths, foot-baths, sprays and rest rooms with hot towels should be provided. The warmth of the water relieves spasm and pain. Buoyancy counteracts gravity; muscles can perform in water many movements of which they are incapable in air, and with far less fatigue. The patient develops his own muscles, and their contraction, combined with the pressure of the water, is an effective form of massage, invaluable in the rehabilitation of patients suffering from fibrositis, arthritis, certain forms of paralysis, phlebitis and injuries. Patients, however, are seldom sent for water treatment, and baths are seldom mentioned in books on orthopædic surgery. Much greater use might well be made of this physiologically correct form of treatment, and it has a specially wide scope in the many injuries of the locomotor system which are so common in war.

ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS

AT a meeting of the association on April 19 the problem of

Tuberculosis and the Industrial Worker

was discussed. Dr. P. M. D'ARCY HART dealt with the close relationship that exists between the incidence of tuberculosis and the degree of industrialisation of the community. Industrialisation, apart from any special hazards incurred in certain types of occupation, facilitates the spread of tuberculosis by increasing the frequency of personal contacts and therefore the opportunity for infection. Both the progressive increase in the entry of young women into industry that began about the end of last century and the sudden increase during the last war were closely reflected in the adverse course of their mortality from respiratory tuberculosis. Dr. Hart pressed for efforts on the part of industrial medical officers and others to control any similar exacerbation during the present war. He sets most value on ensuring early diagnosis

through routine health examinations accompanied by radiography of the chest. For working girls coming from rural districts to industrial areas where the incidence of tuberculosis might be high such routine examinations should be repeated at intervals. Mass radiography has been made much easier and cheaper by the introduction of miniature fluoro-photography. From experience of large schemes of health examinations now in operation he thought that there would be little or no opposition by the workers themselves to examinations made by factory medical officers.

Dr. CHARLES SUTHERLAND discussed the risks of tuberculosis in industries involving exposure to silica. He pointed out that a new worker entering a silica-risk industry may be tuberculous on entering, may have a quiescent lesion which becomes active, or may become infected within a few years of starting work. Having become infected, the worker may develop the condition known as silico-tuberculosis which usually becomes open tuberculosis after a number of years. Such a man probably is only infectious to other workmen for a short period, as he quickly becomes unfit for work. In certain occupations with intense exposure, as in sandblasting, a worker with quiescent tuberculosis has his focus reactivated. In other industries the focus remains quiescent for years, but ultimately becomes active after simple silicosis has developed. As a prophylactic measure, in addition to continuing with improvements in the hygiene of working conditions, Dr. Sutherland urged the importance of medically selecting the workers entering the silica industries. Silico-tuberculosis could be greatly reduced by preventing, through initial and repeated medical examinations, any tuberculous person being employed in a silica-risk industry and so infecting fellow workers possibly rendered more susceptible by their previous exposure to silica. Silico-tuberculosis can be minimised by reducing the risk of infection with tuberculosis as well as by measures directed to eliminating silicosis. He protested against the view that all adult tuberculosis was due to the reactivation of a childhood infection.

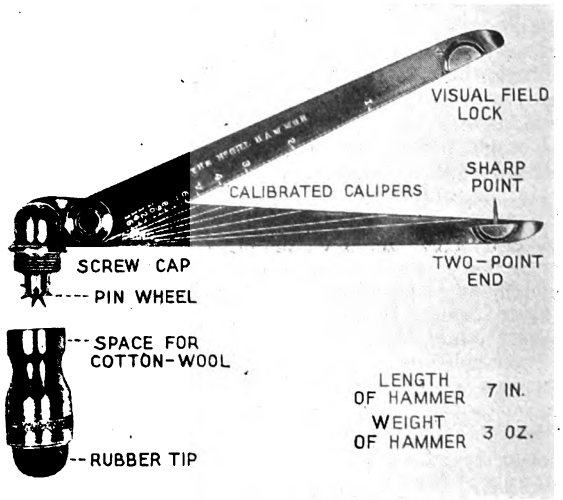
Sir HENRY BASHFORD spoke about the experience of tuberculosis among Post-Office workers. The Post Office, he said, is the largest and probably the most varied industrial unit in the country, but its employees are to some extent a selected group, since the majority have been examined medically at least once, and in most cases twice, before establishment. All new cases of respiratory tuberculosis are seen by Post-Office doctors, and after periodical reports from sanatoria or hospitals every case is re-examined by a Post-Office doctor before being allowed to resume duty. The incidence of respiratory tuberculosis, which compares favourably with that of the community, has declined steadily for the last 20 years. It is highest, both for men and women, between the ages of 20 and 30. With Dr. W. L. Scott Sir Henry Bashford published in 1936 an analysis of the after-histories of 3755 cases arising between 1914 and 1926. Although, in addition to the usual Civil Service sick-pay allowances, the Post Office permits very liberal sick absence in cases of respiratory tuberculosis as long as medical reports are favourable, it is a constant finding that half of all new cases do not recover sufficiently to return to duty. Of those who return nearly half are invalided within ten years for recurrence of the disease or for other forms of ill health, although every effort is made to provide them with suitable employment. After ten years the prospects are much better, and the loss in the next five years is only 14 per cent. In the experience of the Post Office over many years the personal contact factor does not appear to be of much importance, and Sir Henry Bashford inclines to the view that the majority of new cases are due to the reactivation of some earlier or childhood focus of infection, to intercurrent illness or strain, or to anxiety.

In the discussion that followed Dr. G. T. HEBERT emphasised that mass X-ray examinations must be regarded as a sieve for separating suspicious cases. Such cases must be re-examined from time to time in order to detect any progressive changes in their earliest stages. Dr. E. J. KING described the structure of silicotic nodules and the criteria for their recognition. Dr. DONALD STEWART pointed out the difficulties now existing in the examination of new entrants to industry both on account of the shortage of qualified staff and the great and rapid movements of workers to war-time industries. Dr. JOHN CRAW said that mass radiography has proved of great value in the hæmatite mining industry both by preventing the employment of tuberculous men and by facilitating the earlier detection of tuberculosis amongst men actually engaged in mining. Dr. E. L. MIDDLETON expressed the hope that adequate arrangements would be made for the care of those found to be affected should mass diagnosis on the lines proposed by Dr. Hart and other speakers be attempted.

New Inventions

A COMPACT NEUROLOGICAL INSTRUMENT

THIS instrument, the combination of several pocket instruments, will be found useful in summing up the effects of wounds on the nervous system. It weighs 3 oz., measures 7 in. long, and easily fits into a military pocket. The handles are calibrated up to 20 cm. and can be used in measuring the diameter of the heart and other objects. The ends are designed for testing two-point discrimination, and the lock has a sharp point for testing pain sensation. A 3 mm. object



can be enamelled in white on this lock for roughly testing visual fields. The head, made of duralumin, is in two parts: the lower section has a soft-rubber percussion tip of standard (door-stop) size, and a compartment for cotton-wool; the upper section, with a fine steel pin-wheel for testing pain sensation, screws into the lower compartment. This "hammer" was constructed by a group in the graduate school of McGill University, aided by the department of mechanical engineering.

HAROLD ELLIOTT, M.D.

REVIEWS OF BOOKS

Textbook of Surgery

(5th ed.) By JOHN HOMANS, M.D., clinical professor of surgery, Harvard Medical School. London: Baillière, Tindall and Cox. 1940. Pp. 1272. 44s.

THIS book is compiled from the lectures and writings of the members of the surgical department of the Harvard medical school, and provides just the clear and concise account of its subject that the undergraduate student needs. Each chapter or section begins with an historical sketch which makes interesting reading and gives the student a firm basis for intelligent discussion with his examiners. The main stress is laid on the clinical picture, pathology and treatment being dealt with more briefly. The general principles of treatment rather than details of operation are set out, which is as it should be in a work of this kind, but it is strange that the illustration of a Murphy button as used for intestinal anastomosis is thought worthy of inclusion, particularly as it receives no mention in the text. The illustrations are mostly reproduced from drawings made by Mr. Shepherd and are so good that even the 513 presented seem too few. Altogether it would be difficult to find a better single-volume textbook of surgery for the student.

Blood Groups and Blood Transfusion

(2nd ed.) By ALEXANDER S. WIENER, A.B., M.D., serologist and bacteriologist in the office of the chief medical examiner of New York City. London: Baillière, Tindall and Cox. 1939. Pp. 306. 27s. 6d.

THE large-scale enrolment of blood-donors throughout the country in the last year has stimulated a widespread interest in blood-groups, and a new edition of this classical study could not have come at a more opportune moment. Much new material about transfusion has been included, especially about technique, indications and reactions. The section on preserved blood is brief, but America is still at peace. No mention is made of the most recent work on the substitution of plasma or serum for whole blood under certain conditions. Wiener himself when possible still prefers to give fresh uncitrated blood, which is at variance with English practice. The enormous advantages of the drip technique of Marriott and Kekwick are considered in this country to outweigh the possible disadvantages of transfusing small amounts of citrate solution. The latter half of the book deals with the heredity of the blood-groups, and their medicolegal and anthropological and zoological application. These pages contain a rather alarming series of diagrams and mathematical formulæ, but even those unversed in statistics and their application will find them a mine of interesting information. Thus, he tells us that the blood-group of mummies can still be determined; therapeutic malaria inoculation of incompatible blood takes twice as long to incubate as an inoculation of compatible blood; group-specific substances are contained in body fluids other than blood, especially in the saliva. The bibliography is complete and the book has the rare merit of being of equal interest to the research worker, the layman in the street, and the medical man.

Rôle de la constitution dans les maladies infectieuses des enfants

By HANNA HIRSZFELD, docteur en médecine. With a preface by Prof. ROBERT DEBRÉ. Paris: Masson et Cie. 1939. Pp. 152. $0.70.

IN this monograph Professor Debré reminds us of Madame Hirszfeld's earlier collaboration with her husband, Prof. Ludwik Hirszfeld, in the study of blood-groups. The present work evolved naturally from this and was undertaken in the children's hospitals of Warsaw. After a preliminary discussion of the general mechanism of immunity processes and of the great racial and individual variations in susceptibility to disease, the author travels along the well-trodden path of plant and animal genetics. She follows this with a concise outline of contemporary research in human genetics and in the hereditary character of blood-groups, and tries to establish a hereditary base for immunity mechanisms. She gains some support for her attempt by investigating the frequency of certain illnesses in families and by the study of uniovular and binovular twins, but no very firm conclusions can be drawn. Nor, in fairness, does she draw any, the monograph being written throughout with commendable restraint and with a clear recognition of the numerous other factors which are known to influence the individual conflicts of infection versus resistance. The study must be regarded as a preliminary one, calculated to arouse the interest of clinicians and immunologists in this aspect of genetics.

Textbook of Psychiatry

For Students and Practitioners (5th ed.) By D. K. HENDERSON, M.D. Edin., F.R.F.P.S., F.R.C.P.E., physician-superintendent of the Royal Edinburgh Hospital for Mental Disorders, professor of psychiatry in the University of Edinburgh; and R. D. GILLESPIE, M.D. Glasg., F.R.C.P., physician for psychological medicine to Guy's Hospital, London. London: Humphrey Milford, Oxford University Press. 1940. Pp. 660. 20s.

THE principal features of this standard British treatise which so admirably steers a middle course between continental (Kraepelinian) and American (Meyerian) psychiatry have remained unchanged in this edition. There is still the wealth of case-histories illustrating and enlivening the often controversial psychiatric classifications and theories which are presented in clear and not too technical language. Since the last edition practical psychiatry has been swept by a wave of therapeutic activities applying physical methods like hypoglycæmia and convulsions. The detailed résumé of these methods now given, and the guarded but not discouraging judgment on their value, will be welcomed by every student of psychiatry. Another important addition is a chapter on psychopathic states. Although the first description of a group of these constitutional anomalies was given by an English psychiatrist over 100 years ago, the concept has not gained much ground here until lately. Psychopathic states in the wider sense, as the concept is used in many countries today, have a great practical significance; the authors' reminder that more attention should be paid to psychopathy underlying psychoneuroses will have the support of most experts. Many chapters of the book have been amended to keep pace with recent research. Obsolete material has not been removed everywhere, but the effort to keep abreast of the times has been mainly successful. Only the "short bibliography of principal works" has been excluded from the renovating process: none of the books mentioned is dated later than 1934. German books of Kretschmer and Storch which have since been translated into English are still quoted with their German titles, and the omission of works of the Meyerian school like Diethelm's "Treatment in Psychiatry" and Kanner's "Child Psychiatry" will need to be corrected in the next edition. Other desirable additions would be a more complete and

modernised version of the chapter on cerebral arteriosclerosis and its differential diagnosis, a common problem of practical psychiatry; and a fuller account of the sexual abnormalities. Where is the G.P. to look for psychological advice if confronted with one of the frequent cases of impotence and frigidity if he does not find it in his textbook of psychiatry?

The Neurogenic Bladder

By F. C. McLellan, M.S., M.D., instructor in surgery, University of Michigan medical school. London: Baillière, Tindall and Cox. 1939. Pp. 206. 22*s*.

THE neurogenic bladder, for the understanding of which a knowledge of neurology is essential, often provides a difficult problem to the urologist. He will therefore welcome a summary of the recent work on the subject in a readily understandable form. Dr. McLellan is an efficient guide in the difficult no-man's land between the domains of the neurologist and the urologist. His book is based on original observations, especially cystometric readings of the bladder. Five hundred cystometric studies were performed on neurogenic and non-neurogenic bladders, and some two hundred neurogenic cases were analysed to provide a clinical background. The technique employed in cystometry with the Munro cystometer is described and there are 57 figures and charts illustrating the text. Cystometry has not received the attention it deserves in this country, and it is to be hoped that this book will stimulate British urologists to add cystometric readings to the other methods of examination employed in the elucidation of obscure cases.

Hearing and Equilibrium

By H. Macnaughton-Jones, M.B.R.U.I., clinical assistant to the ear and throat department of the North London Hospital. London: Baillière, Tindall and Cox. 1939. Pp. 128. 7*s*. 6*d*.

THE avowed purpose of this book is to explain in simple terms a new theory of the physiology of hearing and equilibrium. All but the last chapter is taken up by an account of the former, and the latter is briefly dismissed in 13 pages. The author's thesis is that sound-waves are gathered up by the drum, directed to the membrane covering the round window and thence to the fluids in the cochlea. The basilar membrane and associated structures convert the cochlea into a graduated resonator capable of responding to an infinite gradation of frequencies and of resolving into its component parts any complicated pattern of sound-waves. The argument is based on diagrams of the structures taken from various textbooks and also on experiments with models. There is nothing essentially new in any of these assumptions (no experiments on the ear itself are quoted) and it is difficult to understand the reason for the vehemence with which the whole point is laboured. Much of the book is repetitive, and descriptive terms are loosely used making it difficult to follow the central arguments. Much is doubtful. To take the author's initial contention that the round window is the portal of entry of sound-waves to the cochlea (described by Politzer many years ago as an alternative method in certain circumstances); it has been shown experimentally by many observers that a loss of hearing invariably occurs when any parts of the ossicular chain is removed or damaged. Dr. Macnaughton-Jones also regards the ossicles and accompanying muscles as forming a protective mechanism for the cochlea controlling the foot-plate of the stapes so that its movements may guard the cochlear fluids against excessive displacements. He compares this function with that of the iris. But he does not explain what happens in cases where disease has interfered with the drum and ossicles but where hearing perception is normal (cases of conduction deafness only). There is less to criticise in the remainder of the book, and indeed much of it is current belief elucidated in the last ten years or so by the painstaking researches of Békésy and others. Finally, to quote Hallowell Davis: "Conclusions drawn from the study of models are no better than the assumptions which enter into their construction," and while in the past theories and models have played a great part in helping us to some knowledge of the physiology of hearing the field of experimental research has now widened especially with the discovery of the Wever and Bray phenomenon and no new theory of the function of the inner ear can afford to ignore this work.

An ABC of War-time Law

By Robert S. W. Pollard, solicitor. London: Hamish Hamilton (Law Books). 1940. Pp. 156. 2*s*. 6*d*.

Mr. Pollard has packed an amazing amount of useful information about our problems and duties under the defence legislation into 130 pages. This half-crown issue is described as the legal edition, to distinguish it from a popular edition published at a shilling from which the appendix of authorities and notes is omitted. The paragraphs are grouped under more than a hundred alphabetically arranged headings such as aliens, change of address, compulsory military service, evacuation and billeting, lighting restrictions, petrol rationing, photography, summer time, war damage and so on. The law is stated as at March 14 last. It changes rapidly. Part of the paragraph on the closing hours for shops, for instance, has been killed by recent revocation; but Mr. Pollard catches up even this change in his appendix of authorities. An ABC of enactments is not as easy to consult as an ABC of railway trains. This little book, however, is remarkably clear and good value for the money.

Indigenous Drugs of India

Their Scientific Cultivation and Manufacture. (2nd ed.) By J. C. Ghosh, B.Sc. Manc., principal, School of Chemical Technology, Calcutta. Calcutta: P. K. Ghosh. 1940. Pp. 243. 5*s*. 6*d*.

THIS little book embodies the spirit of original research into indigenous drugs in India, a realm which has already provided some of the mainstays of our pharmacopœia and which may still reveal unsuspected treasures. Recent pharmaceutical history is rich in the scientific adaptation to medicinal use of herbs to which native tradition has ascribed potent properties. The origin of such beliefs is not to be despised. In the East an ancient belief is well established from the teachings of Ayurveda that there is a herbal specific for the cure of each disease and this belief is supported by the fact that a large number of important remedies—quinine, strychnine, atropine, ephedrine, emetine and kurchicine to name but a few—are derived from the vegetable kingdom. So far there has been no regular cultivation of indigenous drugs in India though many familiar medicinal herbs grow wild in great abundance there, such as *Atropa belladonna*, strychnos, aconite, juniper, digitalis and squill. The native *Boerhaavia diffusa* has been found to have a valuable diuretic action in certain cases of dropsy. A lot of space is given to chaulmoogra oil and its uses in leprosy and here there is a disconcerting mixture of ancient Ayurvedic with modern scientific procedure. Thus cow's urine is recommended for internal as well as for external use in conjunction with chaulmoogra. An appendix includes sixty drugs not mentioned in the 1932 edition of the British Pharmacopœia.

THE LANCET

LONDON: SATURDAY, MAY 4, 1940

PSYCHIATRY AND THE SERVICES

THOSE responsible for recruiting cannot claim to be doing everything possible to ensure economy and efficiency in the forces while pegs that are recognisably square are being put into round holes in the ranks. Physically the recruit is being examined thoroughly enough, though we still hope to see routine radiography of the chest extended from the Navy, where it has now been adopted, to the other Services. But much more could be done to weed out the mentally unfit. It is said that psychiatric examination of each recruit would be unjustifiably costly in time and money and that there would still be psychiatric casualties among those who were given the benefit of the doubt or gave no indication of future instability at the time of recruitment. There can be no question, however, that simple psychiatric tests applied during the military and naval expansion of the last few years would have prevented the early breakdown with or without the stress of actual fighting of an appreciable number of mental defectives and psychopaths among young recruits and the occurrence of depressive reactions, often with an arteriosclerotic or other organic basis, among recalled veterans and reservists.

GRELINGER [1] has reviewed the first four hundred military psychiatric cases referred to the central unit of the psychiatric service in Holland since the beginning of mobilisation. Only a small proportion of the total number of psychiatric casualties reached the central unit; the majority were dealt with by psychiatrists attached to army units or the military hospitals, who eliminated gross psychotics and treated mild cases as outpatients. The material comprised men of 20–35 years of age, apart from some older non-commissioned officers. Nearly all were conscripts; this fact is important when the figures are compared with those of countries where conscription is not in force or is only an emergency measure. These men had already performed their prescribed period of military duty in peace-time satisfactorily and many mental defectives, psychopaths and neurotics had been eliminated during that period. The classification used by GRELINGER is that of the Leyden clinic. He found that few of the depressives could properly be placed under the heading manic-depressive; a certain number were hysterical depressions, but the majority were reactive depressions and these he classifies among the psychopathies. For this reason no less than 51 per cent. of the total were put down as psychopathies. The incidence of the different disorders changed from week to week. Schizophrenics were rarely met with after the first fortnight of service, probably because their behaviour quickly drew attention to them, and depressive reactions became less frequent as the arrangements for leave and other aspects of daily life became better organised. On the other hand psychopathic reactions, other than depressive, became more common the longer the conditions of stress continued. Mental defect was an exceedingly rare cause for breakdown owing, presumably, to the strict recruiting criteria. In almost every case a strong predisposition towards mental disorder was found, based sometimes on hereditary factors, sometimes on a chronic pathological process such as schizophrenia or encephalitis, and sometimes on factors in the patient's life history. This predisposition which is almost invariably present must play a large part in the decisions as to attributability which face the service psychiatrist. GRELINGER is not concerned with acute anxiety or hysterical reactions arising during actual fighting; in those cases attributability can only be justly settled by a close coöperation between the psychiatrist and the commanding officer, whose report on the stress to which a patient has been subjected should take the place of the social worker's report in civilian psychiatry. In few of the Dutch soldiers were the conditions of service either causative or contributory factors. When attributability has been proved the military authorities are responsible for treatment until the patient is fit to return to duty or be discharged to civil life. Of GRELINGER's four hundred patients, 70 per cent. were found unfit for any form of army service, 22½ per cent. went back to full duty and 7½ per cent. were recommended for garrison duty only.

The experience in Holland suggests that a more systematic psychiatric service will be necessary if the number of psychiatric casualties is to be reduced to a minimum. Group intelligence tests and a record of the past work of each recruit, psychiatric observation during training, and coöperation between psychiatrists and the executive in making appointments would already have prevented much wastage of man-power in the Army, Navy and Air Force. In 1918 Prof. D. K. HENDERSON formulated proposals which he recently reiterated in Edinburgh.[2] He advocated the rigid exclusion of men showing mental deficiency or neuropathic and psychotic traits or giving a history or other evidence of head injury; the appointment of mental specialists to recruiting boards, with instructions to all recruiting medical officers to refer probable cases of mental defect to an expert; and the attendance of mental specialists at every large training centre. The Minister of Labour,[3] however, says it is impracticable to include a psychiatrist on every medical board, though he has drawn the attention of the boards to the importance of the examination of mental and nervous stability. Apart from the recruiting station the key-position for the service psychiatrist is in the barracks and

1. Grelinger, H. *Ned. Tijdschr. Geneesk.* Jan. 13, 1940, p. 150.

2. See *Lancet*, March 9, 1940, p. 472.
3. *Ibid*, April 27, 1940, p. 812.

training establishments where all unusual deviations from normal behaviour, repeated infringements of the rules and other difficulties would be referred to him. He would advise the executive as to the disposal of the personnel in suitable work and by outpatient treatment would avoid that unnecessary hospitalisation which saps morale and makes a return to duty far less likely. He would also help in selecting those hysterics and psychopaths who are at present invalided and returned to civil life but who could usefully be transferred to a labour corps for service at home.

SURGICAL RELIEF OF ANGINA

CORONARY disease kills many vigorous men in the prime of life when their other organs are still healthy. We can do little to prevent the development of coronary sclerosis for we do not know why it begins, but lately the surgeon has been trying his hand at relieving the established case. The operations performed are of two kinds. Some surgeons, notably BECK [1] and O'SHAUGHNESSY,[2] have tried to solve the problem directly by grafting operations which aim at supplementing the cardiac blood-supply; others following LERICHE [3] have been content to influence the syndrome indirectly by operations on the autonomic nervous system, or still more indirectly, following the work of the Boston school, by total thyroidectomy. STRIEDER, CLUTE and GRAYBIEL [4] feel that a direct attack on the cardiac ischæmia offers the best prospect, a view for which there is a good deal of experimental support, some of which, especially that of LEZIUS,[5] has not received the attention it deserves. They discuss the natural revascularisation which sometimes takes place if a fresh cardiac infarct becomes adherent to the parietal pericardium and they quote HOCHREIN'S [6] statement that pericarditis is not a complication of coronary thrombosis but a natural attempt at healing, and that its presence is to be welcomed rather than deplored. This opinion is based on the clinical data of patients with angina of effort who have been relieved of their pain after an attack of coronary thrombosis and on the pathological finding that the vascularity of the pericardial adhesions which may follow an infarct can be demonstrated after death. It is not contended that parietal revascularisation is the only type of compensation available in coronary disease—indeed, as the recent injection studies of SCHLESINGER [7] have demonstrated, the compensatory mechanism of intercoronary anastomosis has enormous potentialities provided the coronary obstruction is of slow onset—but it is the only type which can be encouraged or initiated by surgery.

It is not easy to weigh the immediate risk of operation against the prognosis without operation. No-one has yet published a large enough series of cases for operative mortality to be assessed and there is not yet enough evidence to form a sound prognosis of angina if operation is withheld. Certain provisional rules have been laid down for the selection of patients for operation. The first desideratum must be unequivocal evidence of coronary disease, and patients with obvious signs of cardiovascular degeneration in other organs like the brain or kidneys must be excluded. STRIEDER will only consider operation in patients suffering from angina of effort, but O'SHAUGHNESSY believes cardio-omentopexy to be indicated and relatively safe (1) in patients between 45 and 55 with a clear previous history who have an attack of coronary thrombosis and six months later continue to exhibit angina of effort or other symptoms of cardiac ischæmia; (2) in specific aortitis with angina provided the heart is not grossly enlarged; and (3) in hypertensive heart failure in early middle life. STRIEDER and his associates describe two patients submitted to cardio-omentopexy. Their first patient, a man of 44, had increasing angina of effort which had reached the point at which pain came on even if he crossed the street. He was operated on in May and by October was able to return to work, but in December he died after an operation for a diaphragmatic hernia. Sections at the site of the graft showed a rich capillary growth from it into the myocardium. The second patient had a similar history of increasing angina of effort and was having attacks even when resting in bed. He too was operated on in May and returned to work in October. His pain had not been abolished but his attacks were less frequent and less severe. From these cases STRIEDER concludes that the general principle of revascularisation is sound. BLALOCK [8] maintains that alcohol injection of the dorsal sympathetic chain is the safest procedure and he quotes LEVINE [9] as saying that removal of the normal thyroid gland for intractable heart disease is still in the experimental stage; it is a drastic procedure not to be undertaken lightly, for it also produces certain ill effects.

Lately RANEY [10] has summarised current views on the innervation of the coronary vessels in a way that should stimulate efforts to elucidate this key factor in the syndrome. Clinicians have no doubt been unduly hasty in discarding the classical view that in the coronary tree as elsewhere the sympathetic conveys vasoconstrictor impulses. Even some of the workers who attribute a vasodilator function to the sympathetic supply of the heart suggest that this action may be reversed when the coronary vessels are diseased, although no such reversal of function has ever been suggested in the parallel case of diseased vessels in an extremity. The effects of drugs give a good deal of indirect support to the existence of a coronary constrictor action on the part of the sympathetic nervous system. Adrenaline, the peripheral vasoconstrictor action of which is

1. Beck, C. S. *Ann. Surg.* 1935, **102**, 801.
2. O'Shaughnessy, L. *Lancet*, 1937, **1**, 1.
3. Leriche, R. and Fontaine R. Rapport 41ième Congrès français de chirurgie, 1932.
4. Strieder, J. W., Clute, H. M. and Graybiel, A. *New Engl. J. Med.* Jan. 11, 1940, p. 41.
5. Lezius, A. *Arch. klin. Chir.* 1937, **189**, 342.
6. Hochrein, M. Der Myocardinfarkt, Dresden, 1937, p. 138.
7. Schlesinger, M. J. *Amer. Heart J.* 1938, **15**, 528.
8. Blalock, A. *J. Amer. med. Ass.* Jan. 13, 1940, p. 97.
9. Levine, S. A., Eppinger, E. C. *Amer. Heart J.* 1935, **10**, 736.
10. Raney, R. R. *J. Amer. med. Ass.* 1939, **113**, 1619.

undisputed, will produce an attack in anyone liable to angina of effort, and if given during an attack will increase its severity. On the other hand nitrites, which relieve an attack presumably by relaxing coronary spasm, cause vasodilatation in peripheral vessels. So far the coronary vessels have never been observed during an attack of angina or even after the injection of adrenaline—recent progress in the deliberate surgery of the heart may soon remedy this gap in our knowledge—and therefore the vasospastic theory remains a theory. But RANEY regards it with such favour as to base on it a new neurosurgical approach to the problem. Long ago MELTZER [11] and ELLIOTT [12] established that postganglionic sympathetic denervation tended to increase the spastic tendency of smooth muscle while preganglionic section had the reverse effect. Thirty years later SMITHWICK, FREEMAN and WHITE [13] applied preganglionic denervation to the treatment of Raynaud's disease and in this condition ganglionectomy has been abandoned. RANEY has now applied this principle to the treatment of angina pectoris, claiming that it is more logical as well as safer to interrupt the vasoconstrictor efferent impulses than to concentrate on the ablation of sensory afferent paths. It should however be remembered that LERICHE has always claimed that the suppression of vasoconstrictor rather than sensory impulses is the important aim of operation for angina, and in his view ganglionectomy has succeeded in doing this. In RANEY's operation the upper dorsal sympathetic ganglia are identified after a paravertebral resection of short segments of the third, fourth and fifth ribs. The rami communicantes between the second to the fifth intercostal nerves and the corresponding ganglia are cut, while the sympathetic chain itself is divided between the fifth and sixth ganglia. The operation is attended by little shock and the only immediate complication which RANEY fears—laceration of the pleura—will be without serious effect if the operation is done under positive-pressure anæsthesia. RANEY has operated on eleven patients without a death and some of his patients have been observed for nearly two years, during which time they have been relieved of a previously crippling angina. Although it should in theory be necessary to operate on both sides in order to interrupt all the vasoconstrictor paths to the heart, this relief has been attained by operating on the left side only.

PHYSIQUE OF LONDON'S SCHOOL-CHILDREN

As part of measures taken for the supervision of the nutritional condition of elementary school-children, and the selection of those in need of special investigation or special feeding, the London County Council made arrangements in 1935 for the measurement of the height and weight of all school-children twice a year. Since over 400,000 children attend the council's schools the amount of data thus accumulated with regard to their physique is enormous, and its analysis would clearly allow some interesting questions to be answered. For instance, to what degree do the children of the poorer boroughs differ in their measurements from those of the more fortunate areas, and how far has the undoubted improvement in physique progressed in the last quarter of a century? For this, and other purposes, the council directed that a statistical analysis should be made of a sample of some 100,000 records of the year 1938 and the results of this have now been issued by Sir Frederick Menzies.[1] The last investigation of this kind was made in 1905–12 and comparison of the two sets of data gives most instructive results. It shows that the London children of today when they enter school life are, on the average, rather more than 2 in. taller and 5 lb. heavier than their predecessors of 25–30 years ago. In other words, the average child of 5½ in 1938 was as tall as the average child of 6½ in 1905–12 and about 1½ lb. heavier. This advantage they maintain throughout their school career, so that taking the total range of ages, 5–14 years, the figures show that there has been an average increase of 2·2 in. in the height and 7·5 lb. in the weight of boys and 2·1 in. in the height and 8·1 lb. in the weight of girls. Expressed relatively the children at each age are today 4–5 per cent. taller and roughly 10–15 per cent. heavier than the children of 1905–12. Comparison of these figures with those collected ten years previously by the Board of Education for the whole country leads also to the conclusion that the London children are about 0·4 in. taller and about 3·3 lb. heavier than English elementary school-children as a whole (allowance being made for the probable improvement in the interval between the two inquiries). There is, it may be recalled, some evidence that this larger physique is also a characteristic of the adult Londoner.[2] The larger measurements of London children were also present in 1905–12 but not so distinctly, so that it is likely that the improvement during the last thirty years has been greater in London than in the rest of the country. Although, of course, all the figures relate to elementary school-children it is a little surprising that the differences between the children of the more fortunate and those of the poorer areas are quite small. For instance, the report gives a comparison between the children of Hampstead, Lewisham and Wandsworth and the children of Bermondsey, Bethnal Green, Finsbury, Shoreditch and Stepney. The former are certainly at each age taller than the latter, but both for boys and girls the average difference is only of the order of two-fifths to four-fifths of an inch. In weight the boys of the better circumstanced boroughs are also superior at each age but only by some ¼–1 lb. With girls the differences are erratic but again mainly favour the more fortunate areas. Separate figures are given for each of the metropolitan boroughs. Statisticians will perhaps grieve that the presentation is confined to average figures. For at least the county as a whole the frequency distributions of the heights and weights observed at different ages would have been of much interest and value. It is, however, clear that improving physique and declining mortality-rates have been characteristics of the child population of London in the present century. Though much, no doubt, yet remains to be done we are steadily moving in the right direction.

11. Meltzer, S. J. and Meltzer, C. *Amer. J. Physiol.* 1903, **9**, 57.
12. Elliott, T. R. *Brit. med. J.* 1905, **2**, 126.
13. Smithwick, R. H., Freeman, N. E. and White, J. C. *Arch. Surg.* 1934, **29**, 795.

1. L.C.C. Report by the School Medical Officer on the average heights and weights of elementary school children in the county of London in 1938. London: P. S. King and Son. 1940. Pp. 22. 9*d*.
2. Physique of man in industry. Ind. Hlth. Res. Board Rep. No. 71. 1935.

ANNOTATIONS

PROS AND CONS OF LIQUID OXYGEN

IT has been an uphill fight to make oxygen available in adequate amount for every patient who really needs it. It is doubtful whether more than 10 per cent. of hospitals in this country are properly equipped for oxygen therapy, and indeed, owing to the efficiency of some of the commercial services, better conditions can often be secured in the patient's home than in hospital. There have been three major advances in oxygen therapy in recent years, all of which have widened its applications. The first is the discovery that breathing oxygen at increased pressure up to 60 per cent. of an atmosphere increases the oxygen and carbon-dioxide pressures in the tissues even in a normal animal [1] and that there is no risk of oxygen poisoning in man though pure oxygen is breathed continuously for several days.[2] In consequence many of the theoretical restrictions on oxygen therapy have been swept away, and it is false to assume that oxygen therapy can only be of value when there is some impediment to the passage of oxygen through the pulmonary alveoli. The second and third great advances were the popularisation of the oxygen tent and the development of the B.L.B. mask. Perhaps the greatest obstruction to the wider use of oxygen which now remains is the difficulty of transport. At a flow of 4 litres a minute, which is a minimum effective therapeutic dose with most types of breathing apparatus, a single patient will use over 5 cubic metres or about 200 cu. ft. of oxygen a day. This will usually come as compressed oxygen in cylinders, say two 100 cu. ft. cylinders, each of which weighs about a hundredweight. When the need for oxygen in high altitude flying was realised in the last war liquid oxygen was first used because of its lightness. Liquid oxygen can be carried in fairly light vacuum containers of double-walled metal construction. A litre of liquid oxygen liberates 800 litres of gas and weighs only about a kilogramme. Thus a day's supply for a patient would be represented by 7 kg. of liquid oxygen, to which must be added 8 kg. for the container, making a total of 15 kg. or little more than ¼ cwt. Nevertheless liquid oxygen fell out of use and none of the world's air forces is known to employ it now. This is not because liquid oxygen is dangerous to handle—the fear of burns is probably exaggerated—but because of difficulties of supply. Gaseous oxygen is a standard commercial article, liquid oxygen is not, for liquid oxygen cannot be stored for any length of time. Owing to the danger of explosion if its expansion is resisted the cap of a container for liquid oxygen is always made loose-fitting with a vent, and the oxygen evaporates at the rate of about 0·5 per cent. per hour. Moreover the apparatus necessary to convert the liquid oxygen into a form suitable for inhalation is itself relatively heavy and the final reduction in weight of the complete oxygen supply is not more than 50 per cent. In a hospital which is near a supply of liquid oxygen—and liquefaction of air and evaporation of the nitrogen to leave liquid oxygen is the usual method of manufacture of commercial oxygen—these disadvantages are less irksome and there is the great advantage of reduced porterage. The case for liquid oxygen for hospital purposes is persuasively argued in the *Presse médicale* by Cot and Genaud [3] who have devised a relatively simple and fool-proof installation for its employment on a large scale. In the same journal Reiser [4] gives pictures of an apparatus for inhalation of oxygen by the individual patient which is charged by means of liquid oxygen. Critics will note that the patient is shown inhaling from a funnel, that the apparatus is patented, and that no details are given of the mode of construction or reasons for believing it superior to the designs figured in most aviation textbooks. All the same a good case has been made out for reconsidering the use of liquid oxygen for therapeutic purposes.

1. Campbell, A. and Poulton, E. P. Oxygen and Carbon Dioxide Therapy, London, 1934, p. 12.
2. Armstrong, H. G. Aviation Medicine, Baltimore, 1939, p. 315.
3. Cot and Genaud, *Pr. méd.* April 10, 1940, p. 361.

EGGS

EVERYONE from cook-dietitian to music-hall artist is interested in the egg, but to understand the hold it has over people's imaginations one has to go further afield than the kitchen or the political platform—possibly into the realms of mythology. On April 24 the nutrition panel of the food group of the Society of Chemical Industry looked critically at the egg.

Mr. Joseph Needham, Sc.D., pointed out that while the eggs of the octopus, the newt and the frog must to some extent look after their own nutrition, the bird's egg is a type of "closed-box" structure which requires many ingenious devices in order to survive. One is the excretion of nitrogen by the embryo as uric acid rather than as urea, because uric acid can be readily deposited as crystals. The egg as eaten by occidentals is, however, in an undeveloped stage and so must contain all the materials needed for the growth of the embryo. Therefore we should expect the egg to contain in smallest compass the best materials for growth when used as food, and experiment, so far as it has gone, bears out this expectation. Miss Ethel M. Cruickshank, Ph.D., showed what these food materials are. The four proteins of egg-white when combined contain all the essential amino-acids and are of high biological value. The same is true of the two yolk proteins. In addition the egg contains iron, calcium, phosphorus and copper among the inorganic elements essential to life, and vitamins A, B_1, the B_2 complex and D. With the exception of vitamin C, then, the egg has all the "protective" material essential to human existence. It is not possible by diet to alter the composition of the egg except as regards vitamins, but the better the diet of the hen the greater the vitamin content of the egg. Mr. S. K. Kon, D.Sc., spoke of the dietetic value of the egg and showed how its proteins supplement the proteins present in cereals. Perhaps this explains the instinctive attractions of the poached egg on toast. Mr. R. B. Haines, Ph.D., mentioned the efforts made in cold-storage research to preserve not only the nutritive value but also the palatability and culinary quality of eggs. A combination of gas and cold storage makes the egg available in good condition at times when it is but slowly produced in this country and therefore expensive. "Swollen" and "flabby" yolks in cold-storage eggs, he said, are due to loss of moisture, "water whites" and "sunken" and "sided" yolks to chemical changes and "whiskers" to the growth of fungus on the shell. Finally, Miss Mary Andross discussed the high culinary properties of the egg. No mention was made of the economics of the egg, and inquiry shows that its cost outweighs its culinary and dietetic advantages. According to Sir John Orr the hen needs three times as much food as the cow to produce human food. Her fruit is therefore a luxury article compared with milk and it is unpatriotic to demand eggs in war-time. Com-

4. Reiser, C. *Ibid*, p. 367.

pared with milk, eggs as a source of energy cost 3½ times as much; of protein twice; of calcium fourteen times; of phosphorus four times; of vitamin B_1 three times as much and of vitamin C infinitely more. Only in providing iron, vitamin A (in March) and vitamin D are eggs cheaper than milk. None the less eggs are a dear source of iron—three times as dear as the best calves' liver and six times as dear as black treacle. Cheese will give vitamin A at a twelfth of the cost in eggs and tinned salmon will provide vitamin D at a tenth! Can all the king's horses and all the king's men put together the reputation of the egg as an economical food?

CONTACT LENSES

THIS war may provide the experience that is still needed to define exactly the sphere of usefulness of the contact lens. It may also dispel the last prejudices against its general use. The most obvious, and the most obstinate, fear is the risk of breakage "in" the eye, although no instance has ever been reported and the accident is almost impossible. It has been shown at the Contact Lens Centre in Cavendish-square that if a contact lens is fitted over a Negacoll mould, which very closely reproduces the size and elasticity of the living eye, the lens after repeated blows from a metal hammer remains unbroken and unsplintered, although the mould itself is squashed and destroyed. An incident that is likely to become classic happened not long ago in Germany. A certain aviator, a patient of Professor Sattler of Königsberg, fell out of his aeroplane at a great height. The only parts of the body that were not shattered when he crashed were the contact lenses which he was wearing. These were lenses of thin Zeiss type and not the more robust variety manufactured in London. It is argued, too, that concussion or blast from the firing of guns—as on the quarter-deck of a ship of war, must set up vibrations capable of shattering the glass. This reasoning, however, would apply with even greater force to the glasses of wrist-watches and spectacles, yet there appears to be no evidence that these are particularly vulnerable. Contact lenses are equally immune because, being free of internal stresses or strains, no molecular disturbance of a vibratory character, however high its amplitude, can affect them.

So far no satisfactory spectacle-frame for wear under a civilian gas-mask has been designed. Even with service respirators steaming is a serious inconvenience. For every type of gas-mask the contact lens is free from objections. It may even have a protective value against injury to the eye by gas, although this is a matter on which there is some difference of opinion. It is important to note that, whereas the Zeiss ground glass covers only the cornea and a few millimetres of bulbar conjunctiva adjacent to it, the Hamblin-Dallos lens covers almost the whole anterior eye-ball. A priori, therefore, the latter should give effective protection against droplets. Some believe that protection extends also to gas vapour, while others maintain that, owing to the great solubility of mustard gas in tears, the gas in solution would diffuse beneath the lens and, evaporation being prevented, have greater destructive effect. Obviously this is a problem that can only be solved by experiment and it would have been solved long ago had it been easier to obtain samples of gas. There are rumours, however, that the necessary experiments are about to be made at last.

During its short existence nearly 500 patients have been fitted at the Contact Lens Centre. Although the cases include such conditions as conical cornea, gas erosions, corneal nebulæ, pemphigus and so on, as well as every variety of ametropia, a visual acuity of 6/9 or better has been obtained in 74 per cent., while the percentage of patients who wear the lenses with ease and comfort all day long is still higher. This is a result that can neither be equalled nor approached in any other country. To these figures must be added those obtained by pupils trained at the centre, who are now practising in the Dominions and elsewhere, as a recent paper by Flynn[1] of Sydney testifies. Among the patients treated at the centre, almost a score, not including civil air pilots, are members of the Navy, Army and Air Force, and one of these is aphakic. No adverse report has been received from any member of the Services, in spite of the difficult conditions with which some of them have had to contend. The disadvantages of spectacles in bad weather are well known and contrast unfavourably with the behaviour of the contact lens. On many counts it may be said that, in the contest of spectacles versus contact lenses, there is substantial backing for the contact lens.

ARTIFICIAL PNEUMOTHORAX IN CHEST INJURIES

THE extreme vascularity of the lung tissue makes it surprising that hæmorrhage from the lung, as a result of disease or injury, is not more often fatal. For this we must thank the relatively low pressure of the pulmonary circulation and the elasticity of the lung substance itself. If the attractive force of the pleural cavity is released the lung contracts centripetally and in so doing reduces the area of the lesion; the contraction also allows blood-vessels to close and become kinked, which further helps to arrest the hæmorrhage. The value of artificial pneumothorax for severe hæmoptysis in phthisis is admitted, but its employment in other types of hæmorrhage is not so well recognised. On another page Dr. Kretzschmar, as a result of experiences in the Spanish civil war, advocates this procedure in certain chest wounds where there is damage to the lung. Penetrating injuries almost always result in some degree of pneumothorax and hæmothorax and these complications exercise a controlling effect on the actual site of the bleeding. The retraction of lung reduces the extent of the damaged area, and the air and blood form a kind of pressure pad which resists the out-pouring. The site and size of the lesion determine whether the hæmorrhage stops or not, but in cases which reach treatment centres with signs that bleeding has not ceased the establishment of an artificial pneumothorax may be considered to ensure that pulmonary collapse is complete. The decision must largely depend on what treatment is accessible. The risk of infection of a hæmothorax is considerable and if full surgical assistance is to hand potentially infected wounds demand active attention rather than a conservative attitude, as Roberts, Alexander and Sellors lately pointed out in a symposium in the *Post-Graduate Medical Journal*. The possibility that the bleeding may be from vessels in the chest wall must also be borne in mind, and the presence of a fractured rib will sometimes suggest the source of the hæmorrhage and prevent confusion. To treat an actively bleeding intercostal or internal mammary artery with an artificial pneumothorax would be to court disaster; here only active surgery can help. If facilities for surgery are not readily available the value of artificial pneumothorax when the blood is definitely coming from the lung is more readily understood. The pleural cavity can be filled

1. Flynn, A. J. *Aust. N.Z. J. Surg.* January, 1940, p. 259.

with air in an attempt to improve the collapse and form a pad against the bleeding area. Later the blood can be removed by repeated aspirations, and Ranson [1] suggests that not more than 1000 c.cm. should be removed at a time. Air-replacement will prevent the intrapleural pressure from falling too low, which might lead to the reopening of torn blood-vessels. But after three or four days clot in the wound will probably have become sufficiently organised to withstand a pressure in the neighbourhood of 0–4 cm. of water. The maintenance of a full pneumothorax should not be encouraged after the bleeding has finally ceased. As long as infection does not supervene our efforts should then aim more at re-expansion of the lung, which may be hindered by fibrosis resulting from clot and damaged tissue actually in the lung substance.

NITROUS OXIDE WITHOUT ASPHYXIA

BEFORE nitrous oxide came to be used as an anæsthetic for long operations there was a clearer realisation of the part played in its administration by oxygen deprivation than there is today among anæsthetists who have grown up in the service of machines which give full scope for the delivery of oxygen along with the anæsthetic. Frederic Hewitt was perhaps foremost in pointing out that certain symptoms often seen during nitrous-oxide inhalation were nothing to do with that gas but were purely anoxæmic phenomena due to the curtailment of air or oxygen. Jactitation, violent stertor and the like were, he rightly held, to be regarded as warnings to remove the gas or to add air or oxygen in sufficient quantity to relieve the anoxæmia. It seems odd that it should be necessary at this late date to insist as does Murphy [2] on the undesirability of permitting anoxæmia with nitrous-oxide anæsthesia, and it is interesting that much has been written of late to show the evil, even the fatal effects, of permitting oxygen insufficiency during short and still more during long operations. We have commented [3] on the cerebral lesions that have been demonstrated post mortem when anoxæmia has been permitted and on the evidence adduced to show that these lesions are due not to any toxic action of nitrous oxide but purely to deprivation of the brain cells of sufficient oxygen. Recent investigations of maternal and fœtal blood at delivery [4] appear to show that there is some evidence of shortage of oxygen in the fœtal circulation when nitrous oxide has been administered to the mother. The evidence however is slight and the shortage slighter and there does not appear to be any good reason on this account to decry the use of gas and oxygen in obstetrics.

ALBERT CALMETTE

THE friends and pupils of Calmette have honoured their chief in a book [5] which tells the story of the man who applied the principles of Pasteur's work to the various problems of disease in men and animals in the tropics, and who sought to apply them to the conquest of tuberculosis in man. Calmette served as a medical "aide" in the French Navy in the East, in Africa, and on the French islands off the Newfoundland coast. Here he taught himself the methods of bacteriological research and on his return to France presented himself at the Pasteur Institute and enrolled himself as a worker under the Master. Within a few months he was selected by Pasteur to establish in Cochin China the first Pasteur laboratory outside France. There in addition to his administrative work he began his study of snake venoms. On his return to Paris six years later its importance was quickly recognised, and the various anti-venom institutes throughout the world are all the offspring of his work. He was barely thirty when he returned to Paris and in a few months he was appointed to organise an institute in Lille. At Lille he lived and worked for the next twenty-five years, including the four years of the German occupation. Under his energetic guidance the institute there soon became famous, especially among those interested in the scientific problems of industrial occupations and in sanitary reforms. Calmette gathered round him a body of devoted workers and friends, and while still an active director of the scientific work of the institute he became more and more wrapped up in his studies of tuberculosis, and on the methods by which immunisation could be established. At the end of the war he returned to the Pasteur Institute at Paris, and in collaboration with Guérin he elaborated the B.C.G. immunisation of infants. In England the tendency has been to regard this method as not sufficiently safe to be adopted, and the Ministry of Health has preferred to encourage other methods of prevention, but in France and other countries it has been extensively employed. No-one can read the account of his laborious studies and careful experimental work without realising the high standard of Calmette's scientific attainments. Whatever may be the final judgment as to its efficacy it is clear, now that the dust of conflict has subsided, that it represents a logical development of Pasteur's principles, that it is an advance on any previous work, and that it must be the foundation for all future work in this special sphere.

1. Ranson, *J. thorac. Surg.* April, 1940, p. 278.
2. Murphy, F. J. *Surg. Gynec. Obstet.* April, 1940, p. 741.
3. *Lancet*, 1939, **2**, 1180.
4. Smith, C. A. *Surg. Gynec. Obstet.* April, 1940, p. 787.
5. Albert Calmette. *Sa vie, son œuvre scientifique.* By Nöel Bernard and Léopold Nègre. Paris: Masson et Cie. Pp. 272. $1.15.

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We regret to announce the death of Sir GILBERT BARLING, emeritus professor of surgery in the University of Birmingham, on April 27, three days before his 85th birthday.

PREVENTION AND TREATMENT OF WOUND INFECTION

IV

ACTION OF ANTISEPTICS ON WOUNDS

BY LAWRENCE P. GARROD, M.D. Camb., F.R.C.P.
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(*Concluded from p.* 802)

SELECTIVE ACTION

It is well recognised that susceptibility to the action of antiseptics in general differs with bacterial species; that spore-forming bacteria and tubercle bacilli, for example, are exceptionally resistant, owing to their impenetrability. Other bacteria possessing considerable resistance to many kinds of antiseptic and for no such obvious reason are *Ps. pyocyanea* and *Streptococcus fæcalis*; the gonococcus, however, is easily killed. The antiseptic, on the other hand, may exhibit unequal degrees of activity, peculiar to itself, against different types of micro-organisms. These inequalities may be very noticeable; of two micro-organisms more or less equal in their susceptibility to other antiseptics, one may survive exposure to a concentration a hundred or even a thousand or more times greater than that required to kill the other. These extreme inequalities of effect are naturally only seen in antiseptics such as dyes, which act in high dilution; their effect on certain bacteria is evidently the result of some peculiar affinity. A substance such as phenol, on the other hand, is a general protoplasmic poison and acts almost equally on most types of non-sporing micro-organisms. Although striking degrees of selective action are chiefly seen among antiseptics of high efficiency—the rapiers rather than the bludgeons of this class of weapon—it should not be taken for granted that any antiseptic less crude and simple than phenol will act as well on one micro-organism as it may perhaps be known to on another. It is one of the defects of the Rideal-Walker test that its results refer only to the killing of typhoid bacilli; a similar test performed with one of the bacteria infecting wounds may yield a different result. Some essential oils, for instance, give a Rideal-Walker coefficient 5–10 times higher than that obtained when *Staph. aureus* is substituted as the test organism, and similar wide differences in action are observed with substances no more complex or potent than soaps.

Staphylococci are intensely susceptible to the violet dyes; streptococci are a little less so; most gram-negative bacteria are highly resistant to these dyes. The acridine compounds, on the other hand, exert their most powerful action on hæmolytic streptococci, staphylococci being somewhat less susceptible to them. The pneumococcus is peculiarly susceptible to Optochin. *Ps. pyocyanea*, which flourishes in the presence of many antiseptics, succumbs to dilutions of acetic acid which other bacteria can resist, and a 1 per cent. solution has been used successfully for dressing wounds infected with this organism. These are striking examples of selective action which can be turned to some practical account. This, however, can as a rule only be done in the case of an established infection in which the responsible organism has been identified, and the view to be put forward in this paper is that in this sphere of therapeutics effective treatment is much less feasible than prevention.

HABITUATION

Exposure of bacteria for more than a day or two to any of a great variety of noxious agents in concentrations not wholly lethal is followed by the multiplication only of the more resistant individuals and consequently by an increase in their capacity to withstand the treatment. This change is specific and does not involve any diminution in susceptibility to other poisons. It would therefore be advisable on this ground, if on no other, to discontinue the treatment of a wound with any antiseptic which did not achieve its effect after several days and either to substitute another or to rely on entirely different methods of treatment.

FORM OF APPLICATION

It is not within the scope of this paper to discuss surgical technique; given that the introduction of a certain substance into a wound is calculated to have beneficial effects, it is for others to decide how this should be done, and in particular how the substance should be kept there for an adequate length of time. The form in which the substance should be applied is another matter, and important theoretical as well as purely practical considerations enter into it. An example will illustrate this. Solutions of phenol in water are highly toxic in adequate germicidal strength; among other attempts to obviate this drawback recourse has been had to other solvents, including oils. A 5 per cent. solution of phenol in olive oil is bland and non-irritating and has long been used as an antiseptic, but is inert. It would indeed be surprising if toxicity for tissues were lost and that for bacteria retained, and the fact is that olive oil in which phenol is dissolved does not part with it when brought into contact with water. To dissolve or to emulsify an antiseptic in oil is usually to prevent its diffusion, except in minute traces, into a watery medium and therefore to deprive it of effect. The acriflavine emulsion of the B.P.C. is another example; this elaborate preparation is inert, although a more simple and less stable water-in-oil emulsion can be prepared from which enough diffusion takes place to exert an antiseptic action. Incorporation in a semi-solid oily basis in the form of bipp deprives iodoform of what little power it possesses to restrain bacterial growth, and most ointments possess little antiseptic power, although if made up with a "vanishing cream" base they become more effective. Generally speaking, the use of any solvent other than water, whether to secure greater solubility, to diminish toxicity, or in some way to facilitate application, entails loss of antiseptic power. This is true of glycerin and, for certain purposes at least, of spirit as a solvent; the sole advantage of this practice is to ensure rapid drying on the skin. The proper vehicle for an antiseptic to be applied to a wound is water, and the solution should if possible be rendered isotonic.

PROPHYLAXIS

It seems desirable that anyone in the habit of using antiseptics should ask himself whether or not he believes that their application to a fresh wound can prevent infection which otherwise would develop. It has been the fashion for many years to decry antiseptics, and some surgeons have little belief in them; it is indeed difficult to understand why, under such sceptical direction, they are used so freely. The explanation probably is that long-established ritual engenders a compulsion in its own favour in which reason plays no part. If the possibility of prophylactic treatment of wounds is reconsidered impartially, it must surely be admitted that prophylaxis is a very different thing from the treatment of an established

infection of a wound and should be much easier to achieve. The number of bacteria to be destroyed is comparatively small, and they are in the wound cavity, more or less accessible to application from without. Both from observations on experimental wounds and by analogy with the lag period in cultures it can safely be concluded that proliferation of the bacteria and invasion of the tissues will not occur for two hours or more. During this period an antiseptic has a task to achieve which is simplicity itself compared with that which may face it on the following day, about which no more need be said than that it involves a depth of penetration of the tissues of which no known antiseptic is capable even to reach the now enormous numbers of invading bacteria. If antiseptics cannot at least in some circumstances prevent infection of a wound, or greatly diminish its severity, they have no place in the treatment of wounds at all.

The prevention of infection does not necessarily require that all the bacteria contaminating a wound shall be destroyed. It has been amply demonstrated by experiment that there is a minimal infecting dose, varying with the degree of virulence of the micro-organism at the time and with the resistance of the host, expressible in terms of bacterial numbers; a number less than this can be dealt with by the body. Even to reduce the bacterial population of a fresh wound without altogether eliminating it can therefore be of service. What may be much more important is the fact that exposure to no more than sublethal concentrations of certain antiseptics for only a few minutes greatly reduces bacterial virulence; this effect is known to be produced by acriflavine on streptococci.

There are clearly two policies either of which may be adopted in the prophylactic treatment of wounds. First, the effect on tissues in the wound may be disregarded for the sake of securing complete disinfection or as near an approach to this as possible. An extreme example of this is burning out the whole area of an infected needle-prick with pure phenol, or the application of a 5 per cent. solution of, or even pure, phenol to larger wounds, as practised in France in the early part of the Great War. Methods so drastic have the drawback of leaving necrotic tissue liable to further infection and in any case slow to heal. There is more to be said in favour of using antiseptics less grossly toxic but rapid and powerful in their action on bacteria; among these the less toxic coal-tar derivatives, such as cyllin, izal, and dettol, deserve serious consideration. Used in adequate strength they kill bacteria in a few minutes even in mixtures containing blood, and they cause no gross damage to tissues. Little information is available about their action on the individual cells of the body; but, if it is assumed, as is indeed probable, that they kill or damage such leucocytes as may initially be in the wound, these are in any case few and easily replaced, and it is clear from clinical experience that there is no really disastrous effect on the cells of skin, connective tissue, or muscle. A wound involving only such structures may thus be treated in this way without fear of harm. An important advantage in using antiseptics of this class is that their action is fairly rapid; irrigation of a wound for ten minutes will achieve an effect not far short of that to be obtained in a much longer period. This saving of time or, to put it in another way, the absence of any need for somehow securing prolonged contact with the wound may make all the difference between a practicable method and one which in busy times cannot be properly applied. No other class of antiseptic combines rapidity of effect with adequate activity in the presence of blood. Dyes and acridine compounds act in blood, but slowly; the halogens act quickly, but not in blood; and mercury compounds suffer some disadvantage on both of these scores. In this category of treatment of wounds, which accepts microscopic cell damage for the sake of more efficient disinfection, must be placed the use of such dyes as brilliant-green and crystal violet. If, as their staining properties suggest, these dyes persist for some time at the site of application, this property may compensate for their slower action.

The alternative policy is to insist that adequate disinfectant power shall be combined with minimal toxicity to tissues, so that if possible no damage shall be done, even to specialised and perhaps highly susceptible cells. There is no answer to this demand except in the acridine compounds. No other class of antiseptics has been shown, either by application to tissue cultures or by the study of effect on leucocytes, to be more toxic to bacteria than to cells. These compounds also have an exceptional claim in that they have been shown in carefully regulated experiments to be able consistently to prevent infection when experimental wounds in animals have been inoculated with virulent bacteria. This, in a simple skin cut, is achieved by a single application, and it may be that enough of the solution is absorbed by the surrounding tissues to ensure prolonged action. That prolonged action is necessary to secure adequate effect is the main drawback of these substances, and in ideal treatment the solution should remain in the wound cavity for an hour or more. To apply a dressing or to pack with gauze soaked in it is not ideal, because the affinity of cotton for dyes leads to the retention of the antiseptic in the substance of the dressing. Whether, in fact, tissue absorption ensures enough persistent effect to remove the need for prolonged initial treatment is a question worthy of study. Solutions of acridine compounds can be injected interstitially without ill effect, and thorough infiltration by this means of the tissues round a small but dangerously infected wound is good treatment. It is particularly indicated for punctured wounds sustained accidentally during septic operations, the track of which is narrow, inaccessible to external applications, and perhaps untraceable.

It goes without saying that extensive, deep, and irregular wounds, possibly containing foreign bodies which cannot even be located until later, present a very different problem from the clean standard cut of animal experiments on antiseptics. Where an antiseptic cannot reach it cannot act, and excision is the only measure which will deal effectively with such a condition. The opinions expressed here involve no suggestion that antiseptics can take the place of plainly indicated surgical measures; they refer only to cases in which the surfaces of a recent wound are accessible to an external application. This is not to say that antiseptic treatment is useless even in wounds of which some parts cannot be reached; when excision has perforce to be delayed, such treatment should be used for what it may be worth.

CURATIVE TREATMENT

Antiseptics are applied perhaps even more thoughtlessly to infected wounds than to fresh ones. If we do think what their effect is calculated to be, this must clearly depend on two factors: the depth from the surface which the bacteria have reached and the capacity of the antiseptic to follow them—i.e., to penetrate tissue. Studies of the penetration of tissue by antiseptics are few and incomplete, but such as there have been seem to show that a fraction of a millimetre is the limit for most of them. It is

Universities for the establishment of war-degree courses enabling students in some faculties to take their degrees in shorter periods.

TREATMENT OF VENEREAL DISEASES

In his Honyman Gillespie lecture on modern aspects of anti-specific therapy in Edinburgh last week Dr. R. C. L. Batchelor said that no-one surveying the therapeutic measures adopted in the treatment of venereal diseases could fail to be impressed by the great improvements that had taken place during the last two decades. The advance was perhaps more striking in the case of gonorrhœa than in syphilis, but even in the latter there had been noticeable advances. In 1935 the League of Nations international committee drew up a scheme for the treatment of early cases of syphilis. The general adoption by clinics of this scheme had not only stabilised the treatment but had ensured that all suitable cases should have a sufficiently intensive course of therapy. The patient received a unit course consisting of 10 weekly intravenous injections of a trivalent arsenical compound such as "914" (each injection containing 0·6 g. for men and 0·45 g. for women) and 10 biweekly intramuscular injections of a bismuth preparation (each injection containing 0·3 g. of metallic bismuth for men and 0·2 g. for women). The patient received four or five such courses, a four-weeks' rest being interpolated between each unit course. The whole course lasted 50–60 weeks. For the next two years examinations of blood and cerebrospinal fluid were made at three-monthly intervals. While a routine scheme such as this had manifold advantages it must be used with care and discretion, for individual cases required variations—age and weight and concomitant disease must be taken into consideration. Such intensive therapy was quite unsuitable for old-standing cases where tertiary lesions might be present. This was particularly so in alcoholics and in cases of liver diseases. Indeed Dr. Batchelor advised that the routine course should be used only for the treatment of acute cases.

With the introduction of the sulphanilamide compounds the treatment of gonorrhœa, he said, had completely changed. With sulphanilamide 60–75 per cent. cures could be obtained; with sulphapyridine 90 per cent. From these results, obtained in the Edinburgh clinic, sulphapyridine was considered the drug of choice. Some 6 per cent. of cases were drug-resistant and in these older methods had to be adopted. The course of sulphapyridine (in grammes) should be: 2, 2, 1½, 1½, 1½, 1½, 1, 1, 1, 1 daily. By the tenth day the great majority of cases should be cured. If no result was obtained by the 14th—18th day there was no point in continuing the drug. In severe cases it might be advisable to give an extra dose at night. It could be used in both sexes and in all types of cases, even for gonococcal conjunctivitis of the newborn and vulvovaginitis of the young girl. In these conditions he recommended doses of 0·125 g. four times daily and 0·25 g. four times daily respectively. Of the untoward results of sulphapyridine vomiting was the only one likely to cause trouble. It could often be relieved by giving 15 mg. of nicotinic acid daily, or if this failed parenteral administration of the sulphapyridine could be tried. If a thorough course of treatment was given such complications as stricture, arthritis and so on should be very rare. The probable cause of the high relapse-rate reported from some clinics was the failure to realise that infection of the prostate, Littré's glands or Bartholin's glands required local treatment as well as sulphapyridine. The three-month test of cure must still be employed.

As regards the special problems that were likely to arise from the war Dr. Bachelor held that, prevention being better than cure, the instructions given with regard to immediate swabbing of the genitalia with potassium bichromate and the wider use of condoms were beneficial steps. The general morality would not be lowered since fear of venereal infection in no way reduced the incidence of promiscuous intercourse. Treatment with sulphapyridine greatly reduced the length of treatment in gonorrhœa, while the proper organisation of clinics for syphilis allowed soldiers who were underging intensive therapy to remain on active service.

IN ENGLAND NOW

A running commentary from our peripatetic Correspondents

I BELIEVE—though I have no statistics to support my belief—that wars increase the volume and improve the art of letter-writing, and that despite the Chancellor of the Exchequer. Besides the letters to and from husbands, fathers, sons and sweethearts in the Services, there is among us civilians a strengthening of family bonds and a greater desire to hear how our relatives and friends are faring and reacting to the changed order of things. Separation of children from their parents through evacuation schemes has also produced its flood of letters; the eldest member of our family, aged nine and now in Devon, writes a dutiful letter every Sunday, and even at that tender age one sees a steady improvement in the letter-writing. Perhaps the thought that I, too, in my younger days used to write every week to my mother was one of the stimuli which have set me writing to her more regularly again. Now, as far as letter-writing goes, I am ordinarily as lazy as my neighbour, but having overcome the primary inertia I take some pains and pride in trying to write a "good" letter. Indeed, if truth be told, I find almost as much pleasure in the letter well written (as I imagine!) by me as in those I receive from my friends. All of which leads up to the point that in response to the latest of my filial epistles telling of the effects of meat-rationing on us townspeople my mother has sent me a week's menu of the kind of food that was—and probably still is—the staple diet of the farming folks in the north-east of Scotland. It is a menu which would delight the heart of Sir John Orr and I give it more or less as it was written down.

Sunday.—Breakfast: oatmeal brose with creamy milk, oatcakes, home-made scones, butter, syrup, tea. Dinner: Scotch broth, butcher meat, vegetables (potatoes, turnip, peas, cabbage), apple-dumpling, home-made ale. Supper: high tea with fish or eggs.

Monday.—Breakfast: as on Sunday and every other day. Dinner: broth (second-day), potatoes, milk-pudding, oatcakes, milk (these last two form part of every midday and evening meal). Supper: porridge, scones, jam.

Tuesday.—Dinner: potatoes done in the oven with fat from Sunday meat, junket and cream, cheese. Supper: milk-porridge.

Wednesday.—Dinner: potatoes, mustard sauce, scones and jam. Supper: tapioca pudding and cream.

Thursday.—Dinner: mashed potatoes with oatmeal stuffing,* rice pudding. Supper: pease-meal brose and cream.

* The doric equivalent is "chappit tatties and skirley."

Friday.—Dinner: milk-rice soup, cheese. Supper: potatoes and salt herring, scones and syrup.
Saturday.—Dinner: potato soup (made with meat-bone), rice pudding. Supper: porridge, fish.

You will note that butcher meat (which alternated with poultry) figures in the diet-sheet only on Sunday, and even then only a limited ration was available to each member of a household which seldom numbered less than a dozen. "With sufficient milk, vegetables and potatoes there need be no malnutrition. With sufficient bread, fat, potatoes and oatmeal, there will be no starvation": Orr and Lubbock. Generations of hardy and healthy farm-workers in the north-east of Scotland endorse these statements.

• • •

We are getting very fond of our gas-bags. Gilded by the horizontal rays of the rising sun all turned the same way they look like the ram-headed statues of Amon at Karnak. But they take on all sorts of forms according to the light and the way the wind is blowing—two fat maggots, or sheep lying in the fields and especially the old one that kept a shop in *Alice Through the Looking-glass*. When they are pulled down and part deflated they look for all the world like bulgy elephants with floppy ears. In a mist or behind midday clouds they resemble all the denizens of the sea. In winter we did not notice them much. I do not think we look up at the heavens when they are grey, but now they are blue with white clouds again we begin once more to take an interest in our barrage. The most glorious adventure of all was when one was chasing the moon, and she nearly in her first quarter was running away with her head turned sideways roaring with laughter as he tried to catch her.

The number of names they have acquired show their popularity. Some have applied the collective name to the individual and called them "barrages." Our Mary who is deaf and cannot read has heard this and calls them "garages." Children have been heard to speak of the "heavenly cows." One good lady that I met referred to them as "Blimps," but we who saw their predecessors stick to the old word and name them "gas-bags."

• • •

The Chancellor of the Exchequer has enjoined us to save all we can and lend it to the Government. So far, so good. But are we to do this with all the money (if any) we are able to save? I quite understand that I ought to renounce sherry, a foreign product which has to be brought in ships required for more urgent services; and I suppose the same applies to tobacco. But what of whisky, beer and gin which are home-grown? Have they been taxed to discourage me from buying them, or is it my duty to buy and consume them in the largest possible quantities? Ought I to write more letters or fewer now that postage has been increased? If I squander money on luxuries I am unpatriotic; but if, on the other hand, I buy no British-made luxuries I help to create poverty and unemployment among the producers thereof. It is all very difficult; or, rather, it would be if I were saving money.

• • •

We are proverbially creatures of habit; a recent one of mine (and of others I could mention) has been to arrange my Saturdays so as to leave the hour from 8–9 P.M. free at all costs for listening to "Garrison Theatre." Mr. Shadwell's guest artistes may be a mixed bag but about his permanent cadre of entertainers there can hardly be two opinions; the stentorian sergeant-major, the pert programme girl, and lastly Mr. Jack Warner himself whose refreshing humour epitomises the indomitable spirit of Cockaigne with which those of us medically (and otherwise) educated in the East End of London are so happily familiar. Only a cockney could keep his end up as Mr. Warner does and survive the snubs so mincingly and devastatingly delivered by Miss Joan Winters. Indeed, on the all too rare occasions when he scores it is almost a relief. If Garrison Theatre ends this week it will leave a gap hard to fill in the life of at least one doctor's household.

• • •

Multiple pregnancy, brought to a happy conclusion, is always a cause for parental pride. The production of even one child is often privately thought to be a miracle. Naturally the production of two, three or more at a single sitting is an indication for public as well as private wonder. Then comes the difficult task of naming the infants. Ordinary children can be called Betty or John, but not so the triplet or quadruplet. The wonder of their birth must be perpetuated. Triplets are fairly easy—Faith, Hope and Charity or Ruth, Rachel and Rebecca quickly suggest themselves. But quadruplets are more difficult. The four Evangelists, the four seasons, the four condiments (vinegar to be included in our cruet) or the four horsemen of the Apocalypse are not always apt. If one "quad" is a boy, a flavour of patriotism may be added to the triplet mixture, a method that was adopted recently in Alabama, when the coeval brother of Faith, Hope and Charity was named Franklin, after the President.

Twins are fairly common, and to be a twin does not make one so different from other children. But triplets or quadruplets are still curiosities. They start life with the handicap of feeling one of a litter. Childhood is complicated by intimate questions from complete strangers: "And what did you weigh when you were born?" they ask. "Are you all quite normal, and right in the head? Now isn't that wonderful!" Have not these children already enough to endure? Names of assembly may give pleasure to parents; but what of the child?

Societies have been formed to protect children from dirt, which most children like. Also from disease and cruelty, which are usually only transient. But nobody has ever formed a Society for the Prevention of giving Uncommon Christian Names to Children. Yet this thing is permanent. Not even deed-poll can save you. Imagine the feelings of the twins of the last war saddled for life with the name of Gallipoli and Dardanelles, perhaps even called Galley and Delly for short! To be called Charity, and frequently told you are the greatest of these, especially if you happen to be the fattest, is humiliating to the sensitive child. Pride is one of the seven cardinal sins. This sin of the parents is often visited upon the child of the multiple pregnancy. Which reminds me how awful it might be if anybody ever had septuplets. Anger, Lust, Envy, Pride, Sloth, Gluttony and Covetousness are the seven associated things that leap to the mind, but perhaps a mother's heart might insist on the seven wonders of the world, which would be even worse.

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My friend the elderly consultant is delighted at this new order about economy in clothing stuffs. He will now be able to continue to wear his suits after they have at last become comfortable. He makes his suits fit him and does not suit himself to a tailor's ideas. The reach-me-down has therefore always been as efficient with him as Cork Street. But the process takes time, and just when a suit is fitting his curves and irregularities it shows serious signs of wear. Then his wife says he must have another and sends

for the tailor. When it is delivered he does not open it and the cardboard box stands propped against a book-case for months till the tidying hand unpacks it. For a few weeks the suit hangs from his book-case; then he moves it into the wardrobe where it stays another six months or so. But there is a disadvantage in this delay for the suit is not getting any wear, and still fits as stiffly on his shoulders as when the tailor tried it on. Yet when the discussion comes, as come it must, whether the suit should be thrown away, he dates its age from the month he took it into wear, while she makes it older by nearly a year, from the day she summoned the tailor. Now he can patriotically refuse to allow another to be ordered; and she must acquiesce. Thus he saved the decrepit one he wears down at their cottage. She was beginning to demand that the one he wears on Saturday to travel down should become the cottage suit, and he was wondering how to circumvent the change. He admits minor discomforts do arise from this long wear. In the pair of trousers that he calls his "nearly best" the right-hand pocket has so long borne the weight of coppers that he must now carry them in the left. But sometimes he forgets, as when he was pocketing a hard-earned fee and three shillings rattled on the floor just as he was about to pick up the notes. The lady stared and he handed her out before he retrieved them. So also in the bus he always dives for his right pocket first, finds the hole, and then being somewhat bulky heaves himself in the other direction, to the disturbance of his neighbours, before he gets his shilling from the left. Again when he puts his spectacles into the top left-hand pocket of his Saturday-morning waistcoat, which is also deficient in its depths, they slip through and end at the lower margin where the lining joins the cloth and he has to work them up again with one hand while angling with two fingers of the other through the pocket. And he does not ask her to mend it, for if he did he feels sure it would be condemned not only for Saturday mornings but even for that pottering at the cottage which he calls gardening. Or so it was a week or so ago; now he feels the garment safe. He can even look in his wardrobe with zest, confident that however long the war lasts he will not have to buy another suit before it ends. His tailor is joining the Auxiliary Pioneer Corps.

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One of Anthony Hope's characters neatly observes that a king should know all creeds but embrace none. What is good enough for a king should be good enough for a doctor. During the Spanish civil war I happened to be attending, at one and the same time, an ardent young communist and a devout Roman Catholic lady. I heard the case for both sides expressed with fervour and eloquence, and, needless to say, I agreed with both. During the present war I have had as a patient a keen but despairing pacifist who pressed a copy of Sir Francis Acland's "Unser Kampf" into my hands. "Read that," he said, "it is the only hope for the world." I promised to do so. My next patient, a retired barrister, though confident of ultimate victory, deplored the financial cost of the war but still more the presence of the enemy within our midst. "For instance, that fellow Acland," he said, "is a public menace." More closely reasoned, realistic and practicable than "Unser Kampf" is Sir William Beveridge's recent pamphlet, "Peace by Federation?"[1] He is all for exorcising Hitlerism but points out that if Germany is smashed she will be a ready prey for Soviet communism. In his view Germany must be included in a federation as soon as she is willing to return to democracy. He does not object to his plan being called Utopian because "the choice is between Utopia and Hell." He feels that federation of kindred nations will work if the people themselves desire it, but not as a plan thrust upon them by their rulers. He has written this pamphlet "to persuade the people of this country and of her allies and of other countries to choose this plan for themselves."

1. Peace by Federation? Federal Tracts: No. 1. By Sir William Beveridge, K.C.B. London: Federal Union, 44 Gordon Square, W.C.1. Pp. 31. 6d.

PUBLIC HEALTH

Candidates for the Second Evacuation

WHEN the Government scheme for a further evacuation of school-children was propounded the Ministry of Health estimated that the number of children from the metropolitan evacuating area for whom provision should be made would be 266,900, including 160,000 from the administrative county of London. The process of registration was supported by as much publicity as possible, through the press, the B.B.C., posters and personal contact between the school staff and parents, but the response has been disappointing. During the first fortnight of March every householder in the evacuation areas was sent a leaflet offering "another chance of sending your children away" and parents were given until the end of the month to register their children. A summary now issued shows that less than 10 per cent. of the total number of children in the metropolitan evacuating area were registered. The actual figure was 43,481 out of 456,225, or 9·5 per cent. The parents of 16 per cent. of children definitely declined to register but the remaining 74·3 per cent. merely failed to reply at all. The L.C.C. think that if and when the scheme is put into operation many unregistered children may present themselves for evacuation, and if they are to be medically examined on the day of evacuation or the day before it may be necessary to add considerably to the council's medical and nursing staff. The Central Medical War Committee has therefore been approached with regard to reinforcements.

Points from Annual Reports

In the smaller boroughs the medical officer of health is always the school medical officer and has himself to do work which in larger units is delegated to numerous officers. In these small boroughs the coördination of school medicine with maternity and child welfare is complete. Dr. J. E. Spence in his school report for *Eccles* says that continuous supervision is exercised over the welfare of all children from birth up to the school-leaving age and there is no gap in the supervision of the pre-school child. This is usual in the boroughs and for this reason many borough medical officers resent having to present separate reports to the education and health committees, feeling that in doing so they divorce what they have taken much trouble to unite. In Eccles as in all districts there was some dislocation of the school medical service after the declaration of war, but it got back to normal working before the end of 1939, except that it was unfortunate in losing its school dentist, so that the dental work was still in abeyance when Dr. Spence wrote his report in March 1940. The passage in which he says that the children found

to have vermin in the head are confined to a few well-known families might have been taken from any school report, for in the boroughs head lice have become family heirlooms. No completely satisfactory way of dealing with them is known, for the offending families are usually of poor mentality.

Dr. E. T. H. Wood, of the county borough of *Bootle,* an evacuation area, was amongst the first to present his school report for 1939. In this report we get some reliable facts on the thorny subject of head lousiness in evacuated children. In 1938 a head survey of the Bootle children showed 1979 unclean out of 11,054. This is a high proportion and may mean either that the children of Bootle are below the level of freedom from nits of most towns, or that the standard aimed at is high. Probably both, for Dr. Woods says the trouble with unclean heads in evacuation was foreseen and early in 1939 a list of recidivists was prepared, brought up to date and forwarded to the medical officer of the reception area. These children, who when at home can only be kept passably respectable by the continuous action of the school medical department, would naturally be in worst condition at the end of the summer holidays and receiving households might not be aware of this or what was necessary to cleanse them and protect their own children. The preparation of lists of troublesome children was an idea which, had it been generally adopted, would have saved much recrimination, for the chief complaint of the reception areas was that they were not told what to expect and in many cases were given an erroneous impression of what they were about to receive.

Dr. Thomas Lauder Thomson in his report of *Dumbarton* county tells us that it was a very wet year, though the rainfall was distributed irregularly, from 52·80 inches in Garshake to 112·15 inches in Glen Finias. Commenting on the water supply to the county he says that most of the waters, unless treated by slow sand filtration, contain *Bacillus coli* because the supplies are derived from hillsides used for grazing. The presence of coliform bacilli in large numbers in upland surface waters points to excessive use of the catchment area for grazing purposes, which may in some instances be objectionable, but minor pollutions from this source are not of much moment and in wet districts are unavoidable unless the catchment area is kept free of animals. The year was very favourable for health; the corrected death-rate was 11·4, the birth-rate 16·1 and the infantile mortality 49. There was only one maternal death, and there were 40 deaths from tuberculosis giving the very low rate of 0·47 per 1000. The deaths from pneumonia were 63 against 94 in 1937 and those from cancer 128 against 143. An interesting matter was the recommendation of the Joint Smallpox Hospital Board that the provision of a special hospital should not be proceeded with. The county council suppressed the board and decided that one of the existing isolation hospitals should be used for the treatment of smallpox.

Old Fletton with 7721 inhabitants is the largest town in *Huntingdonshire,* which is a small and almost purely rural county with a population of 56,560. In 1938 its birth-rate was 15·2, death-rate 12·1 and infantile mortality-rate 46·2. The rate of illegitimate births, 62·7 per 1000, is high. No deaths were attributed to puerperal sepsis, but of 11 notified cases of puerperal pyrexia two died, and these were the only maternal deaths. Dr. C. B. Moss-Blundell refers to the large number of samples of milk which showed a cream-content below the legal limit. There was little evidence of added water and appeals to the cow suggest that the milk was naturally poor. He refers to the value of the freezing-point test for discriminating between milk naturally thin and milk artificially watered. In his preface he writes: "One cannot help but feel that the policy of the Milk Marketing Board to pay on quantity irrespective of quality has had a very serious effect upon the standard of milk."

Infectious Disease in England and Wales

DURING THE WEEK ENDED APRIL 13, 1940

Notifications.—The following cases of infectious disease were notified during the week: Scarlet fever, 846; whooping-cough, 603; diphtheria, 693; enteric fever, 21; measles (excluding rubella), 3592; pneumonia (primary or influenzal), 873; puerperal pyrexia, 167; cerebrospinal fever, 411; poliomyelitis, 4; polio-encephalitis, 2; encephalitis lethargica, 4; dysentery, 51; ophthalmia neonatorum. 84. No case of smallpox, cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on April 12 was 990 made up of: scarlet fever, 139; diphtheria, 159; measles, 3; whooping-cough, 66; enteritis, 55; chicken-pox, 68; erysipelas, 33; mumps, 17; poliomyelitis, 1; dysentery, 11; cerebrospinal fever, 102; puerperal sepsis, 16; enteric fevers, 8; german measles, 164; other diseases (non-infectious), 47; not yet diagnosed 101.

Deaths.—In 126 great towns, including London, there was no death from smallpox or enteric fever, 1 (0) from scarlet fever, 3 (0) from measles, 7 (0) from whooping-cough, 25 (0) from diphtheria, 26 (4) from diarrhœa and enteritis under 2 years, and 72 (10) from influenza. The figures in parentheses are those for London itself.

Fatal cases of diphtheria were scattered over 21 great towns, Birmingham reporting 3. There were also 4 deaths from influenza at Birmingham. Hendon reported 3 deaths from diarrhœa.

The Lancet 100 Years Ago

May 2, 1840, *p.* 202.

From a report of the libel action of Syme v. Lizars.

JAMES SYME, Professor of Clinical Surgery in the University of Edinburgh *v.* John Lizars, Professor of Surgery to the College of Surgeons, Edinburgh.

The pursuer, in his "Summons of Damages," contended as follows, namely, that in July or August, 1839, the defender published a book, entitled, "A System of Practical Surgery," Part II., wherein the defender did calumniously write, at page 196, the following words:—"In every operation about the anus, however unimportant it may seem, the operator cannot be too careful in averting hæmorrhage, as many have died from such neglect. Nor is it improper, as an additional warning, here to mention another case which was under the care of our Professor of Clinical Surgery a few years ago; he operated on a gentleman for a slight fistula in ano, left the part inadequately defended, and dreadful hæmorrhage ensued; the Professor was sent for, arrived, groped about in the anus with his knife, *searching for a needle in a hay-rick*—I mean, for a blood-vessel to be tied; meantime the life of the patient was saved by *deliquium animi*; but to this day the wound remains unhealed, and the unfortunate man a miserable nervous invalid, from the excessive loss of blood."

Mr. PATRICK ROBERTSON for the defender.—On the subject of *fistula in ano* there seems to be a great war raging among the doctors. They are divided into the Pluggites and the Anti-pluggites. One set are for defending with double care; another trust to the tightness of ligatures, where these are used, or, instead of compression, they trust to a little bit of lint introduced into the wound. In short, there is war *to the knife* on this great question . . . Now, the defender is a keen Pluggite, and, says he in his book, "for God's sake, take care of hæmorrhage." And then, as an additional warning, he adds, "Take care, above all, of the practice of the anti-pluggites; for in the hands even of the great Dr. Syme, such is the danger of not defending well the parts, &c." Surely there was no harm in this. . . .

The Jury, after an absence of ten minutes, returned with a verdict of £50 damages.

LETTERS TO THE EDITOR

SCIATICA AND THE INTERVERTEBRAL DISC

SIR,—Mr. Pennybacker opens his interesting paper by reminding his readers that "any new treatment for sciatica should be received with caution." There are few maladies in respect of which the reminder is more necessary, yet when we turn from it to the author's summary wherein we learn that "most cases of sciatica are due to lesions of the intervertebral disc" we may well ask whether, carried away by enthusiasm for a new discovery—ex America semper aliquid novi—he has not abandoned the critical and prudent mood in which he first put pen to paper.

Had he been content with a little less he might have carried conviction to his readers a little more. No-one will contest that a proportion of cases of chronic sciatica so-called is due to this lesion of the disc. What this proportion may be it remains for more ample experience to discover, and in the meantime no good purpose is served by a false simplification of a difficult problem.

Mr. Pennybacker further maintains that the laminectomy that follows logically as a mode of treatment upon his diagnostic conclusion has no disabling or untoward sequels. Yet in a discussion upon this subject to which he refers in his paper (*J. Amer. med. Ass.* 1939, **113**, 2019) Dr. Willems of Chicago, speaking primarily as that dispassionate spectator of therapeutic triumphs, the medical referee, stated that he had seen "several dozens" of men upon whom this operation had been performed for lesions of the disc, that they had "all sorts of complications" and that he could not get them back to work again. He ended with a plea for conservatism in treatment. While this summary statement clearly lacks the amplification we should like, it as clearly indicates that a laminectomy may not have for the patient all the attractions it possesses for the neurosurgeon.

Yet this matter of treatment is secondary to that of diagnosis. Has Mr. Pennybacker established his thesis that most cases of sciatica are due to disc lesions? I venture to submit that he has not. Of his 30 cases we are not told what proportion consisted of chronic cases that had resisted all modes of conservative treatment. It is a reasonable inference, however, that most of them were of this order; that is of a category in which the proportion of disc lesions was very probably much higher than in a similar number of acute and recent cases.

Most medical men of experience must have encountered many cases of sciatica in which an acute attack has cleared up under conservative treatment never to return, and cases of undoubted sciatica in which objective sensory loss and loss of the ankle-jerk have not been found, and in which no rigidity of the lumbar spine remained when the acme of pain had passed and examination became possible. This considerable group of cases does not come under the observation of the neurosurgeon and it is therefore not surprising that he knows nothing of their existence. To escape the difficulty of accounting for them as due to disc lesions by calling them sciatic neuralgia would be a juggling with words.

I submit therefore that there is a large category of cases of acute non-recurrent sciatica in which there are no grounds for postulating an intervertebral disc lesion. It may well be that some of these cases could give a history of trauma to the back, but trauma is a red herring that crosses many clinical trails. To take this view is not to belittle the undoubted value of the observation that lesions of the intervertebral disc underlie some cases of sciatica. It is simply to preserve a sense of proportion and to sound a note of warning against the inference that some, better armed with technique than with judgment, may be tempted to draw—namely, that most cases of sciatica should be subjected to laminectomy. If this notion ever becomes widespread it will no longer be safe for the unfortunate citizen to have a pain in his leg or in his "lower back."

I am, Sir, yours faithfully,

London, W.1. F. M. R. WALSHE.

ACUTE SUBDURAL HÆMATOMA

SIR,—Mr. Eckhoff does service in reporting his case of the acute form of subdural hæmatoma in your issue of April 12, and describes it so well that there is little to add. Most surgeons having special interest in intracranial surgery are constantly on the lookout for this remediable complication of head injury, and from a personal experience of eighteen cases I would add the following points.

1. It is not essential that there should be a direct blow on the head; any accident producing severe jarring of the whole body may cause subdural hæmorrhage. One of my patients slipped on some ice, sitting heavily on the buttocks; a second was knocked over by a large wave whilst bathing.

2. Though it is true that the hæmorrhage is usually on the same side as the larger pupil—when inequality of pupils is present—the reverse may be the case; and even if a clot be found on the homolateral side, one must remember that there may still be another on the opposite side.

3. The cerebrospinal fluid is not of necessity blood-stained or xanthochromic, and three of my cases had absolutely normal C.S.F.

4. Drowsiness is usual, but in 1929 I saw at Harvey Cushing's clinic a woman who was excitable and who talked with much vivacity and gesticulation in a completely foreign language that no interpreter could understand, in whom a fairly large subdural hæmatoma was found on the left side.

5. The tendency to bilateral distribution cannot be too strongly emphasised.

I have definite views on the best way of dealing with these cases, and for several years now have treated them as follows. The hæmatoma is sought for, as by Mr. Eckhoff, through thumb-nail trephine-holes. When the blood is clotted it is removed with gentle suction, and the cavity is then drained for 48 hours by a small rubber tube passing between adjacent scalp stitches. If the blood is fluid suction is not employed but merely drainage is established. At first this technique sounds heretical but it was evolved for the following reason. About four years ago, and within a period of six months, I had two cases of large subdural hæmatoma that were treated by the more usual method of removal and then closure. Both died, yet at autopsy nothing abnormal was to be found; and the only explanation seemed to be that the sudden decompression of the compressed brain allowed a reactionary œdema which spread to involve the medulla. Another great advantage of drainage is that there is no fear of blood re-collecting without warning. Drainage in this manner is surely better than blind aspiration.

I am, Sir, yours faithfully,

F. A. R. STAMMERS.

MENTAL ILLNESS AS A CLUE TO NORMALITY

SIR,—There are three points in Surgeon Lieut.-Commander Taylor's article on which I should like to comment. (1) He deprecates the old-fashioned differentiation between neurosis and psychosis because there is no sharp dividing line between the two. He himself "favours six arbitrary stages" between normality and gross psychosis. (2) He regards normal personality as a combination in various proportions of six behaviour patterns. (3) He suggests that these may prove to be biochemically determined.

(1) As for his six arbitrary stages, they are quite as arbitrary as, and rather more complicated than, the older differentiation between neurosis and psychosis. Many reasons have been given for this differentiation. Some are absurd, but the rest are mostly concerned ultimately with the individual's relationship with reality. There will always be a division between those patients whose relationship with reality remains more or less intact, and those in whom it is more or less disordered. This is not in the least invalidated by the fact that there is no sharp dividing line and that there are many patients in whom the distinction cannot profitably be made. Let the author make use of his six stages, but let him not deny to others the simpler division.

(2) His six facets of normality represent as he points out six patterns of reaction which are frequently observed in mental illness. It is good to demonstrate the relationship between normality and disease, but in using such labels there is a grave danger of a kind of superficial pseudo-objectivity. We have recently been presented with a series of studies of the character of Hitler in which the terms hysterical and paranoid have been freely used. I believe that, in this connexion, nothing is gained by the application of such terms, the use of which only makes it harder to reach the truth. I wonder if Dr. Taylor really thinks that by calling the conduct of Joan of Arc hysterical (plus some "hypomania" and "intelligence"!) it is thereby "simply explained." I fear that it is much too simply explained, and that such an "explanation" illustrates the limitations of all our diagnostic terms. Let us by all means use these labels when facts allow, but let us also remember that there are many occasions when the facts must be allowed to speak for themselves and cannot be translated into other terms. This applies as much to the problem of neurosis versus psychosis as to Dr. Taylor's facets of normality.

(3) With regard to the biochemical factors in personality. No doubt the biochemist will be able to offer more possibilities of treatment in the future than he has in the past. Meanwhile we must attempt to modify personality at whatever point we can reach it, and today psychotherapy still remains the most valuable weapon in our armament.

I am, Sir, yours faithfully,

Cassel Hospital, Penshurst. C. H. ROGERSON.

COMMUNAL MEALS

SIR,—I would suggest that the time has come when national and coöperative canteens should supplement uneconomic methods of home cooking. In this war, as in the last, people will be working ten and twelve hours a day. These will be chiefly the elderly men, the young people and the women. But after twelve hours work a woman does not go home and cook a joint, two vegetables and a pudding for herself and her children. She buys something (anything) at the shop round the corner. It is true that not all women will be working. A number of them will stay at home to look after their children. Let us take an average sort of case, the wife of a private with three children aged 10, 8 and 6. Her total income is 36*s.* a week (39*s.* 6*d.* in the London area). She is faced, moreover, with a steadily increasing cost of living. Unless something is done to implement this income it is hard to see how she and her family will avoid being undernourished. For a generation now we have known what war babies are. They were "difficult" in the nursery, "neurotic" at school, and as young adults they are rather less robust than their seniors and juniors. We must now prepare for another generation of war babies.

I give here the comparative costs on April 24 of a meal produced for four people and the same meal produced for a hundred, the figures being for food only, and not including fuel, labour or equipment.

	Meal for 4 people	*Meal for 100 people*
	s. d.	*s. d.*
Stewed lamb	1 4	17 9
Carrots, peas and potatoes ..	10	13 6
Prunes and custard	1 1	8 2
	3 3	£1 19 5
Cost per head ..	9¾*d.*	4¾*d.*

The present method of a hundred kitchens producing food for four hundred people is as unprofitable as a hundred village smithies producing weapons for four hundred soldiers. A scheme such as I suggest is not out of keeping with the English national character. It would be a development of the provision of meals in schools and day nurseries. If people wished, they could take food home with them to eat. The canteens would, of course, be run on a non-profit basis, the charges being simply the cost of production. Such communal marketing and cooking would make the most of the rations available, cutting waste to a minimum. Incidentally, it would make rationing itself much simpler. As doctors, I believe we should take an active part in organising and encouraging some scheme of this kind.

I am, Sir, yours faithfully,

Upper Wimpole Street, W.1. E. HERZBERG.

UNITED HOSPITALS SOCIALIST ASSOCIATION.—At a meeting held on April 23 this association was inaugurated. There were present 57 students, representing many of the London hospitals, and the chair was taken by Mr. Ruscoe Clarke, F.R.C.S., chairman of the Joint Medical Socialist Committee. Mr. Somerville Hastings, F.R.C.S., who outlined the purpose of the meeting, spoke of the necessity for relating socialist belief to the daily life of the hospital. Medical students who are interested are invited to communicate with the hon. secretary of the association, University Labour Club, 15, Percy Street, W.1.

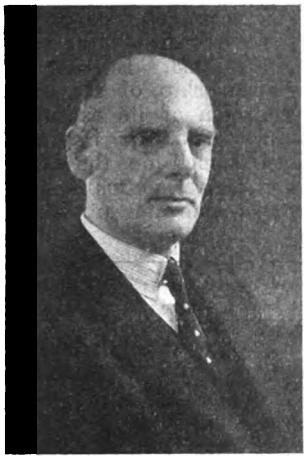
RECRUITING CENTRE FOR NURSES.—King Edward's Hospital Fund for London had arranged to set up a nursing recruitment centre last September. The project was postponed, but the centre has now been opened at 21, Cavendish Square, W.1, where it is available to all who wish to enter the nursing profession. It is staffed by state-registered nurses, who are prepared to give information on all branches of training, and individual guidance to those entering upon a nursing career. The centre will keep in touch with the training-schools, will collect and distribute information as to the various pre-nursing courses now being established as a means of "bridging the gap" between the age of leaving school and that of entering hospital, and will supply speakers on nursing as a career, who will give their services in schools and other educational centres.

OBITUARY

JOHN TATE

M.R.C.S., D.P.H.

Dr. John Tate, county medical officer of health for Middlesex, died on April 21 at the Central Middlesex County Hospital. Born at Bradford in 1880 and educated at the grammar school there, he studied at University College Hospital, London, and qualified M.R.C.S. in 1906. He held various house-appointments but he had early shown an interest in preventive medicine, and in 1908 he took his D.P.H. and obtained the position of assistant medical officer for Middlesex. He was to serve the county for the rest of his life. When he joined the staff the public-health department consisted of the county medical officer, an inspector of midwives and one clerk. To-day it numbers several thousands and it has grown upon the sound foundations laid by Dr. Tate. In 1913 he had become deputy county medical officer and in 1923 he was appointed county medical officer. When the poor-law institutions were handed over to the county council in 1929 he evolved a grading scheme of salaries and conditions of employment which have attracted the right men and women to the council's service, for he realised that a hospital's staff is more important than mere buildings and equipment. He was a past president of the Association of County Medical Officers, and he served on the Committee for the Prevention of Blindness set up by the Ministry of Health. In the last war as a captain in the R.A.M.C. he saw active service in France. Dr. Tate, a colleague recalls, had a well-balanced, logical and orderly mind, and in addition to his gifts of foresight and imagination possessed a fund of sound common sense. He had the power to a remarkable degree of being able, at a glance, to see the many aspects of a complicated problem; and then in a few lucid sentences to analyse its complexities and indicate the path along which its solution was to be found. This faculty deeply impressed all those who worked with him, and much of his success was due to his skill in explaining, in clear and logical sequence, an abstruse medical or technical problem to a lay committee. As a chief he was admirable—loyal to his council, his colleagues and his staff, by whom he was respected and loved.



Wykeham.

Dr. Horace Joules writes: Tate's zest for the complicated problems of health and hospital organisation had served to energise his frequent returns to duty during the past fourteen months. He refused to husband energy, which he felt could be more usefully employed in the work he loved. Those who feel that whole-time service of the community is enervating can never have known such a man. He spared no pains and looked facts squarely in the face. Despite a realisation of his own fate his ever-ready humour would often break a tense situation. The fortitude with which he bore months of increasing pain testified to the courage that always characterised his actions. His talks of the country, the garden, music, or the sea, were a constant delight. His incisive grasp of the basic problems of ill health enabled him to encourage in the hospitals of his county a spirit of devotion to duty which will long bear testimony to his insight.

HERBERT FRANCIS WOOLFENDEN

M.D. LPOOL, F.R.C.S.

Mr. H. F. Woolfenden died on April 10 at the age of 60, just four days after he had completed his career as honorary surgeon to the Liverpool Royal Infirmary. His health had been failing for many months from serious gastric trouble, yet he bravely faced long operation lists when obviously too weak for such an effort.

Woolfenden qualified M.R.C.S. from Liverpool University in 1904 and took his M.B. the following year. He was awarded the Thelwall Thomas fellowship in surgical pathology and after postgraduate study in London, Paris and Berlin he was appointed senior demonstrator in anatomy at Liverpool University in 1908. He left to become surgical registrar at the Royal Infirmary, and in 1909 obtained his F.R.C.S. He was a little uncertain whether the early years of struggle for consultant rank were worth while, but he enjoyed his pipe, his golf, and his work as a tutor. The war brought him work in plenty. By this time he had been appointed an assistant honorary, and he was attached to the 11th General Hospital and served as surgical specialist with several other units. He was promoted acting lieutenant-colonel and was mentioned in dispatches. In his Surgeon's Journal Harvey Cushing paid a tribute to the way he "faced the music."

Woolfenden's contributions to medical journals were not numerous but they will be remembered. He showed a keen appreciation of the truth, and terseness in expression. His interest was aroused by the inexplicable: Could the failure of simple appendicectomy to relieve pain be diminished by cæcoplication; was fundectomy the right procedure for peptic ulcer; was lead of value in cancer? His operation list often contained cases of trigeminal or glossopharyngeal neuralgia, and he became an authority on sympathectomy and thyrotoxicosis. He invented or reintroduced the split Thomas splint, and his interest in orthopædic surgery laid the foundations of that department at Liverpool Royal Infirmary.

Burrell & Hardman.

Woolfenden lost two of his best friends from septicæmia following a trivial scratch—W. S. McLellan with whom he had struck up a friendship in the old days in Liverpool before the war, and John

Campbell, his colleague and collaborator in France. In 1919 he married Miss Beryl Hughes and her death from the same disease changed his way of life.

R. K. writes: "Of him the words of Canon Dawson were true—'He was a silent surgeon seeking solace in his work'—for life had been for him a very tangled skein of brief joy and tragic grief. His silence was often harmful to himself, but it was understandable. Often a sufferer himself, he felt the sufferings of others most acutely."

He leaves two sons and a daughter who is a medical student.

JAMES JOHN DAY

O.B.E., M.R.C.S., D.P.H.

Dr. J. J. Day, who died on April 13 at Sandwich, was born in 1873 at Port of Spain in the British West Indies, the son of James John Day, professor of chemistry at Queen's College, Trinidad. He was educated at Aske's School, Hatcham, and the Middlesex Hospital, where he qualified M.R.C.S. in 1896. He held posts under the Foreign Office and the Colonial Office at Benion City and Sapeli in West Africa, and later he went south as civil surgeon to the South African Field Force in the Highland Brigade bearer company. About the turn of the century he returned to this country and for a time was an assistant medical officer under the old Metropolitan Asylums Board. He took his D.P.H. in 1902 and the following year became a partner in a practice at Sandwich. He began his public-health work as one of the medical inspectors of school-children of the Kent education committee, and found it to his liking and on his appointment as medical officer of health for East Kent and the borough of Sandwich he gave up his private practice. In 1919 he became chairman of the Kent local medical and panel committee and his work there became one of the main interests of his life. His "Defence of the Panel System" was published in the *English Review* in 1923. In 1927 on his resignation from the chairmanship of the committee he was appointed chairman of its executive body and he held this office until 1935. Dr. Day also represented the Kent county council on the Kent insurance committee and was active on many sub-committees. He married Mabel, daughter of W. J. Gordon, who survives him.

PARLIAMENT

ON THE FLOOR OF THE HOUSE

By MEDICUS, M.P.

THE House, which began consideration of the Budget last week and had two days of general debate, has continued its discussions this week and shown much more desire to prepare, nationally prepare, for action on a big scale rather than to cut down taxation. Indeed, the complaint has been rather that we have not had sufficiently drastic taxation. The desire is expressed on all sides to get on with the job more and more vigorously. Sir Herbert Williams complained of the delay and said that "the administrative methods now being pursued in all Government departments are a crying scandal." Strong dissatisfaction is expressed always now if things do not go quickly enough. There have been mutterings too about the Communazi activities in this country and the need of tightening up control of anti-national activities. There has been some adverse criticisms of special features of the Budget but as questions of detail only and not with the desire to escape even heavy payments.

Mr. A. V. Alexander, winding up the general debate last week, emphasised the unity of the nation and said that the world must understand that the whole nation would put its weight behind the national effort. When Sir John Simon replied he thanked Mr. Alexander for his "well-chosen declaration." "A foreigner," said the Chancellor, "must think this a very curious country, for I believe it to be completely true that there has never been such fundamental unity amongst us as exists today." The curious feature of the Budget debate has been the complaint of too little taxation. Sir John Simon has added 100 million but members demanded 1000 million and this cannot be raised by taxation in the ordinary way.

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We have moved away from the ordinary taxation budget to the national economy budget. The questions to be decided, although expressed in the budget in terms of money, are questions of large-scale control of economic resources and of man-power. We are not moving in the Nazi or Communist direction but we are moving to the British form of national organisation in which a main feature will be the reliance on voluntary organisation. What was not mentioned in the debates, except obliquely, was the more intensive organisation of our internal resources, but it is certain that we shall have to use all "surplus" voluntary labour and all "surplus" unused resources of land or manufacturing capacity.

The organisation of aid to agriculture through the holiday labour of schoolboys at secondary and public schools between the ages of 14 and 17 under the auspices of the Ministry of Agriculture is an example of the use of these resources. The unoccupied middle-class or retired person will also be asked to do his bit. The allotments and back-garden production of food will probably spread yet more widely and the question is being asked: "Why should not all schools grow a large part of the food for the girls and boys attending them by using the labour of these pupils?" This could be done easily in many places. A great increase in subsistence food production would save the tonnage of many ships.

The spread of the war to Scandinavia, and the threat of the spread of war elsewhere have been at the back of many of these speculations. The taking into the Army of more and more age-groups of militiamen spreads the realisation of the vastness of the war effort over more and more people in the nation. And what is particularly interesting is that convinced pacifists of pre-war days who have been sincere and consistent advocates of avoidance of war by peaceful diplomacy are now openly admitting that a real peace cannot now be negotiated. The Labour Party has been circularised with a letter from the secretary of the French Socialist Party describing the Communists there as acting against the interest of the nation and as attempting to divide the Allies by seeking to turn French public opinion against Britain.

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It has been almost a relief to get away from these intense issues to the question of workmen's compensation, a matter which, however heatedly discussed, is at least of normal type and species. The bill brought forward by the Government is called the Workmen's Compensation (Supplementary Allowances) Bill, but it has been adversely criticised because

of its cheeseparing provisions and because of its prudery. Government departments in general make provision for the "unmarried wife," or, to use the Archbishop's phrase, "unmarried dependant living as a wife." But not the Home Office. Oh dear me, no! Nor if a man marries after an accident are allowances payable. But if he was married then his wife will get 5s. a week and "legitimate" children an allowance at a rate not exceeding 3s. a week.

The bill may fill a gap temporarily but it does not deal with workmen's compensation in a way to meet expert medical and legal opinion and certainly not in a way to meet House of Commons opinion. Mr. Greenwood condemned it, Miss Rathbone spoke of its creation of "gratuitous anomalies," and, worst of all from the Government point of view, Sir Arnold Wilson, who moved an amendment when the matter was before the House before which saved the Government's bacon, was against it. Sir Arnold roundly declared that he did not believe that the Home Secretary had had any real discussions with the leaders of industry. He seemed sure that they had consulted the Accident Offices Association but thought their opinion unrepresentative. The accident offices, he said, were wholly unaware that there was a social problem as well as a technical one. Sir Arnold had an alternative suggestion—namely, that the great representative employers should ask the Accident Offices Association to place before them scales outside and beyond the act enabling them to pay compensation at higher rates up to 75 per cent. of wages. Contracting-out powers existed in the act and Sir Arnold thought that employers would be willing to pay extra premiums. A doubling of benefits would be got by a 25 per cent. addition to premiums. Sir Arnold ended by quoting Ecclesiasticus about a good man who has taken a wrong turning and asked the Home Secretary to repair the error he had committed. For this bill Sir Arnold could not vote but he hoped to come back from where he is serving in the Air Force to vote for the third reading of a better bill.

In the House of Commons on April 23 the Royal Society for the Prevention of Cruelty to Animals Bill and the King Edward VII National Memorial Association Bill were read the third time and passed.

QUESTION TIME

Supplementary Rations

Mrs. J. L. ADAMSON asked the parliamentary secretary to the Ministry of Food whether he had yet received the Medical Research Council's advisory committee's report on food rations in regard to the requirements of invalids and expectant mothers on special diets for supplementary rations.—Mr. A. T. LENNOX-BOYD replied: The advisory committee have considered the need of invalids and expectant mothers on special diets for supplementary rations and have expressed the opinion that under present conditions only in the case of persons suffering from diabetes mellitus is any variation required. In such cases additional meat coupons can be obtained on the surrender of sugar coupons.

Milk for Children

Mr. F. MESSER asked the President of the Board of Education whether, in view of the danger of malnutrition amongst school-children arising from rationing and rising costs, he would make provision for the supply of free milk to all school-children.—Mr. H. RAMSBOTHAM replied: The existing law does not admit of the supply of free milk except to necessitous under-nourished children, but in nearly all public elementary schools milk is available under the milk-in-schools scheme at less than half the ordinary retail price.

Mrs. ADAMSON asked the Minister of Health whether he had yet reached an agreement satisfactory to distributors and consumers with the Milk Distributive Committee so that the arrangements outlined in circular 1840 extending the school milk scheme to children under five years of age and to expectant mothers could be put into immediate operation.—Mr. WALTER ELLIOT replied: I regret that I am not yet in a position to make a statement.

Notification of Measles

Mr. GROVES asked the Minister whether the notification of measles was intended to include that of the variety commonly known as German measles.—Mr. ELLIOT replied: No, Sir.

Rank of Conscripted Doctors

Mr. R. W. SORENSEN asked the Minister of Labour and National Service whether all medical practitioners who were now to be called up for military service according to their age-groups were given a commission; what was the position of such medical practitioners when they decline a commission; and whether those who so decline would be compelled to serve in a non-medical capacity in the ranks or would be allowed to continue medical work of a civil character.—Mr. ERNEST BROWN replied: No medical practioner will be called up for military service without being offered a commission as a medical officer. I cannot believe that medical practioners called up in these circumstances would decline to accept a commission, but if such a case should arise the man concerned clearly could not be allowed on that account to escape his liability for military service.—Mr. SORENSEN: May I take it that if a medical practitioner does refuse a commission he will be called upon to serve in the ranks?—Mr. BROWN: He will have his liability to military service subject to the general law, which applies to all in the same way.

Mr. T. E. GROVES asked the Secretary of State for War whether, as the rank held in previous R.A.M.C. service was to be taken into account in fixing the present rank of officers in that corps, he would consider giving credit and promotion accordingly to men who held commissioned rank as combatants in the last war and who were now doctors.—Mr. OLIVER STANLEY replied: It is not considered that previous commissioned service in other branches of the Army should be reckoned as equivalent to previous commissioned service in the R.A.M.C. for the purpose mentioned, but such service is, nevertheless, taken into special consideration when R.A.M.C. officers are selected to fill appointments carrying acting higher rank.

Extension of National Health Insurance

Mr. G. N. GARRO-JONES asked the Secretary of State for Scotland whether he was considering the representations from Scottish health insurance committees urging that arrangements should be made to provide medical treatment for dependants of insured persons serving with the forces.—Mr. D. J. COLVILLE replied: The conclusion reached by the Government is that they cannot fairly distinguish for this purpose between dependants of men serving with the forces and dependants of insured persons in civil occupations. The question of extending medical benefit to the dependants of all insured persons has been sympathetically considered from time to time, but the Government do not consider that in present circumstances they would be justified in proposing so far-reaching a development of social policy. The reply, therefore to the representations which have been received must be that the Government are unable to adopt the suggestion made. I should add that in the great majority of cases the pay and allowances provided by the service departments should be sufficient to enable the cost of medical treatment to be met and that the War Service Grants Advisory Committee have power to supplement such pay and allowances in cases of exceptional hardship.

Mr. D. J. B. JOEL asked the Minister of Health whether he would take steps to arrange that the temporary war allowances granted to meet the increased cost of living should be excluded from the calculations of remuneration for national health insurance, and that the limit of income for compulsory insurance in respect of non-manual workers should be raised from £250 to £400.—Mr. ELLIOT replied:

I have no power in the absence of amending legislation to adopt the suggestion contained in the first part of the question. As regards the second part, I would refer Mr. Joel to the reply given by the Minister of Labour on Feb. 20. The decision then announced covers national health and contributory pensions insurance as well as unemployment insurance.

Emergency Medical Service

Mr. T. E. HARVEY asked the Minister whether any county council or borough council had been authorised or given powers to appoint a medical officer in charge of air-raid precautions medical services and delegate to him the complete responsibility for such services in independence of the medical officer of health for the county or borough.—Mr. ELLIOT replied: The precise relation to the medical officer of health of any medical officers appointed by a local authority in connexion with air-raid precautions services is a matter for the authority, but it is generally accepted that the responsibility for the casualty services should rest with the medical officer of health.

Soldiers and Sick-leave

Captain S. F. MARKHAM asked the Secretary of State for War if he could make a statement clarifying the position with regard to sick-leave for the home forces and the British expeditionary forces.—Mr. STANLEY replied: Sick-leave is granted on the recommendation of the medical authorities, and, provided that the sickness is not due to the patient's own fault and that the medical officer considers it necessary for the patient to go home, a free warrant is given.

Complications of Vaccination

Mr. ALFRED EDWARDS asked the Minister (1) whether he was aware that Dennis Barnes, who died a month after vaccination, stated to his relatives that he was one of several men who indicated when paraded for vaccination that they objected, and that it was only because they were informed that they would lose pay if they were not vaccinated and became ill, and would be put on fatigues at once, that they consented; and would he take steps to see that intimidation of this sort was put an end to, and (2) if, in view of the fact that in several cases of postvaccinal encephalitis inquired into by the Rolleston Committee on Vaccination the vaccination wound had practically healed before encephalitis developed, why no inquest was held to ascertain how the streptococcal infection entered the late Gunner Barnes's system.—Mr. STANLEY replied: I have been definitely assured that no form of threat or pressure was used in this case. The decision not to hold an inquest was made by the coroner in the light of the pathologist's report. The soldier's death was not due to encephalitis, but to streptococcal infection.

Mr. GROVES asked the Minister of Health how many cases of encephalitis following vaccination had been reported during the last year; and how many of these had been serving soldiers or sailors.—Mr. ELLIOT replied: Six such cases came to the notice of my department during 1939, of whom three were serving soldiers.

Miners and Silicosis

Mr. JAMES GRIFFITHS asked the Secretary for Mines if he was aware of the fact that, during 1939, 91 miners were certified to have died of silicosis and 355 were certified to be disabled by the disease in the South Wales coalfield; and what special measures were being taken to reduce the incidence of the disease.—Mr. GEOFFREY LLOYD replied: I am aware of the position as regards silicosis among miners in South Wales and my department is collaborating fully with the Medical Research Council in the large-scale investigations which are being made there. H.M. Inspectors are continuing to promote the adoption and improvement of a variety of methods for the prevention and suppression of dangerous dust and an additional inspector attached to the staff at the Mines Department has been appointed to devote his whole time to giving further help in dealing with the difficult technical problems involved.

Mr. GRIFFITHS asked if it was proposed that these representatives would issue a separate report on the preventive measures which might be necessary.—Mr. LLOYD said that with regard to the Medical Research Council investigation he thought, subject to advice, that that was so.

Industrial Health Research

Mr. RIDLEY asked the Home Secretary whether his attention had been drawn to Emergency Report No. 1 of the Medical Research Council Industrial Health Research Board; and whether he proposed to take any action in connexion with the recommendations contained therein.—Sir JOHN ANDERSON replied: Yes, Sir. The Home Office is represented on the Industrial Health Research Board, and I called attention to the importance of this report in a reply which I gave on April 18 to a question by the Member for London University. Action on the recommendations is a matter for all those who are responsible for the organisation and management of industry, but the Home Office is taking steps to ensure that the report shall be made widely known and the factory inspectors will of course continue to do their share in securing that progress is made in those matters which fall within the provisions of the Factories Act, such as lighting, ventilation, temperature and safety precautions.

Vacancies

Aberdeen Royal Infirmary.—Gynæcological registrar, £300.
Altrincham, St. Anne's Hosp.—Res. surg. O., at rate of £200.
Ashford, Grosvenor Sanatorium.—Third asst. res. M.O., at rate of £100.
Birmingham City.—Res. asst. M.O. for Monyhull Colony, £350. Also asst. res. M.O. for Erdington House, £300.
Birmingham and Midland Hosp. for Women.—H.S., at rate of £100.
Birmingham United Hosp.—Res. surg. reg., £100.
Bradford Royal Eye and Ear Hosp.—H.S., £180.
Brighton County Borough.—Tuberculosis officer and asst. M.O.H., £800.
Bristol Royal Hosp.—Res. anæsthetist, £250.
*British Postgraduate Medical School, Ducane Road, W.*12.—Obstet. H.S. and five H.P.'s, each at rate of £105.
Cardiff, King Edward VII Welsh National Memorial Association. Asst. res. M.O. for South Wales Sanatorium, £200.
Chester Royal Infirmary.—H.S.'s, £150.
Chichester, Royal West Sussex Hosp.—Jun. H.S., £125.
Devon County Council.—Deputy county M.O., £750.
Dudley Guest Hosp.—Cas. H.S., £150.
Durham County Council.—Jun. res. M.O. for Seaham Hall Sanatorium, £200.
Edmonton Borough.—Asst. M.O.H. and asst. school M.O., £550.
Glasgow Royal Mental Hosp.—Jun. asst. M.O., £300.
Great Yarmouth County Borough.—Asst. M.O.H. and asst. school M.O., £500.
Halifax County Borough.—Asst. M.O.H. maternity and child welfare, £500.
Hertford County Hosp.—H.P., at rate of £150.
Hull Royal Infirmary.—Cas. O., at rate of £150.
*King Edward Memorial Hosp., Ealing, W.*13.—Cas. O. and deputy res. M.O., at rate of £225.
Lancashire County Council.—M.O.'s, £200.
Liverpool Hosp. for Consumption and Diseases of the Chest.—Res. M.O., £150.
London County Council.—Temp. asst. M.O., Class I, £350.
Manchester City.—Res. asst. M.O. for Crumpsall Hosp., at rate of £200.
Manchester, Duchess of York Hosp. for Babies.—Sen. res. M.O., at rate of £175.
Newcastle upon Tyne, City and County.—Res. med. asst., at rate of £250. Also H.P.'s and H.S.'s, at rate of £200 and £150, for spec. hosps.
Newport County Borough.—Jun. asst. res. M.O. for public assistance hosp., at rate of £200.
Newport, Mon, Royal Gwent Hosp.—Cas. O., at rate of £175. Also H.P.'s and H.S.'s, at rate of £160 and £150 respectively.
Northampton County Mental Hosp., Berrywood.—Med. supt., £900.
Nottingham General Hosp.—Res. cas. O., at rate of £150.
Nottingham Hosp. for Women.—H.S., at rate of £150.
Oldham Royal Infirmary.—Res. surg. O., £400
Preston and County of Lancaster Queen Victoria Royal Infirmary. Two H.S.'s to spec. depts. and res. anæsthetist, each at rate of £150.
Reading, Royal Berkshire Hosp.—Cas. O., at rate of £150.
Rochdale Infirmary and Dispensary.—Second H.S., £150.
Rochdale County Borough.—Temp. res. M.O., £350.
*Royal Chest Hosp., City Road, E.C.*1.—H.P., at rate of £200.
Sheffield Royal Infirmary and Hosp.—Anæsthetist, £350.
Sheffield Royal Infirmary.—Res. H.S.'s, each at rate of £80.
Taunton and Somerset Hosp.—H.P., at rate of £125.
Warwickshire and Coventry Joint Committee for Tuberculosis.—Temp. first asst. M.O. at Memorial Sanatorium, £350. Also jun. asst. M.O. for Memorial Sanatorium, at rate of £250.
West Hartlepool, Cameron Hosp.—H.S., £150.
*Westminster Hosp., St. John's Gardens, S.W.*1.—Physician for diseases of the skin.
Wolverhampton Royal Hosp.—H.S.'s and cas. O., each at rate of £100.

MEDICAL NEWS

University of Oxford

On April 26, the degree of D.M. was conferred on G. A. Hodgson.

University of Cambridge

On April 27 the following degrees were conferred :—

M.D.—*B. S. Jones.
M.B., B.Chir.—*P. G. H. Gell, *J. H. P. Gauvain, *G. H. P. John, *R. D. Kennedy, *T. J. A. Phillips.
* By proxy.

On May 6 at 5 P.M. Prof. W. W. C. Topley, F.R.S., will deliver the Linacre lecture on Authority, Observation and Experiment.

University of London

At recent examinations the following were successful :—

D.P.M.

Special Knowledge of Mental Diseases.—J. D. N. Hill and R. E. D. Markillie.

Special Knowledge of Mental Deficiency.—M. S. Rayner.

Part A.—Jaime de Bastarrechea, Helen Baker, Rankine Good, and Matthew Radzan.

University of Wales

At recent examinations the following were successful :

D.P.H., Part I.—Sonia D. Dymond, Gladys M. Herbert, Margaret H. Vickery, Llary M. Williams, and Mary Williams.

Royal College of Physicians of London

At a meeting of the college on April 25, with Sir Robert Hutchinson, the president, in the chair, Mr. Walter Elliot, Prof. Édouard Rist (Paris), Prof. Alan Brown (Toronto), and Dr. W. E. Gye were elected fellows under by-law XXXIX(b). The following members were elected fellows :

Sydney Fancourt McDonald, M.D. (Brisbane); Douglas Murray McWhae, M.D. Mel. (Perth); John Wycliffe Linnell, M.D. Camb. (London); Guy Austin London, M.D. Adelaide (Adelaide); Cyril Carlyle Beatty, M.B. Lond. (London); Wilfrid Burton Wood, M.D. Camb. (London); Joseph Bamforth, M.D. Liverpool (London); Calvert Merton Gwillim, M.D. Lond. (London); Herbert Victor Morlock, M.D. Lond. (London); Alexander Lyall, M.D. Aberd. (Aberdeen); Thottakat Bhaskara Menon, M.D. Madras (Madras); Shankar Sahai Bhatnagar, M.D. Lausanne, Major I.M.S. (Kasauli); William Brockbank, M.D. Camb. (Manchester); Wilfrid Fletcher Gainsford, M.D. Lond. (Birmingham); Hugh Walker Gordon, B.Chir. Camb. (London); Samuel Levy Simpson, M.D. Camb. (London); Frederick Horace Smirk, M.D. Manc. (Dunedin); Geoffrey Sydney Todd, M.B. Sydney (Midhurst); Stanley Jack Hartfall, M.D. Leeds (Leeds); William Arklay Steel, M.D. St. And. (Hillingdon); John Richard Hugh Towers, M.D. Camb. (Leeds); Ernest Rohan Williams, M.D. Lond. (London); Thomas Benjamin Davie, M.D. Lpool (Liverpool); Walter Montague Levitt, M.D. N.U.I., (London); Eric Gordon Oastler, M.B. Glasg. (Glasgow); Edward Weston Hurst, M.D. Birm. (Adelaide); Paul Hamilton Wood, M.B. Mel. (London); Frederick Murgatroyd, M.D. Lpool (London); Kenneth James Franklin, M.D. Oxfd. (Oxford); Thomas Shirley Hele, M.D. Camb. (Cambridge); Lionel Everard Napier (Calcutta); Leybourne Stanley Patrick Davidson, M.D. Edin. (Edinburgh); Arthur Rupert Hallam, M.D. Edin. (Sheffield); and Harold Edward Whittingham, M.B. Glasg., Air Vice-Marshal R.A.F.M.S. (Wendover).

Dr. N. B. Capon was appointed Milroy lecturer for 1941, his subject will be the principles underlying the influence of prenatal and neonatal health upon later life. Dr. George Graham will deliver the Croonian lectures on recent work on diabetes mellitus at the college at 2.30 P.M. on May 16 and 21.

The following were admitted to the membership :—

Alexander Arthur Alderdice, M.B. Sydney; Charles Anderson, M.B. Lond.; George Herbert Harry Benham, M.B. Manc., L.R.C.P.; Austin William Byrne, M.B. Lpool.; Charles Harry Catlin, M.D. Birm.; Philip Richard Kendall Coe, M.B. Lond.; Robert Cruickshank, M.D. Aberd.; Mohamed Abdel-Halim El-Okbi, M.B. Cairo; William John Strachan Ewan, M.B. Aberd.; Malcolm Weld Fletcher, M.B. Adelaide; Edward Brodie French, M.B. Camb.; Anderson Garland, M.D. Lond.; Nansi Eirlys Harry, M.B. Wales; Rupert Desmond Charles Johnstone, M.B. Lond.; Denis Dalmain Keall, M.B. Camb., Lieutenant R.A.M.C.; Franklyn Holt Lloyd, M.D. Florence; John Edward Lovelock, M.B. Oxfd.; George Edward Maloney, M.B. N.Z.; Samuel Oram, M.B. Lond.; Ralph George Park, M.B. N.Z.; Robert Johnstone Porter, M.B. Camb.; Leo Rau M.D. Berlin; Charles Graham Riley, M.B. N.Z.; Allan Thomas Marsh Roberts, M.B. Lond.; Mark Andrew Rugg-Gunn, L.R.C.P., Surgeon Lieutenant R.N.; Herman David Ruskin, M.B. Witwatersrand; Georgy Petros Ghattas Sobhy Bey, M.D. Cairo; George Lees Taylor, M.D. Manc.; Helen Margaret Taylor, M.B. Sydney; Peter Graham Todd, M.B. Lond.; Hugh John Trenchard, M.B. Birm., Flying-Officer R.A.F.M.S.; and Stephen Adrian Yaffe, M.D., Queen's Univ., Kingston.

Licences to practise were conferred upon 205 candidates (181 men and 24 women) who have passed the final examination of the Conjoint Board and have complied with the by-laws of the college. The following are the names and medical schools of the successful candidates :—

D. J. Anderson, Lond.; H. J. Anderson, Camb. and St. Thos.; M. Y. Ansari, Osmania and N.E. Lond.; G. A. S. Anthony, St. Mary's; Louis Babrow, Cape and Guy's; D. W. Bain, St. Mary's; A. M. Barnett, Camb. and St. Thos.; A. J. Barrett, Lond.; A. J. Barwood, St. Bart's.; O. H. E. Bayles, Guy's; L. B. G. Bennett, Camb. and Manc.; I. J. Bernstein, St. Bart's.; Margaret R. Biggs, Roy. Free; G. V. Blaine, St. Thos.; A. R. Blowers, Middlesex; F. V. A. Bosc, Univ. Coll.; B. F. Boyd-Cooper, Charing Cross; T. R. M. Bristow, Camb. and St. Thos.; H. T. Calvert, Camb. and St. Thos.; J. C. K. Campbell, Camb. and St. Thos.; Joan E. Campkin, Roy. Free; David Caplan, Lpool; Maxwell Caplin, Lond.; J. F. Cartwright, Camb. and St. Bart's.; Isabella S. Chalmers, Roy. Free; M. A. Charrett, St. Mary's; Joan M. Cheale, Roy. Free; Ralph Cocker, Manc.; C. W. D. Cole, Middlesex; E. H. L. Cook, Lpool; Dorothy J. Cooper, Roy. Free; P. R. Cooper, Oxfd and Guy's; Daniel Coueslant, Univ. Coll.; J. P. Crawford, Guy's; R. C. Cronin, Birm.; G. H. Daglish, Lpool; L. R. Dalton, St. Mary's; R. W. Danziger, Camb. and St. Mary's; E. J. D'Arcy, Univ. Coll.; J. I. Davies, St. George's; Joyce G. Davies, Camb. and Roy. Free; R. R. Dickson, St. Bart's.; S. W. Dunkin, Leicester Royal Infirmary; Mary E. Eiloart, King's Coll.; J. A. Elliott, Camb. and St. Thos.; R. E. Ellis, St. Bart's.; Marguerite P. Elman, West Lond.; J. A. Evans, Cardiff; E. J. Ewell, St. Mary's; Edith I. Fettes, Roy. Free; R. D. Firth, St. George's; F. M. H. Fletcher, Manc.; I. G. Forbes, St. Thos.; C. A. E. Forssander, Middlesex; T. L. Frank, Middlesex; L. M. Franklin, Middlesex; G. A. Fraser, W. Ontario and West Lond.; S. S. Freedman, Leeds; H. J. Friend, St. Mary's; Kenneth Froome, St. Thos.; Aitolia Georgiadis, Univ. Coll.; Charlotte F. Godrich, Cardiff; M. B. H. Golden, St. Bart's.; John Gordon, Guy's; T. W. Greatorex, Camb. and St. Thos.; John Greene, St. Mary's; Evan Griffiths, St. Bart's.; C. W. Hall, Lpool.; Margaret E. Harker, Roy. Free; R. W. Harries, Camb. and Middlesex; J. H. Harrison, Middlesex; F. M. Hayes, Camb. and Guy's; W. H. N. Heavens, King's Coll.; F. C. N. Holden, Westminster; S. A. Holmested, Lond.; J. A. G. Horton, St. Bart's.; Patricia K. Hosford, Manc.; R. A. House, St. Bart's.; D. J. Howell, Cambridge and St. Mary's; F. H. D. Hutter, St. Mary's; G. H. Illingworth, Leeds; C. W. H. Ingoldby, Lond.; F. L. Ingram, Guy's; P. V. Isaac, Lond.; R. C. Jack, Camb. and St. Bart's.; J. P. Jackson, St. Thos.; Joseph Jacobs, St. Bart's.; J. A. C. James, Camb. and Middlesex; E. W. Jarratt, King's Coll.; W. H. W. Jayne, Westminster; G. T. E. Jenkins, King's Coll.; Margaret C. Jenkins, Cardiff; A. T. G. Johnston, Camb. and St. George's; E. W. Jones, Lond.; G. G. Jones, Lond.; Alexander Katz, St. Bart's.; Josse Kaye, Lond.; E. P. Kempsey, Univ. Coll.; N. S. Kenchington, Camb. and Birm.; M. S. Khan, Charing Cross; Humphrey King, St. Bart's.; R. F. Kingston, St. Bart's.; Christine Kirby, Birm.; N. D. Lance, Camb. and St. Thos.; J. J. Landon, Camb. and King's Coll.; S. E. Landy, St. Mary's; Marcus Latner, St. George's; T. S. Leedham, Guy's; Ivan Levinson, Lpool; Emmanuel Levy, St. George's; Abraham Libertson, St. Bart's.; D. G. Lloyd-Davies, St. Thos.; A. G. G. Long, Camb. and Lond.; Mary E. Long, Roy. Free; P. R. Lowns, Univ. Coll.; W. T. C. Lumley, King's Coll.; M. G. McColl, Lpool; D. G. C. Macdonald, King's Coll.; I. M. Macgregor, St. Thos.; Kathleen B. McClintock, Roy. Free; J. C. H. Maidment, Lond.; D. H. Manson-Bahr, Camb. and Lond.; Leonard Marre, Middlesex; Winifred A. Mason, Roy. Free; R. L. Meyers, St. Bart's.; Charles Midwinter Jones, Lpool; P. F. Milling, Camb. and St. Thos.; H. V. Morgan, Camb. and St. Bart's.; R. W. M. Morrison, St. Mary's; M. C. Mundle, Camb. and Guy's; J. M. Mungavin, Camb. and St. Bart's.; Bernard Murphy, St. George's; Herman Nagler, Charing Cross; F. G. Neild, St. Thos.; A. R. Nettleton, Middlesex; Mary E. Nixon, Roy. Free; D. M. Nundry, Guy's; Gerald O'Gorman, Guy's; B. H. O'Neill, St. Bart's.; E. I. Ostry, St. George's; P. J. Pablot, St. Bart's.; Robert Park, Ox. and Middlesex; T. G. Paxon, Lond.; A. G. E. Pearse, Camb. and St. Bart's.; Harold Petty, Leeds; J. D. Philip, St. Mary's; F. P. Powell, Oxfd and Univ. Coll.; N. J. Pratt, Univ. Coll.; B. H. Price, Camb. and King's Coll.; John Price, St. Mary's; Max Querido, Charing Cross; Mary L. Rae, Roy. Free; W. K. Raw, Westminster; R. E. Rainey, Lond.; H. H. Renyard, King's Coll.; J. A. Rich, Middlesex; H. G. H. Richards, Birm.; E. A. Ritchie, Charing Cross; T. W. Robson, King's Coll.; David Romney, Lond.; G. K. Rose, Birm.; J. V. Rose, Middlesex; R. W. Rowan, Charing Cross; B. C. Rowlands, St. Mary's; M. H. M. Ryan, Melb.; Guy Savill, Univ. Coll.; T. A. Shannon, Lond.; R. E. Shaw, Leeds; F. S. W. Shute, Guy's; R. A. H. Simpson, St. Barts.; C. C. Slack, Lpool; B. J. D. Smith, St. Bart's.; G. S. C. Sowry, St. Mary's; W. H. Spencer, Guy's; A. H. Staples, Lond.; B. A. D. Stocker, Westminster; Michael Strachan, Camb. and Lond.; R. P. Strang, Camb. and Guy's; Goodapaty Subba Rao, Osmania and Birm.; P. E. Sundt, Charing Cross; P. H. Sutton, Westminster; D. R. Syred, St. Bart's.; Cecil Thomas, Cardiff; Gwendolen M. G. Thomas, Roy. Free; F. A. Thompson, St. Bart's.; Walter Thompson, Leeds; T. C. Thorne, Leeds; D. A. Tolhurst, St. Thos.; E. W. J. Townsend, Bris.; Madaravasal Venugopalachari, Madras; Helen Wagstaff, West Lond.; J. J. Walker, Camb. and Lond.; A. I. Ward, St. Bart's.; M. B. Watson, Camb. and Charing Cross; G. O. C. D. Webb, Camb. and St. Thos.; J. M. W. Wells, Guy's; May D. Westerman, Roy. Free; J. C.

White, Birm.; J. R. D. Williams, Guy's; I. H. T. Wilson, Univ. Coll.; W. J. S. Wilson, Westminster; W. M. Winter, Camb. and Middlesex; Nona E. Wright, West Lond.; P. S. Wright, Birm.; and Hyman Zinobar, Witwatersrand and Middlesex.

Diplomas in child health were granted to the candidates named in our issue of April 20 in the report of the meeting of the Royal College of Surgeons.

Royal College of Surgeons of England

On May 9 Dr. E. D. Adrian, F.R.S., professor of physiology in the University of Cambridge, will deliver a lecture on the nervous mechanism of pain. On Thursday, May 16, Dr. A. D. Macdonald, Leech professor of pharmacology in the university of Manchester, will speak on experimental spinal anæsthesia. These lectures, which are open to all medical practitioners and advanced students, will be held at the college, Lincoln's Inn Fields, W.C.2, at 4 P.M.

Society of Apothecaries of London

At a recent examination the following were successful:

Surgery.—T. A. H. Adkins, F. L. Dickson, F. W. Ford, E. Greenhalgh, P. Haden, G. T. Hammond, H. A. Kreiser, R. Morley, and E. A. Roberts.

Medicine.—J. B. Brownlie, G. E. H. Enderby, H. A. Kreiser, R. Morley, S. J. P. Ras and J. P. Rochford.

Forensic Medicine.—J. B. Brownlie, G. E. H. Enderby, H. A. Kreiser, R. Morley, S. J. P. Ras, and J. P. Rochford.

Midwifery.—J. B. Brownlie, J. B. Gurney Smith, S. G. L. Klein, R. Morley, E. A. Roberts, M. F. Smith and S. Wetherell.

The following candidates, having completed the final examination, are granted the diploma of the society entitling them to practise medicine, surgery and midwifery: T. A. H. Adkins, Guy's; J. B. Brownlie, Manc.; G. E. H. Enderby, Camb. and Guy's; F. W. Ford, Middlesex; J. B. Gurney Smith, Bart's; P. Haden, Camb. and Guy's; H. A. Kreiser, Guy's; R. Morley, Leeds; S. J. P. Ras, St. Mary's; J. P. Rochford, Oxfd and Guy's; and M. F. Smith, Camb. and St. George's.

Royal College of Obstetricians and Gynæcologists

At a meeting of the council on April 27, with Prof. W. Fletcher Shaw, the president, in the chair, the following admissions and elections were made.

Admitted to fellowship.—David Fyfe Anderson, Glasgow; Nicholas Attygalle, Ceylon; Adam Barr, Glasgow; Richard Alan Brews, London; Archibald Donald Campbell, Canada; Jajneswor Chakraverti, India; Gladys Helen Dodds, London; Robert Leslie Dodds, London; Edith May Hall, London; Clifford Donald Kennedy, Edinburgh; Henry Connell Lowry, Belfast; Herbert Edward Murray, Calcutta, India; Charles David Read, London; James Wilfrid George Hewat Riddell, Plymouth; John Sturrock, Edinburgh; Lydia Ida Huber Torrance, Calcutta; and George Abeysingha Weera Wickramasuriya, Ceylon.

Elected to fellowship.—Samuel Lambert Navaratnam, Ceylon; Edwin Moody Robertson, Kingston, Ontario; Manindranath Sarkar, Calcutta, India; and Dagmar Florence Curjel Wilson, Oxford.

Admitted to Membership.—C. W. F. Burnett, J. A. Chalmers, Alexander Culiner, G. J. Cuthbert, Samuel Davidson, Ronald Eadie, Alice B. Field, H. J. Green, H. A. Hamilton, D. R. Kilgour, Oswald Lloyd, H. S. McLelland, E. R. Rees, H. M. Rees, Jane B. Roy, C. S. Russell, P. N. Simons, and G. R. Turner.

At the annual general meeting which followed, Mr. Malcolm Donaldson, Prof. J. Chassar Moir, and Prof. Gilbert I. Strachan were elected to the council as representatives of the fellows, and Dr. A. W. Spain and Dr. J. M. Scott as representatives of the members.

Navy Medical Compassionate Fund

At the quarterly meeting of this fund, held on April 19, with Surgeon Vice-Admiral Sir Percival Nicholls, medical director-general of the Navy, in the chair, the sum of £274 was distributed among the several applicants.

Royal Medical Benevolent Fund

The annual general meeting of this society was held on April 22, when the following honorary officials were re-elected: president, Sir Thomas Barlow, F.R.S.; treasurer, Dr. Lewis G. Glover; secretary, Mr. R. M. Handfield-Jones. The address of the fund after May 24 will be: 1, Balliol House, Manorfields, Putney, London, S.W.15.

Medical Association of Pan-America

A conference will be held by this association in July, 1941, at Buenos Aires under the presidency of Dr. José Arce.

Naval Honours

Surgeon Lieut.-Commander H. L. Cleave, H.M.S. *Nelson*, has been mentioned in dispatches for "zeal, enterprise, and devotion to duty in ordering his sick bay from a state of chaos, and for his skilful and untiring care of the wounded." Surgeon-Lieutenant Alexander Donald, H.M.S. *Viscount*, has been similarly mentioned for his care of the sick and wounded survivors of the s.s. *Domala*.

Royal Institute of Public Health and Hygiene

Sir Thomas Oliver will receive the guests at a reception to be held by the institute on Thursday, May 30, at 3 P.M., when the Harben medal will be presented to Sir Leonard Hill, F.R.S., and the Smith award to Sir William Savage. The reception will take place at 28 Portland Place, London, W.1.

British Empire Leprosy Relief Association

The annual meeting of this association will be held at the India Office, Whitehall, S.W.1, on Monday, May 6, at 3 P.M., under the chairmanship of Mr. Malcolm MacDonald, secretary of state for the colonies.

Tavistock Clinic

The annual lunch of the clinic will be held on Monday, May 6, at Grosvenor House, London, W.1, at 1 P.M., when Sir Walter Monckton will be the principal speaker. Further particulars may be had from the secretary of the clinic, Westfield College, Kidderpore Avenue, Hampstead, N.W.3.

Westminster Hospital

Dr. Thompson Barron has resigned his position as senior physician for skin diseases at this hospital and has been appointed supernumerary physician in the dermatological department.

Medical Diary

Week beginning May 6

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2.

THURSDAY.—4 P.M., Prof. E. D. Adrian: Nervous Mechanism of Pain.

UNIVERSITY OF CAMBRIDGE.

MONDAY.—5 P.M., Prof. W. W. C. Topley, F.R.S.: Authority, Observation and Experiment in Medicine. (Linacre lecture.)

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1.

TUESDAY.—5 P.M., special meeting of fellows. 5.30 P.M., general meeting of fellows.

WEDNESDAY

Proctology—5 P.M., annual general meeting. Mr. Lionel E. C. Norbury, Mr. W. H. Ogilvie, Prof. G. Grey Turner, and Mr. W. B. Gabriel: The Surgical Treatment of Idiopathic Ulcerative Colitis and its Sequelæ. Dr. Cuthbert Dukes: demonstration of specimens.

ROYAL INSTITUTION, 21, Albemarle Street, W.1.

TUESDAY.—5.15 P.M., Sir John Orr, F.R.S.: National Food Requirements.

SOUTH-WEST LONDON MEDICAL SOCIETY.

WEDNESDAY—8.30 P.M. (Bolingbroke Hospital, S.W.11), Dr. Alan Moncrieff: Cow's Milk and the Child.

MEDICAL SOCIETY OF INDIVIDUAL PSYCHOLOGY.

THURSDAY.—2.30 P.M. (11, Chandos Street, W.1), Dr. H. V. Dicks and Dr. Ellis Stungo: Analysis under Hypnotics.

BIOCHEMICAL SOCIETY.

FRIDAY.—2.45 P.M. (British Postgraduate Medical School, Ducane Road, W.12), short communications.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W.12.

TUESDAY.—2.30 P.M., Dr. Hinds Howell: ward clinic.

WEDNESDAY.—11.30 A.M., clinico-pathological conference (medical). 2 P.M., Dr. T. C. Stamp: Bacteriology of Cerebrospinal Meningitis. 3 P.M., clinico-pathological conference (surgical).

THURSDAY.—2 P.M., Dr. Duncan White: radiological conference.

FRIDAY.—2 P.M., clinico-pathological conference (gynæcological). 2.30 P.M., Mr. V. B. Green-Armytage: sterility clinic.

DAILY.—10 A.M.–4 P.M., medical clinics; surgical clinics and operations; obstetrical and gynæcological clinics and operations. 1.30–2 P.M., post-mortem demonstration.

FELLOWSHIP OF MEDICINE AND POSTGRADUATE MEDICAL ASSOCIATION, 1, Wimpole Street, W.1.

Medical Society of London, 11, Chandos Street, W.1. TUES., 5 P.M., Mr. McNeill Love: Diseases of Joints.—Brompton Hospital, S.W.3. MON. and THURS., 5 P.M., M.R.C.P. course in chest diseases.

NOTES, COMMENTS AND ABSTRACTS

INFLUENZA IN 1940

IMPRESSIONS IN GENERAL PRACTICE

BY F. G. MACNAUGHTON, M.D. Edin.; AND A. M. MACQUEEN, M.D. Glasg.

THE strain of an influenza epidemic on the general practitioner is so great that he cannot keep accurate records of cases. Generally he is ill himself, short of sleep, and missing his meals in an endeavour to get through the work. In the rush of work there is the fear that he will miss an acute appendix amongst the many cases of gastric influenza, or overlook a commencing diphtheria amongst the sore throats. Hence this article is based on impressions rather than records.

The epidemic in Leicester began slowly, became gradually more severe in infectivity and symptoms, abated a little, then increased again, and then fell off. It lasted much longer than has any epidemic since 1918, but unlike that in 1918, the most severe cases occurred towards the end of the first wave, rather than in the second wave. The most remarkable features were the passage of days or even weeks between the initial symptoms and the collapse of the sufferer, the severe pain in the throat, the persistent and painful cough, the rapid variations in temperature and the neurotoxic symptoms.

The usual case began with a severe sore throat, with nothing to be seen to account for it, followed later by pharyngitis, laryngitis and tracheitis with or without a rise in temperature. Often the patient felt surprisingly well at this stage and complained chiefly of the cough and the pain on coughing; the cough was incessant. The pain was so severe that doses of ½ gr. of heroin brought little relief. Anything from 1–14 days or more after this onset the patient would collapse, with temperature up to 105° F., pains all over, headache, sickness and pain in abdomen. The temperature would vary 4° or 5° F. in an hour or less with frequent sweatings and occasional rigors, and this might go on for several days. At this stage complications might arise: pneumonia, appendicitis, otitis media, frontal sinusitis (which was common), and conjunctivitis. Severe tonsillitis was rare, but the cases of appendicitis were associated with more or less tonsillar infection. The order in which the symptoms appeared varied. Sometimes the cough preceded the sore throat, occasionally either or both of these symptoms were absent, or they developed with the collapse or even after it.

ILLUSTRATIVE CASES

The following cases illustrate the long period between initial symptoms and collapse.

CASE 1.—A dairyman aged 35. On March 6 he complained of sore throat and on the 8th developed tracheitis, but he continued at work till the 16th (when he had to go to bed). On that day his temperature was 103·5° F., he had frequent sweatings, pains all over, headache, and sickness with some abdominal pain. The temperature settled by the 20th. On the 23rd he felt weak and dizzy, and his "legs would not go right." He returned to work on the 30th.

CASE 2.—An engineer aged 32. On Feb. 24 he had a sore throat which continued until March 11 when he collapsed with temperature 102° F., severe abdominal pain, headache and sweating. He had no cough.

CASE 3.—A motor-bus driver aged 39. He developed tracheitis on March 1, but remained at work for a week. On the 8th he felt shivery and his temperature was 103° F. Sweating and weakness continued, but there was no pain at all until the 12th when he had a severe sore throat. On the 16th he felt shaky and dizzy but returned to work. A week later he felt quite well.

Sometimes the delay between the initial symptoms and the collapse stage was very brief. For example:

CASE 4.—A schoolboy, aged 12, had a slight sore throat on Jan. 27. Next day he complained of severe headache, pain in the abdomen, and sickness. His temperature was 104° F., there was slight neck rigidity and a doubtful Kernig's sign. On the 29th, when four other members of his household were suffering from influenza, he had tracheitis and pain in the throat. A month later he still had difficulty in coördinated movement such as skipping.

The collapse stage occurred in some cases with no fever.

CASE 5.—A dentist aged 44. This man simply went to bed feeling completely done up a fortnight after he had had a cough with tracheitis.

The collapse stage might have given the impression of a double attack in some cases, but none of the patients was entirely free of symptoms between the initial symptoms and the collapse. We had the impression that when sulphapyridine was given at the commencement the disease was cut short and there was no collapse, but if it was delayed the drug was of little use. After the collapse stage the cough and sore throat as a rule cleared up at once, but when sulphapyridine was given early cough and sore throat returned repeatedly (in F. G. M.'s own case on three occasions), or continued for several weeks or even months, but there was no collapse.

Our complications included 23 cases of pneumonia with 2 deaths, both in elderly bronchitics, who only survived about thirty-six hours. All were treated with sulphapyridine. There were 8 cases of appendicitis; 5 cases of coronary thrombosis with 3 deaths; 1 case of generalised peripheral neuritis, which is progressing favourably; and several cases with meningeal symptoms.

CASE 6.—A woman, aged 74, had pneumonia and appendicitis. Operation was out of the question. She was treated with sulphapyridine. An appendix abscess ruptured into the bowel. A month later there was a further attack of pneumonia which was cut short with sulphapyridine.

CASE 7.—A woman, aged 29, was expecting a baby on March 11. On Feb. 27 she complained of sore throat and was given 1 gramme of sulphapyridine at once. She felt well next day. Her baby was born on March 12; that night her temperature was 101° F., and she had tracheitis. She was given 1 g. of sulphapyridine. The temperature was normal next day. The tracheitis continued and her temperature rose gradually to 100·2° F. on the fourth day. Sulphapyridine was given again, 6 g. in all, and her temperature gradually fell to normal in six days. There was no collapse stage and the patient felt well throughout except for a cough.

It is suggested that the collapse stage is an allergic phenomenon, that the early administration of sulphapyridine prevents sensitisation of the patient and hence collapse does not occur. In the cases where sulphapyridine was given immunity was not so well developed, as shown by the repeated sore throats, tracheitis and so on.

Approximately a third of the working population of Leicester was off work with influenza. The very poor were little affected perhaps because they were out of work and could not afford to go to the pictures and hence avoided infection in factory or picture house.

A BABOON BOY

TALES of children brought up by animals are always fascinating. We read of Mowgli in the nursery and of Tarzan in the school-room. In more scientific form the interest persists as we grow older and there are several reasonably authenticated cases of these children on record to which another has just been added.[1] In 1903 two troopers of the Cape mounted

1. Foley, J. P. jun. *Science*, March 22, 1940, p. 291.

police surprised a troop of baboons in a remote part of the south east Cape. They caught one who was not so fast as the others to find that it was a native boy of 12–14. He had long arms and his haunches were abnormally developed. He jumped about and wanted to walk on all-fours. He chattered like an ape, he was mischievous and wild, he preferred his old diet of raw corn and cactus to the best diet humans could provide. After a year in a mental hospital he was sent to a farm where he became a dependable worker. Most of the wolf-children of India, unlike Romulus and Remus, have proved to be idiots, but this boy is said to be "remarkably intelligent" and to have learnt to speak so that he was able to describe his life among the baboons. Though he retained traces of his unusual upbringing he seems to have adapted himself to his new life much better than other animal foundlings. It is thought that this is the first case of a human child being reared by infrahuman primates.

IMPORTED MEDICINES

AMONG the many articles which cannot now be imported except under licence are compounded medicines. These range from popular proprietary articles to preparations intended for prescription exclusively by doctors and include drugs in tablets, capsules and ampoules. It is said that the British agents for some of the better known proprietary articles took early precautions to augment their stocks and that in some cases their supplies are adequate to satisfy a normal demand for a long time to come. It is inevitable, however, that stocks of some commonly prescribed preparations imported from the United States, France and Switzerland will become exhausted fairly soon unless licences are granted for fresh importations. One of the tests used by the licensing authority when considering applications is whether similar articles can be produced in this country, and as we announced last week (p. 804) an addendum to the British Pharmacopœia is to be published dealing with foreign drugs that can be manufactured at home.

NEW PREPARATIONS

ASTEVAN is an aqueous solution of atropine methylnitrate, papaverine hydrochloride, sodium nitrate, pituitary extract (anterior and middle lobes), adrenaline, chlorbutol and glycerin, issued by Evans Sons Lescher & Webb Ltd. (London, E.C.1) which is intended for the inhalation treatment of asthma and hay-fever. It is presented in vials of ½ fl. oz. As contact with metal or exposure to light causes decomposition of this preparation it is necessary to use an atomiser made of amber alkali-free glass.

NARCONUMAL is a new intravenous anæsthetic introduced by Roche Products Ltd. (Welwyn Garden City). It is the sodium salt of methyl-5 : 5-allyl-isopropyl-barbituric acid. The makers claim that its toxicity factor is low and it can safely be used in prolonged anæsthesia for periods up to three hours. As it is not a sulphur-containing barbiturate it can be given to patients receiving sulphanilamide preparations. Narconumal is issued in ampoules containing 1 gramme of the dry substance to be dissolved in 10 c.cm. of sterile distilled water immediately before use.

CYCLONAL SODIUM.—Sodium N-methyl-C-C-cyclohexenylmethyl-malonylurea, which has been widely used as an intravenous anæsthetic under the name of Evipan Sodium during the past few years, is now being manufactured in this country by Pharmaceutical Specialities (May & Baker) Ltd., Dagenham, as Cyclonal Sodium.

NEGATOL.—Under this name Negatol Products Ltd. (40, St. Martin's-le-Grand, London, E.C.1) have introduced a metacresol sulphonated hydrocarbon with salicylic acid. It is a complex colloidal substance which has dehydrative and astringent and styptic properties. It is supplied in solution, in pessaries and as insufflation powder for use in cervicitis, non-specific vaginitis, trichomoniasis and post-gonorrhœal conditions.

BROMETHOL is the name adopted by the British Pharmacopœia Commission (*Lancet*, April 27, 1940, p. 804) for a solution of tribromoethyl alcohol in amylene hydrate which was formerly imported from Germany under the proprietary name of Avertin. British Drug Houses Ltd. are now issuing it as a British product—Bromethol (B.D.H.). It is presented for clinical use in bottles of 25 c.cm. and 100 c.cm.

Appointments

ARNOTT, G. M., M.B. Glasg., F.R.C.S.E., resident surgical officer at Birmingham Children's Hospital.

BISHOP, ISABELLA R., M.B. Edin., assistant medical officer at the maternity home, Ilford.

BRADY, JULIA, M.B. Durh., resident medical officer at Upney (Maternity) Hospital, Barking.

BULL, H. C. H., M.B. Camb., M.R.C.P., hon. radiologist to the East Ham Memorial Hospital.

DAVIES, H. H., M.R.C.S., temporary assistant medical officer of health for Newport, Mon.

GORE-GRIMES, MAUREEN, M.B. Dubl., resident medical officer at Leicester City General Hospital.

GRIST, G. S., M.A. Oxfd, L.M.S.S.A., temporary medical officer (A.R.P.) for Islington.

MACHUGH, MARY, M.R.C.S., temporary pathologist at the Brompton Hospital, London.

MCPHERSON, A. R., M.B. Edin., D.P.M., medical officer of health for Douglas, Isle of Man.

MITCHELL, CECILY C., L.R.C.P.E., resident medical officer at Leicester City General Hospital.

NEVIN, MARY E., M.D. Belf., D.C.H., D.P.H., assistant school medical officer for Enfield.

OWENS, W. E., M.B. Camb., D.A., anæsthetist to the Hôpital et Dispensaire Français, London.

ROPER, OLIVE N., M.B. Lond., temporary assistant school medical officer and assistant medical officer of health for Taunton.

SWINTON, C. F., M.D., Ch.M. St. And., F.R.C.S.E., medical superintendent at Mayday Hospital, Croydon.

TRUEMAN, R. S., M.B. Lond., F.R.C.S.E., resident surgical officer at the Coventry and Warwickshire Hospital.

Examining Surgeons under the Factories Act, 1937: Dr. J. A. W. ROBERTON (Leek, Staffs); Dr. T. FARTHING (Swanscombe, Kent); Dr. R. H. TITCOMBE (New Mills, Derbyshire).

Medical Referee under the Workmen's Compensation Act, 1925: Dr. W. N. CHALMERS, Kirkcudbright sheriff-court district (sheriffdom of Dumfries and Galloway).

Births, Marriages and Deaths

BIRTHS

CAUCHI.—On April 22, at Mayfield, Sussex, the wife of Dr. Joseph Cauchi, Nigeria—a son.

CHARLTON.—On April 23, at Ditchling, Sussex, the wife of Captain P. H. Charlton, R.A.M.C.—a son.

EASTON.—On April 26, the wife of Dr. J. L. H. Easton, of Tonbridge—a daughter.

O'DOHERTY.—On April 20, at Westminster Hospital, the wife of Dr. Colman O'Doherty—a son.

O'DONOVAN.—On April 22, in Dublin, the wife of Dr. Denis K. O'Donovan—a son.

MARRIAGES

BINTCLIFFE—LEWIS.—On April 27, at Doddridge Memorial Church, Northampton, Eric William Bintcliffe, M.S., to Beatrice Mary Lewis.

DIXON—ALLEN.—On April 25, at Kensington, Robert Halstead Dixon, M.B., of Ealing, to Marguerite Edith Allen, of Surbiton.

GAIRDNER—JAMES.—On April 24, in New York, Douglas Montagu Temple Gairdner, B.M., to Ann Helen James.

O'SULLIVAN—POWELL.—On April 25, in London, Bryan Michael O'Sullivan, M.B., Surgeon Lieutenant, R.N., to Patricia Powell.

WALLACE—Wilson.—On April 24, in London, David Mitchell Wallace, F.R.C.S., Flight-Lieutenant, R.A.F.V.R., to Elsie Noel Kate Wilson, M.B.

WATTS—STIELL.—On April 20, at Clapham, Ronald Williams Watts, Surgeon Lieutenant, R.N.V.R., to Ruth Barbara Stiell, of Clapham.

DEATHS

BARLING.—On April 27, at Edgbaston, Harry Gilbert Barling, Bart., C.B., M.B. Lond., F.R.C.S., aged 84.

HINTON.—On April 25, at Bristol, Hammond Tooke Hinton, M.B. Aberd., aged 73.

KINTON.—On April 22, at Brighton, Walter Gregory Kinton, M.B. Manc., aged 67.

LAVY.—On April 26, at Tunbridge Wells, Ernest Edward Lavy, M.B.E., M.D. Dubl., late Vicar of St. Andrew's, Watford, aged 62.

ADDRESSES AND ORIGINAL ARTICLES

LABORATORY DIAGNOSIS OF DIPHTHERIA

COMPARATIVE VALUES OF VARIOUS MEDIA

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AT intervals during the last ten years we have carried out series of parallel investigations in which various media recommended for the diagnosis of diphtheria have been compared. We believe that, as a result of the introduction of various forms of blood-tellurite-agar in that period, the detection of *Corynebacterium diphtheriæ* has become a much more exact procedure than it ever was with the methods generally used ten years ago and still considered sufficient in many laboratories. It seems to us, therefore, that it may be of some value to those who are puzzled by the multiplicity of new media to publish some account of these investigations and to make some suggestions about everyday practice in the laboratory diagnosis of diphtheria. This may in particular be useful to some of those who have recently been placed in charge of newly established laboratories and have a limited experience of diphtheria work.

The investigations were carried out as five separate series of examinations. The first of these, which was largely the work of F. C. Happold, was the most extensive and covered all routine examinations done in the laboratory over one or two years. It was designed to make a rigid comparison between primary cultures on Löffler's medium and on the special tellurite, heated-blood, and agar medium introduced by Anderson et al. (1931), and it was supplemented by a similar and independent investigation carried out by K. E. Cooper at Bristol. The four others, which were carried out with K. E. Cooper, K. I. Johnstone, and K. Zinnemann, were much smaller and instituted comparisons between various blood-tellurite media recommended in this country and in Germany.

COMPARISON OF LÖFFLER AND HEATED-BLOOD-TELLURITE-AGAR MEDIA

The object of this investigation was to determine whether the use of Löffler's inspissated serum, so long supreme and unchallenged in the bacteriological diagnosis of diphtheria, could with advantage be supplemented or substituted by the use of low-temperature meat extract, heated-blood, agar, and tellurite medium introduced by Anderson et al. (1931) for the differentiation of the cultural types of *C. diphtheriæ* (*gravis* and others). The examination of swabs from 7429 cases submitted for report in the city of Leeds was included in this series. In each instance the swab received was inoculated first to a Löffler slope and then to a plate of the special tellurite medium. The results of this investigation can be summarised as follows: 1469 (19·8 per cent.) positives were recorded, including 255 cases in which there was a discrepancy between the results on the two media; in 59 (23·1 per cent.) of these the Löffler results were positive, whereas the second medium gave a negative or late positive result; and in 196 (76·9 per cent.) of them the tellurite medium gave a positive result, whereas that on Löffler was negative or doubtful.

This result corresponds fairly closely with that obtained by Clauberg (1931) in an earlier and similar series of comparisons between Löffler's medium and a fresh blood, tellurite, and agar medium which he introduced. In that series 20·3 per cent. of all positives were obtained only on Clauberg's medium, and 1·9 per cent. of all positives were missed on Clauberg's medium, whereas in our series 13·3 per cent. of all positives were obtained only on the medium of Anderson et al., and 4 per cent. of all positives were missed on this medium. So far, therefore, as the results are comparable, the superiority of the medium of Anderson et al. over that of Löffler is rather less than that of Clauberg's medium. The full superiority of results obtained on the tellurite medium in our series over those on Löffler was brought out better, however, when an analysis of the discrepancies between the findings on Löffler and those on tellurite medium was carried out. In all cases of discrepancy an inquiry form was sent to the doctor concerned and eventually in most cases to the fever hospital to discover the condition of the patient and so determine which medium was missing the more formidable cases. The results of this inquiry are presented in table I. It is noteworthy that among the cases which involved a considerable risk to the patients' lives—those above the transverse line in table I—there were 12 unsatisfactory results on Löffler's medium to 1 on the tellurite medium. Our attention, however, was drawn, during the period in which these results were recorded, to a fatal case in which the Klebs-Löffler bacillus was missed on tellurite medium.

TABLE I—ANALYSIS OF 255 DISCREPANCIES BETWEEN LÖFFLER AND TELLURITE MEDIA

Cases	On tellurite medium		On Löffler medium	
	Missed	Late positive	Missed	Doubtful
Fatal	0	0	6 (G)	2 (G)
Severe	0	1	2	0
Moderate	4 (2 G)	0	24 (20 G)	29 (24 G)
Mild	20	9	48	34
Carriers	3	2	12	4
Contacts	3	1	6	4
Not considered diphtheria	12	—	2	1
Rhinitis	1	0	8	4
No history obtained	2	0	4	6
Laryngeal	0	1	0	0

Figure in brackets with "G" indicates proportion of *gravis* cases.

Some time after the completion of the series just recorded one of us (K. E. C.) had the opportunity at Bristol of making a similar comparison between the

results obtained in parallel primary cultures on Löffler and on the Leeds medium. Bristol is an area where the *intermedius* type is predominant, and, since the results in Leeds could not be considered significant so far as this type was concerned, these observations supply valuable additional information. The series included 5659 cultures, of which 570 (10 per cent.) gave positive results on one or other medium. The incidence of types determined was *intermedius* 81 per cent., *mitis* 14 per cent., and *gravis* 2·6 per cent., 1·7 per cent. being atypical. There were 164 discrepancies; among these 34 were positive on Löffler and negative on tellurite and 22 doubtful on Löffler and negative on tellurite; 95 were positive on tellurite and negative on Löffler and 13 positive on tellurite and doubtful on Löffler. If the results doubtful on Löffler and positive on tellurite are ignored, there are left 557 possible positives, of which 17 per cent. were obtained only on tellurite and 6·1 per cent. only on Löffler. These figures are very similar to those in the Leeds series, the only differences being that the figures favour the tellurite medium a little more, probably owing to the difficulty experienced in differentiating on Löffler the very short forms of *intermedius* from the unusually granular Hofmann strain which is met occasionally.

COMPARISON OF VARIOUS TELLURITE-BLOOD-AGARS

Four further short series of investigations were made at intervals in the last three years. The swabs examined in these series were all taken from cases of diphtheria in the Leeds Fever Hospital. They were taken, however, either late in the disease or during convalescence. The object was to get material which would give a high percentage of positive results and would in many cases contain but few diphtheria bacilli, so that the relative values of different media might be efficiently tested. Since several media were tested simultaneously in each series, equality of inoculation was important. The technique adopted to secure this was to rub up the swab in 2–3 c.cm. of broth and then inoculate a drop of the resulting suspension to each medium. Except Löffler's, all the media contained approximately 1 part of potassium tellurite in 2000. They were the following:—

(1) The medium of Anderson et al. (1931) is referred to as the Leeds medium; it is a heated blood and agar medium of which the special feature is a basis of meat extract obtained at low temperature and sterilised by filtration.

(2) Glass's medium (Glass 1937), which contains fresh blood and is claimed for that reason to be superior to heated-blood media because of the inhibitory effect of the hæmatin, contained in the latter, on many *mitis* strains (Glass 1939).

(3) Neill's medium (Neill 1937), which has a basis of commercial meat extract and contains heated blood previously treated with ether and formaldehyde. It was included because its author claimed results with it much superior to those obtained with Löffler's medium, and it has the advantage of being simple to prepare.

(4) Clauberg's medium (Clauberg 1935, 1936); this has a great reputation in Germany and has recently been fully described by Sutherland and Iredale (1937). It is a translucent medium, containing unheated laked blood, of highly complex composition and preparation, on which, in virtue of its content of glucose and dyes, diphtheria bacilli develop bright-blue colonies. At its best it makes the diagnosis of diphtheria at sight a very simple matter, in so far at all events as the elimination of negatives is concerned.

(5) Gundel-Tietz medium (Gundel and Tietz 1934), which next to Clauberg's has had the greatest vogue in Germany. Since it is less well known to workers in this country and the descriptions of it are not so readily available as those of the others, the formula taken from Tietz (1935) is given below.

To 260 c.cm. of a 2½–3 per cent. solution of agar, buffered at pH 7·6, are added 1 c.cm. of stock cystine solution (the stock solution is prepared by dissolving 0·5 g. of cystine in 5 c.cm. of a 10 per cent. solution of Na_2CO_3 and this is diluted to 50 c.cm.) and a mixture of 30 c.cm. of defibrinated sheep's blood and 12 c.cm. of a boiled 1 per cent. solution of potassium tellurite puriss. (Grübler et Cie, Leipzig.) The mixture is poured as plates containing very thin layers.

Besides these, small series of investigations were made with the Leeds medium in which fresh blood was substituted for heated. Two or more observers took part in each series, and, to equalise the treatment of the various media, those used by observer A in the first series were given to observer B in the second series, and so on. Each observer formed and recorded his impressions independently of the others.

In the second series of investigations the media of Löffler, Neill, and Glass, and the Leeds medium were compared; there were 67 cases, of which 55 were found positive on one or other of the media. In the third series Neill's and Clauberg's media were compared with the Leeds medium on 100 swabs taken from 55 cases; among these, 45 positive results were obtained on one or other of these media. In the fourth series the Leeds medium was compared with the media of Neill, Clauberg, and Gundel and Tietz, and in part of the series also with that of Glass; 228 swabs were examined, and 82 of these gave positive results on one or other of these media; in the fifth series the media of Löffler, of Neill, and of Clauberg, and that used in Leeds were compared; 177 swabs were examined, and 37 positives were recorded on one medium or other. The order of value in which the various media were placed in the different series was as follows:—

Second series:—Neill, Glass, Leeds, Löffler.
Third series:—Leeds, Neill, Clauberg.
Fourth series:—Clauberg, Neill, Leeds, Gundel-Tietz, Glass.*
Fifth series:—Neill, Leeds, Clauberg, Löffler.

* The comparison with Glass's medium was only made in the first half of this series.

There is an element of irregularity in these results, the performance of each medium varying to some extent from series to series. This depends in all probability on variations in preparation, some of which are inevitable, as, for example, differences in samples of meat extract and others due to irregularities in heating, which could be eliminated but are very likely to occur. In one series these variations will have favoured one medium, in the next another.

A direct numerical comparison of the results obtained with each of these media with each of the others will not be attempted, because all did not appear in each series, and the numbers of examinations, therefore, available for analysis in which two media were compared directly would be rather small in some cases. A comparison, however, has been instituted on the two following lines.

(1) Since the Leeds medium has been used in each series, table II has been drawn up showing how each medium contrasted with it in the examinations common to both.

(2) Table III has been drawn up showing the positive results obtained with each medium as a percentage of the total positives obtained on all media with the same material.

The order is slightly different in the two tables, Glass's medium appearing equal to the Leeds medium

TABLE II—RESULTS ON VARIOUS MEDIA COMPARED WITH RESULTS ON LEEDS MEDIUM

Medium compared	Examinations common to both on positive cases	Positives on		Value of second medium stated as percentage of positive results obtained on Leeds medium
		Leeds medium	Second medium	
Neill	212	178	186	104·5
Clauberg ..	162	139	139	100
Glass ..	101	81	81	100
Gundel-Tietz	76	65	59	90·8
Löffler ..	79	65	51	78·5

in one and inferior to it in the other. In view of the relatively small series of observations they need not be taken as indicating more than that the first four media yield roughly similar results, and that Neill's would probably still come out on top in a larger series.

TABLE III—PERCENTAGE OF POSSIBLE POSITIVES OBTAINED ON EACH MEDIUM

Medium	Known positive swabs examined	Found positive	Percentage
Neill	212	186	87·7
Clauberg	162	139	85·8
Leeds	218	183	83·9
Glass	101	81	80·2
Gundel-Tietz ..	76	59	77·6
Löffler	79	51	64·5

FAILURES OF DIFFERENT MEDIA TOWARDS DIFFERENT BACTERIAL TYPES

Only two *intermedius* and two atypical strains came under observation in the last four series of investigations. The remainder were made up in the proportion of 55 per cent. of *mitis* and 45 per cent. of *gravis* strains over the whole group of observations, although a different proportion existed in some series, as shown in table IV, in which the failures as related

TABLE IV—DISTRIBUTION OF FAILURES OF DIFFERENT MEDIA AMONG DIFFERENT BACTERIAL TYPES OF DIPHTHERIA

Medium	Examinations of known positive material		Failures	
			With *gravis*	With *mitis*
Leeds	218	(55% *mitis*)	13	22
Neill	212		12	14
Clauberg ..	161		10	12
Glass	101	(50% ,,)	10	10
Gundel-Tietz ..	76	(39% ,,)	9	8

to the different types of strain are shown for the various media. It is clear from this that the differences are not great; but, so far as they go, they suggest that the Leeds medium and Neill's are rather better than the others for bringing out *gravis* strains, whereas the Leeds medium shows a definite inferiority to Neill's and Clauberg's towards the *mitis* strains.

STRONG AND WEAK POINTS OF THE VARIOUS MEDIA

Neill's medium.—The advantages of this medium are its good performance in promoting the growth of diphtheria bacilli, as shown by the figures given above, and its simple composition. The basis is Lemco's meat extract, which can be bought at any time but must be the extract prepared for use in bacteriological medium, which is vastly superior to the product prepared for domestic use. The blood used is sterilised by ether and formaldehyde and can be stored for long periods. It can, therefore, be obtained in the slaughter-house without special precautions for asepsis, and the need for keeping animals in the laboratory is eliminated. The colonies developed on this medium grow very large, and this facilitates their detection in somewhat the same way as the colour change does on Clauberg's medium. The weakest point of the medium is that the differentiation of types and, therefore, the elimination of diphtheroids is rather less easy than is desirable.

Clauberg's medium at its best is remarkably good and makes the selection of diphtheria colonies easier than does any other. It is probably the best of all media for picking out scanty colonies of diphtheria bacilli, especially *mitis*, among numerous diphtheroid colonies. Weak points of the medium are its delicate texture, which makes it liable to be easily wounded on inoculation if it is used in the thin layers recommended; its complicated composition, including dyes not now easily available; and the need of fresh sterile blood. It should not be assumed that this medium can be used for the diagnosis of diphtheria at sight, for a few diphtheroids develop blue colonies on it.

The *Leeds medium* gives the sharpest differentiation of types among these media and so makes the elimination of diphtheroids simpler than on most others. The most difficult differentiation is between a scanty growth of the *intermedius* type and that of some of the finely growing diphtheroids which appear in the nose. It is probably superior to other media in picking out small numbers of *gravis* colonies among numerous diphtheroid colonies in cultures from nasal carriers of diphtheria of this type. The chief drawbacks are the relatively troublesome procedure in preparation and the restricted growth of some *mitis* strains.

Glass's medium, although in view of Glass's experiments it should give better results than the heated-blood media in the isolation of *mitis* strains, has not come out particularly well in this investigation. The series of cases examined with it is rather limited, and it may not have been so successfully prepared as when used by its originator, but in this respect it has been on an equal footing with the media of Clauberg and of Neill. All were prepared by a competent laboratory steward following the instructions of the authors. Since in two series of investigations it proved inferior to Neill's medium both in the number of positives obtained and in the facility with which the colonies were detected in those cases in which a positive was recorded, it was not considered useful to carry on with it further. It has in common with several other media the disadvantage that fresh sterile blood is required.

The *Gundel-Tietz medium* appeared to us to be inferior to all the others, notwithstanding that it was examined by one of us who had extensive previous experience of its use when living abroad.

Löffler's medium.—The comparison of this medium with the various tellurite agars has been extensive in the whole series, and we do not consider it an extreme statement to say that those bacteriologists who continue to depend entirely on this medium are doing second-rate bacteriological work, so far as diphtheria is concerned. One of the weak points of

Löffler's medium is that it is often impossible to pick out small numbers of diphtheria bacilli among numerous diphtheroids, especially with *gravis* forms showing defective granular straining—a common event—or with *intermedius* strains which are very short and easily confused with granular forms of Hofmann's bacillus. There is also the occasional difficulty that when a sporing aerobe gains access to a Löffler tube it reduces the surface rapidly to a fluid medium in which conditions may not be favourable for the growth of *C. diphtheriæ*. On the other hand, Löffler's medium has one very strong feature—speed of growth of many diphtheria strains, which in characteristic morphological form may be detected six or more hours before colonies on tellurite media are so far developed as to be recognisable. We agree therefore with Shone et al. (1939) that it should be retained, and that there has been a tendency in some quarters to write it down unduly.

Other media.—A small series of observations on the Leeds medium with fresh blood substituted for heated-blood showed 6 per cent. more positive results with *mitis* strains than on the original medium, but colonies were less easily recognised.

CONCLUSIONS AND RECOMMENDATIONS

It seems to us, in view of the above findings and those of other workers, that the best results will be got in the practical diagnosis of diphtheria by duplicate examinations using Löffler's medium and one of the blood-tellurite-agar media. Where it is only possible to employ one medium, a blood-tellurite agar medium should be used, for it will give at least 10 per cent. more of positive results than the Löffler medium and is less likely to miss the most severe cases. Of these blood-tellurite-agar media the best available appears to be Neill's, unless special interest is being taken in the rapid differentiation of types, for which the Leeds medium is best suited.

If positive and suspect colonies are picked off from the blood-tellurite agar and subcultured to heated-blood agar (without tellurite), and if the appearances of the growth on both media and of the morphology in preparations taken from the second medium and stained with alkaline methylene-blue are considered, mistakes will be rare.

Where a strain shows the typical characteristics of the *gravis* or of the *intermedius* type, virulence tests are superfluous, and among strains showing the characteristics of the *mitis* type non-pathogenic forms are rare. It is therefore particularly among atypical strains—e.g., such as develop a *gravis*-like colony and pellicle in broth but do not ferment starch—that virulence tests become important, especially in examining suspect carriers.

As regards virulence tests, the injection of $\frac{1}{4}$–$\frac{1}{8}$ of an 18-hour Löffler slope culture into the axilla of a guineapig seems to us to be a more reliable one and in the long run little more expensive than the more modern procedure of simultaneous intracutaneous injections of several strains. A control animal injected with antiserum is unnecessary, provided that the animal dies with a local lesion, with pleural effusion and œdema combined with patchy congestion and collapse of the lungs and congestion or congestion and hæmorrhage of the suprarenals, and that these changes are associated with the recovery of diphtheria bacilli from the local lesion and rarely (Robinson and Marshall 1934) from the blood and viscera or with complete sterility of subcultures from lesion and blood. In routine practice it will probably be adequate to put through one in every ten strains to make sure that the sugar reactions and growths in broth correspond to the type as determined by appearance of colonies. For the experienced observer diagnosis at sight from heated-blood, agar, and tellurite plates can safely be practised at 18–24 hours where the appearances are characteristic, provided that colonies are picked off and examined in subculture on heated-blood agar, so that such corrections as are rarely needed may be made and sugar fermentations done with any doubtful growths.

Where both Löffler's medium and a tellurite medium are employed, all cultures positive on both or particularly characteristic on either may be reported without reservation. Where, however, only a few suspect forms or likely colonies are present in one, it is better to report "doubtful" and wait for the result of subculture before sending a final report.

It must be emphasised that much experience is needed before the full value can be got out of the blood-tellurite media, and it is therefore essential that anyone starting to use them should make a careful comparison of the results obtained with these media and with Löffler's medium and should proceed to the isolation and full identification of all strains obtained on tellurite media until he has acquired the necessary proficiency.

We have much pleasure in expressing thanks to Mrs. I. I. A. Zinnemann for valuable technical assistance; to Drs. J. S. Anderson and E. C. Benn, superintendents of the Leeds Fever Hospital, and to many practitioners in Leeds for supplying clinical information about cases; to Prof. H. D. Wright and Drs. V. Glass, G. A. W. Neill, and P. L. Sutherland for samples of media for comparison with those prepared in the Leeds laboratory; and to R. S. Burrow for much painstaking and efficient work in the preparation of media. We are indebted to the Medical Research Council for a grant in aid of expenses.

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AT the Septenniary Festival of the LONDON HOSPITAL, in the Mile-end-road, held the other day at the London Tavern, the Duke of CAMBRIDGE in the chair, the subscriptions announced in the room, at the conclusion of the dinner, amounted, incredible as it may appear, to the noble and generous contribution of TEN THOUSAND AND NINE POUNDS, and, in addition to this enormous sum, as a general subscription to the hospital, it was announced that a sum of One Thousand Eight Hundred Pounds had just been subscribed, by gentlemen of the Jewish persuasion, towards the erection of an additional wing to the building, for the reception of destitute and afflicted Jews.

Facts of this description are calculated to raise the character of this nation above that of all others on the face of the globe. Where, beyond our own shores, could be found a company—simply, almost, a private meeting—at which a sum of ELEVEN THOUSAND EIGHT HUNDRED POUNDS would be subscribed in charity over the dinner table? Who shall say that England is poor, when such tales as these can be truly related?

DEATH IN THE FIRST MONTH AND THE FIRST YEAR

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II—Feeding in the First Month

Throughout our country, medical and nursing control of dietetics in the first month of life is poorly managed. This mismanagement of early feeding does not of itself cause death, but it disturbs and lowers nutrition and so opens wide the gate to infection. Under our prevailing conditions of a weakened defence, a cold wet climate, indifferent housing, and a low standard of cleanness in the home the baby is an easy prey to infection.

The fact of our high infant death-rates cannot be questioned. It is also a matter of fact, not of opinion, that these high figures are largely due to a continued steady loss of lives after the first month. The explanation is offered that this is largely due to mismanagement of early feeding. If this explanation is true it points the way to a remedy. We cannot hope to change our climate, and it will not be easy to rebuild our houses; but we can do much to improve our domestic habits, and above all else we have nurses and doctors who, at present untrained and incompetent in this early problem of dietetics, can be taught to master it and to establish good digestion and nutrition in the first month and so provide the strongest safeguard against infection.

BREAST-FEEDING

The nutrition of the unborn baby is by direct transference of assimilable food material from the maternal to the fœtal circulation in the placenta. After birth nutrition is indirect, by conveyance of the food (milk) to the alimentary tract of the baby, its digestion, and its absorption and assimilation—a much more complicated process and one that is new and untried. The first few days after birth are a quiet rehearsal of the new process; but the new machine is running at speed at the end of the first week. At this stage many difficulties crop up; and, unless these are understood and properly treated, the machine of digestion runs badly, and the whole complicated process of digestion, absorption, and nutrition gets out of gear. This period of inauguration in feeding and digestion in the first month is of critical importance for the subsequent health and safety of the baby. The food of choice is breast-milk, and its use is called breast-feeding. There is agreement all over the world among those experienced in infant feeding that successful breast-feeding gives the best results in nutrition and provides the strongest guard against every kind of infection; and the keenest advocates of breast-feeding are to be found in those countries and great towns where infant death-rates have been reduced to record low levels and where special measures have been taken to preach and teach the merits of breast-feeding and to secure its practice.

Defect in teaching of breast-feeding.—Here in Britain medical students are taught the great advantages of breast-feeding and about the chemistry and caloric value of human milk; but I do not know any medical school where adequate clinical teaching is given about the critical start of breast-feeding, the difficulties that arise then, and how they may be overcome. As regards the nursing of the baby in the first month, the trained midwife does receive in her maternity hospital school practical teaching about early breast-feeding; but in her practice she ceases attendance in the second week. At this time, when difficulties in breast-feeding are very common, the mother is not likely to receive expert advice in the matter from health visitors, district nurses, family doctors, or clinic doctors, for very few of these advisers have been clinically trained to recognise and treat these problems of early feeding. Our maternity hospitals handle well the problem of early feeding, but they lose control of it when mother and baby return home early in the second week.

Unnecessary weaning.—In early breast-feeding difficulties, unnecessary weaning is extremely common in the area of which I have clinical experience—Edinburgh and its adjoining country areas. I believe it is equally common all over Britain, and that it is the most important predisposing factor in the loss of infant lives after the first month of life. One example is given; but the records of children's hospitals could furnish hundreds of others.

Case 3.—A boy, aged 19 days, was admitted to the Edinburgh Children's Hospital with the story of vomiting and serious loss of weight. He was weaned when 5 days old because of regurgitation of milk. But this became much worse in the next fortnight, when three kinds of cow's milk, fresh and tinned, were tried. On admission to hospital, the diagnosis of pyloric stenosis was made at once, but the weak and dehydrated condition of the baby caused operation to be postponed for 10 days. The Rammstedt operation was then done, and for a few days all went well, vomiting ceased, and weight was gained. He then developed bronchitis and bronchopneumonia and died.

This case illustrates one of the commonest causes of unnecessary weaning—vomiting. Vomiting never justifies weaning. The mistake almost certainly cost the baby its life. The advantage of continued breast-feeding in pyloric stenosis is recognised by all. If breast-feeding were kept up in all cases of pyloric stenosis, the recovery-rate in this disease would be very different.

Of the infants born in the Royal Maternity Hospital in 1938, 80 per cent. were wholly breast-fed and 12 per cent. partly breast-fed on leaving hospital. Spence (1938) gives Edinburgh figures collected by Dr. T. Y. Finlay, where in 3000 babies aged 3 months only 55 per cent. were breast-fed. If these figures are applicable to all Scotland, it means that breast-feeding, the ideal method of nutrition and the main bulwark against infection, is withdrawn in about 25,000 cases annually in these early months when the baby is specially vulnerable. This unnecessary weaning takes place to a great extent in the second half of the first month when mothers, delivered at home or in hospital, take up again the full load of household duties. At rest lactation may be sufficient, but under the sudden strain of work it falls off, although this is often temporary; and with or without the advice of a doctor or nurse the baby is weaned and given a bottle of cow's milk. In many cases of working-class mothers the question of the dieting of the infant at this critical stage, so momentous for its life and safety, is taken out of the hands of the doctor and left to the health visitor or the district nurse or often enough to some wise friend of the mother. The liaison between the maternity hospital or the home midwife and the health visitor is very imperfect; in any case the health visitor is seldom expert in difficulties of breast-feeding. It must be repeated that no blame attaches to the doctor or the nurse; the fault lies in their training. The training of the medical and nursing profession in the inauguration of milk feeding in the first month, and especially in the recognition and management of the difficulties that occur at this time, is quite inadequate. In theory the value of breast-feeding is one of the chief articles of the medical creed; in practice it is often abandoned on the most trivial difficulty.

Science and art of breast-feeding.—The management of breast-feeding requires a good deal more than knowledge of the chemistry of human milk. The milk has to be produced in the breast, to be conveyed to the baby's stomach, and to be digested. Breast-

feeding is thus the interplay of three processes—lactation, suckling, and digestion. Each of these processes has its data of structure and function, its anatomy, physiology, and pathology. The successful clinical handling of any medical problem is the application of the underlying anatomical, physiological, and pathological data. At present systematic lectures on breast-feeding in our medical school are largely devoted to the chemistry of milk and the theory of calories—the least important part of the subject. They are seldom followed up by clinical teaching and demonstration of babies suckling the breast and of early difficulties in lactation, suckling, and digestion. Is it surprising if the young practitioner is helpless when confronted with a difficulty and with a mother persuaded that she or her milk is at fault? This essential clinical teaching cannot be given in the wards of a children's hospital with their cases of dietetic disasters, but only in the nurseries of our teaching maternity hospitals.

Breast-feeding is not a simple but a complicated process, and it is one of the major problems of medicine and dietetics. Ignorance and mismanagement of it throughout the world cost the lives of many thousand babies. The problem will only be mastered, as other medical problems have been, by clearing its underlying foundations of anatomy, physiology, and pathology and by building clinical practice upon these sure foundations. It is worth repeating that infant dietetics is a new process which begins immediately after birth; and that in the first weeks this new and complicated machinery is being tried out. Disorders and disturbances in lactation, suckling, and digestion occur often and may be of many kinds. If they are located and understood, most of them can be overcome; but, if they are mishandled, the general condition of the baby can quickly deteriorate, and its life may easily be endangered by infection. A good deal has been said and written about the mental attitude of the mother and psychological difficulties in breast-feeding. If the physical difficulties are understood and dealt with, the psychical difficulties will quickly right themselves.

COW'S-MILK FEEDING

Under present conditions of medical and nursing practice many babies are weaned in the first month and bottle-fed with cow's milk, fresh, condensed, or dried. Another food, less digestible, is given at a time when the new process of digestion is not yet established and is often also disordered. It is a risky time to change the feeding, but the risk is taken. Sometimes the change is fortunate; much oftener it is not—and the digestion, already disordered, becomes worse than before. There is no difficulty in getting the new food, cow's milk; and there are dozens of different ways of giving it. Can it be said that medical science, which in Britain has made a poor job of the management of breast-feeding, shows more successful management of bottle-feeding with cow's milk? Our children's hospitals only get the failures, and these seem innumerable. But it is fair to say that many babies weaned in the first month because of difficulty with breast-feeding continue to give difficulty with bottle-feeding. Nature's handicap is bound to be heavier with cow's milk, which is not adapted to the baby's digestion and requires a good deal of modification. Again we know a great deal about the chemistry and the calories of cow's milk; but we do not yet know enough about digestion in the infant a few weeks old. Great trouble and ingenuity are shown in the manipulation of cow's milk; but little attention is paid to the baby's digestion, because little is known about its physiology or its pathology. The medical student sees in children's hospitals many cases of chronic dyspepsia in babies; but he sees very few at the early stage of the dyspepsia when the trouble has not become obstinate.

A baby, 8 weeks old, was admitted to the Edinburgh Children's Hospital with a history of vomiting from the first week of life. The vomiting was attributed to a fault in the mother's milk, and breast-feeding was stopped on the fourth day. Cow's-milk feeding was begun, and for the next six weeks six different kinds were tried. In all, seven turns of the dietetic wheel were made—breast-milk; dried cow's milk; fresh cow's-milk mixture; fresh cow's milk plus a little baked starch; condensed cow's milk; dried cow's milk; fresh cow's-milk mixture. Vomiting continued throughout. On admission the baby was much under weight. The vomiting was found to be functional but had now become a fixed habit.

The case illustrates mismanagement of early breast-feeding, then of bottle-feeding. A great dossier of similar cases could be collected from any children's hospital. And the primary fault does not lie in medical practice but in our medical teaching. Most of the dyspepsias of infants begin in the first month at the start of feeding and digestion. Our medical students seldom see these cases at this early stage and are taught very little about them.

Causes of death in bottle-fed babies.—I have said that bottle-fed babies are more liable to infections; most of these are gastro-intestinal and respiratory. Still's (1927) figures of 100 cases of fatal gastro-enteritis in babies—92 entirely bottle-fed, 4 mixed feeding (breast and bottle), and 4 breast-fed—are conclusive of the protective value of breast-milk against this infection. The rarity of rickets and scurvy in the breast-fed is accepted. I do not know of any figures in fatal bronchitis and bronchopneumonia; but the general hospital experience of fatal bronchopneumonia in babies under six months of age is that the great majority of these are bottle-fed. The much lower death-rate in breast-fed babies with pyloric stenosis is further good supporting evidence. The breast-fed and bottle-fed are exposed to the same unfriendly climate; they live in the same dirty and crowded homes; they both run the same risks of infection; but the breast-fed get off lightly, while the bottle-fed suffer heavy loss. Things might be better, if our general standard of management of bottle-fed babies were good; and many examples could be given of bottle-fed babies well-nourished and coming unscathed through heavy risks of infection. But, as things are, breast-feeding is the only strong shield of defence against infection; and how often and how carelessly is that shield thrown away!

In the sixties of last century the death-rate from infected wounds in our surgical hospitals was high; but there was no apparent remedy, and both surgeons and patients accepted it as an unavoidable risk. So by the blinding effect of custom and ignorance we now accept, not with complacency but with resignation, our heavy death-rate in the first year of life.

> "And custom lie upon us, with a weight
> Heavy as frost, and deep almost as life."

The death-rate in the first fortnight of life is heavy; it is due to special causes, which have been mentioned in the preceding paper; and its further reduction, although possible, presents a difficult problem. In Britain the death-rate in infants after the first fortnight of life continues steadily throughout the first year and at far too high a level. This continuing wastage begins really in the end of the first month and is due then to two principal causes: a gap in nursing supervision; and mismanagement of feeding, both of breast-feeding and bottle-feeding. These faults can be remedied. The remedies have been applied in some other countries, with results that have reduced there the loss of infant lives after the first fortnight to a mere trickle compared with ours. In the next paper I shall compare the infant death-rates in Britain with those other countries which are far ahead of us in their protection of infant life during the first year.

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FOLLICULAR HYPERKERATOSIS: A SIGN OF MALNUTRITION?

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THE cutaneous eruption described below was observed in children during a survey of the nutrition of adolescents, school-children, and children of pre-school age in different parts of Great Britain. It is suggested that this is similar to those described by the older writers under the names of lichen pilaris, lichen spinulosus, nutmeg-grater skin, and scorbutic gooseflesh, and is an early stage of the condition described by Pillat (1929) and Frazier and Hu (1931) in China and by Loewenthal (1933) in Africa as follicular hyperkeratosis and by Nicholls (1933) in Ceylon as phrynoderma.

NAKED-EYE APPEARANCES

The eruption (fig. 1) consists of crops of enlarged hair follicles appearing first on the extensor aspects of the arms, legs, and buttocks, and later and less commonly over the scapulæ, back, and abdomen. It has not been observed on the hands, feet, face, or genitalia. The eruption is symmetrical, does not irritate, and often has not been noticed by the patient. The skin feels dry and rough and is sometimes furfuraceous. On closer inspection the hair follicles are seen to be enlarged to a diameter of 1–3 mm. They are firm and cone-shaped. The hair is absent from many of the follicles, and in its place there projects to a distance of about 1 mm. a tiny spine of horny material. It is these spines that impart to the hand the sensation of roughness or "nutmeg-grater skin." At the orifices of some of the follicles the hair can still be seen, often curled, shrivelled, or broken. Occasionally the follicle is pink and indurated, indicating a mild inflammation; pustulation of the follicles was not observed. Sometimes the enlarged follicle is surmounted by a flat imbricated scale instead of a horny spine. If a large follicle with a projecting horny spine is selected, the horny material may be squeezed out with forceps, leaving a minute crater. These craters are sometimes seen apart from interference. The sexes were equally affected, and the eruption was not observed in children under five.

The fully developed condition was present in about 5 per cent. of 3000 children. Simple enlargement of the hair follicles, resembling a permanent cutis anserina, on the extensor aspects of the arms and legs, without projection of horny spines from the orifices of the follicles, was found in about 20 per cent. of the children. In these cases the skin was not noticeably dry. The eruption tends to develop in several members of the same family. In a London family of eight children all except the baby had it. It is impossible to say at this stage whether simple enlargement of the hair follicles is an earlier stage of the eruption or a different condition.

ILLUSTRATIVE CASE-RECORD

A biopsy was performed on a boy aged 14, who showed moderate enlargement of the follicles with projecting horny spines, together with definite signs of malnutrition. He was anæmic, with hæmoglobin 72 per cent. (Haldane), and was 3½ in. below average height and 18 lb. below average weight for boys of his age (Kershaw 1938). An analysis of the diet consumed by his family is given in the accompanying table. The family consisted of the mother and father,

DAILY INTAKE OF THE FAMILY

Calories, 1602	Phosphorus, 0·60 g.
Protein, 44 g.	Total iron, 8·52 mg.
Carbohydrates, 284 g.	Vitamin A, 637 I.U.
Fat, 28 g.	Vitamin B_1, 211 I.U.
Calcium, 0·29 g.	Vitamin C, 8 mg.

a boy aged 14, and three girls, aged 12, 10, and 5. The table gives the average daily consumption per head and is derived from a detailed record of the diet for a week. It reveals a deficient intake of all constituents, except carbohydrate and, possibly, iron and vitamin B_1.

Histological examination.—An ellipse of skin, about 1 in. long and including the subcutaneous tissue, was excised from the extensor aspect of the arm, and serial sections were prepared, which revealed a general degree of hyperkeratosis (fig. 2). The epithelial surface was covered with a layer of squames about equal to the thickness of the epithelium. At the mouths of the skin glands this hyperkeratosis was much more pronounced, and the upper part of each hair follicle was distended with a conical plug of keratinised material. There was some epithelial hyperplasia near some of the hair follicles. Pigmentation of the surface epidermal cells was not pronounced. A striking abnormality was the complete absence of sebaceous glands in association with the hair follicles; not a single sebaceous gland was recognisable. A mononuclear cellular infiltration was seen in some cases in relation to the hair follicles where the sebaceous gland should have been and round some of the sweat-gland ducts. Within the hair follicles the hair shaft could often be seen to be poorly formed and sometimes cut in several planes, as if coiled up behind an

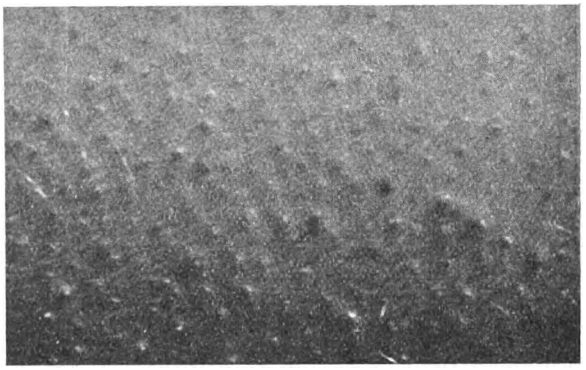

FIG. 1—Follicular hyperkeratosis on the extensor aspect of the arm of a girl aged 14. (Life size.)

obstruction at the mouth of the follicle. The sweat glands were rather atrophic, and the acini in the deep portion of the dermis seemed to be fewer than usual. The photomicrograph (fig. 2) illustrates these abnormalities of the hair follicles. In particular it shows the absence of the sebaceous glands, distension of the hair follicles, the blocking of their orifices with keratinous material and a mild lymphocytic inflammation near the base of the follicle.

DISCUSSION

Pillat (1929), working at Peiping, found that 209 out of 3000 soldiers had ocular manifestations of vitamin-A deficiency. Many had signs of systemic disease, including certain abnormalities of the skin which Pillat considered to be the result of vitamin-A deficiency. The cutaneous lesions of 15 of them, aged 17–31, with keratomalacia were studied by Frazier and Hu (1931). These lesions correspond closely, as regards naked-eye appearance, distribution, and histology, to the eruption described above, strongly suggesting that the two conditions are essentially the same. Frazier and Hu admitted their patients to hospital, and after two to three months on a well-balanced diet and 1 oz. of cod-liver oil daily the skin regained its normal texture. They believed that the eruption was due to vitamin-A deficiency, and that the pathological changes were essentially a keratinising metaplasia analogous to the process, described by Wolbach and Howe (1925), in the respiratory passages of rats on diets deficient in vitamin A, and, by Blackfan and Wolbach (1933), in infants dying of keratomalacia and pneumonia.

Loewenthal (1933), in East Africa, described a similar cutaneous eruption among 81 native prisoners on a deficient diet. The eruption was associated with night-blindness, xerophthalmia, and acne. Unlike

most other observers he found that itching was pronounced. He treated 2 of his patients with vitamin A (Avoleum); in one the eruption cleared up in eight weeks, and in the other it had almost done so in seven weeks, when the supply of avoleum was exhausted. His other cases cleared up in about nine weeks on 1 oz. of cod-liver oil daily. Loewenthal considers that dry skin is the earliest sign of vitamin-A deficiency, and that the follicular eruption varies with the age of the child, older children having small papules, whereas in the very young it may resemble goose-flesh. Nicholls (1933), in Ceylon, found a similar condition in an investigation of 1500 prisoners on deficient diets and named it phrynoderma. Phrynoderma was commonly associated with keratomalacia, mild neuritis, night-blindness, xerophthalmia, and a liability to

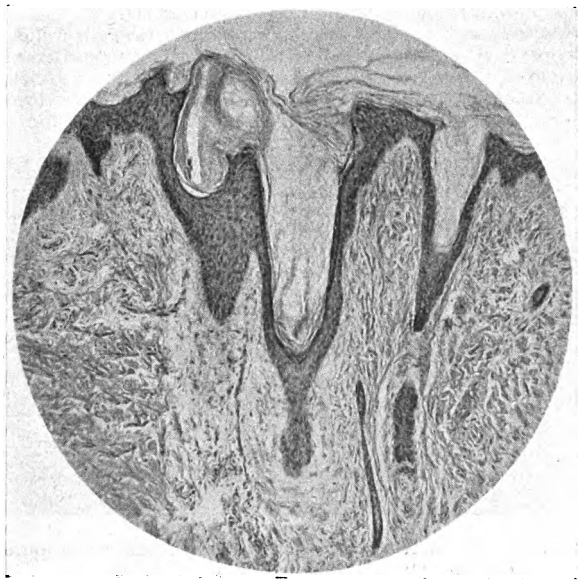

FIG. 2—Follicular hyperkeratosis showing (1) plugging of the hair-follicle with keratinised material; (2) absence of the sebaceous gland; (3) increased keratinisation of the superficial layers of the skin; and (4) infiltration of small round cells near the base of the follicle. (× 80.)

diarrhœa or dysentery. He considered that it was due to vitamin-A deficiency, but that other factors in the diet might be at fault.

Goodwin and Mackay (1934) reported a case arising in London in a boy aged 10. After six weeks in hospital on a good mixed diet with cod-liver oil, the skin was almost normal. Mackay concluded that it was due to vitamin-A deficiency and was "far from rare in this country." Rao (1937) described in similar terms to the above writers the condition as it is seen in India. It was again cured by the administration of cod-liver oil. The older writers appear to have described the same eruption under the name of lichen pilaris, lichen spinulosus, or keratosis. Crocker (1893) described it as "an inflammatory disease of the hair follicles in which a spiny epidermic peg occupies the centre of the papule" and in which there was "hyperplasia of the epidermic cells" lining the follicles.

ÆTIOLOGY

There is still some doubt about the exact ætiology of follicular hyperkeratosis or phrynoderma. It is generally believed to be nutritional in origin, although different observers do not agree about which specific food factor is involved. Frazier and Hu (1931) and Nicholls (1933) found that their cases cleared up after the patients had been admitted to hospital and given cod-liver oil. Loewenthal's cases cleared up on cod-liver-oil, except two which cleared up on vitamin-A concentrate alone. These workers consider that follicular hyperkeratosis is an early and specific sign of vitamin-A deficiency. On the other hand, Reiss (1936) found, in 7 cases in Chinese adolescents, that the association with night-blindness and keratomalacia was not close, and that in 3 of his cases the follicular hyperkeratosis did not respond to cod-liver oil. Wiltshire (1919) described the condition in 32 per cent. of 78 consecutive cases of scurvy in Serbian soldiers and considered that the eruption was an early sign of scurvy. Scheer and Keil (1934) also found a follicular eruption in 2 cases of adult scurvy and suggested that a deficiency of either vitamin-A or vitamin-C might be responsible. They consider that in vitamin-A deficiency the chief effect is on the epithelium of the epidermis and the hair follicles, whereas in vitamin-C deficiency there is a tendency to capillary ecchymoses round the bases of the follicles. Aykroyd (1938) found that in some cases the eruption tended to disappear with the addition to the diet of skimmed milk only. It seems that most of the evidence supports the theory that the eruption is an early sign of vitamin-A deficiency, as a rule preceding the onset of night-blindness and xerophthalmia.

CONCLUSIONS

On clinical and histological grounds the eruption observed by me is similar to that described by the workers whose reports I have cited. Clinically, the nature of the eruption, its distribution, and the absence of symptoms are common to most of the descriptions. Histologically, there are keratosis of the skin surrounding the hair follicles, leucocytic infiltration in relation to the follicles, absence of the sebaceous glands and atrophy of the sweat glands, together with the distension or plugging of the hair follicles with keratotic debris. The eruption is not uncommon among elementary-school children in this country. It is believed that it is an early sign of malnutrition.

SUMMARY

An eruption is described which was observed in about 5 per cent. of 3000 children and adolescents examined in various centres in Great Britain during a nutritional survey.

Histological examination showed hyperkeratosis of the hair follicles, absence of sebaceous glands, and round-celled infiltration round the follicles. It is thought that this eruption is similar to the follicular hyperkeratosis or phrynoderma described by various writers in Africa and the Far East, and that it is of nutritional origin.

The specific dietary deficiency to which follicular hyperkeratosis may be attributed has not been certainly established, but the condition is probably an early sign of a deficiency of vitamin A or of fat.

The observations recorded here were made in the course of the Carnegie United Kingdom Dietary and Nutritional Survey. I am indebted to the trustees and to Sir John Boyd Orr, director of the Rowett Research Institute, Aberdeen, for permission to publish. I wish to thank Prof. D. F. Cappell, of the department of pathology in the University of St. Andrews, for assistance in the interpretation of the histological changes and for the photomicrographs, and Mr. Corkhill for the preparation of the serial sections of skin.

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HYPERTENSIVE EFFECT OF BLOOD FROM HYPERTENSIVE DOGS

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Goldblatt (1934) has shown that partial occlusion of the renal arteries in dogs leads to relatively permanent hypertension. Page (1939) and Greenwood, Nassim, and Taylor (1939) have obtained the same result by encasing one or both kidneys. Using Trendelenburg's toad preparation Fasciolo and others (1938) have demonstrated a vasoconstrictor substance in blood plasma taken from the renal veins of animals treated by Goldblatt's technique. They did not, however, find such a substance in the systemic blood.

The Goldblatt type of renal hypertension is probably due to a generalised vasoconstriction. It is important, therefore, to determine whether or not a substance can be found in the systemic blood which might produce such vascular activity. To eliminate confusion due to a possible species difference in sensitivity to a vasconstrictor substance, the test animal should be of the same species as the hypertensive animal. Katz et al. (1939) have transferred small quantities of blood from an hypertensive to a normal dog without producing a rise in blood-pressure. In the experiments here described we have accomplished the exchange of large quantities of blood over short periods of time between hypertensive and normal or nephrectomised animals. The blood-pressure of nephrectomised recipient animals was invariably raised, that of normal animals being unchanged or lowered.

EXCHANGE TRANSFUSIONS BETWEEN DOGS

HYPERTENSIVE DOG			NEPHRECTOMISED DOG		
Weight (lb.)	Systolic blood-pressure before exchange (mm. Hg)	Maximal systolic blood-pressure during 1st 3 hrs. of exchange except 1st 5 min. (mm. Hg)	Weight (lb.)	Systolic blood-pressure before exchange (mm. Hg)	Maximal systolic blood-pressure during 1st 3 hrs. of exchange (mm. Hg)
20	260	140	14	130	180
35	185	180	19	120	170
20	200	180	10	110	160
20	160	150	20	120	140
22	190	130	20	110	130
35	190	185	10	130	165
34	190	170	24	140	160
HYPERTENSIVE DOG			NORMAL DOG		
23	220	95	45	140	110
32	215	215	19	140	90
25	210	200	15	140	138

Exchange-rate of approximately 3 litres of blood per hour in each direction used throughout.

METHODS

Hypertension was produced by placing a clamp on one renal artery (Goldblatt 1934) or encasing one kidney in a cast of collodion gauze (Greenwood et al. 1939). About three days later the other kidney was removed.

The clamp used in our experiments (fig. 1) is simpler to construct and to use than the conventional Goldblatt type. The applicator is made of brass, the clamp of bar silver. The compression plate of the clamp is riveted to the end of the compression screw and is free to turn on this screw; the riveted end of the screw is countersunk in the plate. The clamp is held

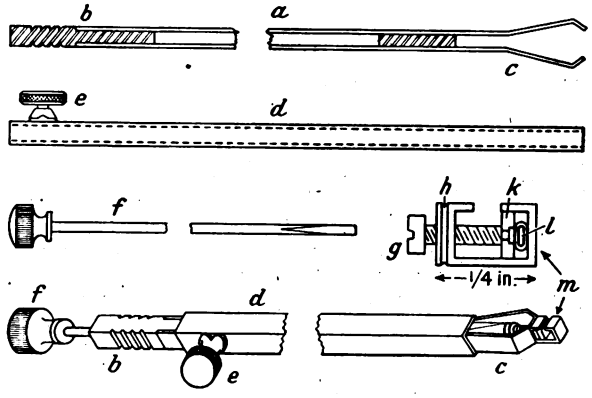

FIG. 1—Adjustable artery clamp and applicator: (*a*) clamp holder; (*b*) serrated end; (*c*) spring-steel jaws; (*d*) applicator handle 8 in. long; (*e*) locking screw; (*f*) screwdriver; (*g*) compression screw; (*h*) slot for applicator jaws; (*k*) compression plate; (*l*) artery; (*m*) adjustable artery clamp.

in the applicator by the spring-steel jaws of the clamp holder as illustrated. The jaws fit in slots in the head of the clamp and are tightened on the clamp by drawing up the serrated end of the clamp holder. When the clamp is firmly held, the jaws are locked by tightening the knurled locking screw on the side of the applicator handle. With the clamp centred in the jaws the screwdriver is automatically guided into the slotted head of the compression screw. It is a simple procedure to hook the artery into the clamp when the compression plate is withdrawn into the top of the clamp. The applicator may then be held in one hand, the thumb and forefinger being used to turn the screwdriver. The other hand is free to palpate the pulse in the artery. The clamp may be freed from the applicator by loosening the locking screw and sliding the serrated end of the clamp holder into the handle, thus allowing the jaws to spread. We found no difficulty in picking up the clamp in the applicator for readjustment or removal some weeks after it had been installed. This type of clamp has been used with complete success in the production of the Goldblatt type of hypertension in many dogs.

A systolic blood-pressure (unanæsthetised animal) of over 200 mm. Hg was considered to indicate a satisfactory degree of hypertension. Before the exchange transfusion all pressures were measured with a mercury manometer by direct arterial puncture (No. 20 hypodermic needle). During the exchange cannulæ in femoral or brachial arteries were used.

In exchanging the blood between two animals it is most important that the same volume be passed in each direction. The ordinary cross-circulation technique would obviously exsanguinate the animal with high blood-pressure into that with the lower pressure. A special pump (fig. 2), described in detail elsewhere (Solandt and Robinson 1938, Thalhimer, Solandt, and Best 1938), was used to accomplish the required

metered exchange transfusion. As shown, a horizontal graduated tube (10 c.cm.) is included in each circuit, so that the movement of a bubble of air, introduced with a hypodermic syringe through the wall of the connecting rubber tubing, could be timed as a means of measuring rate of flow. A trap designed to catch the air-bubble is placed in the circuit distal to the graduated tube. The tubes in the two circuits were placed side by side, so that the balance of the exchange could be checked by introducing a bubble simultaneously into each tube and observing their relative progress. The absolute quantity of blood exchanged could be determined at any time by timing the progress of the bubble. Exchange was from femoral artery to femoral vein in each circuit.

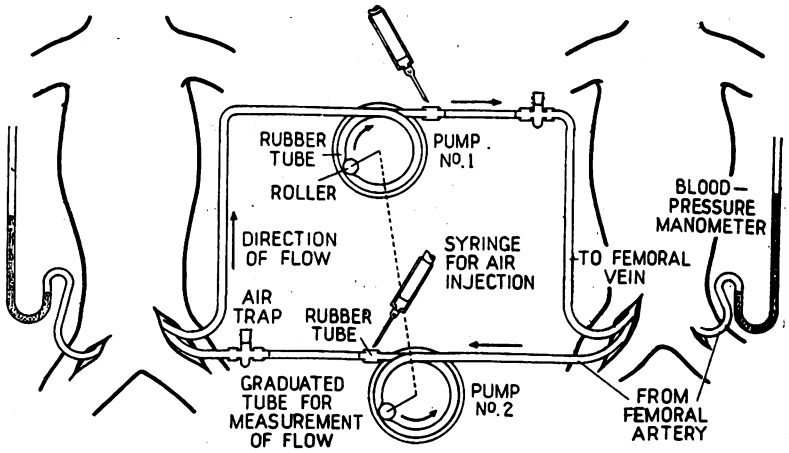

FIG. 2—Plan of exchange-transfusion experiment, showing equal delivery from pumps 1 and 2.

Dogs were used, and surgical anæsthesia was maintained with Nembutal throughout the exchange transfusion. The animals were each given an initial intravenous injection (350 units per kg. of body-weight) of heparin and subsequent hourly injections (50 units per kg.) for the duration of the experiment. Before attempting an exchange transfusion we cross-agglutinated the bloods of the two animals. Dogs with obviously incompatible bloods were not used.

RESULTS

The accompanying table summarises our results. In every case the blood-pressure of the hypertensive dog fell or remained constant; a rise of blood-pressure in this animal was never seen. The blood-pressure in the recipient animal always rose if its kidneys had been removed, but there was no rise if its kidneys were present in the circulation. The rise in blood-pressure produced in nephrectomised animals, although always pronounced, was in some cases of short duration. In other instances it was maintained for several hours. In a few experiments the initiation of exchange produced shock with low blood-pressure in both animals. Unless the blood-pressures showed an immediate tendency to rise, the pump was stopped; when the pressures returned to approximately the original levels, exchange was again started. The cause of this shock is not known. When the exchange was started again, a second shock was never seen. Fig. 3 shows the plotted blood-pressure record of a typical experiment in which initial shock of the type described was seen. In this case the fall in blood-pressure was so transient that it was not necessary to stop the pump. As controls we performed exchange transfusions between normal dogs (20 experiments), between normal and nephrectomised dogs (4 experiments), and between hypertensive dogs with approximately the same blood-pressure (2 experiments). In none of the controls did the blood-pressure of one animal affect that of the other; we never observed a rise of blood-pressure in either animal.

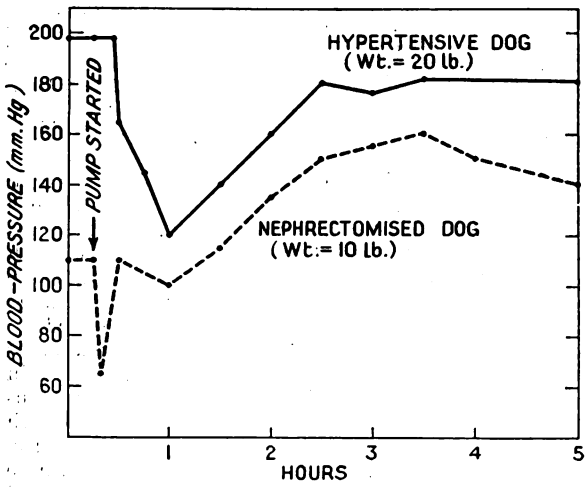

FIG. 3—Blood-pressures of hypertensive dog and of nephrectomised dog during exchange transfusion.

DISCUSSION AND CONCLUSIONS

The results of the foregoing experiments seem to show that an hypertensive substance is present in the systemic blood of dogs having renal hypertension. Katz (1939) probably failed to demonstrate the existence of this substance because he did not exchange enough blood between hypertensive and recipient animals. Our conclusion is verified by the fact that, in general, the heavier the hypertensive with respect to the recipient animal, the greater was the rise of blood-pressure in the recipient. The pooled bloods of two such animals would necessarily contain a higher concentration of the hypertensive substance than would that of two similar animals of equal weight.

Since in the presence of functioning kidneys in the recipient dog no rise in blood-pressure was seen in this animal, we conclude that the normal kidneys in some way prevent the hypertensive substance from exerting its pressor effect.

SUMMARY

The blood of dogs having hypertension produced by the technique of Goldblatt or Greenwood contains a substance which will produce transient hypertension in another dog if the recipient animal is deprived of its kidneys.

We are grateful for the kindly interest of Prof. C. H. Best in these experiments.

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SPONTANEOUS PNEUMOTHORAX AND STAPHYLOCOCCAL LUNG ABSCESS

IN AN INFANT

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THE following case is of interest both because of the rarity of the condition and because it presented an intricate diagnostic problem.

CASE-RECORD

A male infant, aged 8 weeks, was sent to Mr. A. Tudor Edwards by Dr. R. H. Dobbs and was admitted to Brompton Hospital on Nov. 28, 1938. The child had been well until ten days before admission, when he developed a paroxysmal cough. During the attacks of coughing he became blue and breathless and for this reason was taken to the Princess Louise Kensington Hospital for Children. Radiography there showed an air-containing space occupying the greater part of the left chest; the mediastinum was displaced to the right. Barium, given by mouth, did not enter this space. In view of the extreme dyspnœa, a needle was inserted into the left side of the chest and released air under pressure. On the following day the baby was transferred to Brompton Hospital.

On admission the infant was dyspnœic and cyanosed. The heart was displaced to the right. There was hyperresonance, with absence of breath sounds, over the left side of the chest, from which 800 c.cm. of air was removed. The intrapleural pressure (+ 8 + 24 c.cm. of water) remained unchanged. After the needle was withdrawn, air could be heard escaping from the site of puncture; this produced some subcutaneous surgical emphysema of the chest wall. However, the dyspnœa was relieved, and thenceforward the infant's condition steadily improved until the time of operation. The temperature was 99° F. on admission and never rose above this level.

Further radiography showed that the collection of air did not reach the left apex. The lateral view showed appearances suggesting coils of intestine in the left pleural cavity, but these were not apparent in the anteroposterior view, and after a barium meal no barium entered the chest. A diaphragmatic hernia, therefore, seemed unlikely, and the air-containing space, being oval and not completely filling the left chest, was thought to be a large pulmonary cyst rather than a pneumothorax. Infection was not suspected, for there was no radiological evidence of fluid in the space. Since the infant's general condition had improved, and because of the severe nature of the previous attacks, it was decided to perform an exploratory thoracotomy without further delay.

Operation.—When the left side of the chest was opened a cystic space was found. The lung was collapsed and lay posteriorly, the thickened pleura over its anterior surface forming the posterior wall of the space. Where the anterolateral aspect of the lower lobe joined the chest wall a bead of pus was seen escaping from a small abscess cavity in the lung. Apart from this there was no fluid in the pleural cavity. It was evident that the space was a localised infected pneumothorax, and the chest was therefore closed. After operation the baby's condition was poor, and he died on the following day.

Necropsy.—The findings at operation were confirmed. The space consisted of part of the pleural cavity bounded by thickened parietal pleura, except posteriorly, where it was formed by thickened visceral pleura covering the anterior surface of both lobes of the left lung. The pleura was very thick in all areas and on section showed œdema, great vascularity, and a heavy infiltration with polymorphs. The pleural cavity contained no fluid. The upper lobe of the left lung was aerated, whereas the lower lobe was collapsed and hæmorrhagic and contained multiple whitish areas. In one of these there was a small abscess cavity, which had ruptured through the pleura. Histological examination showed that these white areas contained minute abscesses, and that there was a diffuse interstitial pneumonia throughout the collapsed lobe. Chains of gram-positive cocci could be seen in the abscess walls, and cultures from the pus and from the lungs yielded a pure growth of *Staphylococcus aureus*. There were no other defects in the body, and no obvious source of infection was found.

SPONTANEOUS PNEUMOTHORAX IN INFANTS

Frequency.—Spontaneous pneumothorax usually occurs between the ages of twenty and thirty years; Perry (1939), in a series of 85 cases, recorded only 3 under the age of ten years.

Ætiology.—It appears from a study of the literature that the common causes of spontaneous pneumothorax in an infant are as follows:—

(1) Early respiratory effort: Bertin (1936) reported 7 non-fatal cases of spontaneous pneumothorax in the newborn, 6 of which occurred before the twelfth day of life. Only 1 of these could be attributed to a difficult labour. Bertin cites Ruge, who postulated that the condition was caused by respiratory efforts against a glottis thrown into spasm by the irritation of foreign material; but this explanation seems mechanically unsound. The size of this group and its frequency in relation to the other causes of spontaneous pneumothorax cannot be computed, because, although few cases have been reported, their mild course and tendency to spontaneous cure make it possible that many examples may have been overlooked.

FIG. 1—Lateral radiogram showing appearance suggesting a loop of bowel above the diaphragm.

(2) Obstetrical trauma: although this is a well-recognised cause, very few cases have been recorded. Strongin (1938) reports a tension pneumothorax developing in an infant four hours after a forceps delivery.

(3) Congenital malformations: these are uncommon. Davies (1934) recorded 5 examples in a series of 26 spontaneous pneumothoraces under the age of three years. Stoloff (1928) did not mention a single instance in his series of 84 cases. Falk (cited by Dupin and Verger 1937) described a spontaneous pneumothorax which was due to a bronchus opening directly on to the surface of the pleura.

(4) Subpleural vesicles: Kjaergaard (1932) has shown that these are a common cause of spontaneous pneumothorax in the adult. They may be emphysematous or congenital, and Stoloff (1928) says that 13 per cent. of spontaneous pneumothoraces in infancy are associated

with emphysematous bullæ. It seems more reasonable to suppose that bullæ at this early age are congenital.

(5) Pulmonary tuberculosis: widely divergent accounts of the frequency of this cause are given by different authors; Falk (cited by Dupin and Verger, 1937) gave it as 19 per cent. and Davies (1934) even higher, whereas Stoloff (1928) did not record a single instance.

(6) Pneumonia and lung abscess: Dupin and Verger (1937) have pointed out that the cause of a pneumothorax in either of these conditions is the same—namely, the rupture of a subpleural abscess. Pneumonia and lung abscess together constitute the commonest cause of spontaneous pneumothorax in childhood. Stoloff (1928) found that they caused 55 per cent. of cases, Davies 40 per cent., and Scott (1928) 20 per cent. In infants under the age of one year the frequency of this cause appears to be even higher; of 10 examples collected from the literature (Bovaird 1903, Ross 1924, Rogatz and Rosenberg 1931, Johnson 1927) 9 were due either to pneumonia or to lung abscess. Debre and others (1937), investigating the cause of lung abscess in children, found that 9 out of their 13 cases were due to pneumococcal infection.

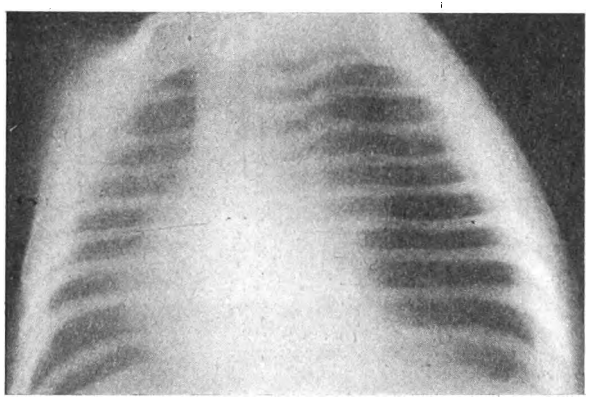

FIG. 2—Anteroposterior radiogram showing a cyst-like space at the base of the left lung.

Clinical course.—This is determined partly by the presence or absence of infection in the pleural cavity; infection inevitably follows rupture of an abscess and develops in nearly all cases of pneumonia. Another important factor is the intrapleural tension; a positive-pressure pneumothorax in an infant causes acute respiratory embarrassment and may be fatal if it is not promptly relieved by aspirating air. The most constant physical signs are hyper-resonance, with diminished or absent breath sounds, on the affected side. Dyspnœa is usually severe and may be paroxysmal. Signs of toxæmia may be present in infected cases. The mortality of spontaneous pneumothorax from all causes in infancy is given by Glaser and Landau (1935) as 50 per cent. Staphylococcal pneumonia in infants is almost invariably fatal.

Differential diagnosis.—A large air-containing space in an infant's chest may be a spontaneous pneumothorax, or a congenital pulmonary cyst, or a congenital diaphragmatic hernia. A diaphragmatic hernia can usually be diagnosed by radiography after a barium meal, but the difficulties of distinguishing between a cyst and a pneumothorax may be very great. A cyst will sometimes show on radiography fine linear shadows due to fibrous septa, and occasionally it is possible to induce a pneumothorax, when the cyst will become visible in the collapsed lung. A pulmonary cyst communicating with a bronchus in such a way that air can enter but not escape may simulate a tension pneumothorax so closely that differentiation between the two becomes almost impossible.

STAPHYLOCOCCAL PNEUMONIA IN INFANTS

Several examples of staphylococcal pulmonary infections in infants are recorded. MacGregor (1936) described 10 cases of staphylococcal pneumonia in children whose ages ranged from sixteen days to three and a half years, 5 of them being due to a pure infection with *S. aureus* and having no septic foci elsewhere. All were fatal. The pulmonary lesions consisted of areas of hæmorrhagic consolidation which broke down to form multiple abscesses. Reimann (1933), Wallace (1937), and Hughes (1938) describe similar pathological findings in cases of staphylococcal pneumonia, and multiple abscesses were found in every instance. In the light of these observations it seems probable that the case here described was primarily due to staphylococcal pneumonia with abscess formation and subsequent perforation of the pleura. A remarkable feature was the absence of any fluid in the pleural cavity; the reaction of the pleura to infection seems to have been proliferative rather than exudative.

SUMMARY

A case is described of spontaneous pneumothorax in an infant aged 8 weeks. Necropsy revealed that this was due to the rupture of a staphylococcal lung abscess. The radiological appearances were strikingly similar to those of a pulmonary cyst. It appears from the literature that a pyogenic pulmonary infection is the commonest cause of a spontaneous pneumothorax in an infant under one year of age.

We are indebted to Mr. A. Tudor Edwards for permission to report this case and to Dr. R. L. Rawlinson for permission to reproduce the radiograms.

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REMOVAL OF IMPACTED LOWER WISDOM-TOOTH

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HAVING a tooth out is proverbially simple and, with our improved technique, it is simpler today than ever before. There are exceptions; the greatest is the removal of an impacted third mandibular molar, or lower wisdom-tooth, which may present such difficulty that a planned surgical operation in a nursing-home or a hospital is essential. These cases are now so much in evidence that one wonders what happened to them formerly. It is another instance of improved diagnosis, for many of the cases in young adults used to be diagnosed as quinsy.

A comparison between the anatomical relations of an impacted third mandibular molar and those of the teeth anterior to it emphasises not only the difficulty but also the greater danger of operation. The normally erupted teeth have their roots embedded in alveolar processes covered by mucoperiosteum, the whole forming a ridge attached by its base to the body of the bone and relatively superficial. The impacted wisdom-tooth, on the other hand, is deeply embedded

in the central area of the body of the mandible, is in close proximity to the marrow spaces of the cancellous bone, and is often immediately related to the sub-alveolar canal with the main vessels and nerve of the mandible. Access for operation is difficult.

IMPACTION AND INFECTION

Impaction is due to lack of space into which the tooth can erupt. It is attributed to the shortening of the jaws during the process of evolution. In contemporary man it is chiefly noticeable in the pathological group known to dental surgeons as "postnormal occlusion," popularly recognised as those who have adenoids and receding chins and are mouth-breathers. It is possible that the greater number of impacted wisdom-teeth is associated with an increase of this type.

With normal growth the wisdom-teeth should come into position about the age of seventeen, or a little later, when eruption is indicated by greater fullness of the gum. The gum over an impacted molar, because of the limited space, tends to bulge upwards and is often injured by the opposing molar of the maxilla, which has usually erupted without incident. Superficial infection results from injury and may extend to the deeper structures, with a definite sequence of pathological changes. Local discomfort and trismus are the commonest early symptoms, but another common symptom—unilateral sore-throat—may possibly not be recognised as due to the erupting tooth, although in young adults it is almost pathognomonic; if there is suppuration, a wrong diagnosis of quinsy may also be made.

Infection may lead to comparatively simple lesions or, by extension to the neighbouring parts, to such serious sequelæ as cellulitis in the neck, abscess in the temporal fossa, pharyngeal abscess, and phlebitis of the pterygoid plexus of veins, with or without secondary intracranial infections, such as thrombosis of the cavernous sinus and cerebral abscess. Perhaps the commonest serious sequela is a general septicæmia or a pyæmia. Similar sequelæ may develop after operation, and there is the additional risk from the injury inflicted; in spite of the greatest care being exercised, local effects of injury are common.

The local injury with a variable degree of infection causes pain, swelling, trismus, and necrosis, all aggravated by bad drainage. The pain may persist for some weeks. Necrosis most often affects the outer side and often involves the socket of the second molar; the infection may track forwards beneath the periosteum and be difficult to control even with free incisions. Osteomyelitis with trismus may be present for months. The second molar may be loosened at the operation, or the posterior surface of the root may be exposed, leaving a painful area difficult to treat. Sometimes subsequent removal of this tooth is necessary because of the severity of the injury and infection. Many do not understand how serious a matter this is, and how gravely the loss of a second molar affects the function of that side of the mouth. The unusual, but far too common, sequela of septicæmia or of pyæmia is caused by injury to the bone, particularly the bone beneath the tooth when an elevator is used. The field of operation is of necessity infected and can be compared with that of an infected compound fracture in other bones.

PRINCIPLES OF OPERATION

The disadvantages described led me to criticise my operative procedure, with the following conclusions.

(1) A low drainage-point is essential and is achieved by cutting away the internal or lingual plate of the mandible. At no other site can the disadvantage of gravity be overcome. This has the most important influence on satisfactory recovery and freedom from anxiety after operation.

(2) Injury to the bone must be avoided, the use of an elevator discarded, and the tooth lifted from its bed with forceps. When an elevator is used on cancellous bone beneath the tooth, there is a risk of such conditions as osteomyelitis, pyæmia, and septicæmia. If the compact bone is used as a fulcrum, necrosis often supervenes. Violent use may cause fracture of the mandible.

(3) Improved accessibility is obtained by operating from behind, with the head retracted as for tonsils and adenoids, and better lighting by using a head-mirror. The greater accessibility permits a more careful cleaning up of the wound.

(4) Injury to the second molar and the bone supporting it is avoided by operating from behind.

(5) The cavity produced by operation should be reduced as far as possible. A saucer-shaped depression rather than a deep cavity is aimed at.

(6) The operation should be a planned and controlled surgical procedure, with the patient in a nursing-home or a general hospital, and the patient should clearly understand the severity of the operation.

An important decision has to be made whether operation is necessary and if so when. Some of the factors to be determined are the age of the patient, whether the tooth has caused trouble, and whether there is or has been suppuration. What possibilities are there that a deeply placed tooth will lead to trouble, or can it remain undisturbed? If the tooth is causing even slight trouble, either operation or palliative measures should be undertaken, such as removal of the maxillary third molar, incision of the overlying soft tissues, or removal of the part covering the tooth. Palliative treatment is dangerous, for although there may be no pain infection persists and must be regarded as a definite menace.

NEW OPERATION

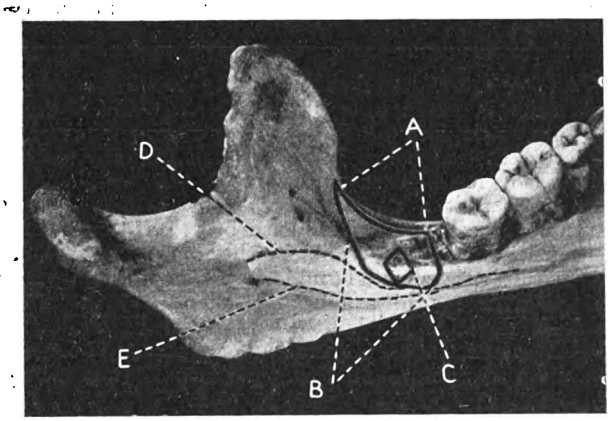
Under ideal conditions, which are not always essential but are desirable, the patient should be admitted to a nursing-home or a hospital, where efficient nursing and a properly equipped operating-theatre are available. The instruments should include, besides the ordinary surgical equipment, a special head-rest; a Boyle Davis, or a special, gag; special long chisels, gouges, and a heavy mallet; forceps and retractors; a sucker; and a viewing-box for X-ray films which have been taken at all important angles.

The ideal operating team should consist of a surgeon, a skilled anæsthetist, two assistants, a theatre sister, and a nurse. The anæsthetic should be intratracheal, with a tube passed through the nose. A long connecting tube should enable the anæsthetist to sit well out of the way. Firm fixation of the tube in the nose is necessary, for it is likely to be disturbed by the surgeon, who must avoid compressing it. The surgeon, using a reflecting head-mirror, is seated at the head of the table, which is tipped until the end rests in his lap. Tilting the table gives a better position than retracting the head. There should be a standard lamp on the right of the table. The first assistant, wearing a head-light and standing on the left, uses the sucker or swabs and holds a retractor. The second assistant supports the patient's chin and Davis gag and holds a retractor. The sister is at the instrument table on the right of the surgeon. The nurse, standing behind the first assistant, hands the swabs. The head-rest determines the exact position of the patient. A long cloth with a hole for the mouth area is best; a folded towel across the upper part of the face is a protection to the eyes.

After the introduction of the gag, the throat is packed with a long strip of damp gauze. The standard lamp and the surgeon's head-mirror are arranged for a complete lighting of the field of operation.

The incision (see figure) is begun on the lingual side, on a level with the floor of the mouth, a short distance behind the second molar, so that a narrow strip of mucosa is left intact behind this tooth. The incision, carried right through to the bone, passes parallel to the roots and posterior surface of the second molar upwards and outwards almost to where the mucosa is reflected on to the cheek; it is then carried backwards towards the coronoid process. If the tooth is showing, the line of the incision should be up to and away from the exposed part. The cut must be made completely down to the bone and the flap carefully and cleanly marked out.

The flap (see figure) is raised by cutting the firmly attached fibres from the bone with a sharp chisel, with



Stages in removal of impacted lower wisdom-tooth: A, the line of incision; B, the line of reflection of the flap to expose the bone; C, outline of first piece of bone to be cut away on the inner and posterior aspect of the tooth; D, the internal oblique line, beginning at the inferior dental foramen and running forwards and downwards, its upper branch running along towards the inner side of the molar teeth. (This ridge forms the acute angle described in the text as produced by the eversion of the mandible, and the lingual nerve lies immediately below this ridge at the back of the wound); and E, the subalveolar canal, containing the vessels and nerve, with which the tooth is often in close contact.

short pushes and without the edge of the chisel being allowed to leave the surface of the bone. Separation is not difficult, except on the lingual side, where the eversion of the mandible (see figure) is often of such a degree that this surface and the upper one form so abrupt an acute angle that, unless great care is taken, the soft tissues are injured. A free exposure of the bone constitutes one of the features of the operation. If the soft tissues are carefully separated, the muscular insertions are in no way disturbed. Tearing of the muscle-fibres causes an annoying and persistent hæmorrhage. Free retraction of the flap may demand an additional nick in the tissues, for the surface of the bone must be freely exposed.

When the tooth is deeply situated and a considerable area of bone is laid bare, the muscular insertions of the superior constrictor, the buccinator, the masseter, or the temporal muscle may be involved. The complete separation of the tissues from the bone, including parts of the insertion of any of these muscles, is most important; not only is the hæmorrhage just mentioned avoided, but also the after-pain is reduced and the healing of the wound is more satisfactory.

Removal of bone is effected by cutting away small wedges from behind and on the inner and outer aspects of the tooth. I find long chisels and gouges and a heavy mallet the most effective. The first cut is made across the back part of the angle between the lingual and upper surfaces (see figure). This should, if possible, be carried through to the tooth, and by continuation from this point forwards on the lingual side of the tooth the low drainage-point, so essential to the operation, is achieved. The variable position of the tooth will affect the details of bone removal; but, whatever the position, sufficient bone must be cut away to allow the tooth to be taken out in a direction away from the second molar. Forceps may be applied to test the resistance and to determine whether more bone needs to be removed. Removal of a small wedge of bone on the outer side of the tooth is nearly always necessary to allow the application of the outer blade of the forceps.

The cavity in the bone, when the tooth is comparatively superficial, is easily rendered saucer-shaped, and drainage presents no difficulty; but, if the tooth is deeply situated, so that the cavity is below the level of the floor of the mouth, considerable care is needed to close the wound in such a way that drainage is not impeded. Deep cavities often lie in close proximity to the subalveolar canal. Numbness of the lip may follow any operation; but, if the injury has not been severe, recovery readily takes place.

The use of an elevator under these conditions is particularly undesirable. In these deep wounds the lingual nerve is commonly exposed, but, if it is carefully retracted, there is no reason to be perturbed. Vigorous retraction may cause a disturbance in sensation in the tongue. As already stated, there is no necessity to disturb the second molar, even when the third molar is in very close contact, but it must be emphasised that such cases demand particular care.

Removal of the tooth is effected with forceps. Special forceps are necessary, and many with the necessary curves will be tried. A deeply placed tooth can be difficult to grasp, and not infrequently upper-molar-splitting forceps will be found to provide the necessary grip. It may be thought desirable to split the tooth, and splitting forceps are preferable to a heavy chisel. The force of a blow on a heavy chisel is less controlled and apt to injure the bone. Some dental surgeons favour the use of a bur or drill in a dental engine.

There are occasions when an elevator may be employed, but the second molar, or the bone separating it from the third molar, should never be used as a fulcrum. The elevator should be used from behind, and the bone from which leverage has been obtained should be cut away. It is necessary to resist the temptation of using considerable force, for the time occupied by the operation could be considerably reduced in this way. It is only justifiable if one can be sure that the after-effects are not going to be impaired. There is much self-deception about the amount of force used with an elevator. Bone injured by pressure becomes readily infected, as is well demonstrated by the subsequent necrosis so often seen on the outer surface and extending to the second molar, when an elevator has been used.

Cleaning up of the wound.—Swabbing with a 1 in 2000 solution of flavine renders visible any small particles which may be left. The wound must be widely retracted and every possible point explored for fragments of bone or of tooth, if it has been broken. The subsequent healing is greatly helped by the removal of every loose fragment. Any overhanging edges of bone should be rounded off and the replacement of the flap kept in mind when doing so.

Closing the wound with the flap.—The flap of mucosa should be tested to see how much of the cavity in the bone can be covered by it. Should there be much retraction, or if there is a tendency to oozing, a stitch may be advisable. The flap is held in place by a pad of gauze, a long strip being used and a considerable wad introduced, so that, when the jaws are closed together, compression is exerted by pressure against the maxilla. The end of the gauze is passed along the sulcus of the cheek to the angle of the mouth. When a stitch has been used, it should only be loosely tied, so that there is no interference with the compression of the soft tissues into the bony cavity. The tension on the flap tends to pull on the palate rather than on the floor of the mouth. Care must be exercised to avoid tension, for considerable pain may be caused later by any movements of the palate. Should there be after-pain when a stitch has been introduced, it is well to remove it the next day; otherwise catgut can be left, for it becomes absorbed.

After-treatment.—Morphia is given after a severe operation if there is likely to be discomfort or to keep the patient quiet. It is usually unnecessary, but is often of more value after than before an operation. The pad of gauze is retained for as long as possible, but often the patient spits it out on recovery from the anæsthetic. It is unnecessary to introduce another pad unless there is some hæmorrhage, which should not occur. Gentle irrigation is begun on the day after the operation. It is best effected with a long piece of rubber tubing on the nozzle of a syringe or an irrigator. It is passed along the sulcus of the cheek and the fluid allowed to wash gently over the surface of the wound. Force should always be avoided. It causes pain and may break down the blood-clot. The lotion used for irrigation is not of great importance, but I have found that half a tumblerful of a 1 in 120 solution of phenol, to which 10 minims of tincture of iodine has been added, is satisfactory and pleasing to the patient. When the mouth can be opened without discomfort, syringing from the lingual side is usually more effective.

SUMMARY

Operation for removal of a third mandibular molar should be regarded seriously because of the anatomical position of this tooth and its relation, if impacted, to the body of the mandible. Operation in a nursing-home or a hospital is imperative for difficult cases and often desirable in others. The great difficulty of drainage in these cases is met by operating through the lingual plate, which considerably reduces the risk of the operation and almost completely avoids after-pain and other ill effects. Removal of the tooth with forceps instead of with an elevator prevents injury to the bone beneath the tooth and is very rarely followed by necrosis, although the improved drainage and the less likelihood of infection are also important factors in preventing necrosis.

By operating from behind and by using a head-mirror, greater accessibility and better lighting are obtained, the second molar remains undisturbed, and the wound can be satisfactorily cleaned up. The reduction in the size of the wound by cutting away overhanging bone and compressing the flap of mucosa into the cavity allows healing to take place more readily. From experience, now of several years, it is remarkable how little pain follows the operation, and none of the serious sequelæ, such as osteomyelitis and septicæmia, has yet developed.

The chief complaint of the patient is soreness of the throat; it can be caused by stitching too tightly.

The operation was first described to the odontological section of the Royal Society of Medicine in December, 1935. Since then modifications have been introduced from experience gained. Many operations have been performed, and statistics might be given; but the variation in type has been so wide that little can be conveyed by a quotation of figures.

I am indebted to Mr. Forsyth Whaley and to my colleagues and house-surgeons at the Middlesex Hospital for their help.

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TREATMENT OF DROPSY WITH MERCURIAL DIURETICS AND UREA

By MAX WINTERNITZ, M.D. Prague

THE chief progress in cardiac therapy during the last few decades has been the development of mercurial diuretics, which has led to definite prolongation of the average life of patients with cardiac failure. A new type of patients has arisen—cardiac invalids with chronic metabolic imbalance of their body fluids living for an indefinite time but entirely depending on regularly repeated injections. The interval between injections is determined by the amount of diuresis produced, by strict and often worrying restriction of the fluid intake, and by the output of urine between the injections. Unfortunately mercurial diuresis, however copious, is often followed by postdiuretic oliguria, and this factor necessitates repetition of the injections at short intervals, which is neither agreeable for the patient nor rational for cardiac treatment as a whole. We therefore sought to raise the output of urine in the intervals between two injections. The usual theobromine compounds almost invariably failed to do this, and dietetic measure proved on the whole equally unsatisfactory. We then remembered urea, a remedy used in cardiac and hepatic dropsy long ago. The uneven side-effects obtained with the large doses previously employed and the patient's dislike of its taste had led to its being almost entirely abandoned on the introduction of Novasurol and its successors. We thought, however, that in patients who had lost their œdema by the parenteral injection of mercurials it would perhaps require smaller quantities to maintain their fluid balance than in those desperate cases in which we had used it previously. We were encouraged in this by an observation made by one of our patients with cirrhosis of the liver due to long-standing rheumatic mitral and tricuspid valvular disease. This patient, taking a small daily dose of urea previously prescribed by one of her doctors, managed to remain quite well for some time without Novurit, which by this time she had been obliged to have at regular intervals.

EXPERIMENTS AND RESULTS

We started our experiments with patients who had been under regular mercurial treatment for a sufficiently long period. They were practically free from œdema on the days following injection. Novurit 1–2 c.cm. or Esidrone 1 c.cm. was injected intravenously with or without the administration of ammonium chloride 4–6 g. on the day before and the day of injection.* Urea therapy was started twenty-four to

* The effect on diuresis of 4–6 g. of ammonium chloride, although it is converted to urea in the body, does not affect urea diuresis. The amount of urea formed by 4–6 g. of ammonium chloride, according to the formula $2\,NH_4Cl + CO_3 = (NH_2)_2CO + 2\,HCl + H_2O$, is 2·24–3·37 g.—i.e., much less than the minimal effective dose (about 20 g. daily).

forty-eight hours after an injection, according to whether diuresis had lasted twenty-four hours or longer, 20–40 g. being given daily, the whole amount being dissolved in a single cup of strong unsweetened coffee, which concealed the bad taste of the drug much better than did fruit juices or the like. Most of our patients took this without protest, even when the dose had to be increased. There were no unfavourable side-effects in any of our cases, from which renal insufficiency and nitrogen retention of other origin had been excluded. Diuresis was invariably produced, the effect appearing on the first or second day. An increase of urinary output, however, is not always accompanied by an equal improvement in the fluid balance. This fact did not surprise us, as we had found before that different diuretics vary in this respect. We believe that two factors may be responsible—namely, invisible perspiration and thirst, both of which are affected to various extents by different diuretics, as shown schematically in the following table.

EFFECTS OF DIFFERENT DIURETICS ON FLUID BALANCE

Diuresis produced by	Increase in output of urine	Loss of body-weight	Increase in extrarenal fluid output*
General measures—e.g., rest, diet, and theobromine	None or +	None or +	None or slight
Digitalis, strophanthin ..	+	++	+
Mercury injected parenterally	+++	++	None
Urea	++	+	None

* Measured by the rough formula: loss of weight = extrarenal + renal fluid output − fluid intake.

To estimate the diuretic power of a drug it is better to observe carefully the body-weight rather than only the output of urine. In most of our cases we succeeded not only in producing diuresis but also in preventing the rapid reaccumulation of fluid after each injection.

ILLUSTRATIVE CASE-RECORDS

CASE 1.—A male, aged 77, with general arteriosclerosis, hypertension, severe cardiac failure, and long-standing dropsy. Refractory to digitalis. Regular injections of novurit with strophanthin, after previous administration of ammonium chloride, every 5th to 7th day since October, 1937. No effect from theobromine by mouth, Euphyllin (Byk) and Deriphyllin (Homburg) or from Diuretysat (Buerger). More than a hundred injections had been given before we started urea on April 12, 1939. A daily dose of 20 g. was given. The patient did not object to taking urea over a long period and did not complain of the bad taste or of increased thirst. Last injections before urea were given at intervals of 7, 6, 7, 7, 7, 7, 6, 7 and 7 days; after urea injections were given at intervals of 9, 10, and 11 days. The weight remained stationary; no œdema and no dyspnœa appeared. Other attempts to lengthen the periods between injections had failed previously.

CASE 2.—A male, aged 67, with coronary sclerosis, auricular flutter, cardiac failure, general dropsy, and visceral congestion. Tolerance for digitalis restricted. Fair reaction to treatment with combined injections of esidrone (Ciba) and strophanthin. Sinus rhythm restored, œdema removed. To maintain this condition, however, strophanthin had to be continued at 4-day intervals and esidrone at 8-day intervals. Urine output was measured, and weekly variations of body-weight were checked. From March 1, 1939, urea 20 g. daily was given through March and April. Urinary output was increased from 570–710 c.cm. to 1150–1350 c.cm. on the days on which no injections were given. Strophanthin had to be continued, but esidrone could be discontinued until the end of our observation—i.e., for 2½ months. Similar attempts to withdraw esidrone had failed previously.

CASE 3.—A male, aged 57, with severe aortic stenosis, gross myocardial impairment (confirmed by electrocardiography), cardiac failure, and frequent angina. Indoors for the last two years. The last previous therapy consisted in the administration of digitalis folia 0·15 g. daily, which did not prevent œdema and nocturnal angina referred to the left arm and shoulder, making sleep nearly impossible and requiring strong analgesics, nitroglycerin being of little value. Novurit with ammonium chloride had to be given at regular weekly intervals to prevent retention of fluid. With abundant diuresis pains in the left arm vanished for thirty-six hours after every injection, thus showing in this case the close relation between myocardial failure and insufficiency of coronary circulation. Mercurial injections had been given regularly since January, 1938. Several attempts to abandon its use ended in deterioration of the patient's condition. Urine and weight were measured by the patient. The urine amounted to 4–5 litres after injections and 500–700 c.cm. in between. Urea 20 g. daily was started on March 18, 1939. Urinary output rose to 1000–1500 c.cm., which enabled us to prolong the periods between injections from 7 to 14 days and later on, with a daily dose of 40 g., to an interval of three weeks. The body-weight remained on the postinjectional level, and the nocturnal angina did not appear for 10 days after each injection. After two months the patient complained of a sudden dislike of the taste of the medicine; hence it was withdrawn temporarily.

We have not been able to continue with our experiments on a larger scale owing to external circumstances. But the promising results in these and other cases encourage us to publish them so that others may check them independently.

SUMMARY

Urea in single daily doses of 20–40 g. is recommended for combined use with mercurial injections to prolong the periods between injections in cases of cardiac dropsy.

AT the general meeting of the British Empire Leprosy Relief Association held on May 6, under the chairmanship of Mr. Malcolm MacDonald, Secretary of State for the Colonies, Sir William Peel, chairman of the executive committee, described Dr. Ernest Muir's African tour (see *Lancet*, March 2, 1940, p. 422) and announced his forthcoming visit to South America and the West Indies. He further reported that excellent clinical and research work on a large scale is being done in India, under the general guidance of the Indian council of Belra. Special attention is being paid to leprosy in childhood. The number of lepers in Burma is estimated at 150,000 and is increasing. In wealthy colonies, such as Malaya, the local government has been able to give unstinted support to anti-leprosy measures, but in other places Belra has to depend largely on missions and other societies, especially Toc H. Dr. Muir said that the association's two aims are to study leprosy in the various parts of the Empire and to advise all the governments concerned and those who are more directly responsible for combating leprosy. The association send out their medical secretary to visit isolated workers, to make brief studies of their particular problems on the spot, and to encourage them in their work. One of the most important results of this village work is that, besides leprosy, complicating diseases, such as malaria, dysentery, and venereal disease, are also tackled; the people are taught sanitation; and defective diet and other causes of malnutrition are studied and, if possible, corrected. Dr. Muir added that within the last few months he has been in touch with doctors at the Leprosy Institution at Chiengmai, N. Siam, where experiments have been made along entirely new lines. The results obtained appear to be most promising and Dr. Muir has arranged for trials to be repeated in four of five centres throughout the world.

REVIEWS OF BOOKS

Peripheral Vascular Diseases

By WILLIAM S. COLLENS, M.D., chief of the clinic for peripheral vascular disease and of the diabetic clinic, Israel Zion Hospital, Brooklyn; and NATHAN D. WILENSKY, M.D., assistant in the clinics. London: Baillière, Tindall and Cox. 1939. Pp. 244. 25*s*.

IN the first half of this monograph the authors outline the anatomy, physiology and pathology of the peripheral vascular system and describe the methods of investigation and diagnosis of peripheral vascular diseases. An account of the various conditions follows, with a particularly good description of thrombo-angiitis obliterans and the Reynaud phenomenon. The second half of the book is about treatment. Too much space is given to medical and physical methods—no less than forty different therapeutic agents or procedures are discussed, including such bizarre pastimes as subcutaneous injection of carbogen gas, intra-arterial injection of Neo-iopax, and iontophoresis. Under surgical methods the modified operation of preganglionic sympathectomy of the upper limb is described. A critical discussion of the value of sympathectomy in peripheral vascular disease would have been a welcome addition. There are a number of illustrated reports of cases treated by intermittent venous occlusion, a procedure first applied to peripheral vascular disease by the authors, and these leave little doubt of the effectiveness of this treatment in certain patients. The account would be more convincing, however, if the observations were more strictly controlled and fuller figures were given of failures and successes. More information might also have been given about the selection of cases for treatment and the criteria on which a successful result may be expected. Nevertheless, this is a useful book, and the excellence of its arrangement and illustrations compensates for the rather discursive style.

Leprosy

(2nd ed.) By Sir LEONARD ROGERS, M.D. Lond., F.R.C.P., F.R.C.S., F.R.S., I.M.S. (retd.), late physician and lecturer, London School of Tropical Medicine, and professor of pathology, Calcutta Medical College; and ERNEST MUIR, M.D. Edin., F.R.C.S., medical secretary, British Empire Leprosy Relief Association, late research worker in leprosy at the School of Tropical Medicine and Hygiene, Calcutta. Bristol: John Wright and Sons. 1940. Pp. 260. 15*s*.

FIFTEEN years have elapsed since the first edition of this book appeared, and during that period great progress has been achieved not only in our knowledge of leprosy but also in our methods of treatment. In the clinical section the new nomenclature of the 1938 International Leprosy Congress in Cairo has been adopted and the book embodies the lessons of long clinical experience in India and of the recent tours undertaken in Africa by Dr. Muir on behalf of the B.E.L.R.A.

History shows that leprosy slowly spreads over the globe by extending to countries previously free while disappearing in the temperate-zone areas of Europe. The present distribution of leprosy and its relation to latitude and rainfall is here given in detail and repays intimate study. It is not generally realised how menacing is its spread in West and Central Africa; in Nigeria, for instance, Muir has estimated the number of lepers as 200,000 or 10·5 per 1000 of the population. Nauru in Oceania presents the latest and most striking example of the spread of the disease in a small native community. Introduced in 1912, by 1925 no less than 30 per cent. of the 2500 native Nauruans showed signs of leprosy. The total number of lepers in the world is now estimated at 2,500,000, and even this is probably an underestimate.

The authors follow their general survey with well-balanced accounts of the bacteriology of leprosy, its paths of spread and distribution in the body, of the vexed question of immunity, and of the clinical appearances. Finally all aspects of modern treatment are set out in detail, and there are a number of useful appendices on the preparation of the esters of chaulmoogra, a description of the "lepromin" and other tests, and the methods of conducting a leprosy survey. The 81 illustrations include a number of excellent photographs of clinical cases. Altogether the book is terse, accurate and readable, and it has a strong claim to be the best account of leprosy in this or any other language.

Yearbook of General Therapeutics

Edited by BERNARD FANTUS, M.S., M.D., professor of therapeutics, University of Illinois College of Medicine; and LEROY HENDRICK SLOAN, S.B., M.D., F.A.C.P., professor of medicine at the university. Chicago: The Year Book Publishers; London: H. K. Lewis and Co. 1940. Pp. 532. 12*s*. 6*d*.

THIS useful collection of sizeable abstracts of papers of practical therapeutic interest follows the style of its predecessors. Sulphanilamide, sulphapyridine and related substances retain the front rank among notable recent advances. Their powers and limitations are being worked out in greater detail and with greater accuracy. The same is true of many other forms of treatment dealt with in the book. Few of them are really new; many are extended applications of familiar drugs or procedures. There is much about oxygen treatment, and about transfusion of blood, fresh or stored. The effect of vitamin B_1 is being tested in forms of neuritis other than alcoholic; nicotinic acid will relieve the mental symptoms of elderly, arteriosclerotic and undernourished patients; benzedrine has benefited intractable hiccup; and so on through observations too numerous to mention. There is a short section on toxicology and a fairly long one on "non-pharmacal therapeutics." The latter includes reference to a search, by the senior editor and a colleague, for something that will protect the skin from sunburn; yellow petrolatum and titanium dioxide were the best protectives among many tested, and formulæ are given for their incorporation into various skin-coloured preparations. Few readers will fail to find some new and useful item in this volume.

Traité de l'immunité dans les maladies infectieuses

(2nd ed.) By JULES BORDET, director of the Pasteur Institute of Brussels. Paris: Masson et Cie. 1939. Pp. 879. $3.90.

AFTER twenty years Dr. Bordet has at last found leisure to revise this great work, and its appearance is doubly welcome because few books on immunity have been published in recent years. As might be expected, a good deal of modification and enlargement has been necessary. The book is divided into four parts. In the first Dr. Bordet discusses the general character of immunity processes, and includes a section on local immunity. The second part deals with cellular immunity, and the third sets out at length and in admirable detail theoretical and established facts about humoral immunity. The fourth part will

particularly interest the practising physician, for here the author views immunity processes as a whole and explains their practical application to a multiplicity of individual diseases of infective origin. The last chapter of this section is reserved for the difficult subjects of anaphylaxis and allergy, the latter particularly in relation to tuberculosis. Both immunologists and clinicians will appreciate Dr. Bordet's lucid style and his orderly presentation of the facts and the opinions based on his wide experience. A bibliography and a detailed table of contents is given but the absence of an alphabetical index is a rather serious defect in a book of this size.

Manual of Neurohistologic Technique

By OSCAR A. TURNER, M.D. New Haven, Conn. London: Henry Kimpton. 1940. Pp. 73. 10*s.* 6*d.*

THIS technical handbook includes a selection of the principal methods required for the special examination of the nervous system, preference being given to those stains that require the least experience on the part of the manipulator. Many will be new to workers in this country since they are modifications recently brought out in the United States. Amongst these Bodian's stain for nerve-fibres in paraffin sections is particularly useful and deserves to be more widely known. Nieto's method for spirochætes is also a recent prescription which has been recommended. The older Herxheimer formula using sodium hydroxide in the scharlach R stain for fat should however be given up in favour of the mixture of alcohol and acetone. There are some rather obvious gaps in this work as a whole. Thus the only embedding method given is the one for gelatin which, incidentally, is prescribed in unnecessarily strong solutions. The section on the metallic stains for glia is slight. The double and triple impregnation methods with silver carbonate are too valuable to be omitted. Such techniques as are described are sufficiently full and clear.

Worth's Squint

(7th ed.) By BERNARD CHAVASSE, D.M. Oxfd, surgeon, eye department, Liverpool Eye and Ear Infirmary; lecturer in ophthalmology, University of Liverpool. London: Baillière, Tindall and Cox. 1939. Pp. 688. 25*s.*

IN rewriting this classical textbook Mr. Chavasse has approached the problems of squint from a novel and attractive angle. Through certain facts of comparative anatomy and embryology and some observations in comparative physiology he traces the basic causes of the condition. He has a new conception of the phylogeny, ontogeny and physiology of the binocular reflexes and from these foundations he discusses a new pathology in which all varieties of squint appear as perversions and subversions of the normal binocular reflexes, produced by various obstacles operative during the developmental period and after. He has made a much needed and laudable effort to clear up the muddled ideas and inappropriate terms that have been applied in the last few years to several aspects of this subject, in particular to orthoptic training. His views are well balanced and are particularly progressive and refreshing in the field of operative surgery. He discusses the importance of early and sometimes repeated operation in young children or even infants, such treatment being directed to the most rapid and complete resumption of normal activities and to the prevention of local secondary deformities and secondary perversions of the central nervous control. The steps in surgical operations are illustrated by prints from cinematograph films, and various types of squint are also explained in this way. The young ophthalmic surgeon whose physiological knowledge is still fresh will particularly enjoy this book.

Guide to Ophthalmic Operations

By J. BRUCE HAMILTON, M.B. Sydney, D.O., D.O.M.S., hon. ophthalmic surgeon to Royal Hobart Hospital. London: H. K. Lewis and Co. 1940. Pp. 202. 10*s.* 6*d.*

THE title of this book is misleading. It is not a guide to ophthalmic operations so much as a compilation of notes and lists of instruments, dressings and medicaments required for all the commoner eye operations. It will give nurses some guidance to the surgeon's requirements and the care of the patient before, during and after an eye operation. There is much useful information about the care of instruments and their sterilisation and the preparation and sterilisation of dressings, drops and ointments used in eye surgery. The book could have been enlivened by a brief description of the principles and object of each eye operation, with a few clear illustrations to help the nurse appreciate the surgeon's purpose and the use to which he puts his selected instruments.

Aids to Psychiatry

(4th ed.) By W. S. DAWSON, M.D. Oxfd, F.R.C.P., D.P.M., professor of psychiatry, University of Sydney. London: Baillière, Tindall and Cox. 1940. Pp. 320. 4*s.* 6*d.*

IT is a pity that Professor Dawson has not brought this little book more up to date. As it stands it is mainly a presentation of psychiatry as it was taught in England fifteen or twenty years ago. A glance through the chapter headings shows this clearly. Old-fashioned Kraepelinian terminology persists—for example, dementia præcox instead of schizophrenia, with separate chapters on paraphrenia and paranoia, manic depressive psychosis, where affective psychoses would have been better and more in accord with modern views. The chapter on heredity is too brief and somewhat misleading, and important recent work in this field is ignored. No doubt the compass of the book makes a certain amount of distortion inevitable, for its material is notoriously difficult to present simply.

The Cyclotron

By W. B. MANN, B.Sc., Ph.D., lecturer in physics in the University of London at the Imperial College. London: Methuen and Co. 1940. Pp. 88. 3*s.*

THE late Lord Rutherford used to say that C. T. R. Wilson's cloud chamber for making visible the ionisation tracks of individual atoms and electrons was the most wonderful scientific instrument ever devised. There would be others constrained to use the same remark about the cylotron—the ingenious device for getting up speed on any electrified particle by methods which could only have been devised and carried into effect by one with a real experimental flair; such a man is Prof. Ernest O. Lawrence who contributes a foreword to this book. Dr. Mann writes with lucidity as well as enthusiasm, and the reader is given just enough history and just enough mathematics for him to get a grasp of how this machine is constructed, how it works, and what part it is likely to play in experimental physics and biology.

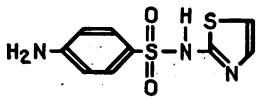
BRITISH POSTGRADUATE MEDICAL SCHOOL.—An intensive course in war medicine will be held at the school from May 27 to 31. The course is free to officers of the armed forces. Further particulars may be had from the dean of the school, Ducane Road, London, W.12.

THE LANCET

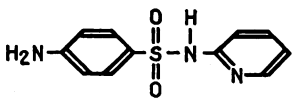
LONDON: SATURDAY, MAY 11, 1940

SULPHATHIAZOLE

IT has been freely predicted that the successes of sulphanilamide and sulphapyridine in the treatment of bacterial infections would lead to therapeutic claims for other similar compounds which the chemists can readily prepare. Such a compound is 2-(para-aminobenzene-sulphonamido) thiazole, a preparation in which sulphanilamide is linked to thiazole, a heterocyclic compound, in the same way as it is linked with pyridine in sulphapyridine.



Sulphathiazole



Sulphapyridine

This preparation, provisionally called sulphathiazole, and its 4-methyl derivative (sulphamethylthiazole) have been distributed in America for experimental and clinical trial, although not yet released in the open market. Early tests [1] suggested that sulphathiazole and sulphamethylthiazole were more effective than sulphapyridine in staphylococcal infections, and HELMHOLTZ [2] has lately shown that in vitro the urine of patients receiving these drugs is bactericidal for both *Staphylococcus aureus* and *Streptococcus fæcalis*. Another report [3] from the Mayo Clinic on the results obtained with these two preparations in urinary infections caused by coliform bacilli (15 cases), *Strep. fæcalis* (7 cases) and *Staph. aureus* (5 cases) claims a 65 per cent. cure. These findings naturally prompt us to ask how these new drugs compare in activity and toxicity with those already in use for the treatment of bacterial infections. PERRIN LONG [4] has presented a report to the American Council on Pharmacy and Chemistry which summarises the available American data on these two points. It seems, as Dr. BUTTLE points out on another page, that in experimental pneumococcal infections the new drugs are rather less effective than sulphapyridine, in streptococcal infections they are about equal, and in staphylococcal infections (which are more difficult to assess) they are somewhat superior to sulphapyridine. Clinical data from America on the treatment of infections due to these bacteria are, with the possible exception of staphylococcal infections, still too scanty to allow an opinion on the usefulness of these preparations. However, a similar product called Ciba 3714,[5] has been clinically tested, in doses similar to those adopted for sulphapyridine, in a variety of bacterial infections by GSELL.[6] Among 60 patients with pneumonia, of whom 23 had lobar pneumonia and the others bronchopneumonia and postinfluenzal pneumonia, there was in general a rapid amelioration of symptoms and only 1 death, while 7 cases of acute cerebrospinal fever all recovered. The concentration of the drug in the cerebrospinal fluid was 4–6 mg. per cent., some 50–60 per cent. of the blood level. Cases of gonorrhœa, erysipelas, and coliform pyelitis and cystitis were also treated with success but 2 cases of generalised staphylococcal infection failed to respond. Staphylococcal infections are indeed likely to be a stumbling-block for chemotherapy because of their great tendency to form localised abscesses. If it is to be effective the drug must be given very early, for without surgical drainage it has little chance of success once pus has accumulated.

As regards its pharmacology and toxicity, sulphathiazole is readily absorbed from the bowel and quickly excreted, while a smaller percentage of the drug becomes acetylated and inert than is the case with sulphapyridine, although experience with the latter drug shows that the proportion of conjugated drug varies greatly in different individuals. With doses of 4 to 6 g. of sulphathiazole per day the concentration in the blood seems to range between 3 and 5 mg. per cent.[7] (the Swiss workers claim higher levels), and higher concentrations are difficult to maintain despite increases in the amount of drug prescribed. This is presumably due to the rapid excretion of the drug, and may be a point of some practical importance, especially in severe infections. Experimentally in mice the chronic toxicity of sulphathiazole is greater than that of sulphapyridine, while the sodium salt of the methyl derivative is as acutely toxic as the corresponding salt of sulphapyridine. In man, nausea and vomiting are less common than with sulphapyridine, and according to both the Swiss and American investigators are never severe enough to interfere with the use of the drug, even with doses of 8–12 g. per day. If confirmed, this is a point definitely in its favour. Drug rashes and drug fever are quite common, and some patients have shown an acute congestion of conjunctiva and sclera in association with a rash resembling that of erythema nodosum. Hæmaturia has been noted in several cases, and is more likely to occur with sulphamethylthiazole which is poorly soluble. In other words the toxic effects are much the same as those produced by sulphapyridine except that the latter drug is more liable to cause vomiting.

The position with regard to the new preparations is admirably summed up by LONG: "The evaluation of these new chemotherapeutic compounds," he says, "will necessitate extensive

1. See *Lancet*, Jan. 20, 1940, p. 137.
2. Helmholtz, H. F. *Proc. Mayo Clin.* Jan. 31, 1940, p. 65.
3. Pool, T. L. and Cook, E. N. *Ibid*, Feb. 21, 1940, p. 113.
4. Long, P. H. *J. Amer. med. Ass.* March 9, 1940, p. 870.
5. Hartman, M. *Schweiz. med. Wschr.* April 20, 1940, p. 337; Meier, R., Allemann, O. and Merz, E. *Ibid*, p. 338.
6. Gsell, O. *Ibid*, p. 342.
7. Reinhold, J. G., Harrison, F. F. and Schwartz, L. *Amer. J. med. Sci.*, March, 1940, p. 393.

experimental and clinical investigations in order to determine their efficiency in the control of infections and their clinical toxic manifestations. Until the time when such data are in hand, it is to be hoped that enthusiasms do not outrun common sense."

THE WOMAN WAR-WORKER

THE controversy over the rates of wages to be paid to women who replace men in war-time jobs is a side-issue of the great national effort, which requires an equitable settlement if the machine is to run smoothly. The first round has been won by the women bus and tram conductors who have been allotted by the Industrial Court the same "rate for the job" as the men they replace, provided they are over 21 and have given six months' service, while in the negotiations now proceeding for the admission of women to the engineering industry the Amalgamated Engineering Union are insisting on equal pay for equal work. The argument between the transport workers and the employers—in this case the municipal authorities—followed traditional lines. The familiar allegation that absenteeism for physical reasons was commoner among women than among men was reviewed but not accepted by the court, and indeed it is more difficult to establish this statistically than would appear at first sight, though it is true that where comparable conditions exist (which in peace-time is rarely the case) the rate of absence for sickness among women is almost invariably higher than among men. Among London teachers for example the number of days lost per head averages steadily about 8 per annum for women and 4 for men. Among industrial workers the rate for both sexes is usually higher, but the differential rate between the sexes is variable and may be less than among teachers. The court may have considered that the difference does not justify a diminution in the standard rates for women. It must also be remembered that sickness-rates vary far more with age than with sex. Sir HENRY BASHFORD [1] has shown that in the Post Office men between 40 and 60 incurred 55 per cent. more sickness-absence than men under 40, and women over 40 incurred 58 per cent. more than women under that age. But in war-time the average age of the women substitutes will be lower than that of the men left in the transport services or in the factories, so that the sickness-rates should not be very different.

Once rates of pay are settled employers and unions would do well to get together without delay and consider how to get the best out of the women engaged in arduous and unfamiliar tasks. The experiences of the last war showed that the presence or absence of amenities has more influence on the output of women than of men. For women a skilled medical and lay welfare staff is not so much a luxury as a necessity. A report recently issued by the Industrial Health Research Board [2] points out that careful and accurate records of absences are the only means of checking the effects of new processes or changes in working conditions. Where the causes of sickness are collected and grouped it is found that much of the women's excess rate is due to "nervous" conditions—which can be greatly reduced by tactful welfare work. A small proportion of the excess is due to "ailments of women," but disability due to the menstrual function has shrunk to negligible proportions, thanks to a recognition of the importance of cleanliness and exercise.

In comparing the sickness-rate and working capacity of men and women it is easy to forget how unequally the pressure of domestic duties falls on the two sexes. That great champion of the working woman, MARY MACARTHUR, used to relate the story of a friend who acted as forewoman in a factory in the last war. Talking to a man engaged on an exactly similar job, she complained of the increasing difficulty and expense of getting her greasy overalls washed. "But how lazy of you not to do them yourself at home," he protested, "my wife always does mine!" Leisure must be really leisure if it is to restore the worker's vigour unimpaired for the next day. Even when the workers are living at home substantial canteen meals should be provided and practical arrangements worked out for getting the laundry done. Small day-nurseries for children proved invaluable in the last war and greatly reduced short absences among married women. Today the introduction of a system of family allowances in industry would bring military and civilian conditions into line. The provision of hostels for mobile labour is a real boon and enables a sympathetic watch to be kept over the girls' health. In the last war thousands of girls at Gretna and Woolwich blossomed like the rose in spite of long hours and heavy work, and today their daughters should prove as capable of quitting themselves like men.

1. *Proc. R. Soc. Med.* 1938, **31**, 185.
2. Emergency Report, No. 1; see *Lancet*, April 13, 1940, p. 699.

SCOPE OF INTERNAL PNEUMONOLYSIS

THE popularity of internal pneumonolysis in the collapse treatment of pulmonary tuberculosis shows no sign of waning. On the contrary, within the last few months there have been four important contributions to the subject, two from this country and two from America. WOLLASTON [1] has reviewed 200 consecutive cases of adhesion cutting, and has compared them with pneumothorax cases discharged from the Royal National Hospital, Ventnor, in 1934, in none of which adhesiotomy was undertaken. He found that with internal pneumonolysis satisfactory collapse was obtained in 58·8 per cent. of the patients, whereas in 1934 the figure was only 25·8 per cent. SMART,[2] working in Chandler's clinic at the London Chest Hospital, gives a detailed analysis of 52 operations on 42 patients who had been followed up for two years; 27 of these now enjoy good health with a T.B. negative sputum, 7 are in fair health, 3 have relapsed or are very ill and 5 have died. The material was not composed

1. Wollaston, F. L. *Brit. J. Tuberc.* 1940, **34**, 13.
2. Smart, J. *Tubercle*, 1940, **21**, 81.

only of early, favourable cases but in some instances the adhesions were divided as a last resort. Both Wollaston and Smart had a low incidence of important complications which agrees with the published experience of Chandler and Brock. From across the Atlantic come descriptions of equally satisfactory results. JONES [3] bases his account on 163 operations, but a detailed analysis is lacking, while NEWTON [4] gives in full his experience of 182 operations on 146 patients with the gratifying figure of 87·6 per cent. clinical successes. The period of his follow-up, however, was short.

That the operation of internal pneumonolysis when performed by experts is an important adjuvant to the artificial pneumothorax goes unchallenged. These four publications, however, show a widening of the indications for the procedure based on a deeper appreciation of the principles underlying collapse therapy. It is not enough to compress the lung against the mediastinum; there must be a corresponding drop of the diseased apex from above downwards if firm healing is to follow. Referring to collapse of lung against the mediastinum Newton says "the lung thus collapsed may heal, but surely not with the same certainty as if concentric apicocaudal release were possible." Thus, "selectivity" and "concentricity" become the twin aims of relaxation therapy. It is but a short step from this premise to the belief that all adhesions attached to the affected part should be divided irrespective of the clinical state of the patient and the bacteriology of the sputum provided that their division can be executed with safety. It is evident that this step has been taken, for all of these workers agree that internal pneumonolysis should be attempted in every artificial pneumothorax in which adhesions are seen on the X-ray screen. To quote Wollaston, "a thoracoscopy should be performed in every case of partial pneumothorax," and Smart in echoing this sentiment adds "the operative risk of introducing a cannula and studying an adhesion is almost negligible." Not only must selective and concentric relaxation be attained but the operator strives for the *maximum* of both, because at present there is no means of measuring the degree of collapse necessary to ensure complete recovery in any particular patient. The disappearance of all symptoms and objective signs of toxæmia, the restoration of the weight to normal and a conversion of the sputum from positive to negative may all be ephemeral and none is a reliable index of absolute healing of the local lesion. For this reason the thoracoscopist plays for safety by leaving no thread intact, as does the physician when he maintains his pneumothorax for an arbitrary period of 4 or 5 years. The "greatest good for the greatest number" is all very well as an armchair generalisation, but medicine is a personal affair and from the point of view of the individual the passing of the "benign adhesion" may not prove to be altogether a good thing.

3. Jones, H. A. *Amer. Rev. Tuberc.* 1939, **40**, 722.
4. Newton, H. F. *Ibid*, 1940, **41**, 22.

IRRADIATION IN GAS GANGRENE

THE employment of X rays in the treatment of infections has not received as much attention in this country as in some others, notably America, and Dr. SEWELL's letter on another page usefully draws attention to their value in gas gangrene. X rays were first used for this condition in 1928 at St. Catherine's Hospital, Omaha, by KELLY who had had a lot of experience with irradiation in other infections, and the patient made a remarkable and rapid recovery. KELLY next reported a series of 8 cases in 1933.[1] Since then a number of reports have appeared, and KELLY and DOWELL in their latest paper [2] refer to 132 cases treated with X rays with a mortality of 11·3 per cent. Cases have also been treated in this way in Australia by GODBY [3] and in this country by W. H. MOWAT, and the subject was discussed by D. W. SMITHERS [4] at the British Institute of Radiology on March 16. SMITHERS quoted three theories that have been put forward to explain the action of X rays: first, that the rays cause the tissues to throw out a protein which is resistant to the bacterial toxins; secondly, that small quantities of hydrogen peroxide produced by the rays inhibit bacterial growth; and thirdly, that the breakdown of the highly radiosensitive white blood-cells liberates antibodies in the infected area.

KELLY uses irradiation as a supplement to other measures—local minor surgery, antiseptics, gas-gangrene serum and tetanus antitoxin are all employed—but he claims that X rays reduce the mortality of the severe cases and save many a limb from amputation. He is strongly opposed to amputation as a therapeutic measure for gas-gangrene infection, and maintains that tissue should only be removed when the severity of the injury makes it imperative. He claims, in fact, that it is in the cases where amputation has hitherto been advised because of extensive infection that X rays have proved most successful. Where the trunk is involved the method also seems to be of value. Thus the 8 patients with trunk involvement in KELLY's second series of 32 cases all survived, and SEWELL [5] points out that success has been attained in infections of the trunk where grossly involved tissue has not even been incised. Against KELLY's successes where irradiation was supported by serum and other established aids must be set the 14 cases treated by COLEMAN and BENNETT [6] with X rays alone, of which 10 died. Furthermore, PAGE [7] points out that X rays do not hold out much hope in the fulminating case and are unnecessary where infection is strictly localised. Much work has still to be done before their true value can be estab-

1. Kelly, J. F. *Radiology*, 1933, **20**, 296.
2. Kelly and Dowell, D. A. *Ibid*, 1939, **32**, 675.
3. Godby, W. H. *Brit. med. J.* Jan. 20, 1940, p. 107.
4. *Lancet*, April 6, 1940, p. 646, and April 13, 1940, p. 724.
5. Sewell, R. L. *Surgery*, 1939, **6**, 221.
6. Coleman, E. P. and Bennett, D. A. *Amer. J. Surg.* 1939, **43**, 77.
7. Page, C. M. *Brit. med. J.* March 9, 1940, p. 411.

lished, and the results must clearly be judged not only by the survival-rate but also by the amount of mutilation necessary in overcoming the infection. GODBY is perhaps over-enthusiastic when he says that "X-ray therapy is the first line of attack in the treatment of gas-gangrene," but it may be that in severe cases early amputation and widespread drainage will give way to conservative surgery, designed merely to clear the wound of foreign matter and hopelessly damaged tissue, combined with chemotherapy and irradiation.

ANNOTATIONS

DIAGNOSIS OF DIPHTHERIA

TEACHERS, particularly of bacteriology, take great pains to impress on successive generations of students that the diagnosis of diphtheria must be primarily clinical and that the laboratory must be used secondarily to confirm or refute the clinical diagnosis. But succeeding generations of practitioners insist on putting the onus of diagnosis on the bacteriologist who must therefore be prepared to give a quick and accurate report on the nose or throat swab submitted to him. For rapid diagnosis certain laboratories still use the direct smear, but its pitfalls are many and except in the case of membrane, diagnosis from a direct smear is not encouraged by most bacteriologists. Other quick methods, such as the use of a swab covered with a pellicle of serum or the application of a solution of tellurite to the swab or the throat, have not proved reliable so that the Loeffler slope is still the mainstay in most laboratories for the early diagnosis of diphtheria. Within the past decade or two, however, it has become apparent that a proportion of cases of manifest faucial diphtheria are being missed when Loeffler's medium is used alone, while nasal diphtheria, the suspected carrier, and the increasing number of atypical cases have rendered a more careful bacteriological diagnosis, using biochemical or virulence tests or both, essential. To achieve this, growth on a larger and more accessible surface and on a medium which will inhibit other bacteria is desirable, and so the Petri plate and telluric acid or one of its salts, introduced by Conradi and Troch in 1912, came into use. The next step was the differentiation by McLeod and his colleagues of the diphtheria bacillus into three main biological types, and the recognition of these by their colonial appearance on a selective blood-tellurite medium. Since then various modifications of these original media have been introduced, and many of the larger laboratories doing public-health bacteriology have adopted a plate-tellurite-blood (or serum)-agar method, usually in conjunction with the Loeffler slope which still has the advantages of early selective growth of *C. diphtheriæ* and a small proportion of positive cultures where the tellurite media are negative. Comparison of the Loeffler slope with any of the plate methods invariably shows the superiority of the latter, as workers in Leeds have again shown in this issue, but it must be remembered that growth in the one is on a slope and in the other on the larger and more accessible surface of a plate. That the diphtheria bacillus has in fact often grown on the Loeffler slope when it cannot be found in a film made from the culture is readily demonstrated by plating the growth on such a medium as that of Allison and Ayling, which is particularly suited to the isolation of *C. diphtheriæ* from a mixed culture. The disadvantages of all media containing tellurite are the delayed growth of the diphtheria bacillus and the great difficulty of microscopic diagnosis from them. Practice in the recognition of colonial types may enable the experienced worker to give a diagnosis in most cases in 24 hours but in smaller laboratories suspected colonies will have to be subcultured on a tellurite-free serum medium. To obviate delay and minimise the need for virulence tests Maslen [1] has devised a rapid method for testing the biochemical reactions of such colonies picked from the tellurite medium, but even so 48 hours must elapse before a diagnosis can be given. Thus we come back to the point that the bacteriologist must be the handmaiden—now a more efficient handmaiden—to the clinician in the diagnosis and treatment of diphtheria.

EYE INJURIES FROM MUSTARD GAS

MUSTARD GAS was one of the later horrors of the last war—the first cases were reported in July, 1917—but in its first six months it accounted for 40,000 casualties in our army in France. In this war we have had no opportunity of testing the newer remedies, and let us hope we never shall, but knowledge is accumulating from the experimental side. Livingston and Walker [2] have been carrying out some experiments in rabbits. They instilled a small drop of mustard oil into the rabbits' eyes so that it fell directly on the cornea. A few of the rabbits showed some degree of natural resistance to mustard, but in most of them the reaction was immediate, rapid and intense, and within five minutes considerable damage was done to the surface of the cornea. Irrigation with a lotion containing bleach in a strength of 1 in 400 caused corneal haziness and cannot therefore be recommended, but a 2 per cent. solution of sodium bicarbonate had some merit. Attention has to be directed towards combating the spread of keratitis produced by the chemical irritation of the highly toxic by-products of corneal disintegration and secondary bacterial infection. Mustard is said to combine with the free amine groups of the protein molecule to form a stable toxic substance, and since no reagent is known which will penetrate the cornea with equal speed and not harm the eye the only approach which offers hope of amelioration is through the blood-stream. Livingston and Walker injected a saturated solution of ascorbic acid intravenously into their rabbits twenty minutes before applying mustard, and followed this up with six daily injections of 500 mg. of ascorbic acid. This apparently had some effect in arresting the spread of keratitis and lid inflammation and in preventing secondary infection. Cod-liver oil by mouth seems also to help the regeneration of corneal tissues and to check the spread of keratitis. Between the fifth and eighth days there is massive desquamation and the micro-organisms of secondary infection may appear in the discharge. At this stage Livingston and Walker say that Merthiolate (Lilly) 1 in 10,000 with a diffusing factor cleans up infection and aids resolution. A mydriatic is essential in the severer cases. Phillips [3] prefers 0·5 per cent. hyoscine to atropine. Warthin and Weller [4] say that dichloramine-T 0·5 per cent. in chlorinated medicinal paraffin is of value in dealing

1. Maslen, L. G. C., *Lab. J.* January, 1939.
2. Livingston, P. C. and Walker, H. M. *Brit. J. Ophthal.* February, 1940, p. 67.
3. Phillips, T. *Proc. R. Soc. Med.* February, 1940, p. 225.
4. Warthin, A. S. and Weller, C. V. *J. Lab. clin. Med.* 1918, **4**, 785.

with secondary infection, but this substance is only stable for three days. Methylene-blue 0·5 per cent. and scarlet red 3 per cent., recommended by French eye surgeons, is under trial. The recovery of the ocular tissues also depends on the general condition of the patient and is retarded by pulmonary complications.

The likelihood of neurasthenia developing in these cases must be borne in mind, and Stallard[5] has pointed out the psychological importance of arranging for first-aid treatment of gassed troops in the forward areas. The swollen lids, conjunctival discharge and adherence of the lid margins make men think they are permanently blinded, but panic may be checked by early reassurance and treatment. Provision should therefore be made for carrying out irrigations with lukewarm 2 per cent. sodium bicarbonate and for instilling 1 per cent. Pantocain or its equivalent as a local anæsthetic and cod-liver oil drops. Tinted eye-shades should also be supplied. For irrigations in the field Stallard has designed an improvised lotion container which is made out of a petrol can and four bullet cases, by which one team of orderlies could treat 80 men in an hour.

POST-MORTEM CHANGES IN BONE-MARROW

BONE-MARROW cells are known to be very liable to post-mortem change, and smears of marrow made at autopsy have long been abandoned on account of the poorness of nuclear detail. Jeanneret[6] has now described the time-table of these changes. Several sternal punctures were performed on each of 58 cases during life and at various times after death, one always being within the first hour after death. He found that only up to one hour after death was the cellular detail comparable to that of cells taken during life, though staining even then was rather inferior. The most sensitive cells were neutrophil polymorphs, cells in mitosis, and platelets, all of which showed serious changes within three hours, the two latter having often entirely disappeared. Normoblasts show changes from the first; the cytoplasm becomes steadily less basophilic and the number of pyknotic cells increases. These changes are interesting because, according to the results of sternal biopsy, the common erythroblast of normal marrow is a basophilic or polychromatic normoblast with a healthy nucleus, whereas marrow sections from autopsies give the impression that orthochromatic normoblasts with pyknotic nuclei are most common. Evidently this difference is due to post-mortem changes. Neutrophil myelocytes and myeloblasts are somewhat more resistant: lymphocytes and plasma cells show changes after about fifteen hours and eosinophils remain remarkably resistant. Thus within twenty-four hours the relative proportions of the marrow cells have changed considerably. Neutrophil polymorphs may be entirely absent, other varieties are relatively increased, and unclassifiable cells are more numerous. Local temperature had little effect on the rate of change, but the presence of sepsis accelerated it so that serious changes were appearing after an hour and a half. In 10 of the cases smears were made from expressed rib marrow at the same time as the sternal punctures. They showed the same post-mortem changes at the same rates, but in earlier smears it was noticed that there were more immature cells and stroma cells and more fat in the rib marrow than in the sternal-puncture marrow. This Jeanneret attributes to the fact that since sternal puncture is a suction method it tends to gather fewer of the immature and stroma cells which are less easily dislodged. The practical significance of this work by Jeanneret and others he quotes is that, unless we can get an autopsy within three hours after death, the bone-marrow we study, by whatever method, will present a distorted picture, and arguments about fine detail are futile. Reports of diminution of neutrophil polymorphs in post-mortem marrow, as in industrial poisoning by benzol, are particularly suspect. The differences between costal marrow and sternal-puncture smears warn us that the latter presents a picture which is on the whole too mature, and that emphasis should not be laid on small changes in the relative proportions of the various cells. So long as this is remembered sternal puncture remains of great value for the study of bone-marrow.

5. Stallard, H. B: *Brit. J. Ophthal.* February, 1940, p. 53.
6. Jeanneret, H. *Schweiz. med. Wschr.* April 20, 1940, p. 351.

"FROSTED" FOODS

PRESERVATION of food by drying, pickling and developing alcohol in it was intended to stretch a glut over a time of famine. Cold storage, a much later development, enables food to be transported great distances. A combination of gas and cold storage preserves the original flavour. Were it not for wars, nationalism and acquisitiveness the solution of adequate feeding of the world would be within our grasp. Everybody, given the will, could probably be well and reasonably fed. Meanwhile food preservation has been conquering new fields. From the earliest times people have hankered after fruits out of season and today we want them not only out of season but with their full natural taste. The "quick-freeze" method has made considerable advances in that direction, and even in small towns we are now offered soft berry fruits and tender vegetables such as green peas in the depth of winter with all or most of the freshness of the natural product pulled six months earlier. These fruits and vegetables have been quickly frozen at a temperature of anything from zero to 40° below zero, and kept at zero till sold on the retail market. Any attempt to obviate the disadvantages of natural events rouses hostility (e.g., the use of chloroform in parturition) and every method of preserving food has been met with suspicion. Some of this has been justified in the event (dried vegetables) and some not entirely (canned fruits and vegetables). So naturally it is asked whether these quick-frozen foods have any or all of their dietetic, as distinct from their gastronomic values, preserved. The answer rather triumphantly is "yes, nearly all." Dr. Mary Swarz Rose, professor of dietetics at Teacher's College, University of Columbia, in a report to the American Medical Association,[1] says there is no reason why the vitamin C of frosted fruits and vegetables when cooked should be less than those of fresh ones when cooked. To retain its maximum vitamin content the fruit or vegetable should pass straight from field to processing plant, it would be thoroughly "blanched" to destroy the ascorbic acid oxidase, and rapidly frozen, and finally cooked without defrosting. The vitamin-A values of such foods remain unchanged over many months. Vitamin-B_1 values may be decreased unless the blanching process is short. There is little loss of riboflavin. Such considerations show that frosted fruits and vegetables are a welcome addition to the dietitian's sources of foods in the off-season especially in providing vitamin A (green vegetables, apricots, tomatoes) and vitamin C (summer fruits and most green vegetables). Fruits and vegetables contain little vitamin B_1 in any case, so that the small loss of that vitamin in frosted foods is insignificant.

1. *J. Amer. med. Ass.* April 6, 1940, p. 1356.

REFRESHMENT FOR CANADIANS

IT was a happy idea of the honorary staff at Middlesex Hospital to offer hospitality to medical officers from Canada. The plan has been for a group of twenty or so of these visitors to come for a day as a sort of refresher course. The programme begins with a lecture or demonstration at 12 noon. Then lunch is provided out of a fund which the staff have subscribed. In the afternoon several attractive programmes are arranged to suit different interests and the proceedings close, more or less, with tea in the nurses home. It is rumoured that a swimming display by the nurses after tea gets a bigger audience than any of the lectures or more scientific demonstrations and this is all to the good, for the social side of these visits to town has been looked after from the start. Not only do the staff at Middlesex Hospital thus meet colleagues from overseas in friendly contact but even the visitors prove at first to be strangers to each other or old acquaintances who have not met since college days. Several old friendships have thus been renewed on these "Canadian visits." The Earl of Athlone, governor-general-designate of Canada, a former chairman of the board of the hospital, paid a visit last week to take tea with a group of medical officers from his new realm. He was welcomed by Major Astor, M.P., the present chairman of the hospital and members of the board and honorary staff and he then made the acquaintance of the guests who were headed by Colonel R. M. Luton and Colonel J. A. Linton. Now that the Middlesex staff's "good turn" is no longer under a bushel it may be possible for other hospitals to adopt the medical officers of other contingents. Swept out of their ordinary work, transported thousands of miles from home and then facing the inevitable period of "lounging about," these guests from overseas welcome the chance of a chat and a cup of tea with their colleagues in Britain.

EVACUATION IN THEORY AND PRACTICE

THE Health Committee of the League of Nations, at its first war-time meeting in November, considered that a pooling of experience in the medical problems of evacuation might be valuable to member-states. Consequently a meeting of the emergency subcommittee of the Health Committee, together with experts from nine countries, was held at Geneva on March 4–7 to consider medico-social questions arising out of the movements of civil populations. To synthesise the medical experience of countries such as France, Great Britain and Finland, which had experienced evacuation under very different aspects, into a form which would be valuable to countries making plans for future evacuation was clearly a most difficult task, and the report which was made available to governments as a result of the meeting was necessarily in general terms. Obviously such factors as the time available, the classes evacuated and the conditions under which evacuation is occurring will greatly modify the measures necessary for the protection of health. Compared with a bomb, a louse or an acarus looks very small indeed. The report, therefore, sets out the measures to be considered in an evacuation under the most favourable conditions, and it is perhaps chiefly valuable in bringing home to administrators that there are important medical aspects in evacuation problems—a fact not fully realised in other countries besides our own. Even the agenda of the Geneva meeting caused a stir in the evacuation department of one country, which had previously overlooked the necessity for calling its medical advisers into consultation. The real value of such a meeting is, of course, in the opportunity for the round-table exchange of views and experiences and not in the necessarily somewhat platitudinous document which emerges from them. The general points brought out in the discussions were the necessity for previous detailed consultation between "opposite numbers" in the evacuation and reception areas; the need for educating both evacuees and hosts in the conditions of life which they will find; the value of retaining with the transferred population the health and social personnel previously in charge of them; and the necessity for propaganda and education of the women in the tasks which they will have to perform. In Switzerland, for example, demonstrations are given by women to women showing exactly what it is best to take and the best method of carrying it in the event of a sudden evacuation being necessary. It is hoped in this way to avoid the pathetic spectacle, noted in every description of refugees, of the retention of the canary and the aspidistra at the expense of bread or boots. On the more purely medical aspects there was general agreement that the expected epidemics, notably diphtheria, from the dispersal of an immune population among non-immunes had not developed. Standards of rural hygiene had been raised in many places through the influx of town dwellers demanding certain amenities, and the opportunity had been taken in many countries to re-enforce or introduce voluntary or compulsory measures of vaccination against smallpox, diphtheria and typhoid. In Holland it seems that the most successful method in practice of obtaining consent to voluntary inoculation was through house to house visiting with the distribution of leaflets. The conference realised that the social and medical aspects of evacuation were intermingled, and the advisory committee on social questions has decided to hold another meeting to consider the social problems involved. In face of the tragic events which have since happened in Norway, it may well be thought that the more academic aspects of evacuation are less important than the work of the practical sanitarian who, faced like Moses with a disorganised flight into the wilderness, must enforce sanitary discipline and get back to the elementary principles of pure water, food and shelter.

RICE IN INDIA

ALTHOUGH the relationship between the consumption of highly milled rice and beri-beri was firmly established 25 years ago by the work of Eijkman, Grijns, Braddon, Fraser and Stanton, Vedder and others, yet the League of Nations inter-governmental conference of far-eastern countries on rural hygiene held in Java in 1937 agreed that the habit of using highly milled rather than under-milled or home-pounded rice was spreading, and that the economic and other factors underlying this regrettable tendency had not been fully studied in any country. A comprehensive investigation has now been undertaken by the Coonoor Laboratories of the Indian Research Fund Association.[1] Rice is the most important staple crop in India, and in Eastern Madras, Orissa, Bengal and Assam make up more than three-quarters of the total food crops. Diet surveys have shown that the poor rice-eater's diet is roughly similar in composition in various parts of India. In addition to his staple cereal he consumes only small quantities of pulses, vegetables and meat, while his intake of milk is negligible. The nutritive value of the diet must therefore depend to a large extent on its main

1. Aykroyd, R. A., Krishnan, B. G., Passmore, R. and Sundararajan, A. R. The rice problem in India, Indian Medical Research Memoirs No. 32, Calcutta, 1940.

ingredient. Milled rice is poorer than under-milled rice in most important constituents, though the loss in nutritive value in milling is lessened if rice is "parboiled," a process in which unhusked rice is steamed or boiled after soaking and pounded or milled afterwards. Caste, however, prohibits the general employment of parboiled rice which is considered to be polluted, and its use is restricted to the lowest classes. The washing and cooking of any kind of rice reduce its content of vitamin B_1 and nicotinic-acid by about 50 per cent., but it is only in those areas where the population live on rice which has been milled raw that beri-beri is endemic. Animal and human experiments and the incidence of deficiency diseases show that typical rice diets are also deficient in vitamin A, calcium, and various factors in the vitamin-B_2 complex. In the Madras Presidency the rice mill is said to be spreading rapidly, and has come to be regarded as a labour-saving convenience. Small-holders, too, are often forced by poverty to dispose of their paddy (unhusked rice) to merchants, and when home-pounded rice is put on the market it is dearer than machine-milled rice. Dr. Aykroyd and his colleagues suggest that agricultural research should aim at the production of high-yielding strains of rice and that any tendency to abandon parboiled rice in favour of raw should be checked by education. The milling of raw rice beyond a certain degree might also be prohibited by legislation, a minimum content of 1·5 μg. of vitamin B_1 per gramme of milled rice being laid down as standard, corresponding roughly to that of once-polished rice. They recommend that public-health propaganda should include instruction about the losses in vitamin content occurring during the washing and cooking of rice, and it should be made widely known that in cooking the minimum amount of water should be used and that the cooking water should be drunk and not discarded. Finally they point out that the poor rice-eater's diet can be improved by the partial substitution of rice by millet.

A TEST OF FITNESS

SOME light is thrown on the methods which are being used to tackle the effort syndrome in the French army by Lian,[1] who reaffirms his faith in the diagnostic test he used during the last war. In this test the patient is made to "mark time" at the rate of two steps a second for a minute, care being taken to insist that the hips are fully flexed at each step. The pulse-rate is then counted for a quarter of a minute immediately after the test and again every minute until it has regained its original level, the patient meanwhile remaining standing. The result is satisfactory if the pulse-rate has returned to normal by the beginning of the second or third minute, and definitely unsatisfactory if the pulse-rate rises to 160 per minute or does not regain its resting level in six minutes. If the response is satisfactory the man is fit for active service. If it is definitely unsatisfactory the man is kept under observation, in hospital or elsewhere, and the test is repeated several times. If a satisfactory response is finally obtained the man is passed for active service, but if he gives a consistently unsatisfactory one he is given light duty or transferred to civilian life. The intermediate group do not need to be returned to civilian life, only slight modifications of active-service requirements being necessary. Lian says that the toe-touching test is not severe enough for military purposes and that other tests, such as mounting steps or running a prescribed distance, require more space than is often available for medical examinations. He does not touch on the knotty problem of treatment and is content with a survey of the various views on ætiology. The experience gained in the last war, as well as in civilian practice since then, suggests that no test yet evolved will guarantee absolute accuracy in the selection of those victims of this syndrome who are fit for active service, though Lian claims to have obtained valuable information from his.

1. Lian, C. *Pr. méd.* April 16, 1940, p. 385.

AN AYLESBURY BROADSIDE

IN a world increasingly dedicated to destruction medicine stands out ever more brightly as an agent of preservation and healing. During the last war the physiologist left his laboratory for the canteen and laid the foundation of a science of nutrition which saved nations from starvation and inanition. Now we know how children can be fed even in time of scarcity; the food is there and needs only to be distributed. But this seemingly simple distribution is already missing its mark and will break down more and more completely as the war presses on the households in which children are being brought up. There is no surer method of securing that every child shall be properly fed than the allocation of a sum of money week by week for that express purpose. The need and the method of meeting it are so obvious to the doctor as to require no advocate, but there are many thoughtful people to whom the notion of a national system of family allowances is still unfamiliar. To these is addressed the pamphlet noticed in our advertisement columns, which is to be published on May 20, and we ask our medical readers with confidence to bring the broadside to the notice of their non-medical friends.

The next session of the General Medical Council will open on Tuesday, May 28, at 2 P.M., when the president, Mr. H. L. EASON, will deliver an address.

Dr. JOHN RITCHIE has been reappointed for a further five years member for Scotland of the General Medical Council.

Sir Weldon Dalrymple-Champneys has been appointed deputy chief medical officer (acting) of the Ministry of Health from Aug. 1 in succession to Dr. Thomas Carnwath who is retiring, and Dr. Dorothy Taylor has been appointed senior medical officer (acting) in succession to Dr. Isabella Cameron who is also retiring. Dr. E. L. Sturdee will succeed Sir Weldon as principal regional medical officer (acting).

At a meeting of the Royal Sanitary Institute at Plymouth on Saturday, May 25, at 10 A.M. Dr. W. N. M. Mason, deputy medical officer of health for Plymouth, will open a discussion on food-poisoning.

On the outbreak of war a number of experienced almoners were temporarily discharged, but as time went on it was seen that war brought more work and not less for the almoner to do. Hospitals in which work had been curtailed opened again at least partially, and new hospitals in the E.M.S. found it necessary to appoint almoners, so that by the end of 1939, according to the annual report of the Institute of Hospital Almoners, thirty-two new departments, as against twenty-eight in 1938, had been opened. The war has also increased the scope of the almoner's work. In one London hospital the almoner has been made responsible for all admissions; in another an inquiry bureau has been set up. The institute which was evacuated to Oxford for the first months of the war has now returned to London and may once more be addressed at Tavistock House (North), Tavistock Square, W.C.1.

PREVENTION AND TREATMENT OF WOUND INFECTION

V

CHEMOTHERAPY OF INFECTED WOUNDS

BY G. A. H. BUTTLE, M.R.C.S.
MAJOR, R.A.M.C., ARMY BLOOD-TRANSFUSION SERVICE

CHEMOTHERAPY has shown itself of immense value in certain medical conditions but has still to prove its worth in infected wounds in war. Many derivatives of sulphanilamide have been tried in infectious conditions, but only one is useful where sulphanilamide is not. This is M. & B. 693 (sulphapyridine), described by Whitby[1] in 1938. It is active in pneumococcal conditions, whereas the other sulphanilamide derivatives are not. It is also as active as sulphanilamide in streptococcal and more active in staphylococcal infections. Recently another compound, sulphathiazole, has been introduced, which may prove superior to sulphapyridine in staphylococcal infection; it is active also in streptococcal and probably only slightly inferior to sulphapyridine in pneumococcal disease.

MODE OF ACTION

These drugs, unlike ordinary antiseptics, have no great destructive effect on bacteria in vitro, but they delay the growth of streptococci and certain other organisms in culture media, and the effect is still more obvious in shed blood. Their value in vivo depends on the fact that, although they inhibit bacterial growth, they produce little or no harmful effect on the phagocytic cells of the host; further, they are not rapidly eliminated or destroyed in the body but are readily diffusible throughout all tissues. The growth of the infecting organism is thus inhibited, and the defensive cells of the host can defeat the infection.

In vitro some bacteria are more sensitive than others to these drugs; the bacteria which are more sensitive to the usual antiseptics are affected more than those which are less sensitive. Gonococci and meningococci are influenced more than streptococci and staphylococci, and the typhoid-coli group are still less affected. In the case of all organisms the effect of the drugs is much more obvious when the organisms are in a poor medium than when they are in a good medium for supporting growth, a fact which is of great importance when we consider the action of the drugs in vivo. In clinical work the effectiveness of the drugs in various conditions appears to be determined more by the situation of the infecting organisms than by their sensitiveness to the drug. If bacteria are situated in a relatively poor medium for supporting growth—e.g., urine or blood—the drugs are very effective; if, on the other hand, they are situated in a good medium—e.g., a collection of pus or other products of tissue breakdown with inadequate drainage—the drugs have little effect. Thus cystitis and pyelitis due to *Bacterium coli* are rapidly cured, but gonococcal cases with gland abscesses do not respond to treatment, although in vitro, in broth medium, the gonococcus is extremely sensitive to the drug and *B. coli* almost insensitive. This limitation of the effectiveness of the drugs is probably very important in infected surgical cases, where there is often a large collection of pus or other products of tissue breakdown. Although the drugs are not a substitute for surgical removal of damaged tissue or drainage of infected parts, they should prevent the spread of infection to other tissues and, by inhibiting the multiplication of bacteria, assist the defensive cells in the undamaged part of the wound area to clear up the infection.

1. Whitby, L. E. H. *Lancet*, 1938, **1**, 1210.

TREATMENT OF INFECTED WOUNDS

Late deaths due to wounds are almost invariably caused by infection. The severity of the infection depends on the nature of the country where the fighting takes place; it will be more serious where there is highly cultivated soil, as in France or in Flanders, than in sandy uncultivated regions like South Africa or Egypt or in snow-covered ground, as in Finland. During the last war Fleming and Porteus[2] found that the commonest infecting agent, the *Streptococcus hæmolyticus*, could be recovered from 15 per cent. of wounds at casualty clearing stations, and from 90 per cent. of wounds a week after admission to a base hospital. The incidence of gas gangrene varied from 10 per cent. of wounds in the early part of 1915 to 1 per cent. in the latter part of 1918. Clearly, any measure which would prevent or cure streptococcal infection and gas gangrene would greatly reduce mortality.

PROPHYLAXIS

The sulphanilamide drugs ought to be more useful in prevention than in cure; they would have more chance of being effective against invading bacteria if given immediately after wounding, before the accumulation of necrotic material which so rapidly follows infection of a wound. It is therefore most important that the drugs should be given as soon as possible after wounding. They may be administered both by mouth and locally into the wound; local applications have not yet been used extensively, but they may be very useful in preventing infection. Because of the severity of the shock commonly associated with wounds, prophylactic treatment by mouth may have to be delayed until the patient has recovered from shock. Local applications of sulphanilamide to wounds will not involve the same risks in this respect, because little of the drug reaches the bloodstream during the first three or four hours. Although the effect of the drugs on men who are seriously shocked is not known, large doses reduce the body temperature of animals and it may be that they would aggravate the shocked patient's condition; on the other hand, clinical experience may show that these precautions are unnecessary (Long has found that the drugs do not increase the shock). This prophylactic treatment would not be a substitute for the surgical cleaning of the injured parts; damaged tissues round the wound should be removed as soon as the patient's condition permitted it.

Treatment by mouth.—The doses of sulphanilamide necessary for administration by mouth in the prophylaxis of wound infection can only be ascertained from clinical experience, which is not yet available; probably a small dosage by mouth will suffice when the drug is also applied locally to the wound. Fuller and James[3] have suggested that 1·5 g. should be given by mouth as soon as possible after wounding, and that this should be followed by 0·5 g. four-hourly, starting two hours after the initial dose. After the first twenty-four hours 1 g. given eight-hourly is just as efficient as the four-hourly dosage. These recommendations are based on obtaining a minimal concentration of 2 mg. per 100 c.cm. of blood as early as possible, and in three subjects receiving the recommended dosage the concentrations of sulphanilamide in the blood varied from 2·2 to 5·5 mg. per 100 c.cm. This concentration is slightly less than is commonly used for severe blood infections, but it will probably suffice when combined with local treatment of the wound. Treatment for a week will be wanted in most cases, and sometimes it will be necessary to continue for two weeks, according to the condition of the wound. The patient should be carefully watched after the end of the course of treatment, because if the

2. Fleming, A. and Porteus, A. B. *Ibid*, 1919, **2**, 49.
3. Fuller, A. T. and James, G. V. *Ibid*, March 16, 1940, p. 487.

bacteria are not all destroyed the infection may flare up again two days after the drugs have been stopped. The suggested dosage must be considered as purely experimental. If infection develops in spite of the treatment, and the drugs do not appear much more toxic in these severely shocked patients than in others, the dosage might be increased; if on the other hand the drugs appear dangerous in badly shocked patients it may have to be reduced. In America a dosage of about double that suggested by Fuller and James has been used as a prophylactic in some civilian injuries, and, according to Perrin Long (personal communication), it has been found that the drugs do not increase the shock. The shock associated with war wounds will, however, be often more serious than that found in civilian cases.

Sulphanilamide is suggested for this treatment because, unlike sulphapyridine it does not cause vomiting, which might be a grave danger to soldiers already suffering from shock and dehydration; it is also cheaper and more easily obtainable. Sulphanilamide is as effective as sulphapyridine against streptococci and against *Clostridium welchii*, two organisms which cause most of the dangerous infections of wounds. It is not so effective as sulphapyridine against vibrion septique; but this organism was present in only 10–28 per cent. of cases of gas gangrene. Nor is it so effective against the staphylococcus, which is very common in infected wounds but does not usually cause generalised or dangerous infections. When there is a compound fracture, however, there is an increased risk of staphylococcal osteomyelitis, and in these cases sulphapyridine might be superior to sulphanilamide. Sulphathiazole, a compound described by McKee et al.,[4] may prove even better; it does not cause vomiting, is slightly superior to sulphapyridine in staphylococcal infections, and is also good against streptococci; its action against *Cl. welchii*, however, has not yet been determined. A rough indication of the comparative usefulness of the various drugs in different infections is given in the accompanying table.

ACTIVITY OF DRUGS AGAINST VARIOUS ORGANISMS

Infecting organism		Sulphanilamide	Sulphapyridine*	Sulphathiazole
	Streptococcus ..	+++	+++	+++
Gas gangrene	*Cl. welchii*	+++	+++	—
	Vibrion septique	±	+	—
	Cl. œdematiens ..	0	0	—
	Staphylococcus ..	±	+	++
	Meningococcus and gonococcus ..	+++	++++	—
	Pneumococcus ..	±	+++	++

++++ Very good and rapid effect.
+++ Good and reliable effect.
++ Good, but less than above.
+ Slight effect; drug useful possibly as adjunct to other treatment.
± Very slight effect. 0 No effect.
— No data yet available.
* Sulphapyridine causes vomiting; the other drugs do not.

Treatment by injection.—If the patient cannot swallow, the drugs must be given by parenteral injection; for this purpose sulphapyridine soluble is usually employed. It should be given either by deep intramuscular injection or intravenously, in which event it must be diluted in three to five volumes of saline, to prevent unpleasant reactions due to the alkalinity of the solution. Injections of quantities up to 3 c.cm. of the 33 per cent. solution should be given every four hours; if a larger dose is given in one injection, there is a risk of toxic reactions. A suggestion has been made that sulphanilamide should be added to stored blood for use by advanced units. This procedure might cause a more rapid deterioration of the blood than would otherwise take place, although it would be convenient for the initial treatment of patients who could not swallow.

Treatment by local application has recently been investigated. Jensen and others[5] inserted 5–15 g. of sulphanilamide into forty-one wounds associated with compound fractures, and healing by first intention took place in every case except two, where the fractures were recompounded. Before the use of sulphanilamide the infection-rate was 27 per cent. Evidence was also produced that this form of local treatment will deal even with staphylococcal infection of experimental fractures. Estimations of the sulphanilamide in the blood of two patients receiving this local treatment showed that the concentration was maximal in eighteen hours and returned to zero in sixty hours. Nitti[6] has found that sulphanilamide, 1 g. per kg. of body-weight, placed in wounds artificially infected with streptococci, kept rabbits alive for eight or nine days longer than the infected but untreated controls, which died in one or two days. Large doses of sulphanilamide placed in the wounds of animals did not damage the tissues. This work suggests that the local application of sulphanilamide will be a useful adjunct to treatment by mouth but will probably not supersede it entirely. The drug in the vicinity of the wound will all be eliminated in two or three days; hence after this period it will be necessary to rely on the oral route. The most satisfactory line of treatment seems to be to apply sulphanilamide powder 5–15 g. to the wound locally and to combine this with the course of treatment by mouth already suggested. When local application is used, however, it will probably be unnecessary to start the treatment by mouth until forty-eight hours after the local application to the wound. During this time a sufficient concentration of the drug in the blood to prevent dissemination of the infection will be maintained by the sulphanilamide reaching the blood from the wound. When the wound area is large, the rate of absorption of the drug may be so rapid as to produce temporary toxic symptoms, but these are unlikely to cause permanent harm if the total dose in one application does not exceed 15 g.

This local treatment will probably only be effective in the absence of suppuration; if pus is present, all local measures should be directed to the promotion of free drainage. The drug will probably be more effective after the surgical toilet of the wound, after which the wound should if possible be closed; but it seems that a preliminary dressing, applied as soon after wounding as possible, would also be useful, especially against gas gangrene, which sometimes develops extremely rapidly after wounding. Such a dressing, in the form of a pack containing 5 g. of sulphanilamide, might well be supplied with the first-aid equipment carried by each man. Further experimental work is clearly wanted. It seems, however, that no antiseptic other than sulphonamides should be applied to open wounds. Iodine and phenol will do more damage to the phagocytes of the tissues than to the infecting organisms. A 0·1 per cent. solution of proflavine and a 0·1 per cent. solution of 2:7 diaminoacridine have been shown by Falconer[7] to be without harmful effect on brain tissue, but no experiments on infected animals have yet been recorded. It is uncertain whether the dyes would penetrate into the tissue and retain their antiseptic properties sufficiently to deal with a wound infected some time previously.

CURE

Infected wounds as a rule contain many different organisms besides foreign matter—soil, clothing, pieces of shell—surrounded by contused tissue.

4. McKee, C. M., Rake, G., Greep, R. O. and Van Dyke, H. B. *Proc. Soc. Exp. Biol., N.Y.* 1939, **42**, 417.
5. Jensen, N. K., Johnsrund, L. W. and Nelson, M. C. *Surgery, St. Louis*, 1939, **6**, 1.
6. Nitti, F. *Bull. Acad. Méd. Paris*, 1939, **122**, 432.
7. Falconer, M. *Brit. med. J.* April 13, 1940, p. 631.

Excision of the contused area will be necessary in all cases, and treatment with sulphanilamide will be started at the same time, as already indicated. If, in spite of this prophylactic treatment, signs of spreading infection or of gas gangrene appear, it will be best to substitute sulphapyridine for sulphanilamide and to increase the dosage to 8–9 g. by mouth daily. If there are signs of gas gangrene, vibrion septique or *Clostridium œdematiens* may be present; therefore an injection of the combined antitoxins against these organisms should be given. It is uncertain whether antitoxin against *Cl. welchii* type A will be useful or not. Different strains of this organism probably produce slightly different toxins, so that antitoxin will be more effective in some cases than in others. Bohlman[8] and Kennedy[9] found that chemotherapy alone was sufficient, and Long[10] considers that the use of sulphanilamide alone eliminates the necessity for amputation in gas gangrene except when the condition is far advanced owing to its not having been diagnosed early enough. The number of cases of gas gangrene treated with sulphanilamide so far is small, and some strains of the organism produce much more toxin than others. If gas gangrene appears in a case which has already been treated with sulphanilamide prophylactically, it will be advisable to give a mixture of *Cl. welchii* antitoxin with the antitoxins against vibrion septique and *Cl. œdematiens*. If the more toxigenic types of *Cl. welchii* (types B, C, and D described since the last war) are found in gas gangrene, antitoxic sera against these will also prove useful; so far, these types have not been described in man, although they are often seen in animals and are commonly found in soil. There is no clinical evidence about the chemotherapy of infection with vibrion septique and *Cl. œdematiens*. Experiments of Stephenson and Ross,[11] however, show that vibrion-septique infection is not easily treated with sulphanilamide, although sulphapyridine is somewhat better; the best results are obtained by giving sulphapyridine as soon after infection as possible and following this up with treatment with the specific antiserum. *Cl. œdematiens* has been used in only a few experiments, but these indicate thas it is insusceptible to both sulphanilamide and sulphapyridine; the only treatment for this infection is, therefore, with the specific antiserum. The incidence of these three anaerobes in gas gangrene in the last war was variously given as *Cl. welchii*, 45–82 per cent., *Cl. œdematiens*, 10–48 per cent., and vibrion septique, 10–28 per cent. Although *Cl. welchii* is the commonest, the two other anaerobes must not be neglected.

Cl. tetani has been used in several chemotherapeutic experiments. It seems that the sulphonamides have only a slight effect on infections due to this organism. Mayer[12] has described a slight effect of sulphanilamide in infected animals; he also finds some influence on the neutralisation of tetanus toxin. Probably chemotherapy will not be very effective in tetanus, except by limiting the growth of the concomitant infecting organisms and thus preventing the local anaerobic conditions necessary for the development of *Cl. tetani*.

Wounds which are already suppurating when they are first seen should probably be treated with larger doses of drug than those recommended for prophylaxis. Sulphanilamide will probably be as effective as sulphapyridine, except perhaps where compound fractures increase the risk of staphylococcal osteomyelitis and for infection with vibrion septique, which is comparatively rare. The maximal dosage of sulphanilamide which it will be possible to use will probably be 4 g. followed by 1 g. four-hourly, which dose is gradually reduced to 0·5 g. four-hourly at the end of a week. The simultaneous administration of vitamins A, B complex, C, and D also assists the healing of infections; there are as yet no animal experiments to confirm this finding, but the simultaneous administration of these vitamins to increase the general resistance, in combination with the chemotherapy, should be tried. The best local treatment of a suppurating wound will probably be with sodium sulphate and hypertonic saline, which will assist the evacuation of the necrotic material. It is doubtful whether irrigation with a solution of sulphanilamide drugs will be of any value, it is more likely that processes which assist in the physical removal of the necrotic material will be better than any effort to destroy the bacteria without removal of this dead matter.

8. Bohlman, H. R. *J. Amer. med. Ass.* 1937, **109**, 254
9. Kennedy, W. C. *Illinois med. J.* 1938, **73**, 260.
10. Long, P. H. Clinical and Experimental Use of Sulphanilamide, Sulphapyridine and Allied Compounds, New York, 1939.
11. Stephenson, D. and Ross, H. E. *Brit. med. J.* March 23, 1940, p. 471.
12. Mayer, R. L. *C.R. Soc. Biol. Paris*, 1939, **130**, 1560, 1562.

TOXIC SYMPTOMS

No chemotherapeutic agent has yet been described which is entirely harmless to the host if used in excess. The sulphonamides are no exception. In small doses they are usually well tolerated, and the only common toxic effect is slight malaise, which is usually worse with sulphapyridine than with sulphanilamide and is often accompanied by nausea and vomiting. Extreme cases of hypersensitivity have been described but are very rare. If the drugs are given for ten days or longer there is a risk of leucopenia, and in a small number of cases of agranulocytosis. This risk constitutes the only real danger from the drugs. Slight degrees of leucopenia are relatively common and harmless, but a large fall in the number of polymorphs constitutes a warning that the drugs should be discontinued. For this reason white-cell counts should be done at intervals of two to three days or a blood smear may be made, and, if the differential count shows the polymorphs to be less than half, the drugs should be discontinued. Apart from the cell count there is no warning of the onset of agranulocytosis except a deterioration of general condition, continued pyrexia, and severe prostration. As soon as there is an indication of the onset of agranulocytosis the drugs are discontinued and fluids are given to eliminate the drugs as soon as possible. If the condition is already established and the red cells are below 60 per cent., transfusions are indicated. Injections of Pentnucleotide have also been used to induce a leucocytosis.

Although agranulocytosis is the only real danger in sulphanilamide therapy, there are several minor toxic manifestations. The so-called cyanosis or blueness of the skin is common but is not an indication for withholding the drug. A rise of temperature during treatment ("drug fever") is not uncommon and is sometimes difficult to distinguish from a recrudescence of the infection. It subsides, however, on withholding the drug. Nausea and vomiting are very common with sulphapyridine; they are sometimes so bad that it is impossible to tell how much drug is retained, and in these cases it is necessary to give the sodium salt of the drug in solution by injection. Other toxic manifestations are dermatitis (usually morbilliform); minor nervous disturbances, such as headache, lassitude, depression (more pronounced with sulphapyridine), paræsthesia, transient peripheral neuritis; and acute hæmolytic anæmia. The anæmia, unlike agranulocytosis, develops early in the treatment; it is rare, and no deaths have been recorded. Besides these effects, sulphapyridine sometimes produces hæmaturia, owing to the deposition of concretions of the acetyl form of the drug in the renal tubules.

CONCLUSION

Chemotherapy will in all probability reduce considerably the incidence of serious infections following wounds. Sulphanilamide, sulphapyridine, and sulphathiazole all have a rapid effect on streptococci; sulphapyridine has proved the most successful of the three in meningococcal, gonococcal, and pneumococcal infections, and sulphathiazole is possibly the most

(*Continued at foot of opposite page*)

SPECIAL ARTICLES

TUBERCULOSIS IN THE SILICA-RISK INDUSTRIES *

BY CHAS. L. SUTHERLAND, M.D. Glasg., D.P.H.
CHIEF MEDICAL OFFICER, SILICOSIS AND ASBESTOSIS MEDICAL BOARD

"Almost every mechanical employment, it is said, has a tendency to injure some one or other of the bodily organs of the artisan. Grinders of cutlery die of consumption; weavers are stunted in their growth; smiths become bleareyed."

WHEN in 1834 Lord Macaulay made this remark in the introduction to his essay on William Pitt dust was known to be a source of pulmonary disease in many trades, and protective measures against the inhalation of dust had already been attempted. Later in the century, when consumption or phthisis was recognised to be an infectious disease and the tubercle bacillus known to be its cause, the existence of the second factor in the production of such diseases as miner's phthisis was gradually appreciated. Early in the twentieth century Haldane's work on tin miners led him to use a high death-rate from pulmonary tuberculosis at the later age-groups as the touchstone of the existence of a specific dust hazard. This specific dust hazard was shown to be the dust of silica—i.e., the dust arising from crushed flint, sandstone, ganister and the like. Moreover the disease produced had a distinct tendency to end as pulmonary tuberculosis.

The general conception of silicosis today is that of a disease in which two factors may be associated: (1) silica dust, which is the essential factor at least for the initiation of the silicotic process, and may be the only factor present throughout the disease; (2) infection by the tubercle bacillus, which is responsible in many cases for the development of the disease to a disabling degree and its termination in death. The great body of opinion in Great Britain now agrees that if the inhalation of dust could be prevented the tuberculosis risk in dusty occupations would become that of the ordinary population. But this opinion is not universally held, and various views have been put forward as to the part played by tuberculosis, which after all is quite a common infection in all ways of life. There is a school of French pathologists, for example, who consider that silicosis is tuberculosis merely modified by dust inhalation. Watkins-Pitchford's opinion (1927) was that silicosis, from its appearance as a clinically detectable condition, is in the majority of instances already linked up with a latent element of tuberculous infection. Barnes of Sheffield in 1908, giving evidence at an inquiry into disease amongst cutlery grinders, maintained that tuberculosis was then the most important condition and the effect of dust of secondary importance.

In framing laws for the provision of compensation of workmen suffering from the disease, legislators have found the combination of a dust disease and an infection rather a problem. In the original scheme of compensation for silicosis in this country, the Refractories Industries (Silicosis) Scheme, 1919, compensation was made payable when the worker was disabled by silicosis accompanied by tuberculosis only if the silicosis was so far advanced as to make the worker specially liable to tuberculosis or was likely to accelerate materially the progress of the disease. The amount of compensation payable was proportionate to the effects of the silicosis and the certifying officer had to assess the proportion of disability due to silicosis apart from the tuberculosis. As the result of experience the scheme was amended in 1925 to put silicosis and silicosis accompanied by tuberculosis on the same footing as regards compensation. An even more curious enactment was that in Ontario where a man totally disabled by uncomplicated silicosis was compensated at 66⅔ per cent. of his wages when last employed. If he developed tuberculosis in addition his compensation was reduced to 50 per cent. on the theory that 10 per cent. of the population would develop tuberculosis regardless of the specific exposure to silica.

DEATHS CERTIFIED BY THE SILICOSIS MEDICAL BOARD DURING THE EIGHT YEARS 1932–39

Industry	Caused by silicosis	Caused by silicosis acc. by tuberculosis	Not caused by the disease*	Total
Refractories industries	15	33	19	67
Masons and sandstone quarrymen ..	142	274	137	553
Granite-masons ..	5	46	8	59
Pottery industry ..	106	150	51	307
Coal-mining ..	261	173	212	646
Metal-grinding industries	14	42	15	71
Sandblasters ..	11	22	3	36
Tin-miners	22	23	8	53
Hæmatite-miners ..	5	10	6	21
Other metalliferous miners	4	3	1	8
Miscellaneous industries	15	21	11	47
	600	797	471	1868

* The disease means silicosis or silicosis accompanied by tuberculosis.

EXPERIENCE OF THE SILICOSIS BOARD

The table gives the details of certificates issued by the Medical Board for Silicosis and Asbestosis in death claims during the eight years 1932 to 1939. Since these figures do not represent all the cases of deaths where silicosis was present or suspected during the eight years, they are of limited statistical value. It must be remembered, too, that the death cases coming to the board represent only a small proportion of the deaths in dusty industries. A great majority of workers in these industries die from natural causes, and though silicosis is often present it is definitely not the cause of death. In such cases no claim for compensation is made.

The 600 certificates of simple silicosis indicate that the medical board have accepted what King and Belt (1938) call the "silica specificity theory," which postulates that silica dust per se causes a disabling fibrosis of the lungs. In the 797 cases where death was certified to be due to silicosis accompanied by tuberculosis the diagnosis was made mostly on microscopic appearances. Since compensation is payable to the same extent whether silicosis or silicosis accompanied by tuberculosis is the cause of death, precise differentiation between the two conditions is not necessary for

* Read at a meeting of the Association of Industrial Medical Officers on April 19, 1940.

(*Continued from previous page*)

useful in staphylococcal infections. The drugs will be more effective in prophylaxis than in cure. Sulphanilamide should be given both by mouth and into the wound as soon as possible after wounding. The results obtained with sulphanilamide in cases of gas gangrene due to *Cl. welchii*, though few, have been so good that the extensive amputations commonly necessary in the last war for this condition may be largely avoided.

the purposes of the award of compensation. In many cases it would certainly need very elaborate methods to make sure that tuberculosis was not present, for the diagnosis of tuberculosis post mortem is, like the diagnosis clinically, not always easy. The expression "silicosis accompanied by tuberculosis" which is used in the Workmen's Compensation Act is useful in that it avoids all discussion as to whether the silicosis or the tuberculosis was present first.

HOW DOES INFECTION TAKE PLACE?

Twenty years ago the impression generally was that silicosis was a disease which suddenly showed itself as tuberculosis from the age of forty onwards. At that time it was not the appearance of tuberculosis that seemed surprising but its appearance so late in life. This delayed appearance was so striking that it gave rise to the idea that silica dust might have a protective effect against tuberculosis. That idea led to the question: When and how does the infection with tuberculosis take place?

The opinion of Barnes already referred to was that tuberculosis was common among cutlery grinders because of the ease of infection. A tuberculous workman would spit into the water-trough in which his wheel turned. The tubercle bacillus was thus sprayed into the atmosphere along with the dust. No doubt other conditions were present which favoured the spread of tuberculosis. Such conditions are in fact common to many dusty industries—a confined space, poor light, a humid warm atmosphere with little ventilation. Humid air holds organisms and dust particles in suspension. Stillness of the atmosphere keeps the particles floating in the air (Angus and Stewart 1937). It has been shown by experiment that water-saturated and dusty air carries away from the surface of a culture many more organisms than does dry air (Douglas and Hill 1921). The warmth and lack of sunlight aid the survival of the bacillus.

Accordingly it seems that a young worker coming into such an environment is exposed to the possibility of infection with tuberculosis. Yet the Registrar-General's returns do not indicate an undue death-rate from tuberculosis in this group; in fact the low tuberculosis mortality of the young cutlery grinder was quoted as indicating that the high mortality-rate in later age-groups is not due to a poor class of recruit. Barnes, however, thought that careful investigation might have shown an increase of tuberculosis in the young grinder, and that the curve of tuberculosis mortality in grinders might have shown a rise in the younger age-groups as well as the recognised rise in the later age-groups. No such investigation was carried out till much later when Meiklejohn (1930) in a study of the deaths from tuberculosis in Sheffield grinders from 1918–27 made graphs which showed that there was a primary peak and a secondary peak of deaths when plotted according to age. The primary peak occurs at or before the 40–45 age-group; graphs for individual years showed it quite definitely in the 20–25 group. Graphs from controls show a regular curve and this control curve coincides at its peak with the primary peak of grinders. Meiklejohn interprets the primary peak as indicating the natural group of tuberculosis cases, that is, men who would have died of tuberculosis irrespective of the occupation they chose to follow. The period over which these figures were taken was, however, one in which grinding conditions greatly improved and their effect on the younger workers might not then have been so definite.

That new workers in a silica-risk industry may become affected by tuberculosis has been demonstrated in Wales and in South Africa. A "saddleback" curve of age mortality from tuberculosis has been described at one time as evident in the lead-mining districts of Cardiganshire and the quarry districts of Pembrokeshire and Anglesea (Cummins 1933). On the Witwatersrand there is a high incidence of acute pulmonary tuberculosis in natives in the mines in their first year of service. The tuberculosis-rate, however, falls sharply in the next few years to rise later on, when the factor of silicosis plays a large part. This high incidence in the first year is related to what is described as a lesser degree of inherent natural immunity than is found in the European or the absence of a comparable degree of previously acquired immunity (Irvine 1938). In comparing the reaction of the Yorkshireman, the Welshman and the South African native exposed to similar influences this inherent immunity must be borne in mind.

The reason given for the prevalence of tuberculosis amongst the new boys in the mines is not that they become infected but that pre-existing lesions become reactivated. The mine boy comes from the kraals where tuberculosis is endemic, and since he reacts to tuberculin he has already been infected although on examination he appears healthy. Reactivation and not exogenous infection may be the explanation in the South African native, but not necessarily in workers in other parts of the world. Sayers (1937) favours an exogenous source for the early tuberculosis in silica-risk industries in America and the reason he gives for this opinion is interesting. Nurses under thirty in the tuberculosis wards of United States government hospitals had in the past developed so much more tuberculosis than those over thirty, that only women over thirty were now employed. He assumed that the infections were exogenous and derived from the patients, and by analogy that the silica risk would increase the natural susceptibility of the younger workers to exogenous infection.

SILICO-TUBERCULOSIS

The new entrant to a silica-risk occupation, then, may take his tuberculosis with him, he may become infected on entering, or may escape either temporarily or permanently. If the natural resistance is high, as it is in the Sheffield grinder, the lesion heals up, if low, as in the mine boys, the disease progresses rapidly. The grinder or mine boy who has a quiescent lesion must presumably have had some inherent resistance to tuberculosis, but the healing of the lesion may lead, as Cummins (1929) points out, to a gradual loss of the immunity produced by the invasion. They may therefore in time become as liable to a subsequent infection as those who have escaped at first.

The tuberculous lesion may persist, however, and become the starting point of a condition described in America as silico-tuberculosis and in South Africa as tuberculo-silicosis. This, according to Brumfiel and Gardner (1937), is neither silicosis nor tuberculosis, nor is it a simple summation of the two, but is a distinct disease entity. The characters of this entity are its chronicity, that it appears in the later decades, and that tubercle bacilli are difficult or impossible to demonstrate till late in its course. By postulating this separate entity it is possible to explain the origin and the late termination of the disease. But whether we accept this conception of silico-tuberculosis or not we must in many cases assume the presence of a latent tuberculosis. Fisher (1933) accepts this as the explanation of why in a large body of men exposed to similar conditions only a small proportion develop a disabling fibrosis. It is claimed in America that the incidence of adult tuberculous infection among males under thirty in a tuberculosis-ridden community, in the presence of a silica hazard, is sufficient to account for all the subsequent deaths due to silicosis accompanied by tuberculosis (Cummins 1935).

REACTIVATION OR EXOGENOUS INFECTION

There are certain occupations which force us to favour reactivation as the explanation. It is not likely that sand-blasters, who are subjected to an intense exposure to silica dust, can receive an exogenous infection at work, when working by themselves. In younger men it seems as if the early tuberculous lesion becomes reactivated, and often goes on not to simple tuberculosis but to a massive silicosis with comparatively slight if very active tuberculosis. The same may be true of some of the stonemen in

quarries when working away from their fellows. In both these instances the cases often do not fall into the silico-tuberculosis group but seem to form a distinct class. However, there seems to be no doubt that many cases are not the result of reactivation but of exogenous infections. It is perhaps not wise to attempt, as Gardner (1937) does, to distinguish between exogenous infection and reactivation by noting the position of the possible commencement of the tuberculous process. A tuberculous lesion arising at the apex of the lung in a case of silicosis may as often be an infection from without as one beginning lower in the lung.

The difficulty of proving an exogenous source of tuberculosis lies in the fact that in the human "experiments" of which we are spectators, in contrast to animal experiment, we cannot arrange the conditions beforehand. One has to try to get information after the experiment is concluded and most of the victims have gone. Often where a series of cases of silicosis accompanied by tuberculosis is discovered at a workplace one feels that there has been an undiscovered common source of infection. The suspicion that one workman may be the direct cause of other cases occurring within a short space of time is expressed by Thomas (1937) in his description of acute cases in lead-miners.

Another illustration of this was observed in a small metalliferous mine which had been working for about thirty years without any undue mortality. The first case met was one of acute miliary tuberculosis of the lungs in a miner aged twenty-nine; in this man silicosis could not be proved, but within a year there were seven cases of severe silicosis. Four of these died and three had tuberculosis. Of the other three, two had tubercle bacilli in the sputum. There was a suggestion that could not be confirmed that a miner who had started work at this pit some few years before had been an open cases of tuberculosis. Further, the fact that six were under forty gives strong support to the probability of such an outside source of infection, and makes it likely that the cases were not the result of reactivation of quiescent lesions.

Some say that the virulence of the tubercle bacillus in silicotic cases is increased, others that it is diminished. Kettle (1933) came to the conclusion that the virulence is not increased. Collis (1915), on the other hand, relying on the old statement that contacts with infected silicotics do not contract tuberculosis, suggested that the virulence is diminished. But this alleged paucity of positive contacts is very doubtful and several observers have expressed disbelief. Actually there seems to be no evidence that the tubercle bacillus of silicotics differs in any way from that infecting the population round about (Cummings 1935).

EFFECT OF DIFFERENT DUSTS

The deaths certified by the Silicosis Medical Board as due to silicosis accompanied by tuberculosis (797) were more numerous than those certified as due to simple silicosis (600). In the coal-mining industry the reverse was the case. Explanations given for this are that the dust involved has not been that of silica or that the action of silica is modified by the coal or anthracite dust. It has also been shown that coal has an action on the toxins of the tubercle bacillus (Cummins 1934). However, that tuberculosis is more prevalent in South Wales colliers than is commonly believed seems highly probable, although pathologists have so far not given their support to the opinion. Williams (1933), Sen (1937) and Davies (1940) have at different times expressed this opinion. Amor (1940) maintains that the cricket-ball mass, so common in South Wales anthracite miners, has a tuberculous basis. According to him many of these cases give a history of contact with open cases of tuberculosis, and this particular group appear toxic and occasionally may even have tubercle bacilli in the sputum. Pathologically he finds a similarity between the lungs without definite tuberculosis and those proved to be tuberculous by finding Koch's bacillus in them; he also notes small cavities in such lungs which suggest tuberculosis. Amor also observes that these cricket-ball masses develop more rapidly than typical nodular silicosis. If we accept the view that these coal-mining cases are more often tuberculous than the certificates show, the points put forward by Amor imply a fairly recent exogenous infection, probably from the home.

In the granite-masons, as shown in the table, the number of deaths certified as due to silicosis accompanied by tuberculosis is nine times the number of deaths from silicosis. Furthermore in cases seen during life, especially in the Aberdeen granite-masons, it is rare to find the radiological picture found regularly in the gritstone-masons. Instead of definite nodulation a fluffy or feathery marking of the lung fields is usually found. Similar observations have been made in America where it is considered that granite contains some constituent which inhibits the action of silica. There is apparently a condition of latent silicosis which is ended by tuberculous infection or reactivation of an old lesion.

The cases in which death was certified as not due to the disease include cases which had definite exposure but did not develop silicosis. This natural resistance may be due to many conditions such as the excellence of the nasal filter which prevents dust reaching the lungs. But sometimes dust may be present in the lungs without producing fibrosis; such cases are described by King and Belt. No doubt also the presence of dust without fibrosis is the basis of what is known as latent silicosis, in which workers may leave a silica risk apparently healthy but return after some years with well-developed silicosis. Watkins-Pitchford (1927) thought that such cases might sometimes owe their temporary freedom from the disease to their resistance to tuberculosis. Analysis of the ash of lungs usually gives results for silica content corresponding to the amount of fibrosis present, but Stewart (1940) finds "that lungs which show notable silicosis not infrequently contain at the time they are examined smaller amounts of silica than many apparenly non-silicotic organs." It may be that for some reason the silica in latent silicosis is not readily soluble, or that there is present some inhibitory element as in granite.

Among the cases in which silicosis was not found were 52 of tuberculosis. Some of these had been employed in processes where the silica risk is slight but others had considerable exposure. On the Witwatersrand (Irvine 1938) the incidence of simple tuberculosis in white miners has never been excessive. Our figures probably indicate a similar slight incidence of simple tuberculosis in our workers, since claims are likely to be more numerous because of the presence of tuberculosis.

The relationship of asbestosis to tuberculosis does not appear to be of the same order as that of tuberculosis and silicosis. The medical board's figures for asbestosis are too small to be of help, but Dr. J. C. Bridge, H. M. senior medical inspector of factories, informs me that the number of deaths from asbestosis known to the Home Office Factory Department from 1933 to 1939 inclusive was 90, in 32 of which tuberculosis was present.

PREVENTION

The essential aim is to prevent the inhalation of dust. Since this is not easily achieved one must attack the infective factor by supervision of the worker. Anything tending to increase susceptibility to various infections in a general sense (Middleton 1936) such as poor ventilation, lack of vitamin A or D and so on must be remedied. Prophylactic inoculation has been suggested (Mavrogordato 1926) but has not been attempted in industrial workers.

The only practical measure of prevention that can be adopted at the moment is to try to prevent the tuberculous worker from entering the industry by an examination before he starts work, and to detect new cases by periodical examinations afterwards. The medical board carry out such examinations in the

sandstone industry and refractories industries, and also in certain processes in the pottery and asbestos industries. Recently examinations in dusty industries have been criticised on various grounds, of which the chief is the expense. Considering the difficulties and the complicated nature of the disease itself it is not easy to put forward figures or other direct proof of the value of these examinations, but without them all possibility of controlling the infection would be lost. The initial examinations by the medical board consist of a clinical and if necessary a radiological examination. The board are required to suspend the worker if evidence of present or past tuberculosis of any organ is found, or if he does not reach a certain prescribed standard of physique. This examination probably suffices to keep out a considerable proportion of susceptible individuals, but of course it may be criticised as incomplete. There are no tuberculin tests and all cases are not X rayed. Experience teaches, however, that the greatest defect is the fact that the most painstaking history, taken in the case of a workman at a factory, does not ensure that one gets an accurate family history of tuberculosis, and so one misses valuable information of contact with open cases.

There is considerable doubt of the value of tuberculin tests, and there is the contradictory evidence from South Africa and from Scandinavia (Topley and Wilson 1936). Tattersall (1940) sums up the position in this way, "Of youths entering the silica-risk industries at about 15 or 16 years old," he says, "about 40 per cent. will give a negative tuberculin reaction. On the other hand I should not regard the fact of a positive result as in any way sufficient to consider excluding such persons from the industries. In fact it might even be argued that those with a negative reaction were exposed to a greater risk than those with a positive, as they represent virgin soil which when damaged by silica might prove much more susceptible to the implantation of tubercle than those whose positive response indicating infection presumes some degree of immunity."

Periodical examinations are a means of detecting new cases both of silicosis and of tuberculosis, but they are also the only way of keeping under observation detected cases of silicosis who are allowed to continue at work. The more elaborate means of discovering when a latent form of tuberculosis becomes active, such as sedimentation tests and blood-counts are in practice difficult to carry out. It has been found that the working man objects to blood-examinations. Craw (1937), however, in a series of 50 hæmatite iron-ore miners, found blood changes when infection supervened.

SUMMARY

A new worker entering a silica-risk industry may have active tuberculosis on entering or have a quiescent lesion which becomes active later. He may become infected within a few years of starting work.

The infected worker may develop the condition known as silico-tuberculosis which usually becomes an open tuberculosis after a number of years. Such a case probably has only a short period during which he is infectious to other workmen as he then quickly becomes unfit for work. In certain occupations where exposure is intense, as in sand-blasting, a worker with a quiescent tuberculosis has this focus reactivated. In other industries the focus may remain quiescent for years but ultimately may become active after a simple silicosis has developed. A new worker with quiescent or open tuberculosis entering a silica-risk industry is a potential source of infection to simple silicotic cases; further, the development of silicosis in cases of latent silicosis will be precipitated by tuberculous infection.

The tubercle bacillus from cases of silicosis is not altered in virulence. The presence of other dusts may modify the relation of silica and the tubercle bacillus in the production of the disease, as in the granite and coal-mining industries.

Practicable measures of prevention are: elimination of the dust; improvement of general hygienic conditions; selection of workers entering the industries; and medical control of workers in the industries.

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ARSENIC IN LARGE DOSES

(FROM OUR U.S.A. CORRESPONDENT)

Two hundred syphilologists and specialists in internal medicine gathered at Mount Sinai Hospital in New York City on April 12 to hear a report of the investigation that has been carried on there in the last six years into the massive-dose arsenotherapy of syphilis by the intravenous drip method. Some account of this work has already appeared.[1] [2]

In 1931 Dr. H. T. Hyman published his observations on "speed shock,"[3] and Dr. Louis Chargin suggested the application of the intravenous drip technique to the arsenotherapy of syphilis. Dr. George Baehr made available a male ward on his service at the Mount Sinai Hospital and 25 cases of early syphilis were treated by allowing neoarsphenamine to flow at the rate of 30 to 50 drops a minute for a period of ten to twelve hours daily on five consecutive days. In this way each patient received in five days as much arsenic as is usually given in three months. Of these 25 patients 19 were kept under observation for three years and 15 for more than five years. The symptoms disappeared promptly, spirochætes disappeared from the primary lesions within forty-eight hours, and with the exception of one questionable case all those followed are considered to be cured.

The work was continued in 1938 under the supervision of a committee representative of public health authorities, the American Social Hygiene Association, the universities of Columbia and Cornell and the Mount Sinai Hospital. A new series of 86 cases was treated, making 111 in all to be treated with neoarsphenamine, but the 111th died from hæmorrhagic encephalitis. Tzanck[4] using massive arsenotherapy in France also experienced two fatalities. Although the American investigators consider the work of their

1. Hyman, H. T., Chargin, L., Rice, J. L. and Leifer, W. *J. Amer. med. Ass.* 1939, **113**, 1208.
2. Baehr, G., Hyman, Chargin and Leifer, *Trans. Ass. Amer. Phys.* 1939, **54**, 25; *Amer. J. Syph.* 1939, **23**, 685.
3. Hirshfeld, S., Hyman and Wanger, J. J. *Arch. intern. Med.* 1931, **47**, 259.
4. Tzanck, A. *Bull. Soc. franç. Derm. Syph.* 1938, **45**, 587.

French colleague to be "reckless and poorly controlled," his experience, together with their own, decided them to discontinue the use of arsphenamine and to substitute that of Mapharsen (arsenoxide). A series of 256 patients so treated was reported for the first time at this meeting. Although it is too early to make any estimate of the ultimate success of the treatment, a comparison of the toxicology of the neoarsphenamine and mapharsen series was possible. In the latter there were 3 patients who developed cerebral symptoms. In 2 cases they were transitory and the patients recovered without treatment. The third case developed convulsions on the seventh day after the beginning of treatment and went into stupor. He recovered in five days. This last case is considered to have been one of hæmorrhagic encephalitis. It was the only important toxic manifestation in the series. Polyneuritis which had been a troublesome complication with neoarsphenamine was reduced to negligible importance in the mapharsen series.

The technique at present employed was described by Dr. William Leifer.

The apparatus employed in the intravenous drip is packed and autoclaved in a special container, devised by Dr. Joseph Turner, the director of the Mount Sinai Hospital. Each set consists of a gravity flask and two lengths of translucent rubber tubing connected by a Murphy drip. The drugs are dissolved in a solution of triple-distilled water containing 5 per cent. dextrose. At the present time, four doses of the drug in the diluent are given without intermission each day so that each patient receives 240 mg. of mapharsen in 2400 c.cm. of 5 per cent. glucose solution. The slow rate of flow is approximately 3 c.cm. a minute. Ordinarily, the drip is set up about 8 A.M. and the full dose has been injected by the end of ten to twelve hours. At the end of this period the needle is withdrawn, treatment being discontinued during the night and resumed the next morning. This procedure is carried out daily for five consecutive days until a total of 1200 mg. of the drug has been administered in 12,000 c.cm. of diluent, containing 600 g. of dextrose. The total arsenic content is approximately 360 mg. The choice of the vein is important. Throughout the recent work the site of election for the insertion of the needle has been a vein on the forearm between the elbow and the wrist. This permits free movement of the elbow and no splint is required. The patient may assist in feeding and nursing procedures and there is less danger of dislodging the needle from this site than at the bend of the elbow. The right and left arms are used alternately. Usually a vein can be used again after a rest of twenty-four hours. With this technique local disturbances are uncommon, and infiltrations have occurred in less than 0·5 per cent. of cases. The patients have gained a good deal of weight during treatment, but since they are all derived from the underprivileged class it is not easy to know how much of this is to be attributed to the comfort of a hospital bed and the liberal hospital diet.

Several speakers emphasised the incompleteness of this piece of research, not least the researchers themselves. Nothing is known of the possibilities of the new method in the treatment of late, latent and congenital syphilis or in the syphilis of pregnancy. The selection of the time-dose factor seems to have been arbitrary. Dr. Earle Moore of Johns Hopkins entered a plea for wider experiment, including animal experiment, to determine the optimum concentration of arsenic in the blood and the appropriate time interval through which it should be maintained. The incidence of hæmorrhagic encephalitis had been considerably higher, he said, than in the experience at Johns Hopkins where 30,000 patients have been treated with only 2 cases of encephalitis resulting.

Dr. Walter Clarke foresaw grave danger from premature publicity. Newspaper stories might give rise to pressure which would compel doctors to adopt this system before the research can be completed. Dr. John H. Stokes thought that some doctors could keep in touch with their private patients perhaps even better than can the clinics and that these might share in the investigation. None of the speakers explained how in this land of liberty a doctor could be restrained from adopting the new technique if he believed it to be in the interest of his patient. The question of cost was also discussed. Dr. Theodore Rosenthal, for the committee, stated that the treatment had cost per case $61 for medical and nursing care and $21 for hospitalisation. This is less than the estimate of the New York state department of health of $100 for the treatment of an early case by the present methods, and the cost of the new method has been higher than it will be if adopted as a routine. It seems that this five-day treatment does not entirely remove the danger of infectious relapse but this is at least no greater than under the present form of treatment. Dr. John L. Rice, commissioner of health of New York city, pointed out the importance to his department of a method which renders patients non-infectious during the single week while their behaviour is under control in a hospital.

Panel and Contract Practice

Payment of Private Fees

THE Oxford city insurance committee have been dealing with an unusual case. An evacuee who was sent to the outskirts of the city became ill about a fortnight after her arrival. The services of a non-insurance doctor were obtained and in due course he submitted his account, which the insured person sent to the insurance committee with a request that they should pay it, but the Minister of Health declined to give his consent to payment out of the committee's funds. According to a newspaper report, a member of the insurance committee pointed out at their meeting that there was no resident insurance practitioner in the district concerned and that it was emergency treatment which was required. The committee adopted his suggestion that these facts should be brought to the notice of the Minister, who should be asked to reconsider his decision. At first sight the decision seems somewhat harsh, but it must be borne in mind that insured persons have certain responsibilities, one of which is to apply for treatment to their insurance practitioner. For years insurance committees have been exhorting insured persons not to wait until they are ill before taking their card to a doctor who lives or has a branch surgery in their neighbourhood. The woman in this case had failed to select an insurance doctor in the vicinity of her new address and this was clearly the cause of the whole trouble. It may be that treatment was urgently necessary, and being unaware of the address of the nearest insurance doctor she called in a private practitioner. Any refund of fees could, of course, only be made as a matter of grace, but in such cases payment is sometimes made for the first consultation, the view being that for subsequent attention there is nothing to prevent the insured person from sending his or her medical card to an insurance practitioner with a request for acceptance and a visit.

Reinstatement

The Ministry of Health have asked insurance committees to make arrangements for insured persons discharged from the Forces to be reinstated on the

lists of their pre-war doctors if they return to the same district. If the doctor concerned was away on national service when the insured person returned and was a participant in the scheme for the protection of practices the insured person would still be reinstated on the absentee doctor's list but would be entitled to treatment from another doctor under the scheme. Similarly, in the case of insured persons who leave home to serve in other branches of national service, or as evacuees, it has been suggested that where the insurance committee learns of the insured person's return before he applies to a doctor for acceptance the committee should inform him that he will be reinstated on his former doctor's list unless he tells the committee within a month that he prefers to be free to choose another doctor. No doubt most insurance committees will do what they can in this connexion, but it should be remembered that it is as a rule only when an insured person, having lost his medical card, applies to his original insurance committee for a new one that his return home becomes known before he secures acceptance.

PUBLIC HEALTH

An Epidemic of Pneumococcal Meningitis

THE pneumococcus, although world-wide in distribution, fortunately possesses only a fairly low degree of infectivity. Where it has caused local outbreaks circumstances have favoured the organism, as in overcrowded camps and so on, and the usual infections produced have been in the respiratory tract, accesssory nasal sinuses or middle ears. Other tissues of the body are susceptible in varying degree. Henderson[1] recorded 11 cases of severe ulcerative pharyngitis due to the pneumococcus which developed at a time when pneumonia and influenza were epidemic but without evidence of direct contact or case to case infection. Pneumococcal meningitis secondary to pneumococcal septicæmia is more frequent but up to now the disease has appeared only in sporadic form. Wilkinson,[2] however, has now described an outbreak of pneumococcal meningitis in the infectious diseases hospital at Hong-Kong.

The first patient, a woman of thirty, was admitted to a small ground-floor ward on Dec. 30 and died 24 hours later. The diagnosis of pneumococcal meningitis was not in doubt but unfortunately, in view of subsequent events, the organism was not typed. On Jan. 1 three patients in an adjacent ward who were convalescent from meningococcal meningitis became ill within a few hours of each other with what turned out to be pneumococcal meningitis and 2 days later four other patients were similarly affected. There was complete structural separation between this ward and the one in which the primary pneumococcal meningitis case had been treated but the nursing and other staff was common to both. It must be pointed out too that the bed spacing in this and other wards is given as 6 ft. or more as against a minimum of 12 ft. recommended for fever hospitals in this country. All seven patients died, in five cases from a type II and in the remainder from a group IV infection. Subsequently, during the first half of January, pneumococcal meningitis appeared as a secondary infection in other meningococcal meningitis wards and six further patients were attacked. To these should almost certainly be added two bacteriologically unconfirmed but otherwise typical cases of meningococcal meningitis who also developed pneumococcal meningitis in convalescence. This series of eight cases again had a 100 per cent. mortality, the incidence of pneumococcal types being: type II, 6 cases; group IV, 1 case; not typed, 1 case. Coincident with this outbreak primary cases of pneumococcal meningitis were being admitted but their precise distribution in the wards is not always given. Where it is given the sequence of events strongly suggests a case to case infection. Thus a patient convalescent from a presumed attack of meningococcal meningitis was being nursed alone in a small ward into which one of the primary pneumococcal cases was admitted on Jan. 10. On Jan. 13 the convalescent patient developed a rapidly fatal attack of pneumococcal meningitis, and, in both cases, the organism was a type II one. If, as seems reasonable, this can be regarded as a direct case to case infection the incubation period is shown to be short, certainly not more than 3 days. It would be difficult to explain all the infections on this basis, particularly the early explosive outbreak, because at least two types of organisms were apparently involved and the type of pneumococcus in the possible primary infecting cases is not always known. The possibility of direct droplet spray infection from case to case or via the intermediary of carriers, however, can certainly not be excluded. Staff carriers, as far as can be judged by throat swabs taken after the epidemic had begun, were not an important factor. Much more difficult to explain is the almost complete breakdown of the patients' resistance. Only meningococcal meningitis cases were attacked but it may be assumed that they were most heavily exposed if, indeed, other patients were exposed at all. But convalescent meningococcal meningitis cases must surely have been exposed to the pneumococcus on countless occasions in the past without mishap. A possible additional factor here was that, with one exception, patients affected by pneumococcal meningitis were still being given Streptocide at the time of infection, and this sometimes in doses of 4 grammes daily and at a period up to four weeks after their original admission to hospital with meningococcal meningitis. Prolonged dosage clearly did not prevent the onset of pneumococcal meningitis. It is questionable indeed whether the drug may not actually have interfered with the patients' resistance to the secondary invader. Probably the most important factor was the pneumococcus itself. This may be an example of an unusual invasive strain with a particular predilection for the central nervous system, a view supported to some extent by the post-mortem findings where evidence of involvement of any other system was most unobtrusive or entirely absent.

Wilkinson is not impressed with the action of either streptocide or sulphapyridine, which is not surprising since all the primary as well as the secondary cases of pneumococcal meningitis died. Unfortunately supplies of sulphapyridine did not become available in the colony until Jan. 7. Thereafter three primary and four secondary cases were treated with the drug but, with one exception, not till 4–6 days after the onset and usually after long preliminary dosage with streptocide, so that the strictures on sulphapyridine do not seem quite justified.

1. Henderson, R. G. *Lancet*, 1934, **1**, 615.
2. Wilkinson, P. B. *Caduceus, Hong-Kong*, May, 1939, p. 95.

Points from Annual Reports

Dr. Charles Porter retired from the position of M.O.H. of *St. Marylebone* after presenting his thirtieth annual report, that for 1938. During his

term of office the metropolitan borough has changed mainly by the encroachment of the shopping on the professional residential area. In the census of 1931 commerce, finance, the learned professions and administration occupied 44 per cent. of males and 30 per cent. of females; domestic, hotel and catering work 18 per cent. of males and 54 per cent. of females. The population is therefore unusual, but its age-distribution is not far from normal for the comparability factor is 0·99. Such a population has a low birth-rate (8·84 in 1938) an average death-rate (11 in 1938) and a high illegitimacy rate (12 per cent.). The infantile death-rate last year was 47 for legitimates and 155 for illegitimates. The death-table shows the very high cancer-rate of 2000 per million population and the low tuberculosis-rate of 350 per million. The former might be expected from the composition of the population, but the latter appears low in view of the numbers of young women employed as domestic servants and shop assistants. Most of the latter will not be residents of St. Marylebone. In 1938 a child-guidance clinic was established, with Dr. Grace Sherwood Calver in charge. Child-guidance clinics are usually a function of the school medical department, but the metropolitan boroughs have nothing to do with school-children, so the St. Marylebone clinic is solely for infants and toddlers. We are told that the mental symptoms of this age are practically all associated with assertive tendencies except for some anxiety symptoms after illnesses or operations. We can well believe that the preventive value of the work of this clinic is high; that the problems presented are not difficult to tackle; that the children themselves are easy to handle, but the adjustment of parents toward the children is far from easy.

Paddington metropolitan borough has a smaller area than St. Marylebone but a population 50 per cent. greater and a rateable value of almost exactly half. Its cancer death-rate in 1938 was however almost as high as that of St. Marylebone (1900 against 2000 per million) but its tuberculosis death-rate was distinctly higher 590 against 350). The borough has nine wards, of which three in the south differ markedly from the rest in their population and vital statistics. In 1938 in the three south wards the birth-rate averaged about 6 per 1000 population and the illegitimacy rate about 24 per cent. of total births. In the remaining six wards the birth-rate averaged about 15 and the illegitimacy rate about 13 per cent. There is less marked difference in the death-rates. The comparability factor for the whole borough is 0·99, the same as for St. Marylebone, but separate factors for the wards are not available. Dr. Geoffrey Oates, M.O.H. of Paddington, in his 1938 report gives a table of infant mortalities in special districts and streets. Of recent years infantile mortalities have tended to level themselves out though even today one locality may have four times the mortality of another over a short period. But in the baby-farming days parts of Paddington and some other metropolitan boroughs were notorious for their excessive infant mortalities. Another factor which caused many local districts of western London to have excessive infantile mortalities was the mews. Baby-farming has gone and the mews have been converted into garages, so these two causes of infant life destruction have disappeared. In 1938 there was only one case of poliomyelitis and one of polio-encephalitis notified and no case of encephalitis lethargica, though one death is attributed to the last.

Wandsworth is the largest of the metropolitan boroughs with an acreage of 9199 and a population in mid 1938 of 340,100. Though at the periphery of the county and having a density of but 38·8 persons per acre, its population is declining. In 1938 its birth rate was 11·92 (the decennial average) the crude death-rate 11·17, corrected rate 10·38. The natural increase, which is the difference between the birth-rate and the crude death-rate, was therefore 0·75 per 1000 and the fall in population due to emigration. Of the 3802 deaths which occurred in the borough in 1938, those due to heart disease numbered 971, to cancer 604 and to tuberculosis 199. The infantile mortality was 46, the lowest ever recorded. Of the 3802 deaths 2305 took place in institutions. Dr. F. G. Caley, M.O.H., in his annual report for 1938 gives a table of the age-incidence of the endemic infectious diseases which shows how this incidence has shifted since most of our textbooks on the subject were written. Of 3594 cases of measles, 2027 occurred in the 5–10 age-period and only 471 under the age of 3 years. Of 479 diphtheria, 197 occurred at 5–10 years, 64 at 10–15 and 88 above 15 years of age. Of 584 scarlet fever, 266 occurred at 5–10 years, and of 508 whooping-cough 209 occurred at 5–10 years. The brunt now falls on the infant and junior school ages. In measles and whooping-cough, which kill by respiratory complications, the forward shift of age of attack has led to an enormous reduction in fatality, but diphtheria which kills by toxæmia does not share in this reduced fatality. Diphtheria immunisation is making better progress in Wandsworth than in most of the London boroughs.

Between the 1931 census and mid 1938 the population of the borough of *Scunthorpe* increased from 33,761 to 42,000, raising the density from 4·01 to 5·2 persons per acre; but as the number of inhabited houses increased from 6866 to 11,688 the house-density fell from 4·6 to 3·6 per house. The most satisfactory feature in Dr. W. Hartston's annual report for 1938 was the fall in infantile mortality to the low rate of 33·9; the most interesting an account of an outbreak of epidemic pneumonia in a setting of clinical influenza reprinted from THE LANCET (1939, **2**, 1313). It is one of the last works in which the late Sir Patrick Laidlaw had a hand and is of great interest for throwing a dim light on the influenza-like outbreaks of 1938–39. Owing to the nature of its industries, atmospheric pollution is of great importance in Scunthorpe and in 1938 a special investigation into the state of the atmosphere was undertaken in conjunction with the department of scientific and industrial research of the Home Office. To this Dr. Hartston devotes a chapter, with charts. In the borough portion of Santon where there is a great steel works, tangible atmospheric pollution "has become sufficient to render that district unfit for normal healthy habitation." Cancer mortality in Scunthorpe in 1938 was exactly one death per 1000 population, the tuberculosis mortality 0·61 and the respiratory mortality 1·5 per 1000 population.

Infectious Disease in England and Wales

DURING THE WEEK ENDED APRIL 20, 1940

Notifications.—The following cases of infectious disease were notified during the week: Scarlet fever, 869; whooping-cough, 567; diphtheria, 712; enteric fever, 30; measles (excluding rubella), 4013; pneumonia (primary or influenzal), 815; puerperal pyrexia, 143; cerebrospinal fever, 390; poliomyelitis, 4; polio-encephalitis, 1; encephalitis lethargica, 6; dysentery, 44; ophthalmia neonatorum, 44. No case of smallpox, cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on April 19 was 951 made up of: scarlet fever, 137; diphtheria, 135; measles, 4; whooping-cough, 64; enteritis, 51; chicken-pox, 60; erysipelas, 32; mumps, 13; poliomyelitis, 1; dysentery, 7; cerebrospinal fever, 99; puerperal sepsis, 17; enteric fevers, 7; german measles, 139; meningitis, 2; other diseases (non-infectious), 46; not yet diagnosed 127.

Deaths.—In 126 great towns, including London, there was no death from smallpox, 1 (0) from enteric fever, 1 (0) from scarlet fever, 5 (0) from measles, 6 (0) from whooping-cough, 22 (1) from diphtheria 26 (6) from diarrhœa and enteritis under 2 years, and 56 (4) from influenza. The figures in parentheses are those for London itself.

Newcastle-on-Tyne reported the fatal case of enteric fever. There were 5 deaths from diphtheria at Plymouth.

LETTERS TO THE EDITOR

THE R.C.P. ON DIPHTHERIA AND RAW MILK

SIR,—I am directed by the president and fellows of the Royal College of Physicians of London to request you to give publicity to the following resolutions which were passed unanimously at a meeting of the college on April 26.

1. The Royal College of Physicians urges the Ministry of Health to encourage with all the authority at its command the immunisation against diphtheria of children in the age-group 1–15 by medical practitioners and by the staffs of all health authorities throughout the country, in view of the fact that there has been no abatement of diphtheria incidence or permanent reduction of mortality in England and Wales since the early years of the century. Further, in the opinion of the college, the cost of prophylactics required should not be allowed to interfere with or curtail the proper execution of schemes calculated to reduce so materially the incidence of diphtheria in the country. Where local outbreaks of diphtheria now occur the college recommends that advantage should be taken of the assistance of the expert staffs of the Emergency Laboratory Service to help to control by modern methods epidemics arising in those districts where such services are available.

2. The Royal College of Physicians recommends that the attention of the Ministry of Health should be drawn to the fact that large numbers of children who have been brought up on pasteurised milk in the towns are now receiving raw milk in reception areas to which they have been evacuated, and that the Ministry should be asked to do all in its power to secure the coöperation of the Milk Marketing Board and of the medical officers of health to arrange for supplies of pasteurised milk to be made available in all areas where there are sufficient numbers of children to demand it. Further, in the opinion of the college members of the medical profession might usefully advise parents and guardians of children of the risks of infection which attend the consumption of raw milk and of the value of pasteurisation or alternatively of boiling the milk in removing these risks.

I am, Sir, yours faithfully,

H. LETHEBY TIDY,
Registrar.

Pall Mall East, S.W.1.

TREATMENT OF GAS GANGRENE

SIR,—The increased attention being paid to gas gangrene in the British medical journals has prompted this account of the methods we now employ in this condition. In the past eight years there have been developed two conservative methods for the treatment of gas-gangrene infections as experienced in civil practice in the United States. Both have been attended by appreciable success when used individually and together. Neither expensive nor dependent on different technical methods, both have stood trial by many independent observers. While the number of reported cases is less than 150 there have been no unfavourable reports as yet. The case-mortality of the group is less than 10 per cent.

One method used widely now and introduced by Bohlman is sulphanilamide. The second method, which in this clinic has seemed to be the better of the two, is irradiation, which was advocated by Kelly in 1933. The advantage of those two, separately or combined, is that radical resections and amputations are avoided except in those cases where the extent of the injury or the vascular status of the part would make it imperative.

Prophylaxis in fresh open wounds which are grossly contaminated should be rigorous. Thorough débridement is necessary, but *Clostridium Welchii* antiserum is not used routinely. Frequent reports of gas-gangrene infections developing after the prophylactic injection of serum has made the sense of security following its use a false one. In several hospitals patients with compound fractures are now being given prophylactic irradiation. There have been no instances of gas gangrene in these series as yet. It has been our practice to give irradiation to the involved area. This consists of 75 röntgen units given on three consecutive days using a filter of 0·5 mm. of copper and 1 mm. of aluminium. A 200kV machine is used, with a skin distance of 50 cm. Of the antisera, that against tetanus is the only one used routinely. Sulphanilamide is used prophylactically only in the more severe wounds.

In our treatment of gas gangrene either of the trunk or of the extremities, irradiation is regularly used, often supplemented by sulphanilamide. The former is administered in doses of 75–100 r. depending on the size and depth of the infection. It is repeated for a minimum of three days. If at the end of this time the infection persists, irradiation is continued. It has never been necessary to give more than 1000 r. We have had three patients with trunk infection in the last year, all of whom responded to this regime. They are now living and well.

Sulphanilamide is used frequently; the blood level should be from 5 to 10 mg. per hundred c.cm. When it is not possible to give it orally it is given subcutaneously, 4 g. in 500 c.cm. of one-sixth molar sodium lactate.

The rest of the treatment is chiefly surgical. It consists of wide incision and drainage. At the time of operation it is usually noted that there is necrotic tissue in the wound. If this separates fairly easily, or if a large area is involved, it is removed. No effort is made to remove all of the dead tissue down to living muscle and fat. After this Carrell-Dakin tubes are inserted. Irrigations are commenced on a two-hourly basis using Dakin's solution which we have found to be satisfactory. Hydrogen peroxide has not seemed as efficient in clearing up the wounds. In addition it may liberate oxygen under the skin which could be mistaken for the gas from an advancing infection. Tetanus antitoxin is administered in all cases. If the patient seems very sick, or if infection is not readily controlled, gas-gangrene antiserum is given. Adequate fluid intake and high-caloric, high-vitamin diets are maintained. Electrocardiograms are taken as soon as feasible in these patients. On several occasions myocardial damage has been shown. Cardiac failure subsequently occurred in one of these patients, presumably from the infection, as there was no evidence of any other predisposing factor or previous disability.

Convalescence in our patients has often been prolonged. This is especially true in those with severe trunk infections, with the complaint of weakness most predominant. It has often been from four to six months before patients have been able to resume usual life.

It seems that one can separate true gas gangrene into two rough divisions. One is the massive fulminant infection occurring in extensive injury to a part in which the muscles appear to be especially

involved. Such involvement seems to have been predominant in the cases of the war of 25 years ago. In civil cases a relatively more benign type of infection has been more prominent, often with only subcutaneous involvement. Although these have had large tissue loss with tense and discoloured overlying skin, the muscles in the field of the advancing infection have been spared. While this latter type may be merely a forerunner of a more extensive infection which then rapidly dissects its way through the muscles, our experience indicates that it is a fairly discrete group. Fortunately it is more amenable to conservative treatment.

I am, Sir, yours faithfully,

ROBERT L. SEWELL.

School of Medicine, University of Rochester, New York.

EARLY PURGATION AFTER APPENDICECTOMY

SIR,—It is well known that the discomforts of the first two or three days after an internal operation are much more unpleasant for the patient than the actual operation itself. This is of course due to the intestinal stasis with the accompanying gas distension. Relief is always afforded as soon as the bowels move and the gas is expelled. This entails the use of enemata, often repeated, or flatus-tubes. For the last two years I have given a couple of vegetable laxative pills twelve hours after the operation, provided that vomiting has ceased. If another twelve hours elapse without a result I give a plain water enema, and since I have adopted these tactics I have never seen any of the familiar discomfort.

Old ideas die hard. The prevailing idea regarding the withholding of a purgative until the third day after an appendicectomy is based on the fear of opening up the internal operation area. But if the stump has been properly invaginated such firm adhesions are formed within twenty-four hours that this danger is negligible. The peaceful convalescence which I now see is a great contrast to the old days and the work of the nurse is reduced to a minimum.

I am, Sir, yours faithfully,

English Clinic, Tangier. F. J. W. PORTER.

EMOTIONAL CHANGES OF WAR-TIME

SIR,—It would be a pity if the emotional reactions to recent events passed unnoticed and no-one commented on them. I have observed a number of curious emotional variations which others may be able to amplify. Shortly before the war there seemed to be an increased valuation of animals with a corresponding diminution in the emotion attached to human beings. The picture of an injured man on the films evoked no response, whereas an injured dog produced moans of female pity. Again, a broadcast for a children's hospital produced a very small sum but an appeal for a dogs' home obtained a much larger response. There was almost a deification of the dog. I thought that this might be connected with the strong feelings of pacifism—i.e., psychical attempt to overcome aggression in the mind—but no change has occurred since the outbreak of war and the reaction remains inexplicable.

The onset of war seems to have released a great deal of sexual emotion which appeared mainly as scopto-exhibitionism and female homosexuality. This resulted in increased nakedness on the stage and in the adoption of male clothes by women—the latter ostensibly for convenience. The increased female nakedness on the stage produced a public outcry against it. The reactive forces seem to have won, at least temporarily, and managed to suppress it and the sexual jokes which presumably show the same tendency. Whether this strong instinctual force will break out elsewhere—it seems probable that it will—and how it will appear will be of interest to observe. Promiscuity, and excessive anxiety to protect the troops against it, may have increased but is difficult to assess.

Simultaneous with the release of sexual emotion there seems to have been an increase of religious feeling and it was recently stated that during a bishop's tour of the Western Front he confirmed seventy soldiers daily. Whether this is related to the increased sexuality or sadism (as a form of overcompensation) or whether it is a more conscious reaction to danger is again obscure. One might have expected that the condition of war would have released a great deal of sadism and masochism. This seems to have been in reality much less than in the previous war. Moreover the release seems to be in older (? and safer) men than in the younger ones. Whether there is a basis of masochism in the pacifist efforts one cannot say, but it seems probable. Some of the more belligerent of the opposite party seem to be definitely sadistic—the "Put 'em up against the wall school." In the majority of people there appears to be more pity—i.e., identification—for belligerents of both sides than previously.

No doubt there are others better placed than myself to observe these emotional changes and it would be of interest to hear of their experiences.

I am, Sir, yours faithfully,

Harley Street, W.1. CLIFFORD ALLEN.

TREATMENT OF HERNIA

SIR,—Surgeon Rear-Admiral Wakeley's plea for more attention to hernia surgery is particularly opportune at the present time when large numbers of men are desirous of being rendered fit for military service. The use of silk sutures will be endorsed by all who follow up their hernia cases. Its permanency must be of value and one seldom sees any immediate or remote ill effects of its use. In the treatment of inguinal hernia, I would question the desirability of bringing the external oblique together behind the cord thus losing much of the obliquity of the canal. I practised this method in direct inguinal hernia some years ago, but after having several recurrences alongside the cord I abandoned it in favour of the following technique, which I now use for all cases of established or potential direct hernia where operation is indicated.

The inguinal canal is opened in the usual way, displaying the bulging attenuated transversalis fascia framed in the arching fibres of the conjoint tendon. By light blunt dissection the inner part of this fascia is detached from the posterior surface of Poupart's ligament until the shining surface of Cooper's ligament is exposed. A broad spatula retracts the hernia and conjoint tendon whilst three or four stout silk sutures are inserted at regular intervals into Cooper's ligament by means of a No. 4 Mayo half-circle needle. Each end of the sutures is now reefed through first the transversalis fascia and then the conjoint tendon so that when tied back on to Cooper's ligament the transversalis fascia underslings the hernia and the conjoint tendon's normal attachment to the pectineal line is increased. In closing large defects it may be necessary to slide down a portion of the anterior rectus sheath or to turn up a flap of pectineal fascia. In any case the conjoint tendon is carried back

deepening the inguinal canal, an advantage when the often deficient external oblique aponeurosis comes to be closed in front of the cord. After completing the knots the same silk sutures are used to draw the deep surface of Poupart's ligament up to the anterior surface of the conjoint tendon. The external oblique is then closed in front of the cord. Often in direct herniæ the sac is not opened so separation from the bladder does not arise.

In the repair of femoral hernia it seems unnecessary to traverse and so weaken the inguinal canal when the "highest possible" repair can be very simply achieved by Henry's extraperitoneal approach. The solidity of this repair (using silk) is very convincing.

I am, Sir, yours faithfully,

Harley Street, W.1. KENNETH ARMITAGE.

BREAD

SIR,—The new method of milling wheat, recently described in the *Times*, by means of forced air and steel cutting knives breaks down the whole of the bran, germ, starch grains, &c., into a fine flour which contains only about 8½ per cent. of water in place of the usual 15 per cent. and 14½ per cent. of protein in place of about 9 per cent. in white flour, and all the minerals, and vitamins, A, B and E. Owing to the small percentage of water and the fine milling process this flour keeps very well and makes a most excellent bread. In the milling of white flour some of the best of the wheat is separated off and goes to feed chickens and pigs which do very well on this so-called offal. The white flour is robbed of vitamins and materials present in the natural food, and of much of the protein. The purchaser of white bread also buys in it far more water than he should. It is for the millions of not-well-off people that bread and flour should give all the properties of the natural wheat. The Government appeal to us not to buy articles which have to be brought by ship while they are allowing a large part of the imported wheat to be separated off as "offal" and not put into bread but fed to animals which are not necessary for healthy existence, if conditions become hard, and can be otherwise fed. Millions of Russians live on black bread and vegetable soup; they could not live on white bread.

I am, Sir, yours faithfully,

St. John Clinic, S.W.1. LEONARD HILL.

EXTRACRANIAL LIGATURE OF THE MIDDLE MENINGEAL ARTERY

SIR,—In reply to the letter of Mr. Graham Jessop and Prof. Lambert Rogers in your issue of April 27, I agree that the hæmatoma in civilian practice is usually extradural, but in war wounds (and I made it clear that my article referred to war wounds) the dura is usually injured and the hæmatoma usually subdural. The whole point of my article was to suggest how to minimise compression of the brain by ligaturing the artery as quickly as possible after wounding. This can be done at a first-aid post, but trephining cannot be done before the patient reaches hospital (see the opening sentence of my article on p. 643). "Stylomastoid process" was a slip and should have been "styloid process"; and the words "the facial nerve . . . passing from the stylomastoid foramen, behind the stylomastoid process, and through the parotid gland," though admittedly at first sight ambiguous, should not be so to a surgeon or an anatomist, who knows that the stylomastoid foramen lies behind the styloid process. The words "more medially" do not indicate a compass bearing but mean "on a more medial plane to that where the artery is being ligatured." In other words, the listed structures are safe from injury at operation because they lie at a deeper level.

I must repeat that this ligature is a life-saving practice to bring the wounded alive to hospital for trephining. Of the twenty-two months in 1915–17 that I was surgeon to a battalion of storm troops in the Tirol Alps there were not five in which a well-equipped ambulance was near my first-aid post. The wounded usually had to be carried by stretcher-bearers for many miles over rough steep mountain paths. It rests with the surgeon in such circumstances to decide between immediate ligature and possible death of the wounded man before he can reach hospital, where he can be trephined. There is, of course, no need for ligature in Cardiff, with its skilled surgeons in well-equipped hospitals just round the corner; but it may be useful somewhere else—say, in Norway.

I am, Sir, yours faithfully,

London. MAX WASSERMANN.

THERAPEUTIC POOLS

SIR,—In your condensed report (p. 835) of my short paper on the balneological treatment of war injuries an impression will, I am afraid, be given which I tried (and which is important) to avoid—namely, that a good deal of apparatus is necessary in therapeutic pools for casualties from the *Services*. I said that for these patients, as opposed to sufferers from rheumatoid arthritis and poliomyelitis, the amount needed was small—namely, under-water seats and parallel bars to assist walking.

I am, Sir, yours faithfully,

Droitwich. A. R. NELIGAN.

LIPOCAIC

SIR,—The summary of our work on lipocaic which appears on page 416 of your March 2 issue is correct except that we have not yet secured an active preparation of lipocaic from pancreatic glands in which the acinar tissue has degenerated as a result of ligation of the pancreatic ducts. In our experience, in the majority of animals in whom the acinar tissue of the pancreas has degenerated as a result of such duct ligation fatty infiltration of the liver does not occur, although an occasional animal may show this complication. We have not yet made an attempt to correlate the histology of the pancreas remnant in these cases with the liver changes. The experiment that you suggest is indeed important, and it should be possible as soon as we obtain a more rapid and simple method of assay than is at present available.

I am, Sir, yours faithfully,

Department of Surgery, University of Chicago. LESTER R. DRAGSTEDT.

RUSSIA claims to have established in the last twenty years 13 institutes of tropical medicine and to have 2700 anti-malaria institutes, of which the first 8 were organised in 1921 by the All-Union Institute of Tropical Diseases, itself set up at Moscow in 1920. It is said that, as a result, the incidence of malaria has declined sharply since 1928; that certain swampy areas have been drained and converted into orchards; and that over 38 million people (about an eighth of the population) were examined for malaria in 1937. With the numerous personnel employed and the vast amount of material for research it is strange that no important contribution to tropical medicine has come from Russia since the revolution.

IN ENGLAND NOW

A running commentary from our Peripatetic Correspondents

THE middle of April brought me new dressers. Do I love it or loathe it? I don't know. Certainly just after the last war I used to dislike it. I used to feel that I had just got them to the stage where they would be of use to me when I had to start afresh on a new firm. Now I think I like it. I find that towards the end of the third month I have been as much use to them as I can be at that stage of their development. One or two may come back as a house-officer or a clinical assistant later when one can again help them; but three months at any clinical subject is long enough for the student. There is, of course, regret at losing the old firm, and I believe they are sorry to go. Perhaps that is a good reason for their going. Another month and we might part without regret; we might even mutually slip away from one another without saying good-bye. The regret is lessened by the confidence that the new lot will soon be as charming. In the meantime they seem maniacs. They never imagine that a surgeon could be afraid of them; but up to now an element of fear has never been totally absent from the first meeting with my new firm. And their feet are so large. They entirely fill the floor of the outpatient department. One spends the morning tripping over them. The rapidity with which their feet diminish in size is the best indication of how one is getting on with them. I know now that if I can get them together from the first moment, and work very hard for a fortnight their feet will have so shrivelled that I shall not notice them. Then instead of being tied to the grindstone of dealing myself with every patient I become the chef de clinique walking about and consulting with my colleagues. Normally, this happens in about six weeks, with an heroic effort and in a particularly united firm it may do so at the end of the first month. When they straggle in from day to day, returning from examinations or a holiday, it does not begin till the end of the second, which is the same as not at all. I used to think this meant they were a bad firm, I now know it was because I had been lazy. There are no bad firms unless we make them so and one thing is certain. However much or little justification there may be for the diminished confidence that the people of this nation have had in the medical profession between the wars, the type of student that is passing through our hands to-day is as good a one as it has ever been in the forty years of this century. On the whole, then, I think I enjoy the arrival of my new firm; and one of my secret regrets is that it can only happen seven times more; and I used to count with dread the number of times it was still before me: ninety-two, ninety-one, ninety. How can I go on like this? And now—only seven; and soon—only six times more.

* * *

"And now, doctor, I have good news for you," he said, "I can definitely tell you that the war will be over by the end of the year." He was a small, one might almost say insignificant, little man and he had been sent to me for epilepsy. He hadn't got it. In fact his trouble was nothing more than hysterical hyperventilation tetany. I had just shown him how to hold his nose when an attack came on. "I've had the gift for about four years," he went on, "ever since I was in a car accident. I was not knocked out, but I fainted afterwards. Since then the future just comes to me, but I won't tell fortunes. That's abuse of my gift. However, I'm sure you'd like to know the future of this war." I said I would and my duty as a peripatetic made me jot it down.

"For months and months before the present war," he said, "I knew a war was coming. I knew the date three months before it happened. I knew Hitler was going to walk into Poland and take it in three weeks—and that would bring us in. Six weeks ago I knew he would go into Norway. I told them all he wouldn't touch Belgium—and he won't. He will be in Sweden within seven days. He won't do any good there, but it will take us months to get him out and the whole of Scandinavia will be laid waste. He won't touch Holland, but he'll walk into Switzerland, and they won't resist. All the same, it will be over by Christmas, probably about the last week in November. Hitler will be assassinated by Himmler. That one's after the power for himself. Then the German people will rise. Goebbels will get away, but Goering and Ribbentrop won't." I was sorry to hear about Goering. I've a sneaking affection for the fat old rascal. "His own people will make Ribbentrop pay dearly for what he's done before he dies. I reckon he caused this war. He was spying when he was over here as ambassador. After that there will be a different Germany. Their old royal family will return to power. Poland and Czechoslovakia will be freed, but not Austria. That will still be part of Germany. France will take control of the Rhine for ever, and we shall police Germany for many years. Germany will never rise again—she is finished. Russia too is heading for the last round-up; within two years there'll be another revolution there under that Trotsky. Oh! by the way, there'll be a new king in Norway within eight months." He paused for breath. "Italy, she's got her eye on Singapore, and she won't come in for a month or two. When she does, we shall beat her—easily. Mussolini's time is getting short. Within six months of coming in with Germany he'll be finished, and they'll be back to Pope, King and Queen in Italy, and that's all. Turkey is going to be affected—but I can't say how. I'm pleased to tell you, England won't be bombed—nor Germany either for that matter. There'll be no real war on the western front—only aerial war. I can tell you Germany's already moved three-quarters of her men away from there. After the war, everybody thinks there'll be a lot of unemployment—but there won't. There's going to be as much work as there is now. We shall still be making armaments. We shall be standing ready in case there is war in the far east. I can tell you war between the U.S.A. and Japan will start within eight months from now. Japan wants the Dutch East Indies and certain minor islands. America is going to take Holland's part, and it won't be a long war. Japan can't stand the pace. We shall keep out of it."

"How about the budget?" I asked. "I've known about it for weeks," he replied, "and I can tell you this. Cigarettes and whisky will remain up for three years, and the postage for two. They'll have to, so as to pay for the damage in Norway. And now I'll tell you one more thing. You're a very clever man"—I smiled charmingly—"but on one line only." He paused dramatically. "You're a surgeon." It was with real sorrow that I told him I had never done an operation in my life.

* * *

I have just been sampling colloid cocktails at a film preview. We started off with the cocktails and then collapsed temporarily to absorb a talky film. Then we had a film on food convoys. Then we had more colloid cocktails and colloidapsed to watch a coloured film of springtime in Palestine, afyer which we had more crooked coloured clocktoils I know dont how many I had the colours were lovely another springtail please coloured colloids.

* * *

We have lately had an outbreak of nocturnal pilfering at Guy's. The original Guy's House—the surgical block—has stood empty since its evacuation at the beginning of the war, but lights have been appearing mysteriously in its locked wards. Window panes have been carefully cut out in the local bank office on the hospital premises, and the hospital shop has been broken into. There are daily reports of

minor thefts in the nurses' home, and though no serious loss has been sustained these sinister activities are giving the authorities some anxiety. The black-out, the emptying of certain parts of the hospital, and the necessity for leaving many rooms unlocked to ensure that they will be readily accessible if there is an air-raid—all these factors assist and encourage the amateur thief who so often crops up in a hospital. Since Jan. 1, when students ceased to be billeted at the expense of the Ministry of Health, the hospital has had its own student fire squad, living in the hospital at the expense of the governors and forming the nucleus of an A.R.P. team. On bombless nights this "vigilance squad" patrols the hospital in search of unshaded lights and shady characters, but so far no arrest has been made..

PARLIAMENT

ON THE FLOOR OF THE HOUSE

By MEDICUS, M.P.

THE Prime Minister's statement on the operations in Norway made on Thursday of last week has so dwarfed all other parliamentary business as even to get somewhat out of perspective. This statement was made in reply to the question by Mr. Attlee as Leader of the Opposition: "Is the Prime Minister now able to make a statement on the position in Norway?" But immediately before that Mr. Attlee asked another question, whether the Soviet government have now put forward proposals for a trade agreement? That the Soviet government has indicated its attitude on trade negotiations and that exchanges are now going on between the British and Soviet governments are facts of the highest significance at the present time. In an economic sense the possibility of making such an agreement, duly taking into account the difficulties of the war situation, is a part of the immense series of changes and stresses which now has the whole world in its grip.

As far as the statement on Norway itself is concerned, if it is to be understood it must be seen in relation to the almost world-wide extension of the war front. The most significant part of the statement was perhaps not that the attempt to take Trondheim from the south has been abandoned but that "the injury to the German navy has been so substantial as to alter the entire balance of naval power, and to permit an important redistribution of the Allied fleets. . . . A British and French battle fleet, with cruisers and auxillary craft, is already in the Eastern basin of the Mediterranean on its way to Alexandria." As all the world now knows, this fleet is one of formidable dimensions and Egypt is ready for any eventuality.

Mr. Chamberlain made his statement with admirable self control, he showed indeed too little emotion to please some members who commented on his impassivity. But although the House was critical Mr. Attlee and Sir Archibald Sinclair agreed not to put supplementary questions and not to pursue the debate further on that day. Later, "through the usual channels," which means the Whip offices, the debate for this week was arranged and at the moment of writing, before this debate has begun, it is not possible to say what it will bring forth. But whatever the parliamentary reaction the effect on Parliament and on the nation is to bring it more closely towards unity than it has been before. And whatever the circumstances may be the nation is now aware of the tremendous gravity of a war situation which some superficial optimists had begun to regard as already a stalemate.

* * * * *

We have not finished with the Budget yet—the purchase tax is to be discussed in detail and there is other business—but the new realisation of the vast scale of the war and its likely intensification will almost certainly bring forward new proposals. A greater effort to organise man-power, a greater effort to organise the use of our manufacturing resources, a greater drive towards a sane economy in the use of the materials, food as well as other things which we have at our disposal, will all be stimulated by the national awakening to the meaning of this war.

The coming twelve months will see many changes; an emergency budget later on is almost certain, a broadening of the basis of government may come sooner rather than later, and the call to everyone to give what service they can will be more and more insistent. Sweden a short time ago put into force legislation enabling any male from 16 to 70 to be called up for civilian duties. The method is not ours but everyone, man and woman alike, will certainly be needed with a consequent great change in the habits of the nation.

* * * * *

One of the parliamentary habits already changed is that of protracted discussion of bills on party lines. The Agricultural Wages (Regulation) Scotland Bill passed through its final committee stages and its third reading between 4.15 P.M. and 5.51 P.M. on the day Mr. Chamberlain made his statement, and in this period the House discussed both amendments and general principles. In a sense the British Parliament is moving in the direction of the French committee system, the one which prevails also, of course, in English local government. And we may go further in that direction. It is noteworthy also that on this same day when the Norway statement was made a long debate of over two and a half hours took place on allegations by a private member that Major Reid-Kellett had been treated unfairly, and that this gentleman's complaints as to waste, inefficiency and irregularities in the building of militia camps and factories had not been properly investigated. The investigation of grievances could hardly have been better exemplified and the interest in the matter, the subject of which touches so nearly on national expenditure, was fully justified.

Parliament is still the great court of appeal of the nation, and all members recognise the need to maintain its freedom to criticise, to condemn and, if need be, to reconstruct. In the days to come when burdens may be heavier and when economic changes proposed by Mr. Keynes and others may have to be made because there is no alternative, the function of Parliament will be of still greater service to the nation. The great task of the future is how to restrict personal consumption and how to expand more organisation and production. In this process the medical profession will be confronted with many problems of health and nutrition. And standards of health and nutrition are likely to be more important criteria than pounds, shillings and pence.

FROM THE PRESS GALLERY

Workmen's Compensation

IN the House of Commons on April 30, when the Workmen's Compensation (Supplementary Allowances) Bill was read a second time, Sir JOHN ANDERSON said that no comprehensive review of our system of workmen's compensation had taken place since the Holman-Gregory report in 1920. The main lines of the structure of workmen's compensation remained the same today as when the original act was passed in 1897. It was widely recognised that the time was ripe for an overhaul of this system and with the end in view the Government appointed a Royal Commission under the chairmanship of Sir Hector Hetherington in December, 1938. It might be some time before Parliament would be in a position to deal with the problem as a whole, but, bearing in mind the dissatisfaction which existed with the scales, the Government had entered into discussions with representatives of industry with a view to devising a temporary scheme for meeting cases of hardship.

Such a scheme was the basis of the present bill. No argument in favour of an all-round increase of compensation could be based on any change in conditions since the present rates were fixed by the act of 1923. The cost-of-living index at the end of 1923 was about 175; on May 17 this year the figure was about the same—178—only 1¾ per cent. higher. The general average wage-rate for the first quarter of this year was about 15 per cent. higher than in 1924. That meant that on the whole rates of compensation were higher under the existing law. This bill would provide substantial new benefits, not only in respect of accidents happening in the future but also in respect of those which had occurred in the past over a long period.

Mr. GREENWOOD, on behalf of the Labour Opposition, objected to the bill on the grounds that it was limited to a system of supplementary allowances in respect of wives and children, excluded any provision for single men and women, and therefore failed to recognise the necessity for an immediate all-round increase in the rates of compensation payable. He said that the Labour Party put in a claim for an improvement of all-round rates. The Government had chosen to reject a long-overdue demand which members of all parties had admitted. This was a meanly conceived measure and in the circumstances of today when industrial risks would become greater as the war proceeded he thought they might have expected a little more generosity.

QUESTION TIME

London University

Sir ERNEST GRAHAM-LITTLE asked the Home Secretary whether, in view of the unexpected course taken by the war, he was now able to modify the advice tendered by him to the schools of London University last summer, acting upon which they evacuated their students from London; and whether, in consideration of the crippling cost to the schools of continued evacuation, he would sanction their return in the coming autumn.—Sir JOHN ANDERSON replied: I have already explained the general views of the Government in this matter at a deputation from representatives of London University which I received last week. In view of the second part of the question, I should like to make it clear that no question of Government sanction is involved and that the decision rests with the responsible authorities of the university.

N.H.I. Dentists' Fees

Mr. E. G. HICKS asked the Minister of Health whether he had considered the scale of dental fees payable to the dental profession under the National Health Insurance scheme; and whether, in considering the dentists' claim for an increase, owing to the war, he would give full weight to the fact that about half of the fees, including any increase, fell directly upon the pockets of the working men and women of this country who themselves were bearing their share of the added financial burden cast upon them by the war.—Mr. WALTER ELLIOT replied: A claim has been put forward by dentists for an increase of the scale of charges for the treatment of insured persons entitled to dental benefit under the National Health Insurance scheme. This claim was addressed to the Dental Benefit Council as the body responsible for advising the Secretary of State for Scotland and me in the matter, and is now under consideration by the council.—Mr. RHYS DAVIES: Will you mind that if you grant an increase to dentists, panel doctors and others will want to follow suit? Mr. ELLIOT: All these considerations will be taken into account.

Medical Orderlies in the W.A.A.F.

Mr. RALPH ETHERTON asked the Secretary of State for Air why medical orderlies and cooks in the Women's Auxiliary Air Force, many of whom were specially recruited, were graded in the lowest grade, namely, A.C.2; whether there was a proper establishment under which medical orderlies could obtain the rank which their training experience and responsibility warranted, and whether he would rectify the present anomalies.—Sir SAMUEL HOARE replied: Members of the Women's Auxiliary Air Force are employed only as sick-quarters attendants on members of that force who are sick in quarters and not sent to hospital. Any skilled nursing necessary in such cases would be carried out by members of Princess Mary's Royal Air Force Nursing Service and trained members of voluntary aid detachments. The majority of the personnel are therefore appropriately graded as aircraftwomen 2nd class. I am aware that some members have been found since their enrolment to possess skilled qualifications and the question whether any higher mustering can be accorded them is now under consideration. In regard to cooks, there is an adequate establishment by ranks but this, as with all Women's Auxiliary Air Force establishments, is kept under review.

Weil's Disease

Lieut.-Colonel A. P. HENEAGE asked the Minister of Health if his attention had been called to illness and death caused by Weil's disease spread by rats in seaports; and what steps he was taking to counteract this.—Mr. ELLIOT replied: I am aware that cases of Weil's disease occur from time to time, but the disease is not specially a feature of seaports. The dangers of this disease have been referred to in recent reports by my chief medical officer, and local authorities generally are aware of their powers and duties in connexion with rat destruction. I do not, therefore, think it necessary to make any special recommendations in this matter at the present time.

Advertisements in Stamp Books

Sir ARNOLD WILSON asked the Postmaster General whether, in view of the increased revenue now derived from the sale of postage stamps, he would arrange to discontinue the advertisements in postage stamp booklets of appeals to the public to spend money upon alleged remedies and appliances of which the British Medical Association disapprove, and the publicity given to which all responsible medical authorities deplored.—Mr. W. S. MORRISON replied: The alteration in longstanding policy suggested means forgoing the revenue derived from these advertisements; and I am not prepared to give this up, in view of the present heavy expenditure on national services.

Clacton Casualties

Mr. HOLMES asked the Minister of Pensions what action he had been able to take to deal with claims by sufferers eligible for compensation in respect of injuries received from the recent tragic incident at Clacton-on-Sea.—Sir W. WOMERSLEY replied: An officer of the ministry was dispatched to Clacton early on the morning after this incident, when he took immediate steps to visit hospitals and otherwise to get in touch with the injured persons. Necessary treatment was found to have been provided with great promptness. My representative made immediate arrangements for the opening of a local sub-office, and with the help of the assistance board's local officer took steps to make known, by means of posters at post offices and other places, the arrangements for the grant of injury allowances and pensions. It is too early yet to give particulars of the claims that may arise, but an officer of the ministry will be available to ensure that any necessary advice is provided.

Protection against Eye-wounds

Sir IAN FRASER asked the Secretary of State for War if the Cruise visor for protection against preventable eye wounds had now been approved; and what steps he was taking to bring it into use in the Army.—Mr. OLIVER STANLEY replied: A small number of these visors were sent to France for trial, but the reports received were inconclusive. It has been decided to make further trials with a larger number, and these are now in course of production.

Women Doctors for the A.T.S.

Miss WARD asked the Minister whether in order to advise the responsible authorities on health and hospital services in the Auxiliary Territorial Service he will consider appointing a woman doctor in a senior rank to each command.—Mr. OLIVER STANLEY replied: This matter is under consideration.

OBITUARY

HENRY DEVINE

O.B.E., M.D. LOND. AND BRIST., F.R.C.P.

Dr. Devine, who died on May 1 at Portsmouth, was one of the outstanding figures in British psychiatry. Son of A. C. Devine, formerly postmaster of Colchester, Henry Devine was born on May 2, 1879, educated at the Merchant Venturers School, and entered the medical school of Bristol University where he qualified in 1902. Later he took a London medical degree and was awarded the gold medal in psychiatry at the M.D. examination; he was elected F.R.C.P. in 1919. After qualification he turned to psychological medicine, which became the dominating interest of his professional life. He entered the L.C.C. mental hospital service at Cane Hill and was transferred to Long Grove at Epsom when it was opened in 1907 by Sir Hubert Bond. Among the keen young men who staffed this hospital Devine at once took a prominent position. He had by this time been awarded the Gaskell prize of the Medico-Psychological Association and he seized the opportunity afforded him by a grant of special leave to study at Kraepelin's clinic in Munich, then the Mecca of psychiatry in Europe. From Long Grove he went as senior medical officer to Wakefield mental hospital, the home of able men like James Crichton-Browne, Bevan Lewis, and Shaw Bolton; and then as medical superintendent to the Portsmouth mental hospital. During the late war, when this hospital was partly converted to military purposes, Devine was officer commanding there, being awarded the O.B.E. and appointed consulting psychiatrist to the Royal Victoria Hospital at Netley. Finally he became medical superintendent of the Holloway Sanatorium at Virginia Water, remaining there until his retirement, from ill health, in 1938. He was a good administrator and was responsible for many improvements and new ventures both at Portsmouth and Virginia Water. He was also busily engaged outside: as examiner in psychology R.C.P., lecturer in psychology at the Maudsley Hospital, and president of the psychiatric section of the Royal Society of Medicine. When the British Medical Association met at Portsmouth in 1923 he was naturally selected to preside over the section of neurology and psychiatry. He was deeply concerned in the psychological problems of childhood, and played a prominent part in the work of the Child Guidance Council.

Elliott & Fry

Devine's writings were distinguished not so much by the initiation of original lines of thought as by a comprehensive grasp of the value and import of the contributions offered to psychiatry by the various schools of his time. In this field of divergent views he maintained a balanced and impartial attitude, ready to examine and appraise every alleged advance and to coördinate it, if it could be established, in the structure of psychiatry. His interest ranged over every line of approach which promised to aid in the solution of psychiatric problems, from neurology and chemistry to psychology and sociology. For long he contributed every year to the psychiatric section of the *Medical Annual*, a duty which he embraced with enthusiasm because it meant keeping up to date with the growing flood of psychiatric literature at home and abroad. Extensive reading enabled him to produce in 1929 the book which must be regarded as his chief contribution to medical literature "Recent Advances in Psychiatry." This work attempted the sorely needed task of coördinating and placing in perspective the divergent and largely independent schools of scientific thought in modern psychiatry. The task was accomplished with success and the book, for which a second edition was soon demanded, remains one of the most helpful and illuminating available to the student. His other works included many papers to psychological and psychiatric journals, and the articles on "Psychoses" in the Encyclopædia Britannica and in various systems of medicine.

Devine's personality was extraordinarily attractive. He was, writes B. H., universally popular, and it is not too much to say that he was one of those rare beings who are universally loved by all who come in contact with them, both subordinates and friends. He was always "Henry" to his friends, and personal characteristics which might have been defects in another man, notably a charming absent-mindedness in everyday life, seemed in him to fit with absolute congruity into a character which endeared him to all.

Dr. Devine married Phyllis, daughter of George Hanson, who with two sons survives him.

CONRAD THEODORE GREEN

T.D., M.R.C.S., D.P.H., COLONEL A.M.S.

Colonel Green, who died on April 24 at Oxton in his 77th year, had played a large part in the life of Birkenhead. Born at Kirkburton, Yorks, the eldest son of the Rev. Conrad S. Green of Buxton, he qualified from St. George's Hospital in 1887 and settled in the Wirral peninsula where he soon became dispensary doctor and medical officer to the 1st V.B. Cheshire regiment. As a territorial medical officer and as admiralty surgeon and medical examiner of recruits for the yeomanry he was in a good position at the outbreak of the late war to take over command of the Cardiff casualty clearing station with charge of a Welsh division. He was made an assistant director of medical services, after four years being promoted colonel. Later in the war he was acting deputy director at Bury St. Edmunds and on demobilisation went to the Ministry of Pensions as deputy commissioner of medical service. On his return to Birkenhead he kept in touch with the local Red Cross centres while remaining chairman of medical boards at the Ministry. In 1889 he married Frances, eldest daughter of Edward William Cropper, J.P., of Liverpool. Their daughter is now attached to a first-aid post; of his three sons the second met his death at Gallipoli and the youngest, Dr. Norman Green, is attached to the C.M.S. hospital at Maseno, Kenya.

A colleague writes: In Colonel Theodore Green Merseyside has lost a well-known practitioner who, in addition to his routine work, found an outlet for other interests in his extensive surveys of local flora and fauna. Over fifty years he produced thousands of coloured slides for his many lectures, and finally distributed them between various museums. From his early days a keen volunteer, and later territorial

officer, he took his D.P.H. in 1913 to improve his efficiency in camping matters, and served throughout the late war. His great regret was that he was unable to serve again in the present emergency.

GEORGE YOUNGER RICHARDSON

M.D. EDIN., D.P.H.

ON May 1 Dr. George Richardson, medical officer of health for the counties of Midlothian, West Lothian and Peebles, died suddenly in Edinburgh. He was educated at the Royal High School and the University of Edinburgh, graduating M.B. in 1906. After some years spent studying children's diseases in London and midwifery and French hospital methods at the Clinique Tarnier in Paris, he returned to Scotland and took the diploma of public health in 1910. In 1913 his thesis for the M.D. degree on tuberculin as a dispensary agent in the diagnosis and treatment of tuberculosis received commendation. In the course of the last war he served with the R.A.M.C. in France and Belgium until he was invalided home. He held public-health posts in Leith, in the county of Ayr and in Cumberland before he was appointed county medical officer of health for East Lothian in 1919. Nine years later, on the death of Dr. Robb, he took up his work for the three counties. During his period of service the health services and hospital administration under his direction reached a high standard of efficiency. For the past four years he had been active in planning the extension of the Tippethill fever hospital in West Lothian and in completing the maternity-services scheme. Since the outbreak of war his work had been greatly increased by A.R.P. duties and the provision of military hospitals

Dr. Richardson, who was 59 years of age, is survived by his wife and a son.

ALMA SUNDQUIST

Dr. Alma Sundquist, who died in Stockholm early this year, was born in 1872 at Torp, Medelpa, in Sweden. She studied medicine at Upsala and Stockholm and after graduation in 1900 she visited Paris and Vienna. She chose as her specialty gynæcology, dermatology and venereal diseases, and in 1903 she was appointed head physician of the first free clinic in Stockholm for the treatment of women suffering from venereal disease. In recognition of her work there she was appointed to a royal commission which considered measures for the prevention of venereal disease. The report of this commission which was published in 1921 embodied her recommendation that sex education should be included in the ordinary school curriculum, and by this she meant more than the mere teaching of biological and social facts. It was also to be an education towards a higher conception of sexual life, and much of the rest of her life was devoted to this work. When the reform was later introduced in the Swedish schools she was asked to give the preliminary lectures to the teachers. In 1930 she was chosen one of the three members of the League of Nations committee of inquiry into the traffic in women and children in the east, and in connexion with this investigation she travelled widely in Asia. In 1934 she became a member of the Swedish royal commission which revised the abortion laws and later she was appointed to the pregnancy commission and the population commission. In 1933 she was elected president of the Swedish Dermatologists' Association. Her personality and her work were both recognised by medical women when in 1934 they appointed her president of the Medical Women's International Association.

Medical News

University of Oxford

The summer dinner of the Oxford Graduates' Medical Club will be held in Magdalen College on Friday, June 28, at 8 P.M. Dr. W. D. Sturrock will be in the chair.

University of London

Prof. F. R. Fraser has been reappointed to the Senate as representative of the faculty of medicine, and Sir Charles Wilson as representative of the general medical schools. Lord Dawson has been coöpted by the Senate.

The diploma of D.P.H. has now been awarded to T. K. Abbott who passed the examination in June, 1939.

Royal College of Surgeons of England

On April 30 the Earl of Athlone visited the college to receive the diploma of honorary fellow. In presenting the diploma, Mr. Hugh Lett, the president, paid tribute to Lord Athlone's interest in education, particularly postgraduate medical education, nursing, and the hospitals. In the college he had been a trustee of the Hunterian collection for 17 years, he had formally opened the Bernhard Baron laboratories in December, 1937, and he had been present at Hunterian festivals.

Scottish Conjoint Board

The following having passed the final examination of the board were on May 1 admitted licentiates of the Royal Colleges of Physicians and Surgeons of Edinburgh, and of the Royal Faculty of Physicians and Surgeons of Glasgow :—

M. M. Aly, Mary C. Clay, Murray Cogen, J. H. C. Corr, W. P. Forrest, R. H. Georges, A. N. Godholm, J. C. Greenfield, D. B. Handelman, G. I. Heron, Ellan B. Ho-A-Yun, Harry Holzer, Edward Iskander, Gattas Iskander, Muttutamby Kanagaratnam, P. J. McGinley, A. E. McKay, A. J. MacQuillan D. I. C. Milton, S. H. Myers, J. G. Palin, Lionel Phillips, C. M. Ramakrishna, Wolf Rapoport, E. Z. T. Salama, J. H. P. Stewart, W. F. J. M. Thom, and B. C. Weerappah.

The following graduates of recognised universities, having passed the final examination, were also admitted licentiates of the colleges and faculty :—

H. G. J. Herxheimer, Erich Hohenberg, and E. C. Kalmar.

Lebanon Hospital for Mental Diseases

The 41st annual meeting of this hospital will be held on May 21 at 4.45 P.M. at the Cora Hotel, Upper Woburn Place, London, W.C.1. Sir Harold Satow, former consul-general at Beirut will be in the chair, and other speakers will include Dr. Isabel Wilson, Pastor Pradervand, and Mr. H. Lyn Harris. Subscriptions from Europe have already fallen since the outbreak of the war and a special appeal is being made to neutral nations at a distance to maintain this international hospital through difficult times. Further information may be had from the secretary, Miss Hilda Fox, Drayton House, Gordon Street, London, W.C.1.

London Medical Exhibition

The exhibition will take place this year at the Royal Horticultural Hall, from June 24 to 28.

Advertising of Aphrodisiacs

Condemnation of the advertising of aphrodisiacs has been expressed by the statutory committee of the Pharmaceutical Society in the strongest possible terms. The occasion was the hearing on May 1 of the first case of alleged infringement of the code of ethics which the council of the society has laid down as a guide for members (see *Lancet*, 1938, **2**, 840). A pharmacist was alleged to have distributed to the public by post and without invitation a pamphlet of indecent nature contrary to the rule of the code which says that " advertisements of medicines should not be issued to the public referring to sexual weakness." His six-page pamphlet is entitled " new life for weak men and women by means of the newly discovered hormonal treatment," and contains matter which the chairman said no decent man would discuss " with anybody except a most intimate friend or with his doctor." The registrar was directed to remove the pharmacist's name from the register.

Pharmaceutical Society

At the council meeting on May 1 three honorary members were elected: Sir Ernley Blackwell in recognition of his services as chairman of the society's statutory committee 1934–39: Sir William Willcox, the Privy Council visitor to the society's examinations; and Colonel R. N. Chopra, professor of pharmacology in the school of tropical medicine, Calcutta.

National Union of Students

A conference of medical students will be held at Manchester University on May 18 and 19 to discuss medical education and its war-time problems. Further information may be had from the secretary of the London medical committee of the union, 3, Endsleigh Street, W.C.1.

British Postgraduate Medical School

From June 3 to 7 Mr. R. Watson Jones will give a course of lectures and practical demonstrations on the treatment of fractures with special reference to war conditions. A limited number of officers of the armed forces will be admitted free. Further information will be found in our advertisement columns.

Medical Diary

Week beginning May 13

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.1.
THURSDAY.—2.30 P.M., Dr. George Graham: A Survey of Recent Work on Diabetes Mellitus—Ætiology and Treatment. (Croonian lecture.)

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2.
THURSDAY.—4 P.M., Prof. A. D. Macdonald: Experimental Spinal Anæsthesia.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1.
TUESDAY
Therapeutics and Pharmacology—2.30 P.M., annual general meeting. Dr. H. S. Banks, Dr. G. E. Harries: Modern Methods in the Treatment of Cerebrospinal Fever.
Psychiatry—4.30 P.M., annual general meeting. Dr. Lindesay Neustatter: Social and Economic Factors in Psychiatry.
THURSDAY
Dermatology—4 P.M., cases. 5 P.M., annual general meeting.
Neurology—5 P.M., annual general meeting at the National Hospital, Queen Square, W.C.1.
FRIDAY
Obstetrics and Gynæcology—5 P.M., annual general meeting. Mr. Leslie Dodds: Forty Consecutive Cases of Ectopic Pregnancy. Mr. Aleck Bourne and Dr. L. T. Bond: Pathology of Cervicitis.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 26, Portland Place, W.1.
THURSDAY.—4.30 P.M., Dr. Frederick Murgatroyd: Immunisation against Human Rickettsial Diseases. Dr. G. M. Findlay will also speak.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W.12.
WEDNESDAY.—11.30 A.M., clinico-pathological conference (medical). 2 P.M., Prof. J. H. Dible: Pathology of meningitis. 3 P.M., clinico-pathological conference (surgical).
THURSDAY.—2 P.M., Dr. Duncan White: radiological conference.
FRIDAY.—2 P.M., clinico-pathological conference (gynæcological). 2.30 P.M., Mr. V. B. Green-Armytage: sterility clinic. 2.30 P.M., Dr. Hinds Howell: ward clinic.
DAILY.—10 A.M.–4 P.M., medical clinics; surgical clinics and operations; obstetrical and gynæcological clinics and operations. 1.30–2 P.M., post-mortem demonstration.

FELLOWSHIP OF MEDICINE AND POSTGRADUATE MEDICAL ASSOCIATION, 1, Wimpole Street, W.1.
MONDAY and THURSDAY.—5 P.M. (Brompton Hospital, S.W.3), M.R.C.P. course in chest diseases.

Vacancies

Aberdeen Royal Infirmary.—Gynæcological registrar, £300.
Altrincham, St. Anne's Hosp.—Res. surg. O., at rate of £200.
Ashford, Kent, Grosvenor Sanatorium.—H.P., at rate of £100.
Belfast, Queen's University.—Five Musgrave studentships, each £200.
Birmingham City.—Asst. res. M.O. for Erdington House, £300.
Bradford, Royal Eye and Ear Hosp.—H.S. to ear, nose, and throat dept., £180.
Bristol Eye Hosp.—Res. H.S., 6 guineas per week.
British Postgraduate Medical School, Ducane Road, W.12.—Obstet. H.S. and five H.P.'s, each at rate of £105.
Buxton, Devonshire Royal Hosp.—H.P., at rate of £150.
Bury St. Edmunds, West Suffolk General Hosp.—H.S., £150.
Cambridgeshire County Council.—H.S. and H.P. at County Infirmary, £200.
Chester, Upton Emergency Hosp.—Jun. res. H.P., £200.
Chesterfield and North Derbyshire Royal Hosp.—Res. surg. O., £300. Also H.S. and asst. cas. O., and H.P., at rate of £150.
Chichester, Royal West Sussex Hosp.—Jun. H.S., £125.
Chorley, Chorley and District Hosp.—H.S., at rate of £150.
Coventry and Warwickshire Hosp.—Two H.S.'s to spec. depts., each at rate of £150.
Derbyshire Education Committee.—Temp. asst. school M.O., at rate of £500.
Dudley Guest Hosp.—Cas. H.S., £150.
Durham University.—Demonstrator in pathology in medical school and asst. pathologist to Royal Victoria Infirmary, £300.
Enfield, Edmonton and Potters Bar Hosp., Winchmore Hill, N.21.—H.S., at rate of £200.
Halifax County Borough.—Asst. M.O.H. maternity and child welfare, £500.
Hertford County Hosp.—H.P., at rate of £150.
Heston and Isleworth, Borough.—Temp. asst. M.O., £550.
Hosp. for Sick Children, Great Ormond Street, W.C.1.—H.P.'s and H.S.'s, each at rate of £100.
Huddersfield County Borough.—St. Luke's Hospital, R.M.O., £230.
Hull Royal Infirmary.—Cas. O., at rate of £150.
Lancashire County Council.—Sen. and jun. H.S.'s for Biddulph Grange Orthopædic Hosp., at rate of £300 and £250 respectively.
Leeds City.—Res. M.O. for St. Mary's Infirmary, £250.
Leicester City.—Res. M.O. for City General Hosp., at rate of £300.
Manchester, Ancoats Hospital.—Asst. pathologist, £350–£400.
Manchester City.—Jun. res. asst. M.O. (Grade 2) for Monsall Hosp., at rate of £250.
Manchester Royal Infirmary.—Second res. clin. path., £150. Res. jun. M.O., at rate of £150. Also three H.S.'s to spec. depts., each at rate of £50.
Manchester, Saint Mary's Hosps.—Two obstet. H.S.'s, each at rate of £50.
Manchester, Duchess of York Hosp. for Babies.—Jun. res. M.O., £100.
Middlesbrough, County Borough.—Res. surg. O. for emergency hosp., £550.
Ministry of Supply, The Adelphi, W.C.2.—M.O.'s for Royal Ordnance Factories, each £650.
Newcastle upon Tyne, City and County.—Res. med. asst., at rate of £250. Also H.P.'s and H.S.'s, at rate of £200 and £150, for spec. hosps.
Nottingham General Hosp.—H.S. and res. cas. O., each at rate of £150.
Oldham County Borough.—Res. asst. M.O., at rate of £200.
Paisley, Dykebar Mental Hosp.—Locum tenens asst. M.O., 7 guineas per week.
Plymouth, Prince of Wales's Hosp., Greenbank Road.—Res. surg. O., at rate of £225. Also sen. H.S. and H.S., at rate of £130 and £120 respectively.
Preston County Borough.—Jun. asst. R.M.O. for Sharoe Green Hospital, at rate of £100 or £150.
Preston, County Mental Hospital, Whittingham. L.T. asst. M.O., £8 8s. per week.
Preston and County of Lancaster Queen Victoria Royal Infirmary. Two H.S.'s to spec. depts., each at rate of £150.
Queen's Hosp. for Children, Hackney Road, E.2.—H.P., cas. O., and H.S., each at rate of £100.
Reading, Royal Berkshire Hosp.—Cas. O., at rate of £150.
Rochdale County Borough.—Temp. res. M.O., £350.
Rochdale Infirmary and Dispensary.—Second H.S., £150.
Rotherham County Borough.—Asst. res. M.O., £350.
Royal Cancer Hospital, Fulham Road, S.W.3.—Asst. radium therapist, £400. Also H.S.'s, at rate of £100.
Royal Chest Hosp., City Road, E.C.1.—H.P., at rate of £200.
Royal Eye Hospital, St. George's Circus, S.E.1.—Asst. H.S., at rate of £100.
Sheffield Children's Hospital.—H.S., at rate of £100.
Sheffield, Royal Hosp.—Asst. pathologist, £300.
Sheffield Royal Infirmary and Hosp.—First asst. to spec. depts., each £300.
Smethwick, County Borough.—H.P. and anæsthetist for St. Chad's Hosp., at rate of £150.
Staffordshire County Council.—H.S. for Standon Hall Orthopædic Hospital, £250.
Stoke-on-Trent, North Staffordshire Royal Infirmary.—Orthopædic H.S., at rate of £150–£200. Also res. cas. O. and H.P., each £150.
Surrey County Council.—Asst. M.O. for Redhill County Hospital, £350.
Swindon Borough.—M.O.H., £900.
Taunton and Somerset Hosp.—H.P., £150.
Wakefield, Clayton Hosp.—H.P., at rate of £150.
York County Hosp.—Res. H.S. and res. H.P., each £150.

Appointments

BORG, J. R., M.D. Malta, M.R.C.O.G., L.M., D.G.O., temporary assistant medical officer at Townley's Hospital, Bolton.
BURTON, Harold, B.M. Oxfd, D.R.C.O.G., resident obstetrical officer at Oldham Municipal Hospital.
BUTTERWORTH, BEATRICE A., M.B. Lond., M.R.C.P., temporary physician to outpatients at Hampstead General Hospital.
CABLE, J. V., M.B. N.Z., M.R.C.P., temporary senior assistant pathologist at Dudley Road and Selly Oak Hospitals, Birmingham.
GLENNIE, H. H. I., M.B. Aberd., resident casualty medical officer at the Central Middlesex County Hospital, N.W.10.
JONES, F. A., M.D. Lond., M.R.C.P., physician (grade I) at the Central Middlesex County Hospital, N.W.10.
THOMPSON, J. W., M.R.C.S., resident assistant medical officer at Wordsley Public Assistance Institution.
TAYLOR, SHIRLEY, M.D. Manitoba, D.C.H., registrar at the Duchess of York Hospital for Babies, Manchester.
WESTELL, UNA M., M.R.C.S., D.A., assistant medical officer at Redhill County Hospital, Edgware.

Examining Surgeon under the Factories Act, 1937: Dr. P. M. BENNETT, Thornhill, Dumfries.

NOTES, COMMENTS AND ABSTRACTS

PEDICULOSIS CAPITIS TREATED WITH SPIRITS OF QUASSIA

BY GUSTAV JØRGENSEN, M.D.
CHIEF MEDICAL OFFICER OF SCHOOL HYGIENE IN COPENHAGEN

FOR many years spirits of sabadilla or spirits of camphor have been used in the municipal schools of Copenhagen for the treatment of head-lice. Neither of these preparations is satisfactory in treatment on a large scale: their effects are not absolutely sure, because time after time children come for further treatment; and their action is not rapid, each child having to sit with her hair wrapped up for 20 mins. A further drawback is the disagreeable and penetrating smell, which draws attention to the fact that the child has undergone treatment for lice.

Learning that spirits of quassia were used in Malmö for the treatment of lice, I got in touch with Dr. J. Axel Höjer, the chief medical officer of health in Malmö, who assured me of its efficacy; so I introduced it experimentally into two municipal schools in Copenhagen. Dr. Höjer's directions for preparing the quassia are are follows:

Add 150 g. of finely cut cortex quassiæ to 1 litre of concentrated spirits and 3 g. of chloroform. This is to be kept for fourteen days at room temperature and then filtered through a layer of gauze before being used.

It is a clear light-yellow liquid without smell. Treatment consists in rubbing the spirits of quassia into the whole of the hair and the scalp with cotton-wool or a brush until they are dripping wet. The hair is then wrapped in a towel for 5 min., after which it is combed with a fine steel comb. The first ten days after the treatment the hair should not be washed with soap. One such treatment is sufficient.

The results have been so good that treatment with spirits of quassia has now been introduced into all municipal schools in Copenhagen. The preparation is also supplied, free where necessary, for home use, because there was always a proportion of infected children representing 2·2 per cent. of the total number in the municipal schools of Copenhagen, many of them being reinfected by other children, in the same home, who have lice and are not yet of school age. Since this has been done, the proportion has dropped to 0·4 per cent.

SUBSTITUTE FOR COD-LIVER OIL

THE prospects of replacing stocks of cod-liver oil, when existing supplies are exhausted, are uncertain for two reasons. British production on a large scale has been impracticable since most of the trawlers engaged in the industry were requisitioned for the Royal Navy, and imports from Norway, the other main source of supply, ceased to arrive after the first week in April. The stocks held by the British producers at the beginning of the war have been steadily drawn upon by consuming interests, and it became necessary last week for the producers to withdraw market quotations and to confine their sales to regular customers on a rationing basis. Substantial quantities of the oil had been received from Norway up to the beginning of April, for Norwegian production, in which some 7,000 fishing vessels were engaged, had been unusually abundant until then. Thus while there is no immediate shortage of Norwegian cod-liver oil in this country, nobody has the remotest idea when shipments from Norwegian ports will be resumed. Consequently it is necessary to husband existing supplies. In the circumstance it seems desirable that the promised standard (see THE LANCET, April 20, 1940, p. 752) for an emergency substitute for this important commodity should be published as an addendum to the British Pharmacopœia with the least delay possible. The secretary of the Pharmacopœia Commission stated recently that it was proposed to include in the draft Pharmacopœia, to be submitted for the approval of the General Medical Council, a monograph on a vitaminised oil standardised to contain vitamins A and D in the proportion contained in a good average specimen of cod-liver oil. We are informed that the oil which it is proposed to specify as the vehicle for these vitamins is arachis oil, which is variously known in commerce as nut oil, ground-nut oil and pea-nut oil, and whose properties are similar to those of olive oil. It is significant that the parliamentary secretary to the Ministry of Food recently said in the House of Commons that ground-nut oil was being "allocated" for various uses, and it may be assumed that supplies will be earmarked for the manufacture of the official cod-liver oil substitute. Those who hold the view that the virtues of cod-liver oil lie in the whole oil and not merely in certain of its components will for the time being be able to go on prescribing the oil expressed from the liver of the cod, but those who are satisfied that the vitamins presented in the prepared form serve the purpose equally well should rely on the substitute.

DEATH FROM BLOOD-TRANSFUSION

IN discussing the pathology of death from blood-transfusion at a meeting of the Pathological Society of Manchester on April 10 Prof. S. L. Baker said that a patient may die as the result of a transfusion within a few minutes or hours or after some days.

The causes of rapid deaths are usually difficult to separate from the primary condition for which the transfusion is given. The intravascular hæmolysis of incompatible or damaged blood-cells produces immediate ill effects, the patient becoming distressed, with a rise of temperature and lumbar pain. Exactly how these effects are produced is uncertain. A patient who is in a precarious state may, however, die as a result of them. Or he may survive this stage but die later from renal failure. In this case there is suppression of urine with progressive nitrogen retention. Urine passed during the 24 hours after the transfusion contains dark brown blood-pigment. These delayed deaths are from renal-tubule blockage by blood-pigment precipitated during the excretion of hæmoglobin. This lesion of the kidney (hæmoglobin infarction) has been known for a long time, particularly in blackwater fever, where a uræmic death may be produced by it. The mechanism by which this precipitate is produced was first elucidated by Dodds and Professor Baker in 1925. Hæmoglobin, being of lower molecular weight than the serum proteins, is excreted by the glomeruli when its concentration in the plasma reaches about 0·3 g. per 100 c.cm. Rapid hæmolysis of about 1/40th of the total corpuscles, or the hæmoglobin derived from 50–100 c.cm. of blood would give this threshold value. The hæmoglobin is excreted in solution in the glomerular filtrate, but this becomes concentrated in its passage through the renal tubules. If the salt concentration exceeds about 1 per cent. of NaCl with a pH of 6 or less, hæmoglobin is precipitated as a granular deposit of hæmatin. These conditions occur in the renal tubules during the excretion of an acid concentrated urine and the precipitate may block the tubules. If the urine is not acid no precipitate forms and no renal damage is produced. The reaction is quantitative, and if the precipitate is not too massive the kidney can expel it, as can be proved by the appearance of brown granular casts in the urine. If hæmoglobinuria is present a markedly acid urine is "blackwater," while a neutral or alkaline one is red. Intravascular hæmolysis may result from incompatible or damaged red cells. Red cells become more fragile the longer they are stored. Fragile red cells are liable to rapid

hæmolysis in the circulation and blood stored too long contains both free hæmoglobin and fragile red cells.

Professor Baker ended by making some practical suggestions for prevention. He advised that the urine should be kept alkaline during and for 24 hours after transfusion; it should be examined several times for hæmoglobin after transfusion and the urinary excretion should be closely watched. Professor Baker also urged that the use of stored plasma should be further extended. It would be as good as blood in probably 75 per cent. of cases where shock is the main feature, and appears to be free from many of the risks of whole blood.

DOCTORS CALLED IN BY MIDWIVES

THE Minister of Health has issued regulations that will come into force on June 1, fixing a new scale of fees to be paid by local supervising authorities to doctors called in by midwives. If he is to be entitled to such fees the doctor must not have agreed to attend the patient either privately or through a club, or be under any obligation to attend her under the N.H.I. acts or any agreement with the local authority, and he must not make any charge to the patient herself. No fee will be payable for services rendered more than 4 weeks after the baby's birth, or, except by special arrangement, more than a fortnight after the doctor's first visit, and in each case the doctor must send a report on the prescribed form to the M.O.H. For attendance during labour and visits during the next fortnight the fee is 3 guineas, or 2 guineas where only one visit is made during labour and the doctor is not present at the birth or subsequently. A second doctor called in to give an anæsthetic, whether for a miscarriage or during labour, is entitled to a guinea. For suturing the perineum, removing an adherent placenta and the like, including necessary visits, the fee is 1½ guineas and the same fee is payable for attendance at a miscarriage or a threatened one. The fee for any visit not included under these headings is 5*s.* by day or 10*s.* by night, or 7*s.* 6*d.* and 15*s.* where both mother and child need attention, mileage being extra. Half a crown is paid for attendance at the doctor's surgery.

COLLOIDS IN MEDICINE

THE opening scene of the Crookes Laboratories' film on the discovery of colloids and their introduction into modern medicine is laid in Thomas Graham's laboratory in London in 1861. We are then shown the ultramicroscope, diagrams, chemical reactions, and the brownian movement of the colloidal particles, while a running commentary explains how colloids differ from other chemical states and how advantage can be taken of these differences in the preparation of drugs for use in the human body.

CONTRAST RADIOGRAPHY OF THE BREAST

AMPLE claims have been made for simple radiography of the breast, but it cannot always furnish those finer details which are necessary to diagnose the benign or the malignant character of a tumour in that situation. Therefore contrast radiography of the breast was developed by Oselladore in Italy and Hicken in America. Thorotrast was used at first, but several unfortunate results of its use led to the adoption of Uroselectan-B. Using Oselladore's technique of injecting the ducts through the nipple, Alexandre and Girardi[1] of Padua used uroselectan-B in breasts not diagnosed as malignant, but used thorotrast in breasts condemned to amputation, so as to compare the effects of the two contrasting media. Uroselectan-B was absorbed so quickly (no trace after half an hour) that the radiograms had to be made immediately after injection. From the results obtained in 17 cases the conclusion is drawn that this method is useful in differentiating between benign conditions, such as tumours, cysts, and abscesses, which push aside the ducts, and malignant growths, which interrupt the ducts by blocking them.

These observations refer only to the female breast; in the rudimentary male breast injection into the ducts is impracticable. To overcome this difficulty Alexandre[2] injected oxygen into the subcutaneous and the retromammary tissues, a method first tried with air by Grasso in 1934 and later successfully used by Hicken and others.[3] Alexandre's case was in a man who ten years after ablation of a tuberculous kidney had a hard lump in his left breast, the diagnosis lying between tuberculous adenitis, fibrolipoma, and epithelioma. Oxygen 350 c.cm. was injected instead of air because in Hicken's case the air was not entirely absorbed for six days. No trace of oxygen was found four hours after injection. From the radiogram the lump was labelled a fibrolipoma, and the diagnosis was confirmed at operation.

1. Alexandre, A. and Girardi, A. *Quad. Radiologia*, 1939, **4**, 250.
2. Alexandre, *Ibid*, p. 402.
3. Hicken, N. F., Best, R. R., Moon, C. F. and Harris, T. T. *J. Amer. med. Ass.* 1937, **108**, 864.

RURAL STORY

"Drive the Dead Leaves," by R. G. Nettell (Sampson Low, Marston and Co. Pp. 314. 7*s.* 6*d.*) is the story of Adam Clay, a farmer, his step-sister, Clare Golden, and Judith Lane, who has recently been discharged from a tuberculosis hospital. Adam meets Judith by chance in a train and takes her home with him to "Rookleas," his farm. They marry but decide to have no children. Though Clare is in love with Adam she soon learns to love Judith also and the ménage à trois runs smoothly enough, despite the ever-deepening depression of pre-war agriculture, until Judith's health breaks down again. She recovers only to be killed in an accident, leaving Adam free to marry Clare. This is a sad, quiet tale of the English countryside written with intense sympathy for the farming community. Mr. Nettell writes about the Cinderella of British industries with knowledge and justifiable bitterness. Especially moving is his account of an outbreak of foot-and-mouth disease necessitating the destruction of a herd of pedigree cattle. All whose tastes are essentially rural rather than urban will enjoy this novel written in the genuine Mary Webb tradition.

Births, Marriages and Deaths

BIRTHS

BEAUCHAMP.—In February, in China, the wife of Sir Ivor Beauchamp, M.R.C.S.—a son.

CORCORAN.—On May 3, at Lerwick, Shetland, the wife of Major T. M. Corcoran, R.A.M.C.—a son.

COYLE.—On April 27, at Blackheath, the wife of Dr. C. D. Coyle—a daughter.

ECKHOFF.—On May 1, at Tunbridge Wells, the wife of Mr. Nils Eckhoff, M.S.—a daughter.

ENRIGHT.—On April 28, at Hove, the wife of Dr. J. F. Enright—a daughter.

MCELWEE.—On May 1, at Calne, Wilts, the wife of Dr. F. C. McElwee—a son.

PAYNE.—On May 5, at Windsor, the wife of Mr. R. Vaughan Payne, F.R.C.S.—a daughter.

PURSER.—On May 6, in Westminster Hospital, the wife of Dr. J. A. Purser—a daughter.

WHITE.—On May 6, at Middle Furlong, Seaford, the wife of Mr. Norman White, F.R.C.S.—a son.

MARRIAGES

ENGLAND—SINGER.—On April 27, at Hastings, Stephen Thirlwall England to Olive May Singer, M.B., of Dulwich.

DEATHS

BULMER.—On April 25, at Providence, Rhode Island, George Alder Blumer, L.R.C.P.E., superintendent emeritus of Butler Hospital, Providence, aged 82.

DEVINE.—On May 1, in Portsmouth, Henry Devine, O.B.E., M.D. Lond. and Brist., F.R.C.P., aged 60.

LLOYD.—On April 30, at Llandilo, Carmarthenshire, Joseph Howell Lloyd, M.D. Lond.

RICHARDSON.—On May 1, in Edinburgh, George Younger Richardson, M.D. Edin., D.P.H.

STUART.—On May 3, in London, Frederick Stuart, M.B. Durh.

ADDRESSES AND ORIGINAL ARTICLES

BLOOD-GROUP TESTS IN DISPUTED PATERNITY

A REPORT OF 50 CASES

By David Harley, B.Sc., M.B. Edin., F.I.C.
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G. Roche Lynch, O.B.E., M.B.Lond., D.P.H., F.I.C.
SENIOR OFFICIAL ANALYST TO THE HOME OFFICE; DIRECTOR OF THE DEPARTMENT OF CHEMICAL PATHOLOGY AT THE HOSPITAL

The application of blood-group tests in medico-legal problems involving disputed blood relationship is based on the fact that the blood-group of every person is determined solely by the blood-groups of the parents, in accordance with certain well-defined laws of heredity; hence, if the blood-groups of a certain man and his alleged child are at variance with these laws, that man is not the father of the child. Such questions of paternity may arise in simple affiliation cases or in divorce proceedings. Alleged cases of substitution of one child for another, of false maternity —i.e., a woman exhibiting another woman's child as her own—and of the accidental interchange of infants are further examples of cases in which blood-group tests may be applied.

The blood-groups are characterised by the well-known A-B-O and M-N systems of agglutinogens, which together define twelve blood types.

The value of the A and N subgroups and other rarer agglutinogens in further differentiating the group systems has been demonstrated by numerous investigators, but in medicolegal work their use is as yet hardly justified until laboratory methods for their identification can be placed beyond criticism. The secretor factor too will undoubtedly be used for this purpose, but further confirmation of its significance, though in our opinion established, may still be desired by the ultra-cautious. The utilisation of these factors would increase the subdivisions of blood-groups and consequently the percentage of exclusions possible in cases of disputed paternity.

The theory of the inheritance of blood-groups is fully covered in the standard textbooks, such as Wiener 1935, and has been discussed in our earlier papers (Harley 1938, Harley and Roche Lynch 1937), but it may be summarised as follows:—

(1) The agglutinogens A, B, M, and N cannot appear in the blood of a child unless present in the blood of one or both parents.

(2) A group-O parent cannot have a group-AB child, and vice versa; a group-N parent cannot have a group-M child, and vice versa.

LEGAL EVIDENCE OF BLOOD-GROUPS

The result of the test in a case of disputed paternity is either "non-paternity established" or "non-paternity not established." Non-paternity is established when the blood-groups of the man, woman, and child are at variance with the laws of inheritance of blood-groups, thus disproving the alleged paternity. If, on the other hand, the blood-groups of the three persons are compatible with the laws of inheritance, it means merely that the man is a *possible* father, but not that he *is* the father, because any other man of the same blood-group might equally well be the father, so far as the test is concerned; hence this result of the test does not assist in solving the question of paternity. In other words, the test may establish the innocence of a man accused of paternity but can never prove that he is the father. It follows, therefore, that the test can never assist the mother in an affiliation case; on the other hand, it can never harm a genuine claimant. Statistically, the test is capable of establishing the non-paternity of men falsely accused in about a third of the cases. The chance of proving non-paternity varies with the blood-group of the accused, being highest (2 in 3) in men of group ABN and lowest (1 in 13) in group AMN. In practice it may be desirable to test the man first, to ascertain his chances, before pressing for an examination of the mother and child.

RESULTS OF 50 TESTS

The results of blood-group tests in a series of 50 cases of disputed paternity are presented in the accompanying table. Most of these cases were affiliation cases in which legal proceedings had been instituted or were pending. From the statistical standpoint the number of cases is too few for generalisations, but they are our results to date and we present them for what they are worth. In the 8 cases in which non-paternity was established evidence of the blood-group test has been given in court only once, the other cases being dropped by the plaintiff's legal adviser as the result of the test.

RESULTS OF BLOOD-GROUP TESTS

No of cases	Results of blood test	
	Non-paternity established	Non-paternity not established
50	8	42

Basis of result in established cases

A-B-O system	M-N system	Both systems
3	4	1

DISCUSSION

The expected rate of establishment of non-paternity based on the assumption that all the men are falsely accused, is approximately 32 per cent. (Wiener 1935). The rate in the present series is 16 per cent., a figure which suggests that half the men were falsely accused and that half were in fact the fathers. It is not claimed that the percentage of false accusations is likely to be so high in the 5000 affiliation cases heard in the courts in England and Wales each year, for in many cases the paternity is not in dispute but merely the amount of compensation to be paid; yet the number of men who go to prison instead of paying for the support of children which they believe not to be theirs suggests that the percentage of false accusations is by no means negligible. The hearing of these cases often takes up much of the time of our courts, and the difficulties of adjudication without injustice are well known. It is therefore proposed that, in all cases where the defendant denies responsibility, proceedings should be adjourned for a blood test, which, if in favour of the defendant, will stay further proceedings; but, if it is inconclusive, the adjourned hearing may be resumed. This procedure would result in much saving of time and money. Apart from the evidence of non-paternity afforded by the test in a third of the false accusations, the more general use of the test

would probably lead to a reduction in the number of cases coming to court, because a woman making a false claim would fear the possible consequences of a blood test. On the other hand, a genuine claimant would have nothing to fear in submitting to a test.

The chief obstacle to the more general use of the test in this country undoubtedly is the lack of legislation enabling the courts to order the performance of the test. At present the woman has nothing to gain by submitting her child and herself to a blood test, and, since the courts have not the power to order her to do so, it is in her own interests to refuse to undergo a test, unless she is certain that the defendant is the father of her child. The caution with which new tests of this type are approached by our legal authorities is perhaps desirable, but the certainty of the test suggests that the time is now ripe for its place in British legislation. The first steps in this direction have been taken by Lord Merthyr, whose Bastardy (Blood Tests) Bill successfully passed the select-committee stage in the House of Lords last year. Their lordships reported as follows:

"The Committee are unanimously of the opinion that the qualities of blood underlying blood grouping and the laws of inheritance governing the transmission of these qualities from parents to children are accepted by such a consensus of scientific opinion throughout the world as to render it desirable in the interests of justice for this knowledge to be applicable to affiliation cases."

REFERENCES

Harley, D. (1938) *Med. Annu.* p. 53.
— and Lynch, G. R. (1937) *Brit. med. J.* 1, 163.
Report of the Select Committee of the House of Lords on the Bastardy (Blood Tests) Bill, London, 1939.
Wiener, A. S. (1935) Blood Groups and Blood Transfusion, London.

DEATH IN THE FIRST MONTH AND THE FIRST YEAR

BY CHARLES MCNEIL, M.D. Edin., F.R.C.P.E., F.R.S.E.
EDWARD CLARK PROFESSOR IN CHILD LIFE AND HEALTH IN THE UNIVERSITY OF EDINBURGH

III—Infant Death-rates at Home and Abroad

YEAR by year the infant death-rates are published for England, Scotland, and Ireland and for their smaller administrative units of burghs and rural districts. And, as the general trend of the figures is downwards, official satisfaction is expressed, and the press passes on the good news to the people. It is easy to make out a good case for this side of our public health by looking at our own figures forty years ago or by quoting the figures of other countries which today are far higher than ours. But it is much more profitable to look at some countries in Europe, America, and Australia which are now producing infant death-rates far lower than ours. In this paper I propose to do this, examining the figures for Britain as a whole and for regions and towns within it and setting these figures alongside those of Holland and Sweden in Europe, the United States of America, Australia, and New Zealand. I shall then examine and compare the medical and nursing services in our own and these selected countries, which attempt to control and reduce infant deaths.

Statistical fallacies.—At the outset we must be on guard against the risks and fallacies in the use of figures. If national infant death-rates are to be compared, can we be satisfied that the figures are comparable? Neonatal death-rates, which always form a large part of the total infant death-rates, are liable to special fallacies, owing to the closely associated group of deaths from stillbirth. If infants who live only a few hours are registered as stillbirths, the total of neonatal deaths will be reduced. Again, the lower limit of viable birth is variable; hence in some hospitals and some countries these deaths of very premature babies are counted as abortions, and in others as stillbirths or neonatal deaths. But the general use of a separate neonatal death-rate is a check and safeguard against these possible fluctuations in the neonatal death-rates. And it is now quite common to have official figures for deaths in the first day after birth and for each week of the first month; this further subdivision allows a stricter and still safer comparison. Further, the countries and towns which I have selected for examination have all paid great attention to neonatal deaths and to their reduction, and their neonatal death-rates are most unlikely to contain errors of the kind described. In the figures which will be given we may be satisfied that they have been carefully collected and are comparable. The interpretation or explanation of differences between the figures, say for England and Australia, is another matter.

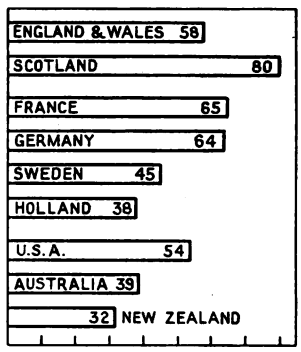

FIG. 3—Death-rate of infants during the first year in selected national states. (1937)

Fig. 3 shows the death-rates for the whole first year, for selected national states. The broad results are seen in the length of the columns. England is better than Germany and France, but Scotland is a good deal worse. The group of European countries that show a substantial lead over England are Sweden, Holland (shown in fig. 3), Norway, and Switzerland. The United States are now ahead of England and are likely to keep in front. Australasia leads the world and is not likely to lose the first place. The rates shown in the chart are for 1937, except in the case of Australia and New Zealand, where the rates are an average of 1936–38; England has a respectable middle position on this international list; Scotland takes the lowest place.

DEATH-RATES IN REGIONS AND TOWNS IN BRITAIN AND BEYOND

A closer examination of infant death-rates in Britain will be assisted by reference to fig. 4. In Britain four regions are taken; and for each the death-rates for the first month and for the first year are shown together in single columns. This regional survey of Britain, passing from south to north, is followed by a selection of five British towns with the same distribution. Infant death-rates in four towns outside Britain, two in the old world, two in the new are also shown; they are remarkably low and surely deserve comparative study. All these rates are for 1937, except those of Adelaide, which are for 1936.

Industrial north of Britain.—This survey of Britain, both in regions and in their larger towns, shows a steady rising trend of death-rates from low to high, as we travel from south to north, reaching its peak in Scotland and in Glasgow. The figures for regions are probably more trustworthy, although I have tried to select representative and important towns, and not because their infant death-rates are particularly high or low. The upward trend in the regional figures is equally steady both for the first month and for the whole year. A line between good and bad might be drawn at the Humber, where we pass from Britannia Felix to Britannia Infelix. Indeed the frontiers of this unhappy tract of Britain are those of

the old kingdom of Northumberland, ending in the north in the line of Forth and Clyde. The general explanation of these high and higher infant death-rates as we go north lies in the worse housing conditions of the big industrial towns and in the wetter colder climate. All over Britain the child population under a year receives a medical and nursing service of a similar standard of efficiency; it is not likely that the management of early feeding is really worse in the north than in the south. But in the north bad houses and a harsh climate expose the ill-fed baby far more to respiratory infection; and it is the general experience that pneumonia in young children is much commoner in Edinburgh and Glasgow than in London and the larger towns of the south. It is the prevalence of respiratory infections in the northern regions that explains their higher infant death-rates. Now we cannot let in the sun or keep out the rain in Lancashire and Scotland. The need for better houses is accepted, and the long and difficult task of providing them is in hand. All kinds of infection within the home can be reduced by raising the standard of domestic hygiene. But the first and best defence against respiratory or any infection is good nutrition established in the first month of life by competent management of early feeding; and we can only fortify this first line by making our doctors and nurses competent to handle the dietetic problem of the infant in the first weeks of life.

Four towns abroad.—The infant death-rates of the four towns shown in fig. 4—Amsterdam (Holland), Gothenburg (Sweden), Chicago (U.S.A.), and Adelaide (S. Australia)—show remarkably low levels. But they are not freak or lucky figures; they all come from countries that produce low national figures; and, although they are the best, they are closely challenged by the other principal towns in their respective countries. Stockholm is not far behind Gothenburg; and Oslo in Norway might have been mentioned, where, for several years recently, the rate has been under 30. The larger towns in Holland all show low figures, which account for her present leading position among European States. Chicago, one of the greatest cities of the world, has got below 40; but New York City is only a little above that level. The principal cities of Australia and New Zealand have a record unapproached by any other continent; for Melbourne and Sydney, each with populations of a million, show rates only a little under 40; and several of the New Zealand towns are under 30. According

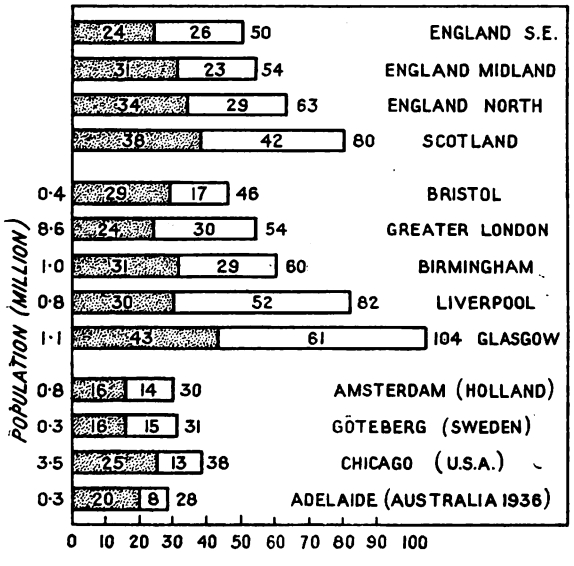

FIG. 4—Death-rates of infants during the first month and the first year in British regions and towns and in four foreign towns. Stippled area, first month; white area remainder of first year. (1937)

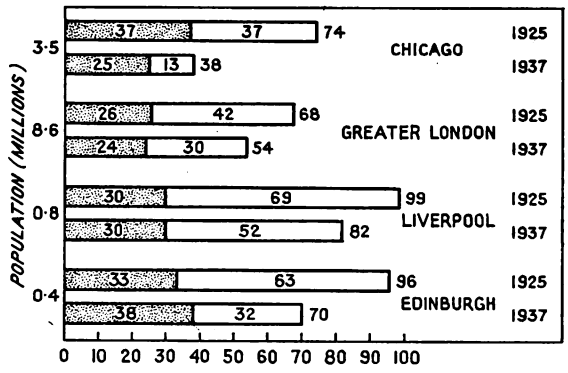

FIG. 5—Comparison of death-rates of infants during the first months and the first year, excluding neonatal death-rates, in 1925 and 1937 in Chicago, London, Liverpool, and Edinburgh. Stippled area, first month; white area, remainder of first year.

to Farr's law, the infant death-rate increases with the massing of the population. Farr's law still holds in Britain; but in parts of Europe, in the United States of America, and in Australasia it has now been written off the public-health statute book. If we look only at our own figures, we seem to have made good progress in the last two decades; but, if we compare our progress with that of other countries and large towns which now lead us, we shall find that they have shown a more rapid rate of progress. And, if we are to mend our pace, it must be done here as it has been done there, by cutting down the high infant death-rates in our large cities. Let us look at what Chicago has done between 1925 and 1937 and at what has been done in the same period in London, Liverpool, and Edinburgh.

TWELVE YEARS OF PROGRESS IN CHICAGO, LONDON, LIVERPOOL, AND EDINBURGH

The death-rates for the first month and the first year for these four towns in 1925 and 1937 are given in fig. 5. If these figures are comparable, Chicago, in the period chosen, has reduced its first-year death-rate from 74 to 38 and its first-month rate from 37 to 25. The first-year rates for London, Liverpool, and Edinburgh all show some, but not striking, improvement, and their neonatal death-rates have remained at much the same level. In Chicago a carefully planned and active campaign has been conducted by the Board of Health, with special attention to premature infants, with special organisation of nursing and hospital services, and with much popular propaganda. And in Chicago, whether by coincidence or by consequence, the fall in the neonatal death-rate has been followed by a remarkable drop in infant deaths in the succeeding eleven months. In Britain during this period there have been no new features in our national public-health policy; our child-welfare services have been working hard, but with no change in their training or direction; and I have not heard of any intensification of municipal effort in the great towns where the infant death-rates are especially high. In Bristol and some of the larger southern towns there has been a greater improvement. But the three towns selected give a fair impression of the general progress made in Britain during this period in lowering our infant death-rates; and it makes a poor showing alongside the record of Chicago and New York. London, in view of the great mass and density of its population, carries off the palm in Britain, and her neonatal death-rate is satisfactory. She might still deserve the praise of the old Scottish poet—"London, thow art the floure of Cities all"—but only among British towns.

Infant death-rates fluctuate from year to year, rising or falling; 1938 has been a good year in Britain, and the London figures have come down a little more.

But in Chicago in 1938 they are down to 34 because they are being steadily forced down by a new policy, which has been well planned, has already proved itself, and inspires enthusiasm in all who carry it out.

MEDICAL AND NURSING CONTROL OF INFANT HEALTH IN BRITAIN AND ABROAD

The organised effort to protect infant health began in the cities (with one remarkable exception); it followed earlier measures of sanitary reform and of control of the great infectious diseases, and it has used one or both of two methods: clinics where babies are assembled and their mothers advised (usually by doctors); and the visiting and advising of mothers in the home by nurses trained in the welfare of babies. Only a brief and imperfect sketch can be given of the different machinery of control of infant health in one or two countries that have been most successful in solving this problem.

New Zealand and Australia.—Here the name of Dr. F. Truby King stands out. He was an original and solitary genius, who created a training school for baby nurses out of a stable, sent his pupils, the Plunket nurses, into the homes of the people, and in a few years brought the infant death-rates in New Zealand down into the low thirties. His training school was a hospital of nursing mothers after delivery, who furnished clinical material for the teaching of breast-feeding and of bottle feeding both in normal and in difficult cases. In Australia the pioneer work was being done at the same time, or even a little earlier, in Sydney by its medical officer of health Dr. W. G. Armstrong, whose inspiration was Pierre Budin's baby clinic (*consultation de nourisson*); but home visiting was added and strongly developed. It was only later that the Tresillian Mothercraft Training School was established at Sydney, on the model of Truby King's Karitane Hospital. Today in Australia, as in New Zealand, the chief marks of the system are the trained baby nurse doing her work in the home; emphasis on breast-feeding and success in securing it; the thorough clinical training of the nurse in a central nursing school (one for each state); and a useful but secondary place for baby clinics. It should be added that in Australia more and more attention is being paid to the antenatal care of mothers. The results in the saving of infant lives are shown in figs. 3 and 4.

Holland.—Here the system seems different, but its principles are the same—the use of special training schools for health nurses and their thorough practical training. The training of midwives in Holland lasts three years. The training of baby-health nurses lasts at least two years. The first year is spent in a maternity-hospital clinic, and this is followed by attendance at a special school for social service and finally by apprenticeship at a welfare centre under supervision of an experienced nursing sister. This thorough training both of midwives and of baby-health nurses seems in theory the perfect way. In practice it has brought the infant death-rate in Holland to a low level, remarkable in itself but still more so when the density of the population and the damp and misty climate are taken into account. Further, this midwife and baby nursing service is welded into the whole national medical scheme of hospital teaching and work and of family practice. It avoids the creation of a semi-detached system of training school and nursing practice which has sometimes caused friction in New Zealand and perhaps also in Australia.

Britain.—In the development of our infant-health service we have followed the lead given by Budin in Paris; and as the main part of our system have set up baby clinics, most of these officered by special doctors. We have also created a special service of baby nurses, whose name of health visitors implies that they have access to and work in the home. But the number of health visitors is few, and their duties are varied; and the supervision of the health of the baby in the home is only one part of their work. In this system the baby clinic is first and work in the home second.

The training of the medical and nursing personnel for the work of the infant-welfare service is faulty. For the doctors the course for the diploma in public health gives a general training in bacteriology, sanitation, and sanitary laws and regulations, but the poorest minimum of teaching in infant hygiene and dietetics. The health visitor's course of study lasts six to nine months and is again an omnibus programme, including venereal diseases, tuberculosis, and fevers, besides infant health and disease. The training of the nurse fits her to be a valuable assistant to the clinic doctor and to do useful work in the home, but it does not enable her to take masterful control of the baby's health and feeding.

This system has been working in Britain for about twenty-three years, and the infant death-rates have been dropping steadily down, although not so rapidly as before it was installed. From personal experience in conducting one of them I have no doubt that the clinics, with their medical and nursing staffs, have done excellent work and have made a valuable contribution in reducing the figures. But I have not met a medical officer of health who was satisfied with the rate of progress, or who did not feel that more could be done. We are attacking a formidable problem; in our attack we employ nurses and doctors; and at present they are poorly trained. We can improve that training. Other countries, that have been more successful than we have been, have given special training to the nurse and have put her in the first line of the attack. The care of the infant in health is the special task of the woman, for which she is fitted by nature and instinct. If in Britain we would give the health nurse a thorough concentrated training for this task, and give her full scope and responsibility in carrying it out, we would soon quicken the pace of progress.

In the next and concluding paper I shall outline a programme for the better nursing and medical control of infant health in Britain.

TOXOID TREATMENT OF RECURRENT INFECTION AFTER STAPHYLOCOCCAL OSTEOMYELITIS

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ONLY a minority of cases of osteomyelitis show recurrence of infection, but 30 patients of this type were examined in the wards of the London Hospital in less than two years. In the commonest type of recurrence the bone does not seem to be affected, but pain and tenderness develop either in the track of an old sinus or in a fresh site in soft tissues. The lesion may subside but usually becomes an abscess. The patient is not seriously ill but has a period of ill health and is away from work for at least some weeks. When the bone is affected, particularly the medulla, the condition is more serious and can be as severe as in acute osteomyelitis; but recurrences of this type are rare. In a similar category may be placed patients in whom repeated infection takes place at the site of war wounds in which the bone has been injured. These patients are cared for at government hospitals, but 2 were encountered by chance, and permission to treat them was obtained. In both of these men recurrence had been frequent and had latterly caused chronic ill health, and one of them appeared to derive so much benefit from injections of toxoid that we decided to investigate the degree of immunity prevailing in patients with recurrence and to study the

effect of the treatment in cases where recurrence had been frequent.

It seemed to us that our object must be to maintain the level of immunity in order to lessen the tendency towards further attacks, and that the injections must therefore be continued for some years. It is still too early to discuss the practical results of the treatment, especially since the war has made its continuation more difficult and further personal contact with the patients impossible, and this paper must be considered as a preliminary note. The patients have attended regularly for their injections, and apart from local reactions there have been no ill effects, with the possible exception of 2 cases in which fresh recurrences took place after three or four months' treatment. These 2 cases will be discussed later; both patients decided to continue the treatment. The only positive results so far obtained were in the 2 patients with war wounds, both of whom have apparently recovered from their chronic ill health. No conclusion can be drawn from 2 cases, but the results obtained justify the extension of the experiment to a larger series.

SEROLOGICAL INVESTIGATION

It seemed important to find out what degree of immunity was developed in the recurrences, and the investigation was therefore planned on lines similar to those described in a recent paper on acute osteomyelitis (Valentine and Butler 1939). It was soon found, however, that repeated examination of the serum was usually unnecessary, because, the condition being subacute, with a history often going back some weeks, rapid changes in the titre of circulating antibody were not to be expected. In 2 cases, however, in which the medulla was the site of recurrence the antitoxic titre rose to the high level found in the acute disease, and the patients were severely ill.

Table I shows the age and sex of 30 patients, the year of the original attack, and the number of recurrences. (Owing to the outbreak of war a few details of age and history were difficult to verify, and possible inaccuracies are denoted by brackets or question marks.) It is hoped that these skeleton histories may suffice to indicate the severe disability from which these patients may suffer. The table also shows the number of sites in which infection has taken place, including the original lesion. The figures suggest, as might be expected, that, where multiple sites are affected, the recurrences tend to be more numerous. The mechanism by which new sites may be involved is somewhat uncertain. The spread must take place through the blood-stream either at the time of the original infection or when operation is necessary for the treatment of any subsequent abscess. Butler (1937) quotes Seifurt (1925) as having demonstrated the presence of staphylococci in the blood after operation in 55 out of 108 cases tested, and we have twice in our series had a similar experience. It must be assumed that an undeveloped focus of infection can remain latent for a considerable time. It is probable that a heavy degree of bacteræmia in the primary attack is the more important factor in the causation of subsequent foci, because postoperative invasion of the blood-stream has in our experience been slight and transient; but more evidence is needed to establish this assumption.

The table shows the titres of antihæmolysin (α) and antileucocidin in the patients' serum on or shortly after admission, and the titres of filtered toxins prepared from the infecting strains when obtained. Antihæmolysin is listed in international units and antileucocidin in terms of K-serum, the Burroughs Wellcome standard B.8760. The first figure in the toxin column gives the volume of toxin which is still hæmolytic after mixing with 1 unit of antihæmolysin, and in the second L denotes a concentration of leucocidin which is active after mixing with an equal volume of K-serum 1/200 but inactive against K/100. The titres of hæmolysin show the variation which is usually met with in all types of staphylococcal infection. The similar variation in the leucocidin titres is more interesting since previous work (Valentine 1936, Valentine and Butler 1939) has shown that osteomyelitis is usually caused only by potent leucocidin-producing strains, except when a heavy bacteræmia develops by mischance from a minor superficial infection, such as a neglected blister or whitlow. There seems little doubt that in time the characteristics of the infecting strain may change; in

TABLE I—INCIDENCE OF RECURRENCES OF INFECTION AFTER STAPHYLOCOCCAL OSTEOMYELITIS AND DEGREE OF IMMUNITY

Case	Sex	Age in March, 1939	Date of first attack	Recurrences	Number of sites	Antitoxin titre		Toxin titre (c.cm.)	
						Anti-hæmolysin (units)	Anti-leucocidin (K)		
1	M	28	1925	3 up to 1938	1	0·4	0·16	>1·0	<L
2	M	30	1923	4 „ „ „	1	4·0	0·08	0·2	8L
3	M	61	1926	1927–38 at least once a year	1	3·0	0·16		
4	M	22	1930	4 up to 1939	1	1·0	0·04	1·0	2L
5	M	11	1937	3 „ „ June 1939	2	0·4	0·32	1·0	2L
6	F	27	1916	5 in 1935–8	1	7·0	0·32	0·2	<L
7	M	(48)	1917	War-wound recurrences up to 1937	1	1·0	0·08	0·4	<L
8	M	18	1928	6 up to 1938	1	7·0	0·32	0·5	2L
9	M	(16)	(1933)	? 3 up to 1939		2·0	0·24	0·2	2L
10	M	44	1904	4 up to 1938	2	1·5	0·16		
11	M	26	1931	13 „ „ 1939	7	9·0	0·12	1·0	<L
12	M	(45)	1917	War-wound recurrences up to 1938	1	1·5	0·32	0·4	<L
13	M	31	1918	8 „ up to 1938	3	2·0	0·08	>1·0	<L
14	M	22	1923	8 „ up to 1939	7	3·0	0·16	0·1	4L
15	F	20	1931	Several abscesses up to 1939	1	1·5	0·16	0·2	4L
16	M	16	1927	4 up to 1939	1	1·5	0·08	1·0	4L
17	F	30	1935	1938	1	3·0	0·64	0·2	<L
18	M	38	1923	2 up to 1938	1	0·4	0·04		
19	M	22	1931	5 „ „ 1938	1	1·0	0·08	0·065	8L
20	M	24	1928	3 „ „ 1938	4	13·0	0·08	1·0	4L
21	M	(40)	1923	3 „ „ 1938	3	1·0	0·32	0·4	3L
22	M	23	1923	1 in 1938	1	1·0	0·06	1·0	4L
23	F	25	1927	1 in 1929; discharge since then	1	0·4	0·08	0·07	8L
24	M	42	1913	Recurring discharge up to 1939	1	7·0	0·64	0·4	2L
25	M	16	1930	2 up to 1939	1	4·0	0·16	0·2	4L
26	M	40	?1918	War-wound recurrences up to 1939	1	0·4	0·08		
27	M	45	1906	1 in 1939	2	1·0	0·06	>1·0	<L
28	F	22	1931	5 up to 1938	2	2·0	0·08	0·05	16L
29	M	34	1931	5 „ „ 1938	3	13·0	0·32	0·5	8L
30	M	(25)	1936	1 in 1938	1	0·4	0·08	>1·0	<L

some cases *albus* strains were isolated from cases in which *aureus* had previously been found. In case 6 an *albus* strain was isolated in the spring of 1939, whereas a fresh abscess in the summer gave a pale *aureus* strain of diminished toxigenicity. It is clear that some such loss need not prevent a strain already present in the tissues from causing further recurrence.

The titres of antihæmolysin varied considerably. In 12 cases out of 30 the figure lay within normal limits, 0·4–1 unit; 2 patients had titres of 13 units—i.e., about half of the highest titre likely to be encountered in human serum. In 14 patients the antileucocidin titre was 0·04–0·08 K, a figure probably equivalent to the upper level found in normal people; with two exceptions, cases 17 and 24, the highest titre encountered was 0·32 K (6 cases). Case 17 had a large abscess in the thigh, and case 24 a lesion involving the shaft of the humerus, both recurrences being therefore unusually severe. In cases 22 and 25 an intramedullary spread of infection took place, the illness became acute, and the titre rose to 2 K or more, as is usual in severe cases of acute osteomyelitis. In the other cases, where little or no bone was involved, it seemed that a titre of 0·32 K at most was enough to localise the infection; but so many cases had titres much lower than 0·32 K that the importance of the figure was doubtful.

It seemed that an investigation of the titre in the pus obtained from abscesses might help to clear up this point. This test is not often possible, because the fluid bathing the pus cells must be examined, thick pus being useless for the purpose. Table II shows the pus titres in the 10 cases in which the test has been performed, together with the contemporary serum values. Case Y had very severe osteomyelitis in the seventh week; the serum titre was somewhat higher than the pus titre. Of the rest only 2 showed a pus titre of less than 0·32 K, and of these case 16 (0·08 K) had a mixed infection, with hæmolytic streptococci predominating. Case 14 (0·16 K) had been receiving toxoid injections for four months, but his response in antileucocidin had been poor. Of the remaining cases 4 had pus titres of 0·32 K and 3 of 0·64 K. Of the latter case 24 had infection of the humerus, and the illness was fairly severe, whereas cases 5 and X had been receiving toxoid treatment for abscesses associated with sequestra. These results suggest that an antileucocidin concentration of 0·32 K is commonly necessary for the localisation of a staphylococcal abscess in soft tissues.

TABLE II—SERUM AND PUS TITRES IN RECURRENCE OF INFECTION AFTER STAPHYLOCOCCAL OSTEOMYELITIS

Case	Serum antitoxin		Pus antitoxin		Case	Serum antitoxin		Pus antitoxin	
	units	K	units	K		units	K	units	K
5	3·0	0·64	3·0	0·64	21	1·0	0·32	1·0	0·32
9	2·0	0·24	2·0	0·32	24	7·0	0·64	7·0	0·64
13	2·0	0·08	3·0	0·32	30	3·0	0·08	1·5	0·32
14	13·0	0·16	13·0	0·16	X	13·0	0·64	13·0	0·64
16	1·5	0·08	?	0·08	Y	0·8	4·0	0·4	3·0

The low serum titres which are so common in table I may be explained if the findings in cases 13 and 30, in both of which the serum titre (0·08 K) was significantly lower than the pus titre (0·32 K), are taken into consideration. It seems that in some of these cases of recurrent infection the affected area carries the main burden of antibody formation and perhaps contributes largely to the serum titre, whereas in acute osteomyelitis the general defence mechanism of the body is stimulated, as the high titres often found suggest, and so helps the infected region. This conception of local immunity may also perhaps explain the development of continuous ill health in the 2 cases with war wounds, if fatigue may be postulated in the infected region. We therefore feel justified in hoping that by maintaining the antitoxic immunity of the patient in the neighbourhood of 0·32 K over a prolonged period we may not only make recurrence less probable, but also that we may bring relief to the infected tissues by causing the production of antitoxin elsewhere in the body.

The titres of antihæmolysin do not suggest that much immunological significance can be attached to this antibody, but it is at least possible that the general symptoms in staphylococcal infection are largely due to the α-hæmolysin, for it has seemed to us that it is this factor rather than the leucocidin which is responsible for the reaction encountered in treatment with toxoid. Toxoid has therefore been prepared from toxins mixed to give a strong leucocidin and a moderate hæmolysin. Beginning with 0·2 c.cm. of a 1 in 20 dilution we have used weekly injections until the patient could take the maintenance dose of 0·3 c.cm. of undiluted toxoid intramuscularly in the deltoid. This dose is then given at intervals of two or three months for an indefinite period.

DISCUSSION

Few attempts seem to have been made to treat chronic osteomyelitis with toxoid injection. Dolman (1935) noticed improvement in the general health of children treated in this way, but the effect on the lesion was doubtful. Ramon et al (1936) were hopeful but came to no definite conclusion. Buchman (1937) reported on the treatment of 38 patients in whom the disease had existed two months to fifty-four years, with an average of six years. An average of 17·9 injections per patient were given over an average period of forty-five days, with a minimum of twenty-two and a maximum of a hundred and thirty days. It is clear, therefore, that the treatment was only given during active disease, and that it was strenuous, reactions being common and sometimes general in their effect. Of the 38 patients 18 developed new lesions during or soon after the course of injections, 2 died, and 1 had an amputation. In 1 case with multiple abscesses many more new foci appeared. The results were, in fact, bad.

In our opinion Buchman's experiment can be criticised on two grounds. First, treatment seems to have been given at a stage in the active disease when immunity is still high. Little benefit could be expected at such a time. Secondly, leucocidin was not taken into consideration, and it is possible that this factor was lacking in the toxoid used; strenuous immunisation with the relatively unimportant hæmolytic factor only might conceivably be dangerous if it interfered with the production of antileucocidin.

The possible tendency of toxoid injections to wake up latent foci is important. In two out of three recurrences in our series, cases 5 and 14, a new site became active after three or four months' treatment—i.e., when a full response to the injections had presumably been obtained. It seems possible, in view of Buchman's experiences, that the treatment may sometimes sensitise the tissues and so precipitate the eruption of a latent focus. Even if this is the case, it seems probable that such a focus would have become active at some later date when, perhaps, the immunity was low. In both of these cases the general symptoms

were relatively slight. The third recurrence, in case 3, was probably associated with a small sequestrum and was mild. When dead bone or a foreign body is present, the tendency towards recurrence is increased, and operation will commonly be necessary. It cannot be expected that the treatment will always stop any further trouble, but it is reasonable to hope that it will make recurrence less likely and, if it comes, less severe.

SUMMARY

(1) Patients with recurrent staphylococcal infection after osteomyelitis or war wounds have been given injections of toxoid in the hope of preventing or of limiting further trouble. The injections are continued for a period of years to maintain a high level of antitoxic immunity.

(2) Antitoxins in the serum of these patients are seldom high and often within normal limits.

(3) Antitoxins may reach higher levels in the pus than in the serum. The results suggest that a titre of about 0·32 K antileucocidin is usually required for the localisation of infection in soft tissues. Titres of antihæmolysin (*a*) varied too much to substantiate the importance of this antibody. It is therefore important to use toxoid containing a potent leucocidal factor and only a moderate hæmolysin.

(4) There has not yet been time to evaluate the treatment in preventing further recurrence. It is possible that occasionally the injections may stimulate activity in a new latent focus. The treatment is probably of value in cases with symptoms of persistent toxæmia—e.g., war wounds.

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ALEUKÆMIC LYMPHADENOSIS WITH EXTENSIVE SUBCUTANEOUS DEPOSITS

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ON Feb. 7, 1939, a boy, aged 4, was admitted to St. Alfege's Hospital, as a case of acute rheumatism, with a history of malaise for five months, during which there had been a severe attack of bronchitis and an intestinal upset diagnosed as food-poisoning. On admission his temperature was 99° F., pulse-rate 136, and respiration-rate 28. Complete extension of right elbow resented; pain in left knee; slight evidence of chorea. No typical rheumatic nodules, no purpura. Slight cough, but no abnormal physical signs in the chest. Harsh systolic murmur at the apex and a doubtful presystolic murmur. On Feb. 27 a blood-count showed hæmoglobin 16 per cent., red cells, 90,000, and leucocytes 2000, 98 per cent. being lymphocytes. During the next two months three blood-transfusions were given, each of about 400 c.cm. Injections of arsenic and nucleic acid were also given. On April 15 a blood-count showed hæmoglobin 66 per cent., red cells 3,000,000, and leucocytes 12,500, of which 77 per cent. were polymorphs and 18 per cent. lymphocytes. On March 19 a blister about an inch in diameter was noted on the scalp. This was followed by the gradual development of several raised purplish subcutaneous tumours on the head. The patient had a low-grade pyrexia until three weeks before his transfer to Queen Mary's Hospital, Carshalton.

On admission to Queen Mary's Hospital on May 4 he was noted as a pale red-haired boy with fair nutrition, temperature 99° F., pulse-rate 96, and

FIG. 1—Boy, aged 4, with aleukæmic lymphadenosis, showing patches resembling erythema nodosum on trunk and limbs.

respiration-rate 22. He was apprehensive and resented movement and firm handling of his limbs but showed no typical choreiform movements. No typical rheumatic nodules. Subcutaneous nodules up to an inch in diameter on the scalp and purplish patches resembling erythema nodosum on the trunk and limbs (fig. 1). Apex-beat not displaced; systolic and mid-diastolic murmurs in the mitral area; blood-pressure 115–70. Throat appeared healthy, but upper deep cervical glands were palpable, and there was a discharge from the left ear; no other superficial adenitis was noted. Liver not enlarged; spleen not palpable.

Urine normal. Sedimentation-rate 25 mm. in an hour; Wassermann and Meinicke tests negative; blood-culture negative; agglutination test to *Brucella abortus* 1 in 30 negative; blood-calcium 8·8 mg. per 100 c.cm.; blood-urea 25 mg. per 100 c.cm.; Van den Bergh test immediate direct positive; electrocardiogram normal; Mantoux test 1/1000 negative. Blood-count on June 1 showed hæmoglobin 69 per cent. red cells 4,470,000, and leucocytes 2600, of which 90 per cent. were lymphocytes and 1 per cent. polymorphs. Primitive white cells were seen in the films and thought to be of the lymphocyte series.

A blood-transfusion, 550 c.cm., brought the hæmoglobin and red cells to normal but did not raise the white cells and left the percentage of lymphocytes unaltered (fig. 2). The subcutaneous nodules grew larger, and the purplish areas on the skin became associated with firm underlying nodules. Swellings developed in the circumorbital tissues, being largest just above and below the left eye, which finally they almost completely closed. More subcutaneous swellings appeared, and just above the wrists and ankles fixed tumours developed, apparently attached to bone. Glands in the neck and axillæ slightly enlarged. Spleen just palpable on one or two occasions, and liver became slightly enlarged. Diarrhœa developed and never really responded to treatment. Intramuscular injections of Pentide amounting altogether to 50 c.cm. were given but did not affect appreciably the total white-cell count. Injections of Campolon were then given and followed by further blood-transfusions. The patient developed a rapid respiration-rate (up to 70), with a cough and high temperature, and was placed in an oxygen tent for five days.

Radiograms of the skeleton revealed periosteal thickenings of both radii and ulnæ, both femora and fibulæ, and right tibia. Biopsy of a subcutaneous nodule on the right arm showed "leukæmic infiltrations of the subcutaneous and muscular tissues, with enormous numbers of cells of the large-lymphocyte type (probably lymphoblasts) present" (fig. 3). At

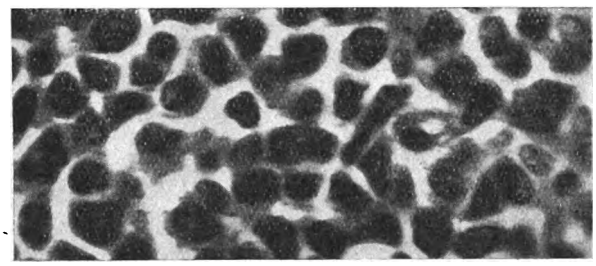

FIG. 3—Photomicrograph of cells of large-lymphocyte type, probably lymphoblasts, seen at biopsy of a subcutaneous nodule. (× 900.)

one time the total white-cell count rose to 11,750, but soon afterwards it dropped to 2000 again, and lymphocytes constituted 100 per cent. of the white cells on two occasions (fig. 2).

Finally the patient's general condition deteriorated fairly rapidly, the subcutaneous nodules increased in size and number, the eyes became practically closed by the circumorbital swellings, the glands became more enlarged, bleeding from the gums developed, diarrhœa increased, terminal pneumonia set in, and the patient died on July 8, 1939. Two days before death a blood-count showed red cells 3,940,000, hæmoglobin 70 per cent., leucocytes 2450, of which 97 per cent. were lymphocytes, and on the day before death the hæmoglobin dropped to 50 per cent. and the total white-cell count was only 1450 per c.mm.

NECROPSY

Dr. S. Robinson, of the Archway Laboratory, gave the following report:—

Numerous areas of hæmorrhagic infiltration up to 1 cm. in diameter, some ulcerated, in skin of limbs and trunk. Several subcutaneous nodules in scalp; largest about 2 cm. in diameter in centre of forehead. Orbital tissues swollen.

Pleura completely obliterated by hæmorrhagic infiltrations. Periosteum of ribs on inner side of right chest infiltrated by hæmorrhagic tissue up to 0·6 cm. thick. Heart: œdema of myocardium; numerous petechiæ in visceral pericardium; no evidence of any valvular lesion. Lungs: congestion and œdema; a few patches of bronchopneumonia in lower lobes. Lymphatic glands: acute inflammatory swelling of cervical glands; glands in axilla infiltrated; bronchial glands œdematous but not obviously infiltrated; cœliac glands infiltrated. Stomach and intestines: numerous petechiæ throughout, with small nodules also; altered blood in stomach. Liver: large, pale, and œdematous, with fine network of infiltration. Spleen: slightly enlarged; hæmorrhagic adhesions to diaphragm; rich red myeloid cut surface. Kidneys: both enlarged and pale; obvious infiltration in cortex of left kidney, with petechiæ. Brain: œdema and congestion.

Special points.—Myeloid infiltration of periosteum over inner ends of clavicles, lower end of right tibia, lower end of right femur, posterior surface of sternum, along right border of dorsal vertebræ, and over inner aspects of several ribs. Petechiæ in testes.

Microscopy.—Leukæmic transformation of spleen. Leukæmic infiltration of lymphatic gland of neck, skin of thigh, scalp, lung and pleura, muscle of right calf, lower end of right fibula (marrow and beneath the periosteum), inner end of right clavicle, and testes.

DISCUSSION

A final diagnosis of aleukæmic lymphadenosis with multiple deposits, according to Piney's (1939) classification, was made. While the patient was alive, chloroma was considered as a possible diagnosis, the circumorbital and subperiosteal deposits in particular suggesting this, but no green tinge was seen in the tumours post mortem. Definitions of chloroma unfortunately differ widely. Whitby and Britton (1935) define it as a rare type of leukæmia and say that "sometimes there is no green coloration." Roehm, Riker, and Olsen (1937) conclude that "chloroma is a faulty designation, as the green colour is not specific of any tumour cell type." Kandel (1937) defined a chloroma as being any tumour which is green when fresh; and, if the term chloroma is to be retained, we feel that it should be used only in this sense.

The original diagnosis of acute rheumatism can be explained fairly simply. The subperiosteal deposits might well have caused the limb pains and tenderness mistaken for rheumatic pains. As regards the heart murmurs, if "dilute blood" can cause a hæmic murmur, blood with hæmoglobin only 16 per cent. should produce such a murmur. The origin of the tumours may be explained in one of two ways: (1) neoplastic proliferation of cells of the lymphocytic series previously situated at that site, or (2) a proliferation of clumps of cells arrested in the capillary network. The latter alternative seems the more probable, because the tumours bore no particular relation to the lymph nodes.

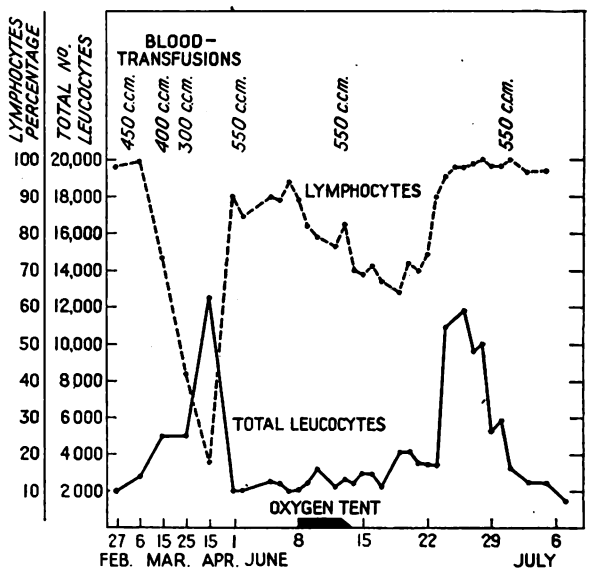

FIG. 2—Graphs showing relationship between total leucocyte count and percentage of lymphocytes.

We wondered if there could be any factor causing an increased destruction of white cells, since the blood-transfusions did not raise the white-cell count. On the other hand, the agranulocytosis could be produced equally well by the large infiltrations of lymphocytic cells in the bone-marrow—a view which was substantiated by the anæmia and by the extensive lymphocytic infiltration of the bone-marrow.

For permission to use the material embodied in this paper we are indebted to Dr. W. A. Daley, medical officer of the London County Council. The council accepts no responsibility for any opinion expressed.

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RESPONSE OF NON-GRAVID HUMAN UTERUS TO POSTERIOR-PITUITARY EXTRACT

AND ITS FRACTIONS OXYTOCIN AND VASOPRESSIN

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EXTRACT of the posterior lobe of the pituitary contains oxytocin, which causes contraction of the excised uterus of the virgin guineapig, and vasopressin, which raises the systemic blood-pressure of the dog (Kamm et al. 1928).

Bourne and Burn (1928), testing the action of these substances on the parturient human uterus, found that within 5 minutes, after an intramuscular injection of 2 units * of oxytocin the contractions of the uterus were increased in force and in frequency, and that the response was indistinguishable from that following a corresponding dose of posterior-pituitary extract. When 12·5 units of vasopressin was injected into the buttock, "there was no augmentation in the force or frequency of the contractions, but from 15 to 25 minutes afterwards the relaxation following the contractions was very slow."

Robson (1933) found that strips of human uterine muscle removed at the same stage of pregnancy did not all exhibit the same reactivity to oxytocin and vasopressin, but in spite of this variation he showed that an increase in sensitivity to oxytocin developed as pregnancy advanced, and that muscle excised during parturition responded to very small doses. Further, muscle removed in the early stages of pregnancy was more responsive to vasopressin than to oxytocin. The response to vasopressin of strips from the uterus in late pregnancy and during parturition was not determined.

Subsequent work has shown, however, that what holds good for the excised uterus, or a strip of its musculature, is not necessarily applicable to the organ in its normal state. Robson (1936) found that after treatment with both œstrone and progesterone the rabbit uterus in situ did not respond to oxytocin, although a contraction might be obtained in vitro. Bell and Robson (1936) showed that the response of the non-gravid guineapig uterus to oxytocin was much less in vivo than in vitro. This finding is of particular interest in view of the use of the excised virgin guineapig uterus in the assay of oxytocin. According to Bell (1939a) the response of the macacus uterus is greater in vivo than in vitro; hence it appears that the response depends on the animal, and that the excised preparation is not always the more sensitive.

White and Pratt (1936), on manual examination of the gravid human uterus, found that an injection of oxytocin might cause the uterus to contract in the very earliest stages of pregnancy; but as they admitted, their observations did not necessarily invalidate Robson's conclusions drawn from the behaviour of excised strips, for they did not measure the response to graduated doses. In each case they gave intravenously the large dose of 5 units of oxytocin.

Moir (1936) found that the non-pregnant uterus responded only to the vasopressor factor and not to the oxytocic factor when given in ordinary dosage.

It therefore appears that, apart from Robson's measurements for the muscle in vitro, no quantitative work has been done on the response of the human uterus to oxytocin and vasopressin and none at all on that of the intact organ.

PRESENT INVESTIGATION

Method.—The movements of the uterus were recorded by introducing a small rubber bag filled with water into the uterus and by registering the changes in volume. The cervix was dilated to No. 6 Hegar. Anæsthesia was not required.

When the uterine movements had become more or less constant, graduated doses of the posterior-pituitary fractions were administered intravenously. A small dose of posterior-pituitary extractor of vasopressin (0·2–0·4 unit) produced facial pallor. Sensitive patients complained of faintness and nausea. After 4 units of oxytocin the patient became flushed and complained of a feeling of suffocation. After smaller doses there was not any noticeable effect except slight flushing.

RESULTS

Sixty records were obtained from 43 women at various stages of the menstrual cycle. The women were all of reproductive age, twenty to forty, and 34 had borne children. Menstruation was regular at the time of observation. The women were attending the outpatient department of the Royal Samaritan Hospital because of minor disorders, which were not accompanied by any palpable abnormality of the pelvic organs, apart from retroversion of the uterus. Retroversion had been present in 15 women, but the position of the uterus was corrected and maintained by a pessary before the observations were made. The records therefore were made under reasonably normal conditions.

Twenty-eight of the sixty records showed that the uterus responded to posterior-pituitary extract or its fractions. The records comprising the responsive group were obtained immediately before or during menstruation and in the early interval part of the cycle. Particulars of this responsible group are given in the accompanying table, and reference to this group is now made.

Posterior-pituitary extract 0·2–0·4 unit was given on thirteen occasions, and in each case a response was elicited. During the first five days of the cycle and in the phase immediately before menstruation the response consisted of a sharp contraction within a minute from the time of injection, followed by in complete relaxation which persisted for 10–30 min. or even longer. While the increased tonus persisted, there were rhythmic contractions and relaxations (Fig. 1). During the interval phase of the cycle the response consisted of a contraction which gradually reached its height and on which small rhythmic movements were imposed (fig. 2). Vasopressin (Pitressin) 0·2–0·4 unit was given on eight occasions, and in seven instances the uterus gave a response which resembled that after a similar dose of posterior-pituitary extract (fig. 3). In one case, whereas 0·4 unit of posterior-pituitary extract caused a prompt response, the response to a subsequent dose of 0·4 unit of pitressin was delayed for about 3 minutes.

Oxytocin (Pitocin) 0·4 unit was given during the course of eleven experiments, and in eight instances there was no response, although during seven of the experiments the uterus responded to a similar dose of posterior-pituitary extract or of vasopressin. In two instances during the menstrual phase there appeared to be a slight response after 0·4 unit of pitocin. Pitocin 1 unit was given on fifteen occasions. In seven instances a contraction was not

* Oxytocin 1 unit has the same action on the excised guineapig uterus, and vasopressin 1 unit on the dog's blood-pressure, as 0·5 mg. of standard powdered pituitary or 1 unit of posterior-pituitary extract.

DR. BATES AND MR. HAINE: REFERENCES

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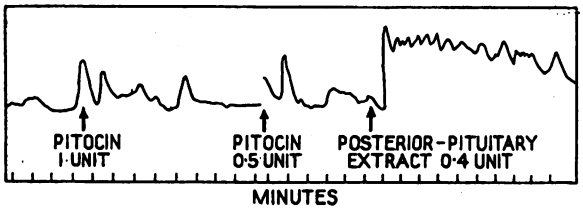

FIG. 1—Effects of pitocin and of posterior-pituitary extract on non-gravid human uterus on 23rd day of menstrual cycle.

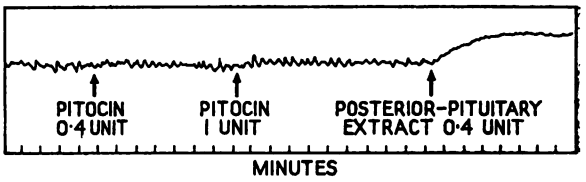

FIG. 2—Effects of pitocin and of posterior-pituitary extract on non-gravid human uterus on 6th day of menstrual cycle.

evoked, in four the response was doubtful or slight, and in four the response was pronounced. On three of the occasions on which there was a response the uterus was in the menstrual phase. In two of these cases there was a sharp contraction followed by incomplete relaxation (fig 4). In the third instance the oxytocin merely initiated rhythmic contractions which had not been present previously. Pitocin 3–4 units was given on five occasions, and in each case the uterus contracted (fig. 5).

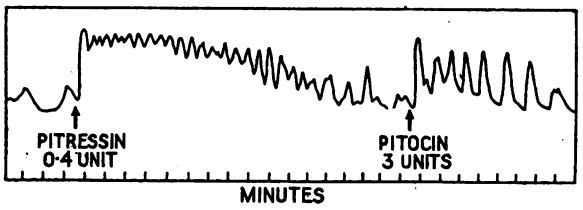

FIG. 3—Effects of pitressin and of pitocin on non-gravid human uterus on 28th day of menstrual cycle.

The minimal effective dose of pitocin was about ten times that of posterior-pituitary extract or of pitressin. Since the oxytocic and vasopressor principles have not been completely separated, it was possible that the responses elicited by the relatively large doses of pitocin were due to the small amounts of pressor principle which they contained. Dr. J. S. White, of Messrs. Parke, Davis and Co., kindly supplied special samples of pitocin and pitressin, each of which had been assayed for both principles. The pitocin contained 10 oxytocic units and 0·4 vasopressor unit per c.cm. and the pitressin 10 vasopressor units and 0·4 oxytocic unit per c.cm. Fig. 6 shows the responses after minimal doses of this pitocin and pitressin. These doses contained approximately equal amounts of pressor principle. In this case the response after 4·0 units of oxytocin, containing approximately 0·16 unit of pressor principle, closely resembled that after 0·2 unit of vasopressin. After 1·0 unit of oxytocin, with only 0·04 unit of vasopressin, there was no response. The conclusion seemed justified that the response after pitocin was due to the vasopressin which it contained, and that oxytocin had no effect on the uterus. This was subsequently confirmed by another experiment, which showed that, even when the reactivity of the uterus was of a different order, the relation between minimal effective doses of pitocin and pitressin remained the same.

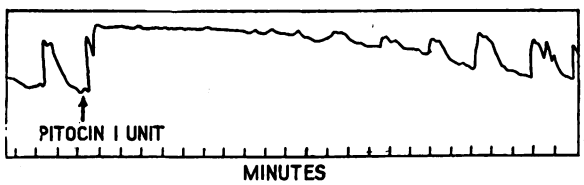

FIG. 4—Effect of pitocin unit on non-gravid human uterus on 1st day of menstrual cycle.

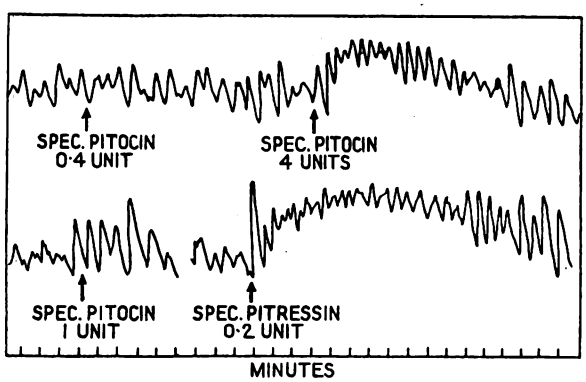

FIG. 6—Effects of minimal doses of special samples of pitressin and of pitocin on non-gravid human uterus on 26th day of menstrual cycle.

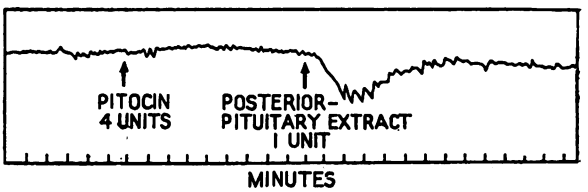

FIG. 8—Effects of pitocin and of posterior-pituitary extract on the uterus of an amenorrhœic patient treated with œstradiol benzoate.

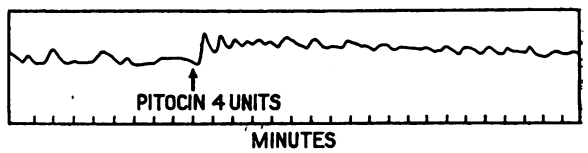

FIG. 5—Effect of pitocin units on non-gravid human uterus on 26th day of menstrual cycle.

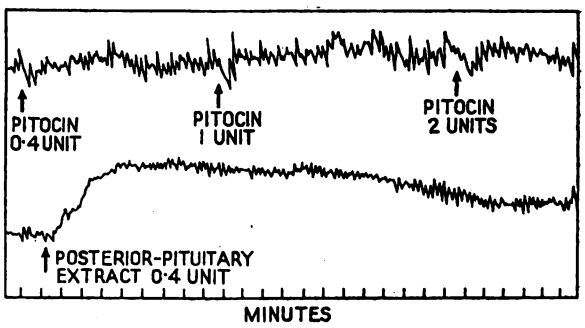

FIG. 7.—Effects of posterior-pituitary extract and of different doses of pitocin on non-gravid human uterus on 19th day of menstrual cycle.

REACTIONS OF HUMAN NON-PREGNANT UTERUS TO POSTERIOR-PITUITARY EXTRACT AND ITS FRACTIONS

Day of cycle	Days before next menstruation	Endometrium: histological findings	Intra-uterine pressure (mm. Hg)	Reaction to posterior-pituitary extract (Units)			Reaction to pitressin (Units)		Reaction to pitocin (Units)		
				0·2	0·4	1·0	0·2	0·4	0·4	1·0	4·0
1st	..	Menstrual	40	..	..	..	..	..	?	+	..
2nd	28	,,	66	..	..	..	..	..	..	±	..
3rd	23	,,	62	..	..	..	..	..	..	+	..
4th	..	,,	72	..	..	..	..	+	?	..	..
,,	..	,,	28	..	..	..	+	..	..	..	..
5th	..	Not examined	62	..	+	..	..	..	..	..	..
6th	18	,, ,,	80	..	+	..	..	..	−	−	..
7th	..	,, ,,	..	..	..	+	..	..	..	..	..
9th	17	Interval	70	+	+	..	..	..	..	−	+
,,	15	,,	40	..	+	..	..	..	..	?	+(2·5)
10th	..	Early premenstrual	76	..	±	..	..	..	..	−	+
13th	..	Not examined	52	..	..	+(2·0)	..	..	..	..	..
14th	..	Interval	40	..	..	..	+	..	..	..	..
17th	14	Early premenstrual	27	..	+	..	..	+	−	?	..
19th	14	Interval	58	..	+	..	..	..	=	=	..
24th	6	Premenstrual	85	+	..	..	..	..	..	−	..
30th	5	,,	60	..	..	..	+	..	..	..	..
26th	..	,,	90	..	..	..	..	..	..	−	+
,,	3	,,	73	..	..	..	+	..	−	−	+
,,	..	,,	66	+	..	..	..	..	..	..	..
25th	2	,,	80	..	+	..	..	..	..	..	..
23rd	1	,,	70	..	+	..	..	..	..	?	..
29th	1	,,	40	..	..	..	− (0·01) + (0·04)	..	?	+	..
30th	1	,,	40	..	..	..	..	..	−	?	..
33rd	1	,,	80	..	+	..	..	..	−	..	..
28th	..	Not examined	..	..	..	+	..	..	..	..	..
,,	..	Premenstrual	73	..	..	..	..	+	−	..	+
29th	0	,,	47	..	+	..	+	..	−	..	..

+ = sustained contraction. + (2·0) = contraction after 2·0 units. ± = increased amplitude of rhythmic contractions.
− = no response. = = relaxation. ? = response doubtful.

In one instance pitocin not only did not elicit a contraction but also caused slight relaxation of the uterus. This observation was made on the nineteenth day of the cycle, fourteen days before the next menstrual period.

Pitocin 0·4 unit, 1·0 unit, and 2·0 units caused transient relaxation of the uterus, whereas 0·4 unit of posterior-pituitary extract produced a sustained contraction (fig. 7). The same action of pitocin was shown by four of the thirty-two tracings obtained when the uterus did not respond to posterior-pituitary extract. Slight relaxation of the uterus took place after doses of 1·0–4·0 units of pitocin. This result did not follow a dose of 0·4 unit of posterior-pituitary extract.

DISCUSSION

In assessing the validity of the results it is necessary to consider what influence the method of recording may have had on the responses. Investigators who have worked with the rabbit uterus, notably Knaus (1935) and Reynolds (1939), have called in question results obtained with the human uterus in which the pressure was above 20 mm. Hg. They considered that the stretching of the wall accentuated the spontaneous movements and altered the responses to hormones. Bell (1939b), on the other hand, has found that the rabbit uterus in pseudopregnancy, which "has long been described as being quiescent," shows large contractions when it is "unloaded." In the present investigation the pressure was varied during the course of certain experiments, and it was found that the spontaneous movements were not altered in type. When dealing with a thick muscular organ like the human uterus, it was found that distension was not readily produced, and a pressure above 20 mm. Hg was considered necessary to ensure that there was sufficient fluid in the bag to record the movements. At the end of the experiment the tube connected to the bag was clipped, and the condition of the bag on withdrawal was noted. In all the experiments the pressure must have been borne by the uterine wall, for the bag was always less distended inside the uterus than it would have been outside under the same pressure. Contrary to the opinions of Knaus (1935) and Reynolds (1939), it was found that distension of the bag was not always associated with spontaneous movements of the uterus or with response to the posterior-pituitary hormones. Large spontaneous movements could be recorded without the bag

being distended, and in one instance the uterus promptly responded to pitressin although the intra-uterine pressure was only 28 mm. Hg. Therefore the stretching of the uterine wall was not the factor which determined the type of spontaneous movement or the response. It was suggested by Knaus (1935) that, when the uterus was distended, the vascular network in the wall was stretched, and that it, and not the myometrium, responded to vasopressin. If that were the case, however, the uterus should have responded at all times in the cycle when the pressure was raised sufficiently to separate its walls.

A further interesting observation on the response of the uterus was made in the course of tests on patients with amenorrhœa.

A patient had not menstruated since the birth of a child 1 year and 10 months before. The endometrium was atrophic. Spontaneous movements could not be demonstrated, but after a course of œstradiol benzoate (40 mg. during six weeks) small movements appeared. Pitocin 4·0 units had no effect, but 1·0 unit of posterior-pituitary extract caused relaxation (fig. 8). The intra-uterine bag was distended when withdrawn. The relaxation was presumably due to the vasopressin content of the pituitary extract, and the experiment showed that stretching of the uterine wall did not always lead to a contraction in response to the hormone.

A relaxation in response to pitressin was noted by Robson (1936) in the rabbit uterus and by Robson and Schild (1938) in the cat uterus. Bell (1939a) has also observed the same reaction in the macacus uterus.

That vasopressin might cause contraction of the uterine muscle indirectly through its ischæmic action had also to be considered. Bourne and Burn (1928) noted that 15–25 min. after the injection of pitressin the parturient uterus relaxed after its contractions more slowly than previously. The fact that the non-gravid uterus promptly responded to an injection of pitressin makes an indirect action unlikely. Robson and Schild (1938) have shown that in the non-pregnant cat uterus vasoconstriction appears to be accompanied by muscular inhibition.

It was also possible that the responses to pitressin were due to nervous stimulation of the uterus. Robertson (1939) found that various nervous stimuli might cause contraction of the uterus, but such contractions were not of the sustained type noted in this investigation.

The conclusion, therefore, seems inevitable that the normal action of posterior-pituitary extract on the myometrium has been observed, for other factors which might have determined the response can be excluded, and that the non-gravid human uterus is caused to contract by the vasopressor and not at all by the oxytocic hormone. It cannot be inferred that the gravid uterus reacts similarly. Consequently, it is desirable that the response of the uterus to oxytocin and vasopressin should be measured at various times throughout the course of pregnancy.

SUMMARY

The uterine contractions in a series of normal women were recorded with an intra-uterine bag.

The reactivity of the uterus to posterior-pituitary extract and its fractions was determined by finding the minimal effective doses of these at various stages of the menstrual cycle.

The uterus responded to posterior-pituitary extract immediately before and during menstruation and in the early interval part of the cycle.

The non-gravid human uterus is caused to contract by vasopressin and not at all by oxytocin.

I wish to thank Prof. E. P. Cathcart, of Glasgow University, for use of apparatus from the physiological department; Mr. Donald McIntyre for kind assistance in the preparation of the manuscript; Dr. J. S. White, of Messrs. Parke, Davis and Co., for supply of pitocin and pitressin; and Dr. A. N. Macbeth, of Organon Laboratories, for supply of Dimenformon (œstradiol benzoate).

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INTRAVENOUS INJECTION OF OXYGEN

UNDER NORMAL ATMOSPHERIC PRESSURE

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MANY attempts have been made in anoxæmia to oxygenate the blood by extrapulmonary routes. The rate of absorption of oxygen from the subcutaneous tissues and the peritoneal cavity is too small to be of any practical value (Singh 1932, 1934). Oxygen was injected intravenously into dogs by Nysten (1811), Demarquay (1866), Gaertner (1902), and Stuertz (1904). Mariani (1902) injected 80 c.cm. of oxygen in half an hour into a dying phthisical patient, and Tunnicliffe and Stebbing (1916), who reviewed the work of the earlier observers, gave small quantities of oxygen intravenously to three patients. The amount given was 10–20 c.cm. a minute for periods of 10–15 min. divided by pauses of 2–3 min. Singh (1935) administered oxygen intravenously to dogs, cats, and rabbits and showed that, if the atmospheric pressure was increased, the quantity of oxygen injected intravenously could be considerably increased, and it was possible to keep a dog alive for 16 min. without breathing oxygen through the lungs.

These last experiments have been extended to human beings, and in six cases oxygen has been administered intravenously under normal atmospheric pressure. These experiments are to be repeated with the patient under increased atmospheric pressure.

METHODS

Oxygen was either obtained from a cylinder or prepared by electrolysing a 10 per cent. solution of sodium hydroxide. It was injected into the veins of the leg with an airtight Collin's syringe worked by turning a screw; a double syringe was also used, so that, while one was emptied, the other filled with oxygen. Ususally there was a pause of 5–10 sec. after the injection of every 20 c.cm. of oxygen. The vein was punctured with a hypodermic needle to which were attached a mercury manometer and a burette filled with saline. Before the oxygen was injected, saline was run into the vein to wash away any blood which

might otherwise coagulate and block the needle. The manometer measured the venous pressure, and the oxygen to be injected was subjected to a slightly greater pressure; any blockage of the needle was indicated by the manometer. Oxygen from a cylinder was also bubbled through water and injected directly into the vein, the rate of injection being determined by counting the number of bubbles a minute. Since the rate of injection could not be accurately adjusted and was variable, this method was apt to produce pulmonary embolism. After injection of every 20 c.cm. of oxygen, the blood-pressure, pulse-rate, and respiration-rate were recorded.

RESULTS

Oxygen was injected intravenously in six cases of pneumonia or of bronchopneumonia. Since the method is still in the experimental stage, advanced cases were used in five experiments and a moderately severe case in the sixth experiment. The first five patients died of the disease four or five days after injection, and the sixth patient recovered.

The signs and symptoms of pulmonary gas embolism are the same as in animals (Singh 1936). With slight embolism there is a rise in blood-pressure and pulse-rate; this does not indicate any danger, and the oxygen should not be withheld. With a greater degree of embolism the blood-pressure falls, the pulse becomes feeble, and cyanosis increases. The patient complains of a sense of impending dissolution, uneasiness over the chest, shortness of breath, and pain over the precordial region. Oxygen embolism, however, unless carried to extreme, is not dangerous.

Oxygen from a cylinder which is likely to contain slight impurities, could be injected at the rate of 10 c.cm. a minute without causing any change in pulse-rate or in blood-pressure; 15–20 c.cm. produced a rise in blood-pressure and pulse-rate. Pure oxygen, prepared electrolytically, could be injected at the rate of 20 c.cm. a minute without any untoward effect.

The results are summarised in table I. Table II shows the results of the case of a patient receiving 20 c.cm. of cylinder oxygen a minute, and showing signs of pulmonary embolism. Table III shows the effect of injection of pure oxygen at the rate of 20 c.cm. a minute. All these cases showed clinical improvement for twenty-four to forty-eight hours after injection, as indicated by raised blood-pressure and improved pulse. The sixth patient, who received pure oxygen and was only moderately ill, showed a great improvement and "asked for more."

TABLE I—RESULTS OF INJECTING OXYGEN INTRAVENOUSLY IN PNEUMONIA OR IN BRONCHOPNEUMONIA

Case	Rate of injection of oxygen (c.cm. a minute)	Total oxygen injected (c.cm.)	Type of oxygen used	Signs of pulmonary embolism
1	5	145	Cylinder	Absent
2	10	310	,,	,,
3	15	315	,,	Slight
4	20	290	,,	Present
5	20	240	,,	,,
6	20	355	Pure	Absent

TABLE II—INJECTION OF CYLINDER OXYGEN

Patient, aged 35, admitted with six days' fever and cough.
Diagnosis: apical pneumonia.
Rate of injection of oxygen: 20 c.cm. a minute.

Amount of oxygen injected (c.cm)	Blood-pressure		Pulse-rate	Respiration-rate
	Systolic	Diastolic		
0	95	65	134	40
10	95	65	128	—
30	85	70	120	48
50	130	90	136	52
70	130	95	130	50
90	140	95	130	52
110	140	90	140	54
130	125	85	136	54
150	125	85	140	52
170	95	70	128	38
190	95	70	128	38
210	95	70	—	38
230	105	85	—	36
250	115	90	—	38
270	115	90	130	40
290	120	90	128	40

Signs of constriction in the chest; patient became restless; and injection discontinued. Distinct clinical improvement, but patient died after 7 days.

TABLE III—INJECTION OF PURE OXYGEN

Patient, aged 24, admitted with 15 days' pain in the chest, cough, and fever.
Diagnosis: bronchopneumonia.
Temperature 101° F., pulse-rate 122, respiration-rate 36.
Moderate cyanosis.

Amount of oxygen injected (c.cm.)	Blood-pressure		Pulse-rate	Respiration-rate
	Systolic	Diastolic		
0	105	65	136	48
15	90	65	132	42
35	90	68	132	44
55	100	68	—	—
75	115	70	130	50
95	120	70	130	40
115	120	70	132	—
135	110	70	—	—
155	105	65	130	40
175	105	65	134	42
195	115	65	138	42
215	110	65	132	40
235	110	65	136	44
255	105	65	130	42
275	105	65	128	—
295	105	65	130	40
315	105	65	130	42
335	100	65	134	—
355	105	65	136	42

Patient had some cough during injection, which was probably the cause of variations in blood-pressure. Much improvement followed.

SUMMARY

In man about 10 to 20 c.cm. of oxygen a minute can be administered intravenously; this is about 10 per cent. of the basal requirement. This is the only method by which any considerable quantities of oxygen can be administered by an extrapulmonary route. This amount of oxygen does not appear to be considerable, but still a distinct clinical improvement follows its administration. These experiments are to be performed under increased atmospheric pressure, and it is expected to administer much larger quantities of oxygen.

We wish to thank Dr. Jivraj N. Metha, dean of the King Edward Memorial Hospital, and Lieut.-Colonel S. S. Sokhey, I.M.S., director of the Haffkine Institute, Bombay, for the necessary facilities.

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RUPTURE OF A BRANCH OF THE SPLENIC ARTERY

ASSOCIATED WITH PREGNANCY

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CASES of rupture of the splenic artery, or more usually of an aneurysm of the splenic artery, in association with childbirth are very rare. We can only find seven cases recorded, and all of these were fatal. In the following case splenectomy was followed by recovery.

CASE-RECORD

A primigravida, aged 22, was attending the antenatal department at St. Mary's Hospital. When seen on Nov. 23, 1938, she was about 28 weeks pregnant and in good health. On the 26th, at 7.30 P.M., while clearing the table, she vomited. She complained of no pain and felt perfectly well at this time. Later she went out, and at 9.30 P.M., while in a violent fit of laughter, she experienced severe pain in the upper abdomen and nausea. She was taken home and was seen by her doctor, who made a tentative diagnosis of concealed accidental hæmorrhage, gave gr. ¼ of morphia, and she arrived at St. Mary's Hospital at midnight.

On admission she was pale, cold, and extremely collapsed. Respirations were shallow and the pulse was not palpable at the wrist. The heart-rate was 120. Abdominal palpitation showed a uterus enlarged to the size of a 28-week pregnancy, and fœtal parts could be readily felt. There was generalised abdominal tenderness, with an area of extreme tenderness over the left upper quadrant. The presence of free fluid in the upper abdomen, though suspected, was difficult to determine owing to the enlarged uterus. The heart-rate rose gradually to 140, and it was obvious that there was severe internal hæmorrhage. Preparations for blood-transfusion were made and immediate laparotomy decided on.

Operation.—The abdomen was opened by an incision in the middle line at the level of the umbilicus, and the peritoneal cavity was found to contain much blood. The uterus and tubes were found to be normal, but a mass the size of a cricket ball could be felt in the upper abdomen. On extending the incision up to the xiphisternum this was found to be a large hæmatoma of the small sac. The enlarged uterus was then held forwards by an assistant, and the splenic area was explored. Blood was spurting from one of the vessels near the hilum of the spleen, but the enormous quantity of free blood made examination difficult. The splenic vessels were clamped, and splenectomy was performed. The spleen was abnormally attached by adhesions to the diaphragm. The splenic bed was packed with ribbon gauze brought out through a rubber tube in the left flank, just below the costal margin, and the abdomen was closed. At the start of the operation the patient received 660 c.cm. of citrated blood, followed by an intravenous infusion of 750 c.cm. of saline. At the end of the operation the patient's condition had improved considerably. On her return to the ward a further 200 c.cm. of blood was given by intravenous-drip transfusion, and at 10.30 the next morning she was given a further 600 c.cm. of blood and 600 c.cm. of saline through a Rotunda syringe, after which a continuous glucose-saline drip-infusion was set up and continued for twenty-four hours (800 c.cm.).

Delivery and subsequent progress.—On the night of the 28th the patient went into labour. She was kept under Omnopon and scopolamine narcosis, and on the 30th, at 6.30 A.M., forceps were applied, and a macerated fœtus weighing 4 lb. 5 oz. was delivered. The third stage of labour was normal and the placenta came away without difficulty. During delivery the patient was given a further 400 c.cm. of blood. Two hours later she had a severe rigor, and in the afternoon vomiting began, due to an acute dilatation of the stomach, which contained 5½ pints of vivid green fluid. The stomach was aspirated and washed out with sodium bicarbonate, and a continuous intravenous glucose-saline drip was again instituted and maintained for forty-eight hours. The patient's condition rapidly improved, and she made an uninterrupted recovery. She was discharged to a convalescent home on Jan. 3, 1939, and she was in excellent health when seen a month later.

Pathological report.—"Size within normal dimensions. Vessels severed at the hilum. Ends appeared normal. The malpighian bodies have hyperplastic and frequently degenerative centres and in the pulp which has been congested neutrophile polymorphs are numerous. It is possible that besides enlargement due to pregnancy there was an element of infection."

Subsequent pregnancy.—The patient was again seen on August 22, 1939, and was found to be about 12 weeks pregnant. She attended the antenatal department of St. Mary's Hospital. The pregnancy was uneventful, and she was delivered of a healthy female child on March 5, 1940, after a normal labour.

DISCUSSION

Rupture of the splenic vessels or an aneurysmal dilatation of the splenic artery is a very rare complication of pregnancy and is, as a rule, rapidly fatal, the patient dying before operation can be performed. Of the seven cases which we have been able to collect not one recovered. In three cases the time between the onset of the first symptom and death was 10 min., ½ hr., and 1½ hr. Mayer (1928) goes so far as to remark that the condition is more of pathological than clinical interest. On the other hand, the cases reported by Bohler (1933), Wesenberg (1912), and Smith (1911) are similar to ours in that several hours intervened between the initial symptoms and the onset of collapse. During this interval Bohler's patient was able to carry on her work, and it is possible that she might have been saved had she been quicker to seek advice. His case is interesting in that the initial symptoms of epigastric pain and vomiting were brought on by only slight exertion—i.e., lifting a bowl of potatoes—after which the patient carried on until nine hours later, when she felt severe pain in the left hypochondrium and collapsed. Laparotomy was performed, the abdomen was full of blood, and, as in our case, a hæmatoma of the small sac was found, which was apparently responsible for the early symptoms. It is to be presumed that a vessel ruptured into the small sac, forming a hæmatoma, which later burst into the peritoneal cavity, producing symptoms of severe internal hæmorrhage. A third case, though not associated with pregnancy, reported by Fitzwilliams (1924), showed a similar pathology, and a prolonged interval of several hours elapsed before death. The formation of a hæmatoma in the small sac appears to be associated with a latent period before the fatal termination, and only in these cases has there been any chance of a successful operation. The cause of the condition in all cases appears to be some exertion, though admittedly sometimes indescribably slight.

In one of the recorded cases the accident took place during labour, after a forceps delivery, and in another after expulsion of the placenta. The other five took place in the latter half of pregnancy.

In six of the seven cases which we have been able to collect the catastrophe was due to the rupture of

an aneurysm of the splenic artery, the site of the aneurysm being usually on the main vessel just at its bifurcation. In the remaining case (Smith 1911) and in the case recorded here the cause was a rupture of one of the small branches of the splenic artery near the hilum of the spleen. The cause of the rupture in our case is difficult to determine, but it was probably due to the violent strain of coughing associated with the abnormal attachment of an enlarged spleen to the diaphragm.

SUMMARY

(1) Rupture of a splenic vessel in association with pregnancy is very rare. A case is described in which splenectomy was performed and recovery followed.

(2) In this case there was no evidence of any aneurysmal dilatation, though this was present in most of the cases reported.

(3) Usually there is a history of slight exertion preceding the catastrophe. The onset is sudden and the symptoms are those of severe intraperitoneal hæmorrhage and collapse, though in some cases the initial symptoms may be mild.

(4) Early diagnosis, immediate operation, and blood-transfusion give the only chance of recovery, but in most of the cases reported death ensued before such measures could be undertaken.

Our thanks are due to the student donors and especially to Dr. C. W. Morley, whose prompt and efficient blood-transfusions played such an important rôle in making the operation a success. We are also indebted to Prof. W. D. Newcomb for the pathological report and to all those who helped towards the successful termination of the case.

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MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF PROCTOLOGY

AT a meeting of this section on May 7, with Mr. J. P. LOCKHART-MUMMERY, the president, in the chair, a discussion on the surgical treatment of

Idiopathic Ulcerative Colitis

and its sequelæ was opened by Mr. L. E. C. NORBURY. The rectum, he said, was usually involved and the fæces and blood revealed no causative factor. Some cases could be cured by medical means, but most of them progressed to a chronic or fatal condition. There was loss of weight, anæmia, intermittent fever, griping and possibly pain in the rectum. Sigmoidoscopy did not usually show ulcers of any great size, but their floor might consist only of peritoneum. The gut was œdematous and raw, and sometimes narrowed by thickening of the wall produced by œdema or fibrosis. Columns of swollen mucosa appeared between the ulcers on lines corresponding to the tænial coli; these were perhaps accounted for by better blood-supply in these areas. The thickening interfered with the nerve-supply. Usually the whole colon was involved. Multiple polypoid excrescences appeared during the healing stage. The treatment he preferred was appendicostomy as a means of approach for colon irrigation and the application of medicaments. Of 27 cases so treated during the last ten years 4 had died but the others had shown steady improvement, with gradual return of the mucous membrane to normal in most instances. One patient had had her operation thirteen years ago; after three years she had an acute recrudescence suggesting perforation; this had been successfully treated through the existing appendicostomy. He pleaded for the use of this method in earlier and less acute cases. Irrigation from the upper end was obviously better than irrigation per rectum against the stream, and "high colonic irrigation" was a fallacy; the tube merely curled up in the rectum and might seriously damage the diseased bowel wall. Moreover, the process was tedious, and required expert knowledge and skill. The patient with an appendicostomy could irrigate himself with ease. Local anæsthesia and a small muscle-splitting incision sufficed. The blood-supply to the appendix must be carefully preserved, and it should be left unopened for a week; often its lumen became greatly distended during this period. If the valve of Gerlach could be preserved there was much less tendency to leakage of fæces. The appendicostomy should not be closed, because of the liability to relapse; it was kept open by catheterisation night and morning, but if there was a protruding button there was no tendency to spontaneous closure. For irrigation, warm normal saline or hypotonic saline might be used, or a mixture of sodium chloride, sodium bicarbonate and sodium biborate. Olive oil and crude cod-liver oil were useful. Sigmoidoscopy was used from time to time to test progress.

A cæcostomy could be formed if the appendix was not available, but this always required a plug to prevent leakage and closure. Ileostomy seemed indicated in severe toxic cases with distension, and where appendicostomy had failed; it should be as low as possible. "Once an ileostomy always an ileostomy" was an apt dictum. When anæmia was severe, blood-transfusion was useful. Colectomy seemed to be unnecessary in the early stages and dangerous in the late. The rectum was not healthy enough for anastomosis. Infective foci in tonsils, teeth and other areas should never be forgotten. Sequelæ included perforation, pericolic abscess, fistula-in-ano, fissure, colitis, polyposa, stricture, and toxic complications such as rheumatism. Ischiorectal abscesses should be treated by simple incision, the resulting fistula being left until the bowel was healthier. Operation should not be performed for perforation, since other ulcers would probably perforate if the colon was handled when it was in this precarious condition. Radiograms of the filled colon showed a rigid œdematous bowel without haustral segmentation and with angular flexures. Appendicostomy could be regarded as a life-saving, simple and safe procedure in many cases. It was a valuable adjunct to medical treatment.

Mr. W. H. OGILVIE thought that operations to assist medical treatment had little place in the management of ulcerative colitis; surgical treatment was essentially destructive and came in where medicine could not succeed. Appendicostomy did not rest the colon or allow lavage that was notably superior to washing-out from below. Undoubtedly a certain number of cases recovered, and this was a remarkable thing when the bacterial content and high pressure in the colon were considered. How it could function with fibrous walls and a lining reduced to a single layer of cells was almost beyond comprehension. Surgery should

be invoked before months of fighting a losing battle had left the patient exsanguinated and exhausted. Absolute indications for surgery were stricture, polyposis, and fistulæ, especially ischio-rectal fistulæ. Presumptive indications were severe blood loss, a year's unsuccessful bed treatment, a fourth relapse, and segmental distribution of the disease. Surgical treatment consisted of exclusion, excision and restoration. When no pabulum reached the colon, the bowel soon recovered. Excision was only necessary when restoration was possible, which it very seldom was. Exclusion ileostomy was to be recommended, and colectomy followed at the time of choice. The third stage—implantation of the ileum into the rectum—should only be undertaken when the patient was really well and the rectum was soft and healed, and the ileal fæces were solid enough not to embarrass it. If restoration of defæcation was going to be impossible, colectomy was pointless. It was no use implanting an ileum into an ulcerated rectum. Thus, ileostomy in most cases was the whole treatment of ulcerative colitis. Of 17 cases on whom he had performed this operation, 7 had died and 8 had a permanent ileostomy. He had ceased bringing both ends of the ileum to the surface; an excluded colon recovered better without lavage than with it. Moreover, it made mobilisation of the cæcum for subsequent colectomy more difficult. The ileum managed the alien function of water absorption quite well even if the colon was left in the body; it seemed to be governed by the last few inches of the ileum, which should therefore be cut as close to the cæcum as possible. A rubber tube was inserted to keep the incision clean and the lumen patent. Prolapse later could be stopped by cutting the ileum flush and suturing direct to mucous membrane. For the initial soreness of the skin, aluminium paste and Fuller's earth were useful.

Mr. W. B. GABRIEL urged the importance of distinguishing the various stages of the disease and the extreme variations in the patient's general condition. The worst cases were hopeless, whatever the treatment applied. Spasm was important; it might occur from repeated emotional disturbances in nervous people, from deficiency of vitamins A and B, from dysentery toxins and from trauma. Prolonged spasm caused anæmia, œdema and ulceration. This made early treatment all the more urgent. Surgical treatment was indicated for severe loss of blood without permanent benefit from transfusion, for toxæmia with evening pyrexia, dry tongue and rapid pulse; for frequent disturbing motions day and night; in the fulminating type, and when medical treatment failed to benefit a patient who went progressively downhill with increasing anæmia. Appendicostomy was the best, safest, easiest and most rational technique; it should be combined with suitable medical treatment and transfusion. One of its chief features was the instillation of oil at night and a washout in the morning. All the other medical treatments, such as low-residue diet and vitamin administration must be applied and required careful supervision. Of 25 cases so treated only 2 had failed, because of sloughing or fibrosis of the appendix; 10 had shown very good and 5 fair results; 5 had died unrelieved and 3 who had improved at the time had not been traced. Appendicostomy was particularly successful in young subjects of twenty-five or less.

Sir ARTHUR HURST thought that the attribution of ulcerative colitis to spasm was entirely fallacious; spasm was a very common neurosis and was not followed by colitis; any inflamed colon would go into spasm. He would like it to be realised that there was such a thing as medical treatment, and that if a doctor had enough cases he would find that the majority would get well. Many of them showed normal sigmoidoscopic appearances. He agreed with Mr. Ogilvie that appendicostomy was no use. No elaborate lavage was needed; an inch of soft catheter in the rectum would wash the cæcum out and the colon could be rendered absolutely clean. Olive oil was useful in the stomach because it inhibited gastric secretion, but in the colon it decomposed and became irritant. Short-circuiting alone might be of great value when there was a stricture. Colectomy was important in the uncommon regional type of colitis; it could then remove diseased bowel and leave normal bowel behind; sometimes it wholly removed a bowel infection. But in most cases the best surgical treatment was ileostomy. If an opaque meal showed exceptionally rapid passage through the ileum the operation should not be performed without preliminary treatment; if this precaution were taken the stools would not be too fluid. He preferred a double-barrelled ileostomy, with the idea of ultimate anastomosis. Patients managed to deal very well with permanent ileostomies, and lived active and vigorous lives.

The PRESIDENT had used appendicostomy in 44 cases, of which 21 had been cured, 16 relieved, and 7 had died. Ulcerative colitis in children under twelve was almost hopeless. He still thought there was a useful place for appendicostomy in these cases. He showed a series of slides illustrating stricture.

Mr. R. S. CORBETT described some cases treated by terminal ileostomy after failure of medical treatment. He suggested that some of those who died after appendicostomy would have survived if ileostomy had been performed. He advised ileostomy in certain (but not all) fulminating adult cases with diarrhœa, wasting, high fever, tachycardia and anæmia, and in recurrent cases failing to respond to medical treatment. A terminal ileostomy was better than one in continuity or a double-barrelled one. Washing-out was not performed. Dehydration had not caused any trouble. In all cases the division had been at a point about six inches from the ileo-cæcal junction, and semi-solid motions were eventually established. The skin was best preserved by keeping the bowel completely closed with a clamp for 48 hours and then inserting a Paul's tube, but even then the skin became excoriated as soon as the ileal contents touched it. Gauze impregnated with vaseline was as useful as anything.

Dr. S. W. PATTERSON emphasised the tendency to relapse. At Ruthin the medical treatment was always continued during surgical convalescence. Of 48 cases treated there, 9 had died and 8 had been operated on, with 1 death. The indications for surgery were ischiorectal abscess, a need to wash the colon from above and to get rid of an affected area.

Mr. M. J. SMYTH spoke of 2 cases in children, aged seven and twelve, in which he had performed appendicostomy with success. In 2 adults also he had had satisfactory results. He had found cod-liver oil difficult to get into the bowel; it had to be emulsified.

Mr. E. T. C. MILLIGAN differentiated between the granula and ulcerative types of the disease; they could be distinguished by the sigmoidoscope. The tubular glands or their stumps were always present, and there was no spasm or toxæmia in the granular type. When there was no ulceration there was always complete resolution in time. Self-pity, resentment and fear could therefore be got rid of with profit all round.

Mr. NAUNTON MORGAN thought that some granular cases became ulcerative. A patient might get better with an appendicostomy and beg for closure; procto-

colitis then recurred immediately. His symptoms would disappear in a week after the appendicostomy was re-opened, though the signs remained. When the colon was unlikely to recover an ileostomy was indicated. Regional colitis was seldom operable, as it developed into diffuse ulcerative colitis. He did not like putting a tube into an ileostomy; he preferred "tulle gras." Recently a cup of collodion and wool had been described; this was put close to the ileostomy and a sucker kept it dry. Many granular cases recovered without any treatment at all.

Mr. DICKSON WRIGHT agreed with the danger of necrosis from the use of tubes in ileostomies. He always left them unopened for a time. An abscess was often the end of the patient. Severe crippling arthritis complicating colitis might do well after colectomy. He had given up appendicostomy entirely; medical treatment should be pursued to the last degree; often patients recovered almost from the gate of death.

Mr. O. V. LLOYD-DAVIES agreed on the importance of distinguishing between the two types. The granular type showed so many relapses and remissions that the estimation of cure was often falsified. He preferred ileostomy when medical measures failed. He did not know what washouts really did.

REVIEWS OF BOOKS

Virus Diseases of Man

By C. E. VAN ROOYEN, M.D. Edin., Sir Halley Stewart research fellow, lecturer in bacteriology in the University of Edinburgh; and A. J. RHODES, M.B. Edin., M.R.C.P.E., lecturer in bacteriology in the University. London: Humphrey Milford, Oxford University Press. 1940. Pp. 932. 63*s*.

RESEARCH on viruses has now mostly been suspended, at any rate in Europe, and the lull provides a useful opportunity for taking stock of the vast mass of facts accumulated during the past twenty years. No less than thirty-four virus infections are described in this book, and even then one or two, such as camel-pox and horse-pox, are unmentioned. In addition, there are chapters on the microscopical examination and staining of elementary bodies, filtration and centrifugation, inclusion bodies, serological technique, methods of tissue culture, and the use of the developing egg in virus studies. Although it is as yet impossible to give a scientific classification of viruses, it seems a pity to separate zoster and varicella by more than a hundred pages while placing zoster and herpes febrilis side by side. In so vast a work it would, of course, be easy to find minutiæ at which to cavil. The hoary heresy, for instance, that Africans possess a racial immunity to yellow fever is again trotted out, as is the suggestion long since disproved that dengue confers an immunity against yellow fever. Incidentally, both yellow fever and dengue are associated with a leucopenia. There are some contradictory statements. On page 412, for instance, evidence is brought forward in favour of the view that Rift Valley fever is present in Uganda, the Sudan and French Equatorial Africa, as well as in Kenya, but on page 516 it is stated that there is no reason to believe that the disease exists outside Kenya. Despite minor blemishes, the book will be an asset to those engaged in virus researches; it should also be studied by those who have to deal with the public-health aspects of virus diseases and the practising physician both at home and in the tropics. In a future edition a separate author index would increase the value of the book, while to the photographs of J. B. Buist and Joseph Meister might be added those of other pioneers in this field.

Pathology of Internal Diseases

(3rd ed.) By WILLIAM BOYD, M.D. Edin., F.R.C.P., professor of pathology in the University of Toronto. London: Henry Kimpton. 1940. Pp. 874. 45*s*.

EVEN when we consider how much there has been to choose from in the last five years the amount of new material included in this edition is surprisingly large. Fiedler's myocarditis and the "Fleckmilz" of Feitis, the prevention of silicosis, and vitamin K in jaundiced patients are subjects of varying importance but there is something new to tell about all of them. Professor Boyd has also rewritten several sections, such as those on Addison's disease, on the iron-deficiency anæmias and on the ætiology of glomerulonephritis; he has included many fresh illustrations, but the most comforting feature is that the book actually has fewer pages than the previous edition. It is very much harder to select and to find a new viewpoint than to include every detail of pathological thought, and in choosing the more difficult task Professor Boyd has given us a well-balanced and sound system of teaching. There are, necessarily, subjects on which the expert will feel that too little or too much has been said and not everyone in this country will agree that actinomycosis is never spread by the blood-stream. But the student welcomes even comparative brevity in his textbooks and he values more the imaginative phrase which replaces a passage of dull minutiæ. The classified list of references at the end of each section is another reason why this book is justly popular as a demonstration that medicine and pathology have no frontier.

Manual of Fractures, Dislocations and Epiphyseal Separations

By HARRY C. W. S. DE BRUN, M.D., F.A.C.S., adjunct professor of surgery, New York Polyclinic medical school and hospital. Chicago: The Year Book Publishers; London: H. K. Lewis and Co. 1940. Pp. 468. 17*s*. 6*d*.

Dr. de Brun has had a long and wide experience of fractures, and he has summarised it here for the benefit of students and practitioners. He describes several methods of treating most fractures, which in a book of this kind is not always an advantage, particularly since he seems deliberately to avoid laying down indications for the employment of any particular method. This is particularly true in regard to operative treatment which he advocates far more often than would be thought advisable in this country, and approaches in an uncommonly light-hearted fashion. In discussing Smith's fracture, for instance, he remarks that although closed reduction has been attempted practically all of them ultimately required open operation. In the section on fractured clavicle Dr. de Brun says that "eleven per cent. of all fractures are of this bone, generally in children. Adults usually have acromio-clavicular separations," which is certainly not the experience of surgeons here. While there is undoubtedly a great deal of useful information in this manual, it is not put together in a way calculated to appeal to students or practitioners in this country.

Clinical Methods

(11th ed.) By Sir ROBERT HUTCHISON, Bt., M.D. Edin., P.R.C.P., consulting physician to the London Hospital and to the Hospital for Sick Children, Great Ormond Street; and DONALD HUNTER, M.D. Lond., F.R.C.P., physician to the London Hospital. London: Cassell and Co. 1940. Pp. 622. 13*s.* 6*d.*

IN 43 years this little book has been printed 40 times; it must be near the record. In the new edition the authors have wisely discarded certain out-of-date sections, and in spite of additions to the chapters on bacteriological and biochemical investigations and the circulatory, alimentary and respiratory systems the book is smaller than it was. In view of the number of elementary and advanced books on chemical methods available to students, some of the more detailed biochemical methods of blood and urine analysis might be replaced by the clinical interpretations of such investigations as the glucose-tolerance test and the sedimentation-rate and by further information on the interpretation of the van den Bergh reaction. In the chapter on urine, too, the urea-concentration test and the phenol-sulphonephthalein test might give way to the simple and equally efficient renal tests which are devoid of any chemical analysis, such as the water-elimination and urine-concentration test.

The book still stands supreme as the student's guide to the practical side of medicine.

British Encyclopædia of Medical Practice

Cumulative Supplement; Surveys and Abstracts. Edited by Sir HUMPHRY ROLLESTON, Bt., M.D., emeritus regius professor of physic, Cambridge. London: Butterworth and Co. 1940. Pp. 170 and 605. 25*s.* (2 vols.).

WHEN everything beginning with Z has been considered an encyclopædia will inevitably come to an end. But if it is a medical one its definitions and descriptions must constantly be amended and added to as knowledge grows; otherwise it will soon be seriously misleading. Hence this supplement. The first volume brings the subjects already dealt with in the encyclopædia up to date, and key numbers make reference easy between this and the parent volumes. A new cumulative volume will be issued annually, so that it will only be necessary to consult one or perhaps two books to find the latest information on the desired subject. The second and larger volume contains critical surveys on certain branches of medical science, a section on modern drugs, and selected abstracts from British and foreign literature of the past year. The abstracts are arranged alphabetically, as far as possible on the plan used in the encyclopædia. The supplement will undoubtedly be useful to students and practitioners, to research workers for quick reference and to others who write medical papers. But perhaps its happiest place will be in the hands of the haphazard reader. To read a short paragraph on encephalitis epidemica, to turn a page or two and read a little on the eye, hereditary diseases and so on is a pleasant way of spending an odd half-hour. As Mark Twain's miner said of Dr. Johnson's dictionary, the book contains much good reading if the plot is a trifle disconnected.

Le guide thérapeutique du médecin praticien

Vol. V. *Les maladies nerveuses et mentales.* By JEAN TRABAUD, professeur de clinique médicale; and J. R. TRABAUD, ex-interne de l'hôpital Péan. Paris: Vigot Frères. 1940. Pp. 253. 7*s.* 6*d.*

THIS book is described as a therapeutic guide, but it is in fact an encyclopædia of treatment, where lists of elegant prescriptions, physiotherapeutic methods and fashionable spas have a prominent place. When the practitioner despairs of a case of progressive neurological disease he will find useful advice here as to the alleviation of symptoms and the management of the patient or his household, but he will be disappointed if he hopes for any critical selection of the material offered. The causal abnormality and its treatment seems sometimes to take a second place among the authors' enthusiasms. For instance, the surgical removal of a protruded intervertebral disc is not mentioned under lumbago and sciatica, although over a dozen spas are recommended; six polyglandular preparations are mentioned under the treatment of eosinophil adenomas of the pituitary gland, while surgery is dismissed in two lines; and faradism is said to benefit the myopathies. But in spite of these idiosyncrasies there is serviceable material for the neurologist and psychiatrist in this little book.

Law for Hospital Authorities

By Captain J. E. STONE, F.S.A.A., F.R.Econ.S., consultant on hospital finance, King Edward's Hospital Fund for London. London: Faber and Faber. 1940. Pp. 488. 30*s.*

No hospital administrator can afford to be indifferent to the changing status of hospitals and legislation as it affects them, and there is an obvious need for a practical treatise such as this, written by an authority on hospital administration and finance. The book starts with a definition and classification of hospitals followed by a survey of statutes dealing with local-authority hospitals. There are 46 pages on the liability of hospital authorities for wrongs; deaths, inquests and post-mortems, the nature in law of charitable gifts, the law and procedure of hospital meetings, hospital insurances, incorporation of hospitals, paying patients, and the general law of contract and national health insurance are all discussed in detail and adequately indexed. The book ends with 100 pages of appendices containing valuable forms and instructive examples of various documents and memoranda.

Perhaps the book would have gained in importance if Captain Stone had collaborated with a lawyer in preparing it. More light might then have been thrown on obscure points—for instance, after reading the pages on post-mortem examinations and dissections one is still left in doubt as to whether a hospital can legally perform an after-death examination. Sir William Baynes has clearly laid down that it is not necessary to obtain the actual permission of anyone to make a post-mortem examination; it is the business of a relative to object if he wishes to prevent it. All that a hospital need do is to wait a reasonable time before making one.

Tooth Form

Drawing and Carving. By RUSSELL C. WHEELER, D.D.S., F.A.C.D., associate professor of dental anatomy, St. Louis University school of dentistry. London: W. B. Saunders Co. 1939. Pp. 71. 12*s.* 6*d.*

THIS is a book for the dental student and his teachers, not for the anatomist. The anatomist is particularly interested in variations of form, but Dr. Wheeler has aimed at devising standards of average tooth form which are compatible with one another, so that the dental student can carve specimens for himself which when assembled in their correct relationship will come into contact just as natural teeth do. Much of the book is about the carving of enlarged models of teeth from plaster, an exercise widely practised. As a practical manual of tooth carving it should be useful, and the clear, brief text and excellent illustrations will commend it.

THE LANCET

LONDON: SATURDAY, MAY 18, 1940

PHYSIOLOGY AND THE SURGEON

THE surgeon, whatever his attainments, is above all a craftsman. He is concerned with the treatment of disease by manual processes and may count himself fortunate that the diseases coming to him for treatment are usually curable and not merely palliable, and that the manual processes by which he treats them are skilled, varied and intensely interesting. But though the practical side of surgery is so important that training in handicraft must always loom largely in surgical apprenticeship it is no more than the basis of the art. The patient does not come to the surgeon to have some standard technical procedure done upon his body, as he takes his car to a service station to have the grease-points injected and the batteries topped up. He asks to be made well, or as well as he can be. He has no knowledge of pathological processes. To him disease is disordered function, cure is restored function, and it matters little to him if his organs as reconstructed are the same shape as they were before he was ill, so long as they work as well. The surgeon then must be versed in anatomy—the study of form—to be a competent technician at his job, but he must turn to physiology—the study of function—to be able to visualise its principles, to know how to vary procedure to the needs of the individual, and to fit himself to make some personal contribution to surgical advance.

It is true that every surgeon is thoroughly grounded in physiology as a student, and that he must later pass the stiffest test in the world, the primary examination for the fellowship of the Royal College of Surgeons. But though the student is taught physiology well and truly, the surgeon in his prime has left his student days twenty or thirty years behind him, and knows little of contemporary physiology unless he learns it from his son. Even the rather antiquated physiology he learnt for his "Primary" has been pushed by fierce competition into those sidereal realms where it is a tax on memory rather than a living science. The lack of liaison between surgeon and physiologist means that important advances may for long remain laboratory secrets and reach the wards only by devious channels and after quite unnecessary delay. There is little machinery whereby the puzzles of the consulting-room and operating-theatre can be brought to the test-bench for solution, or the advances of the research worker be embodied in the everyday treatment of the clinician.

The lectures on advanced physiology now being delivered at the Royal College of Surgeons are an attempt to bridge this lamentable gap between the laboratory and the bedside. In the first of what it may be hoped will be a regularly recurring series three important practical topics are discussed—shock by Prof. R. J. S. MCDOWALL, pain by Prof. E. D. ADRIAN and spinal anæsthesia by Prof. A. D. MACDONALD. Such addresses, in which advanced scientific discoveries are integrated and linked with their practical applications, and not merely slapped down with the "take it or leave it" attitude of the purely technical communication, may have the indirect and welcome effect of humanising the primary examination for the F.R.C.S., making it less a test of memory and more a training for surgeons. The college have for many years been more than an examining body; they have put their excellent library and unique museum at the disposal of students of all grades, and for the last fifteen years have taken a leading part in surgical research. That they have persevered with this step in post-graduate education in spite of the war is a happy augury for the future.

TREATMENT OF DROPSY

CHRONIC dropsy or œdema is a symptom common to several conditions, but it is so often the most striking manifestation that the laity regard it as a disease in itself. In the last fifteen years much has been learned about the mechanism of œdema and the production of diuresis; new remedies have been discovered and we are now able to treat dropsy rationally with a good chance of success. Almost all forms of œdema may be explained by regarding the capillary wall as a semipermeable membrane through which proteins cannot readily pass although water and salts can. At the arterial end of a capillary water and salts pass into the tissue spaces; at the venous end they are reabsorbed. Œdema results when the capillary pressure rises or when the amount of protein in the blood-plasma falls. Important contributory factors are injury to the capillary wall, obstruction to lymph-channels, high salt or water intake and a warm environment. This is of course an over simplification of a complex problem, and it is easier to explain why œdema appears than why it does not appear under normal conditions. The commonest cause of generalised œdema is congestive cardiac failure and the mechanism here is more obscure than in other pathological states, though this is the condition in which treatment is usually most effective. The rise in venous pressure and the lack of muscular activity raise the effective capillary filtration pressure but in addition there is increased permeability of the capillaries to water and salts. A factor often overlooked is the hypoproteinæmia which, as THOMSON [1] points out, may result from the low protein diet often prescribed by the physician and which can be partly rectified by giving as much protein as the patient can digest.

The general measures adopted in the treatment of cardiac failure will of course relieve œdema in so far as they are successful in improving

1. Thomson, W. A. R. *Quart J. Med.* 1934, **3**, 587.

cardiac function. Full digitalisation, combined with rest in bed, often produces a large diuresis and may make additional treatment unnecessary. When œdema persists, however, the most promising measure is the administration of the organic mercurial diuretics and it is only comparatively recently that the value of these compounds has been properly appreciated. The best known of them has lately been introduced into the British Pharmacopœia under the name mersalyl. THOMSON [2] has shown that the diuretic effect of these agents is often just as great without digitalis as with it and in his recent review MARVIN [3] points out that the patient may be spared several days of discomfort if they are used without delay. They are best given by intravenous injection, and this has been an obstacle to their extensive use in general practice especially since escape of the drug into the subcutaneous tissues leads to severe pain and necrosis. Intramuscular injections are, however, almost equally effective and if properly given are free from danger and almost free from pain. Suppositories are also available, but rectal irritation or ulceration is so common after their use that the American Council on Pharmacy and Chemistry has rescinded its acceptance of them. Administration by mouth is practicable but the results with this route are far less satisfactory and it should only be used to supplement intravenous or intramuscular injection. The mercurial diuretics produce their effect mainly by a direct action on the renal tubules that lessens their power of reabsorption. Many attempts have been made to enhance their effect with substances that produce diuresis through other mechanisms. Most of the organic mercurials as issued have a proportion of theophylline, ranging from 5 to 28 per cent., added with this purpose. Similarly, the diuretic effect of mersalyl can be increased by giving gr. 15–30 of ammonium chloride three or four times a day for two or three days before the injection, and SHELLING and TARR [4] have reported an enhanced diuresis when magnesium sulphate is injected together with Salyrgan. Urea was first recommended as a diuretic in cardiac œdema by CRAWFORD and MCINTOSH [5] and in our last issue WINTERNITZ produced further evidence of its value in cardiac dropsy and suggested that it is most useful when given in combination with the organic mercurial diuretics. A profuse mercurial diuresis is commonly followed by several days during which the output of urine is low. Urea tends to prevent this period of oliguria, so that injections need not be given so often—indeed, they can sometimes be dispensed with entirely. It should not be used where there is renal insufficiency or nitrogen retention, but otherwise its only objection is its bitter taste which is difficult to mask. Most patients can take it without nausea for several weeks at a time, and MARVIN says that many continue with it for months or years without interruption.

In renal disease œdema may arise at different stages. It is clearly undesirable to administer diuretics in acute nephritis where the kidney is inflamed, and where the œdema is probably due to capillary damage. In the nephrotic syndrome, however, much can be done provided there is no hæmaturia and no evidence of nitrogen retention. Here high-protein diet with limitation of salt and fluid may be supplemented by diuretics, of which the mercurial diuretics are again most effective and do not damage the kidneys. Urea is also occasionally useful and there seems to be no objection to combining it with mercurials as in cardiac œdema. Potassium nitrate in large doses, up to gr. 180 a day, may also be tried. When other methods fail repeated intravenous injections of acacia seem justified, though they are not entirely without danger. Among the less common causes of dropsy, two are apt to be overlooked, and both are eminently treatable. The first is chronic constrictive pericarditis (Pick's disease), in which dropsy is associated with raised venous pressure, lowered arterial pressure and a small heart. In this condition mercurial diuretics are good palliatives, but by resection of the constricting pericardium normal health is as a rule spectacularly restored. The second is deficiency of vitamin B_1 whose cardiovascular consequences can also be strikingly relieved provided they are recognised. Suspicion of this deficiency, which may arise from defective intake or defective absorption, should always be aroused when congestive cardiac failure with œdema occurs without convincing signs of heart disease, especially when some degree of polyneuritis is also present. Daily injections of full doses of vitamin B_1 lead to great improvement, and the œdema disappears often within a few days.

BURNS

SURPRISINGLY few of the enormous number of papers that appear on burns contain careful clinical studies of the severe systemic disturbances which follow them, yet there is an obvious need for the information which only such studies can supply. One of the oldest theories of the cause of these disturbances—the formation and absorption of non-bacterial toxins in burned tissue—is still a subject of dispute. The theory is widely accepted in this country and on the continent, but in America it has been generally abandoned in favour of UNDERHILL'S view that, apart from an early stage of shock, the disturbances are to be attributed to increased blood (more correctly corpuscular) concentration, the result of plasma loss in the burned area. Another conception is that of ALDRICH,[1] according to whom a burn is essentially an infected surgical lesion: "where there is no infection there is no toxæmia." Some of the conflict of opinion seems to arise from the failure of writers to define and describe precisely

2. Thomson, W. A. R. *Quart. J. Med.* 1937, **6**, 321.
3. Marvin, H. M. *J. Amer. med. Ass.* March 2, 1940, p. 757.
4. Shelling, D. H. and Tarr, L. *Med. J. Rec.* 1930, **131**, 365.
5. Crawford, J. H. and McIntosh, J. F. *Arch. intern. Med.* 1925, **36**, 530.

1. Aldrich, R. H. *New. Engl. J. Med.* 1933, **208**, 299.

the stage and nature of the disturbances to which they refer. Often, for instance, no distinction is drawn between secondary shock, of which the main cause is probably local loss of plasma, and a succeeding stage of "toxæmia" of which the cause may well be different. According to WILSON and others [2] the symptoms of the toxic phase, when it develops under the conditions of coagulation treatment, can be explained neither by corpuscular concentration nor by bacterial infection, and in fatal cases a lesion of the liver cells is found which is incomparably more severe than that produced by anoxia or any of the common bacterial toxins. Corroboration of these observations has lately come from MCCLURE [3] and RUSSEL ELKINTON [4] in America. Here, then, is suggestive evidence from clinical sources of a circulating non-bacterial toxin after burns. It would, however, be interesting to know if the same conclusions hold for other methods of treatment and those who employ them have an opportunity to make a valuable contribution to knowledge.

The treatment of an extensively and severely burned patient is an exacting business for both surgical and nursing personnel, and success can be attained only through interest, energy and unremitting care. It is doubtful whether sufficient attention is paid to the general treatment, particularly of secondary shock, which requires active and timely measures if life is to be saved. Recent developments in the treatment of burn shock include infusion of human plasma, administration of oxygen in high concentrations and injection of suprarenal cortical hormone, natural or synthetic. In severe toxæmia also the hormone seems worthy of trial, and dextrose infusions may be of value. The coagulation form of local treatment is for the moment firmly entrenched as the method of choice. Many modifications of the original tannic-acid treatment introduced by DAVIDSON [5] of Detroit in 1925 have been described but nearly all are aimed at hastening coagulation and combining more efficient antisepsis. Silver nitrate in a 10 per cent. solution is employed either with a dye antiseptic, such as gentian violet, or with a 5 per cent. tannic-acid solution; it acts both as coagulant and antiseptic. The dye antiseptics are also weak coagulants and an interesting mixture is that of brilliant green and acriviolet.[6] MCCLURE uses hexyl-chloro-resorcinol which is said to be strongly bactericidal but not toxic to cells in tissue culture; it is applied with tannic acid in a water-soluble jelly base. Other methods, however, have their advocates; some swear by the simple cod-liver oil application, while others say that the satisfactory local results justify the time-consuming and complicated procedure of saline soaks and baths.

One feature of burning injuries should not be forgotten: prevention. When the annual death-rate is considered—nearly 8000 in the United States alone—it is disturbing to learn that 90 per cent. of the total can be classified as avoidable.

2. Wilson, W. C., MacGregor, A. R. and Stewart, C. P. *Brit. J. Surg.* 1938, **25**, 826.
3. McClure, R. D. *J. Amer. med. Ass.* 1939, **113**, 1808.
4. Elkinton, J. R. *Bull. Ayer clin. Lab.* 1939, **3**, 279.
5. Davidson, E. C. *Surg. Gynec. Obstet.* 1925, **41**, 202.
6. Aldrich, *New Engl. J. Med.* 1937, **217**, 911.

ANNOTATIONS

THE URANIUM TWINS

THE discovery of another radioactive substance, U-235, a chemical twin or isotope of uranium, is announced in the *Physical Review* of May 6, and commented upon by the New York newspapers. Detailed comment cannot yet be made here, but a word may be said on the perpetually recurring subject of the power that can be got from radioactive bodies. It is a splendid topic for those who can wield a facile pen. Five pounds of U-235 would drive a liner for weeks—such attractive headlines have been dangled before the eyes of the newspaper reader ever since Rutherford found that radium could keep itself at a little higher temperature than its surroundings. Energy for nothing, horse-power ad libitum, and if only we had a little more of it we could sail the *Queen Elizabeth* without coaling round the world. The realisation is, of course, impossible, for it is axiomatic that there is only a large amount of a radioactive substance if it is a very weak one; if it is strongly radioactive you simply cannot get hold of a large quantity; ergo, all the talk about speeding battleships by such means is high-falutin nonsense. We hear that German scientists have dropped all other work to concentrate on U-235. If so, good luck to them, for the properties of U-235 are likely to be of great scientific interest, and the energy they get from it is not likely to carry them far towards winning the war.

THE TOURNIQUET

THE arrest of hæmorrhage is the most important subject in first-aid, and the textbooks quite rightly devote considerable space to it. But it is one thing to read about methods of stopping hæmorrhage and quite another to use the right method in practice and to use it effectively. Sound judgment is essential and some experience a great help. It is as easy to do too much as too little, and the cure may be worse than the disease. Above all, the use and the misuse of the tourniquet must be thoroughly understood. In the first place, it is not generally recognised among first-aiders that most external arterial hæmorrhage can be stopped by a dressing bandaged firmly on to the wound and that this is the method of choice. Moreover, in these relatively mild cases, the tourniquet often increases the hæmorrhage because it is not applied or not maintained tightly enough, and as soon as it is released the bleeding, which is from obstructed veins, stops. Although it is well known, it cannot be too strongly emphasised that the tourniquet always causes damage, and sometimes irrecoverable damage, to the limb by direct pressure on nerves, especially in the arm, and by anoxæmia of the tissues. Three sound rules are that every case in which a tourniquet has been used should be clearly marked; that the time of application should be noted in writing; and that the tourniquet should be loosened at regular intervals (say, every 20 min.) and only reapplied if the bleeding

starts again. A minority might disagree with this last rule and maintain that the tourniquet should not be loosened until the patient has arrived where he can be treated surgically. Recently there has been some discussion about the temperature at which a limb to which a tourniquet has been applied should be kept.[1] It is true that an ischæmic limb should be kept cold so as to diminish its metabolism, but when a tourniquet is applied as first-aid it is surely sufficient simply to avoid warming the limb and to get the patient to the surgeon as quickly as possible.

The type of tourniquet used is of great importance. A tourniquet must often be improvised from whatever materials are available, but what is the best kind of tourniquet to recommend to first-aiders and casualty hospitals? It must be easy to put on and take off and must cause the smallest possible damage to the tissues. Sir Thomas Lewis[2] has protested against the Samway tourniquet which has been supplied by the Ministries: it is awkward, inefficient and dangerous. The rubber is hard, thick and inextensible and cannot without great difficulty be fixed in the anchor. To undo it is equally difficult. A strong man would win after a struggle: most women would be beaten: the patient would be tortured. As Sir Thomas points out, a simple broad rubber strap would be cheaper, safer, more convenient and more efficient. The inner tube of a bicycle tyre would serve well. Another useful tourniquet has been devised by Mr. E. D. Smith.[3] It consists of a band of webbing 40 in. long which is fitted with a pressure pad and a knobbed twist-stick: and there is also a dressing of cyanide gauze for the wound. The whole apparatus will fit in a waistcoat pocket. Every first-aider should be supplied with an efficient tourniquet which he knows how to apply, and, above all, he should be taught when to avoid it.

DIGITALIS

WHAT is the most satisfactory preparation of digitalis? Employing what may be described as the Evans-Hoyle technique, used so effectively in the study of the drug treatment of angina pectoris,[4] Evans[5] has investigated the effects of six preparations of digitalis—the powdered leaf, the tincture, digoxin, Digitaline (Nativelle), digitalin (A. & H.), and Digifoline (Ciba)—and three preparations with a digitalis-like action—strophanthin by mouth, ouabain, and Folinerin (Schering)—in 18 patients with mitral stenosis, auricular fibrillation and heart failure. They were treated as out-patients and each preparation was given for a fortnight, the observations being controlled by introducing test periods during which digitalis was withheld and Cardiazol or Coramine were the only drugs prescribed. Judged by the extent to which they relieved symptoms of heart failure, and slowed the heart, and by their freedom from toxic effects, all six preparations of digitalis proved satisfactory, their order of therapeutic efficiency when used in customary doses being the powdered leaf, Nativelle's digitaline, digifoline, digoxin, the tincture and digitalin (A & H.). Folinerin, ouabain, and strophanthin did not produce satisfactory digitalisation and in Evans's opinion their routine use in patients with heart failure is unjustified. It is a pity that the tincture of strophanthus was not used instead of strophanthin, for this preparation is worthy of more attention than most clinicians give it. Evans sets out the actual cost of each drug for hospital patients receiving it three times a day for a fortnight. As was to be expected, much the cheapest of the active preparations were the tincture (3*d.*) and the powdered digitalis leaf (6*d.*), the dosage given being ℥ 15 and gr. 1½. Under war conditions the moral seems obvious—these two preparations should be used whenever possible, and in view of the call for economy in tinctures there is much to be said for restricting ourselves to the powdered leaf.

1. *Brit. med. J.* March 2, 1940, p. 364 et seq.
2. *Times*, May 3, 1940; *Brit. med. J.* March 16, 1940, p. 457.
3. *Oral Topics*, March, 1940, p. 233.
4. Evans, W. and Hoyle, C. *Quart. J. Med.* 1933, **2**, 311; 1934, **3**, 105.
5. *Brit. Heart J.* January, 1940, p. 51.

HAVELOCK ELLIS

Havelock Ellis was a writer by profession. His less known general contributions to literature covered a wide range, but his name is most closely associated with his detailed studies of sexual abnormalities. We know the history of the hostile reception that greeted them, of the Bedborough prosecution and the confiscation of the first volume of his "Studies," and how with the traditional calm obstinacy of the left-handed man he carried on his work till at last it was recognised as honest and valuable. He had been in some ways a recluse; he never took part in controversy, never spoke in public, and almost the whole of the original material for his studies was obtained by correspondence and not by personal contacts. Of the man himself we knew little, and we opened his life story[1] hoping to discover the kind of man this was who shook the deepest-rooted prejudices of our social life. At first we were disappointed. He says in his preface that his leading motive was the wish that others might be spared some of his difficulties; yet, except for a distressing shyness that lasted through life, he gives no direct indication of those difficulties, though on p. 87 he describes, without recognising their nature, disabling psychoneurotic symptoms which persisted till the approach of old age. After denying any sex interest—and, it appears, curiosity—till late adolescence he says "I have never repressed anything." Yet in 1917 he wrote of Freud, "He has revealed the possibility of new depths, new subtleties, new complexities, new psychic mechanisms."

The working out of his family-tree, his early home life, his sea voyages and the adolescent years spent as a school-teacher in Australia, the seven years spent in writing and working for the L.S.A. are described with no hint of emotional difficulties. The story of his married life fills many pages and it is here that he unwittingly discloses a marital situation, unfortunately not uncommon, that depends upon a crippling of emotions in the sexual sphere. His wife was intellectually suited to him, but physical relations meant little to them from the beginning. When they ceased, there followed a period in which the deep affection between husband and wife became more surely and firmly rooted. He declares this process was intensified by his wife's ill health and her now frequent and severe illnesses, some of which were frankly hysterical. When he came to appreciate their "neurotic element" as most prominent, Havelock Ellis protests his increased attachment and describes what he fails to recognise as a masochistic pleasure in being dominated by her.

Now we can fill in the picture. A childhood and adolescence in which sex thoughts and feelings were completely repressed in the psycho-analytical sense of the word were accompanied by intense shyness and followed later by the conversion of pathological anxiety into physical symptoms which, sometimes taking on the form of phobia equivalents, persisted

1. My Life. By Havelock Ellis. London: William Heinemann. 1940. Pp. 542. 15*s*.

for many years. Difficulties reached their climax through a marriage in which, unconscious calling to unconscious, hysterical symptoms on the one side were welcomed on the other as maintaining an emotional bond that otherwise would have snapped. Such a false adjustment could not satisfy emotional needs, and each of the pair, even whilst declaring the everlasting strength of the bond, formed another attachment that inevitably brought bickering and mutual hurt. Behind these experiences we can imagine a sense of frustration, unformulated by himself, that sustained Havelock Ellis in a task the unconscious goal of which was his own salvation, rationalised to himself and the world as a desire to save others from the difficulties in himself which he dimly perceived and never defined. With this aim he set out to collect in minutest detail the material he later published. The curiosity so thoroughly repressed in his youth had now come into its own, but the knowledge thus gained failed to guide him to sexual maturity, for it could not influence his unconscious difficulties. Nevertheless, he reached salvation of a kind, in so far as he made peace with himself and was able finally to attain a philosophy of life that fitted his own needs and limitations. In his external aim he has also come near to indirect achievement, for he has furnished knowledge that can serve us in the understanding of human difficulties which, without the influence of his work, would still be ignored or counted as wanton perversity.

CONTRASTS IN MORTALITY BETWEEN ENGLAND AND THE UNITED STATES

A SEASONAL swing in the incidence of mortality has long been a feature of the Registrar-General's returns. The maximum invariably falls in the first quarter of the year, the minimum in the third quarter, and with the virtual disappearance of summer diarrhœa as a major cause of infant mortality the difference between crest and trough has increased considerably. For instance, in 1851–55 the death-rate in the March quarter was 25·3 per 1000 living and in the September quarter 21·0; the maximum is 20 per cent. greater than the minimum. In 1931–35 the corresponding figures were 15·4 and 9·6, and the maximum is 60 per cent. greater than the minimum. Is there any way, it might be asked, of reducing this large difference, or is the winter excess due to causes of death—e.g., influenza—over which we at present have little control? An indication that its level may include components amenable to preventive medicine is shown when the seasonal swing in England and Wales is compared with that revealed by the mortality figures of the United States. Such a comparison shows that the winter peak is higher in this country although in the summer we fall to a lower point than the U.S.A. It looks as if the English excess at the former time and the American excess at the latter may both include causes of death due to remediable conditions, and that, in fact, is the conclusion reached by Mr. E. Lewis-Faning, Ph.D., in a detailed statistical study of the problem.[1] Mortality in Germany is also included in his picture but owing to lack of sufficiently detailed information he is unable to make much use of it. In this country and the United States, however, many causes of death are tabulated by month of occurrence, and Lewis-Faning has found it possible to calculate average daily death-rates (standardised) in each month of the year for each country, and also for the New England states separately. From the numerous comparisons made it appears that the main contributors to the unfavourable winter balance in this country are influenza, respiratory tuberculosis, bronchitis and pneumonia. To its advantage in the summer the two most important factors are diseases of the heart and deaths from violence, the former showing a large decline in the summer in both countries but more strikingly in England and Wales, and the latter revealing no great seasonal variation in this country but a large summer rise in the U.S.A. Diarrhœa and enteritis also show a considerably greater upward swing in the summer months in the U.S.A. as a whole but in the New England states such mortality is uniformly below that in England and Wales. Lewis-Faning's conclusion, therefore, is that the winter disadvantage and the summer advantage of our country are both dependent, at least in part, on factors of mortality preventable in some degree. The relatively high rate of mortality from violence in the U.S.A. is clearly open to attack, and it would be interesting as a first step to examine its components. On the other hand, influenza in the pandemic of 1918 fell, the Registrar-General concluded, equally on the sanitarily just and unjust, and in recent years mortality attributed to it has, unlike that of other infectious diseases, tended to be higher in the rural than in the urban districts of this country. If we must perhaps exclude it from the field of preventive medicine at present the same does not apply to mortality from pneumonia and bronchitis. Dr. Stevenson long ago stressed his belief that the former was a preventable disease and that judging from local variations some parts of England and Wales had a good deal to learn in regard to prevention. That conclusion still holds, while the importance of environmental and nutritional factors in respiratory tuberculosis is today a commonplace. It seems therefore that there is certainly some scope for reduction in our winter death-rate. It is the only figure to fluctuate materially from year to year; in the decennium 1927–36 the death-rate in the last three quarters of the year varied only between 10·7 and 11·4 per 1000 while in the first quarter it ranged from 13·2 to 20·9. Lewis-Faning's report is a valuable contribution to the study of such seasonal variations and their underlying causes.

1. A comparative study of the seasonal incidence of mortality in England and Wales and in the United States of America. By E. Lewis-Faning. *Spec. Rep. Ser. med. Res. Coun., Lond.* No. 239. H.M. Stationery Office. 1940. Pp. 69. 1s.

RESULTS OF RADIUM THERAPY

NEARLY all of the reports published by national and international commissions responsible for the collection of radium statistics and by individual radium centres give the results from year to year, and include the cases recently treated. It is therefore a welcome change to find the Holt Radium Institute producing a report[1] which deals only with survival-rates five years after treatment. This centre is fortunate in serving a large population which provided in the two years under review, 1932 and 1933, enough cases to give significant figures for analysis of results in the common cancers accessible to radium treatment. There are two sections, written from different points of view. The first gives complete tables for all cases arranged so that they are easily understood by the layman; the second gives a detailed analysis of the methods of treatment and their results. The number of cases treated was 1918 out of a total of 2531 examined; 294 were considered too advanced for treatment, and the rest were submitted to surgery or were found not to have cancer. Of those treated only 2 per cent. have not been traced. The net survival-rate for all cases treated in 1932 is 38 per cent.; for those treated in

1. Christie Hospital and Holt Radium Institute, Manchester. Statistical Report on the Results of Radium Therapy in the Treatment of Malignant Disease.

1933, 43 per cent. The tables contrasting the results by stage demonstrate beyond question the decisive influence of the stage of the disease on the possibility of cure. In the 1933 group, 80 per cent. of early cases or 63 per cent. of early and moderately early cases taken together, but only 18 per cent. of advanced cases were alive after five years. Workers in the field may feel that such mass figures including every type of cancer are of less value than analysis by site, but their propaganda value cannot be doubted. The figures are used here to drive home the fact that cancer in its early stage is highly curable, and they deserve the widest publicity.

The method by which the cases are divided into early and late is interesting. Where there are accepted stages based on pathological anatomy, such as the League of Nations staging for cancer of the cervix or the modified Steinthal stages for the breast, they are used, but where these are not available, as for cancer of the mouth, special stages have been devised and described. The essential difference between early and moderately early (stages 1 and 2) and late (stages 3 and 4) cancer of the mouth is the presence of enlarged lymph-nodes in the neck. This idea has been carried through all kinds of tumour treated, localised lesions being regarded as at least moderately early while those showing secondary deposits or definite spread beyond the primary area are described as late.

The results must on the whole be regarded as satisfactory. Centres such as the Fondation Curie or the Marie Curie Hospital, London, give better figures for individual sites, but the Manchester results show what can be done by radiation therapy in one of the largest industrial districts in the world, part of it scheduled as a distressed area. It is disappointing to see that no success has been obtained with cancer of the rectum and œsophagus, but this is balanced by the satisfactory figure for cancer of the mouth, including the lip, where the net survival-rate was 33 per cent. In recent years there has been a tendency to favour teleradium or X-ray therapy for cancer of the mouth and the radium bomb has largely supplanted mould and implantation methods in many centres. To prove the value of these newer methods it will be necessary to improve on the figures obtained in Manchester by the systematic use of radium needles and applicators.

ŒSOPHAGEAL PILES

UNEXPECTED bleeding from œsophageal varices is not so uncommon as might be thought and has often been the cause of disappointment after an otherwise successful splenectomy for Banti's disease or splenic anæmia. In alcoholic cirrhosis, too, now becoming rare, varices in the œsophagus have sometimes been responsible for a terminal hæmatemesis. Since the enlarged veins can be detected radiologically and can be confirmed visually through the œsophagoscope the possibility of a direct attack invites consideration. But the first step must be correct diagnosis followed by appropriate treatment of the underlying cause, though in many cases little can be done and the varices remain as a residual menace to life. It was workers in the Mayo Clinic who suggested ligation of the coronary veins as a method of treatment and now Moersch [1] has demonstrated that the condition can sometimes be treated by local sclerosing injections, though the idea appears to have originated from Franckner and Crafoord of Stockholm in 1939. Moersch's patient was a man of thirty whose first symptom was a severe hæmatemesis which occurred without warning in 1928. A year later a much enlarged spleen was removed without incident. Then for seven years the man was free from any suspicion of hæmorrhage but since 1936 there had been recurring bouts of alarming hæmatemesis. On ordinary examination the man appeared to be in good health but radiography revealed the presence of varices in the lower œsophagus. On œsophagoscopy the venous masses were seen to be so large that they almost obstructed the lumen of the gullet. In four sittings, with four days between each, the varices were injected with 0·5 c.cm. of a 2·5 per cent. solution of sodium morrhuate. The immediate result was remarkable; the vessels lost their bluish colour, became yellowish-grey, firmer and smaller and the lumen of the œsophagus returned almost to its normal calibre. It cannot be easy to deliver the proper dose of coagulant accurately into the veins when the syringe has to be manipulated at the extreme end of the narrow space provided by even a wide-bore œsophagoscope, but it is comforting to learn that the punctures themselves were not a source of anxious bleeding. It is too soon to do more than live in hope about the man's future but the method is at least feasible and holds out some promise in a condition where treatment has so far been singularly inefficient.

1. Moersch, H. J. *Proc. Mayo Clin.* March 20, 1940, p. 177.

HEALTH MINISTER

SPEAKING to the Royal Society of Medicine shortly before he was appointed to the Ministry of Health in 1938 Mr. Walter Elliot pointed out that the government of England was carried out by amateurs and that one seldom found a doctor as minister of health. Since then he has shown us that even good traditions can have honourable exceptions, and the Royal College of Physicians recognised the force of his demonstration when last month they elected him to the fellowship of the college. This is the first time that Mr. Malcolm MacDonald, the new minister, has strayed from the Colonial Office and the Dominions Office. But of late problems of health administration must have bulked large there, and he brings to his new office a background of specialised experience and a reputation for sympathy which the medical profession will welcome.

We regret to announce the death at Exmouth of LOUIS BATHE RAWLING, F.R.C.S., consulting surgeon to St. Bartholomew's Hospital and an authority on the surgery of skull and brain.

The Army needs more doctors. Men up to the age of 55 who are willing to volunteer for general duty should apply at once to the secretary of the Central Medical War Committee, B.M.A. House, Tavistock Square, W.C.1.

The Lancet 100 Years Ago

May 16, 1840, *p.* 276.

From a leading article.

We have frequently expressed doubts as to the utility of hospitals, excepting in a qualified sense, and under peculiar circumstances. If the Poor could be attended at their own dwellings, and the money expended in the erection of buildings were judiciously employed to promote the warming, ventilation, and cleanliness of their rooms, to provide them with clothing or linen, and to supply them in sickness with the necessary diet or remedies, and the advice of the qualified Medical Practitioners of the district, the mortality would, we believe, be less than it is in hospitals. The patients would recover more rapidly, and many afflicted persons would be restored to their families, who now fall victims to erysipelas, purulent absorption, and other maladies.

PREVENTION AND TREATMENT OF WOUND INFECTION

VI

SURGERY OF INFECTED WOUNDS

By W. H. Ogilvie, M.Ch. Oxfd, F.R.C.S.
SURGEON TO GUY'S HOSPITAL

The body is a sterile territory, protected by an epithelial rampart of intricate contour and varying structure, and surrounded on all frontiers, external and internal, by a world of bacteria. When the epithelium is breached, whether by accident or intention, the way is open for the entry of bacteria into the tissues. None may get in. If any do, they first contaminate the wound only, lying on the surface in the dirt, foreign matter or discharges with which they were introduced; later they multiply, invade the tissues and possibly the body fluids, and infect the wound or the patient. The principles of the prevention and treatment of wound infection in so far as they concern the surgeon are therefore:

1. To avoid the contamination of intentional wounds.
2. To decontaminate accidental wounds before infection develops.
3. In infected wounds, to assist those natural processes by which infection is already being fought.

PREVENTION OF INFECTION IN SURGICAL WOUNDS

Bacteria may be introduced into a wound by the instruments or materials employed in the operation, from the air in the theatre, from the patient himself or from some member of the surgical team. The methods of sterilising instruments and materials now in use are reliable, and few operation infections have been traced to these sources. Heat is the most certain method of sterilisation. Towels, swabs, dressings and operation clothing are sterilised in the autoclave, and provided that it is regularly inspected and checked at intervals by a bacteriologist the efficacy of modern apparatus can be accepted. Metal instruments may be autoclaved, but are more conveniently sterilised by boiling. Ordinary septic organisms are killed by two minutes' boiling; spores can survive this temperature for several hours, but are destroyed by moist heat at 120° C. or dry heat at 160° C. The routine of twenty minutes' boiling usually recommended in hospital is a safe one, but under conditions of stress the time can be reduced to five minutes. Spores may be destroyed by moist heat in an autoclave at 120° C. for twenty minutes, by heating in a bath of liquid paraffin to 140° C. for the same period, or by dry heat at 160° C. in an electric oven for an hour. Instruments containing soft solder may be damaged by the last two methods. Boiling has disadvantages with sharp instruments, which soon lose their edge, and with glass-metal syringes which are liable to crack when boiled. Needles, knives and scissors may be kept in a solution of one part of lysol to three of alcohol, and rinsed in alcohol and allowed to dry before use. Alcohol, even with lysol, is not an entirely reliable germicide, and spores at any rate can survive immersion in it for a long period. Knife blades and needles which have passed through infected tissues should therefore be thrown away or boiled before being put back in the solution, and different syringes should be kept for aspiration and injection. The sterilisation of catgut is a matter of the greatest difficulty, and is not nowadays undertaken by the theatre staff. The products of the firms selling sterile catgut under licence in this country are reliable, but under conditions of increased demand and supply from other markets, such as obtained in the last war, surgeons must be on guard against infections from this source. Silk, linen thread and silkworm gut can be boiled, and afterwards can if necessary be stored in 1 per cent. carbolic acid. In the prevention of wound infection the use of very fine silk or linen thread for ligatures in preference to catgut has many advantages besides that of cheapness. These materials can be rendered unquestionably sterile, they can be used in a much finer grade than catgut of comparable strength, they can be cut short without risk of slipping, and they provoke none of that cellular reaction which accompanies the absorption of catgut.

BACTERIA ON THE SKIN

Skin carries bacteria from two sources: chance bacteria picked up from recent contacts and lying on the surface, among the desquamated scales, on the hairs or in the folds round the nails, and resident bacteria living probably in the deeper skin crevices. The first may be pathogenic, particularly in those who work in hospitals, the second are often comparatively harmless, but may include *Staphylococcus aureus*. The first can be removed almost entirely by mechanical and chemical means, the second cannot easily be destroyed or got rid of. In "sterilising" his own hands and arms the surgeon has to steer between the need to remove pathogenic bacteria and the danger of setting up a dermatitis by repeated scrubbing and the use of antiseptics. Of these risks that of dermatitis is far greater than that of imperfect decontamination. The surgeon must avoid games that injure the hands or roughen the skin, abjure hobbies that are connected with oil and dirt, and keep his nails very short. Before an operation he should scrub his hands for five minutes in running warm water, using a soft nailbrush and paying particular attention to the nails. He should rinse his hands and arms in 70 per cent. alcohol, and while they are wet put on cap and mask and slip his arms into the sleeves of the gown, which is then pulled on by a nurse. His hands emerge dry from the sleeves, which they have not touched on the outside. Dry sterilised gloves whose cuffs have been turned down are then slipped over each hand in turn, the fingers touching the inside only, and the cuffs are turned up over those of the gown, using the finger-tips of the glove. By such precautions no organisms remaining on the skin (and they must be very few while the hands and arms are still fresh from the alcohol rinse) can be transferred to those parts of the operation clothing which will touch the patient.

Boiled gloves carry a great danger of infecting the wound with skin-borne organisms, for the hands are macerated inside them throughout the operation, and any prick or tear gives exit to a jet of infected fluid. Dry gloves, on the other hand, leave the hands dry, and should they be punctured the tendency is rather for tissue fluids to be absorbed inwards by the powder than for anything to get out. Further, they allow the surgeon who has long lists to adopt a technique that avoids the risks of repeated scrubbings. At the end of each operation the gown is undone behind, brought forward, and pulled off the outstretched arms by the nurse. The sleeves coming off pull down the cuff of the glove, and the surgeon takes off the gloves, handling the first from the outside, the second from the inside. His hands and arms are uncontaminated, and if inspection shows no stains where a glove has been punctured he need only rinse them in water and spirit and dress for the next case. Between cases he keeps his gloves on while he handles notes, has a cup of tea or smokes a cigarette, and removes them only to change for the next operation.

With the patient's skin mechanical cleansing is again more important than chemical disinfection. The skin should be well washed with soap and hot water and shaved if hairy. The cleansing should be as thorough as possible, since the dangers of repeated scrubbing do not exist here, and is best done shortly before the operation. Preparation some hours beforehand, followed by a sterile compress, causes the

patient needless anxiety and loss of sleep and tends to increase perspiration and bring deep organisms to the surface. An antiseptic should be painted over the area of operation shortly before it is to begin. The choice of antiseptics for skin sterilisation is largely decided by fashion, spirit being the favourite on the continent, iodine or one of the dyes in England, and mercurial preparations in America. Spirit alone is not particularly effective, and, being colourless, leaves no indication of which areas have been prepared and which missed. Picric acid may cause a severe dermatitis, and is therefore unsafe. Tincture of iodine is expensive and no better than a 2 per cent. watery solution, but it paints well on the skin and has been approved so long and so widely that it is likely to remain a favourite where economy is not a consideration. The antiseptics which appear to be the most potent in sterilising the skin are Tinker and Sutton's solution of acriflavine, Bonney's blue, Harrington's mercuric chloride solution, and Dettol.

AIR-BORNE INFECTION

The air of the theatre will contain organisms from two sources—those carried in the floating dust, and those distributed in droplets from the upper respiratory tract of people in the room. Dust is everywhere in the air, but most near ground level, and on each successive floor of a hospital it decreases. Dust also lies in the trappings of a theatre and is disturbed by movements. When a theatre has been designed without angles or ledges, and is free from cupboards, shelves, windows, radiators and so on, when it is kept scrupulously clean and the necessary furnishings and lamps are not moved during the operation, the amount of dust in the air is negligible. It is doubtful if the wearing of special boots by the team confers any safety on the patient, though as part of the surgical costume they are almost essential to give a feeling of freshness and to spare the ordinary footwear from damage. In modern theatre blocks now being built dust-borne organisms can be almost entirely eliminated. The theatre is empty except for the operating table and the instruments in use, and is tenanted only by the patient and operating team. Spectators and all unsterile personnel are in adjacent rooms or galleries reached by a different approach, and are separated by complete walls of glass from the theatre, with which they communicate by a two-way microphone. There are no windows and an air-conditioning plant satisfies at the same time the needs of air sterilisation, ventilation, and temperature regulation.

Droplet infection from the respiratory tract of some member of the operating team is a danger against which air purification does not guard, and, since the organism is often a virulent streptococcus that can establish a dangerous infection even in healthy tissues, it is the most important single factor to be guarded against in an operation under modern conditions. Air expired through the nose does not often distribute organisms, it is the air expelled from the mouth in talking and still more in coughing that is the danger. The risk is however eliminated by an efficient mask, which must reach vertically from half an inch above the tip of the nose to well below the chin and laterally as far as the outer canthus, and must be moulded at its upper edge to seal the gap between nose and cheek. The incorporation of a layer of Cellophane 3 in. square in that part which covers the mouth is sufficient to exclude any spray, and does not make the mask hot or irksome: six layers of fine gauze (No. 44) mesh give adequate protection and greater comfort.

The prevention of infection implies not only the exclusion of all bacteria from the wound but leaving the tissues in a state to undertake repair rapidly and efficiently, and to overcome any stray organisms that may have found entry or may be brought later by the blood-stream. This object is attained by clean cutting rather than blunt dissection, by interfering as little as possible with the nerve- and blood-supply of divided structures, by gentle retraction, by avoiding hæmorrhage, seizing vessels before they are divided and small bleeding points as soon as they are seen, by ligating with the finest possible material and including the smallest amount of tissue in the ligature, by obliterating all dead space in closure, and by avoiding any mechanical, chemical or thermal injury to the tissues. Diathermy must be looked on as a way out of difficulties, but it does not favour clean healing.

PREVENTION OF INFECTION IN CONTAMINATED WOUNDS

Accidental wounds differ from operation wounds in two main particulars—that they contain bacteria, and that the surface of the wound is to some extent devitalised. They include the injuries of accidents in factories and on the roads, and the wounds produced by every kind of weapon. The principles involved are the same in all, and since it is only principles that are being considered here discussion will be limited to wounds of the limbs produced by machine-gun bullets or fragments of high explosive, because in such wounds the factors of devitalisation and contamination are well marked and modifications due to injury of special tissues do not arise, while they are at present the chief problem in warfare, that upon which surgical teams must concentrate when the number of the wounded makes selection imperative. In such conditions it is right that the surgeon should devote an hour to three limb wounds to enable them to recover with full function, rather than to one abdominal wound which has at best a 50 per cent. chance of survival and a 25 per cent. chance of recovery with a useful life.

A projectile, whether bullet or shell fragment, striking a limb at high velocity, will travel through it in a track that is usually a straight line in the position occupied by the limb at the time, but is often irregular when the limb is straight. The wound of entry may appear smaller than the projectile, that of exit larger; round both the skin is bruised for a short distance. Along the track any tissues in the path of the projectile are destroyed, and around the track to a depth that varies with the projectile and the tissue but is usually half an inch at least they are killed by the concussion and are no longer living structures. The track itself may be filled with blood-clot, and will also contain foreign matter and the organisms which it carries. Foreign matter will include the projectile, perhaps in several bits, clothing, and often fragments of surroundings or personal belongings, consisting of wood, stone, aluminium and other substances translucent to X-rays. Rifle or machine-gun bullets are usually sterile, but shell fragments are soiled with earth, and organisms are also introduced with the clothing and other foreign matter. These organisms will therefore be those on the patient's skin and his clothing and those of the soil in the battle area; they will be of many sorts, and in most cases will include anaerobic bacteria.

Such a wound is contaminated, but not at first infected. There is a variable period, probably seldom less than four hours or more than twelve, between contamination and infection that provides the opportunity for prophylactic surgery. Taking six hours as a fairly safe period; if within six hours we can make a contaminated wound into a healthy one by removing all damaged tissues, dirt and bacteria, we give it the characters of a surgical wound, and it will heal by first intention. Between six and twelve hours we may succeed by similar methods, but we shall need to watch with anxiety for signs of failure in the first few days after operation. After twelve hours we are unlikely to get clean healing, and shall usually be wiser not to attempt it.

Whether the wound can be excised during this period of irrecoverable opportunity depends upon many factors, military, administrative and surgical. In desultory fighting the majority will reach a well-placed casualty clearing station in time; in a severe battle, particularly one of movement, the majority will not. The organisation of transport, the condition of the ground and roads and their immunity from attack will all affect the time of arrival. Once the

wounded reach the C.C.S. the time before they reach the theatre, and the number that can be dealt with before the grace period elapses, will depend on the perfection of the arrangement. If the buildings are arranged to facilitate one-way traffic—reception units leading through resuscitation, X-ray and preparation units into the theatre, and egress from the theatre on the other side leading to the wards—and if in the theatre itself each surgeon is working two tables, and if the building is arranged so that the flow of entering and emerging patients and of clean and soiled materials do not cross, the greatest number can be dealt with. The maximum rate of work over short periods, for a surgeon trained in C.C.S. work and assisted by a skilled team, is about 3 cases an hour, so that he cannot deal with more than 12 to 15 cases in the safe period and perhaps double that number in the period of comparative safety.

DEBRIDEMENT

The prophylactic excision of contaminated wounds, often called débridement, consists, in theory at any rate, of the excision of the whole wound track and of all damaged and devitalised structures around it, the removal of all blood-clot, dirt and foreign material, and the complete arrest of hæmorrhage from the excised surfaces. In practice complete débridement is more often possible in civilian injuries than in war wounds. Short tangential or gutter wounds are readily accessible and can be excised completely, but deep through and through wounds must be approached first from one end and then from the other; the deeper parts are reached with difficulty, so that soiled muscle retracted in its sheath, or blood-clot infiltrating intramuscular planes, may easily be missed. In the buttock the depth of the tissues, and in the shoulder the presence of the scapula, present a serious obstacle to access. Important structures, such as nerve trunks and large vascular bundles which have been contused and soiled yet not divided, can only be cleansed by trimming their coats and washing them with antiseptics. Bone fragments which are loose or attached by damaged muscle only should be removed, but wide excision of the shaft where it is exposed is impracticable. In all cases it is well to realise that decontamination is a hope rather than a certainty. With limited wounds, particularly those involving joints or the hand, débridement is best performed under a tourniquet. To deprive tissues already damaged of their blood-supply even for a limited period may be criticised, and a limit of 20 minutes for the upper limb and 40 for the lower should be set. The saving in time and the gain in exactness and neatness of the excision justifies this procedure in the experience of most surgeons. One lesson learned with difficulty in the last war was the need to conserve skin. The young surgeon was tempted by their speed and simplicity to perform guillotine amputations, and in débridement to convert the wound into an open saucer. Skin, however, is very viable, and later is quite irreplaceable, and its needless sacrifice leads to many secondary amputations and late plastic operations for repair. It may be incised and turned back to lay the deep structures open, but only the damaged edges should be trimmed away.

TREATMENT AFTER DEBRIDEMENT

Primary suture.—Traumatic surgery is concerned above all with saving life and limb, and only secondarily with saving time or securing a good cosmetic result. Immediate closure of an excised wound can give first-intention healing and the best function compatible with the anatomical defect, but unsuccessful suture will give a result far worse than that obtained by second-intention healing, and may lead to amputation or loss of life. Primary suture can therefore be considered in a limited number of cases only, and is more often possible in road or factory accidents than in battle casualties. In war surgery it may be undertaken where débridement has been early and complete, where blood loss has not been severe and the circulation of the injured limb is satisfactory, and where the patient can subsequently be kept under observation for at least a week. It should not be attempted in deep wounds, in those reaching the surgeon after six hours, in those in which the main artery is damaged or there is any hint of œdema or coldness in the neighbourhood, or where a piece of projectile, even the smallest, has been left behind, in patients who are shocked or suffering from multiple wounds, or at times of heavy fighting.

An excised wound, however healthy, differs from a surgical one in that something is missing. Suture therefore is not anatomical reconstruction but an approximation to it, whose most important purpose is obliteration of dead spaces. Any elaborate repair, such as the suture of a divided nerve or the attachment of a severed tendon to a neighbouring belly should be left to a subsequent operation in a cleanly healed field. Sutures should be interrupted, to allow the escape of fluid between them, and should bring the tissues together without obstructing their circulation; it is unwise therefore to close the gaps left by excision in tough membranes, such as the capsule of a joint or the aponeurosis enclosing a muscle group. A drain may sometimes be put in between two stitches with advantage, and retained for the first 24 or 48 hours.

In the middle period of the last war the practice of smearing the surface of an excised wound with B.I.P.P. before closure or partial closure was common, and the results obtained by the method were undeniably good. The antiseptic effect of the paste is negligible, and its value, apart from the moral support it gave to C.C.S. workers in the early trial days of excision and suture, probably lay in the film of oily powder that kept the surfaces apart and provided temporary drainage to the deeper parts of the wound. At the end of the war most surgeons held that the less B.I.P.P. was left in a wound the better it healed, and that it did better still with none at all.

The dressing, compared to that of a surgical wound, should be more abundant, for oozing is more likely, and should be antiseptic, for it may be left on for some days, and the growth of saprophytic or freshly introduced pathogenic organisms in the discharges is thereby discouraged. A bandage should be applied evenly and firmly over the whole dressing to reinforce approximation and hæmostasis, and to forestall œdema. After the dressing steps must be taken in every case to ensure that the wound and its neighbourhood is kept completely at rest. Immobilisation by plaster slab or Cramer's wire in the outer dressings, or by a plaster case or Thomas splint is therefore applied according to the needs of the case.

After suture the patient must be watched carefully. A small rise of temperature does not necessarily indicate infection, but a toxic appearance, a steadily rising pulse-rate, a complaint of increasing pain in the wound, or the discovery of tenderness or pressure or of œdema at a distance from it, are danger signs that cannot be neglected. The wound should be opened and packed at once, without waiting for more obvious signs of infection. Should military needs demand the discharge of patients within a week, it is better to lay open all sutured wounds before evacuation than to risk complications during transport.

(*To be continued*)

INTERNATIONAL LEAGUE AGAINST RHEUMATISM.—The American committee of the league, with the American Rheumatism Association, has issued a statement postponing the American Congress on Rheumatic Disease, which was to have been held in 1940 under the presidency of Dr. Ralph Pemberton. Dr. Pemberton calls the attention of all members of the league to the conviction of the American members and of the association, that the present structure and personnel of the league should be maintained—perhaps in a condition of suspended animation during the war, but ready to resume its activities as soon as circumstances permit.

SPECIAL ARTICLES

BLOOD-GROUPS AND THEIR INHERITANCE

BY G. L. TAYLOR, M.D., Ph.D., M.R.C.P.

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IN human red cells there seem to be many antigens which, in combination with corresponding antibodies, will cause the agglutination, or clumping, of the cells. Some of these antigens can now be identified with certainty, and the development of suitable techniques will no doubt add to the number that can be detected. If an antigen is present in the red cells of some people and absent in others, it is possible to classify people accordingly. The best known and first discovered of these antigens are A and B, the antigens of the original Landsteiner ABO blood-groups. These two differ from all other antigens which may be found in human red cells in being the only ones for which the corresponding antibodies, anti-A (or α) and anti-B (or β), occur naturally in human serum; and it is because an antigen and its antibody may be brought together in the circulation of a recipient that the ABO system of groups is of such importance in blood-transfusion.

THE ABO GROUPS

According to whether their red cells contain one, the other, both or neither of the antigenic factors A and B, mankind may be classified into four groups. Landsteiner pointed out that a person's serum cannot contain the antibody for any antigen present in his own red cells, or his cells might be agglutinated; but, with rare exceptions, unless the corresponding antigen *is* present in the cells, the antibody anti-A or anti-B is found in the serum. The position is outlined in table I.

TABLE I—ANTIBODIES IN SERUM THAT ACCOMPANY VARIOUS ANTIGENS IN CELLS

Antigens in red cells	O	A	B	AB
Antibodies in serum	Anti-A + Anti-B ($\alpha + \beta$)	Anti-B (β)	Anti-A (α)	None
Blood group (Jansky)	I	II	III	IV
Blood group (Moss)	IV	II	III	I

Instead of the alphabetical classification, which, first suggested by von Dungern and Hirszfeld, is recommended by the League of Nations, and is now the official notation of the British Red Cross Society's transfusion service, most clinicians and many laboratory workers use a numerical classification. Unfortunately two different ways of numbering the groups have been described; the first by Jansky in 1907 in the Czech language in a journal that apparently can be consulted only in two libraries in the United States and one in this country; the second independently by Moss in 1910 in the *Bulletin of the Johns Hopkins Hospital*. Almost without exception the numerical classification used in this country has been that of Moss, but in some of the earlier American work an attempt was made to give Jansky's precedence. The numbers given to the groups are included in table I; in both systems group A is called II and group B III, but the numbers given to AB and O are reversed. The League's recommendation does not include α and β for anti-A and anti-B, although these symbols are useful and are employed by most authorities. The letters "a" and "b," sometimes seen, should not be used, because they are readily mistaken for the antigens.

Besides preventing the confusion that may result from there being two different sets of numbers, the alphabetical nomenclature has the advantage of giving information about the nature of the groups. Anyone who understands the simple relationships of the antigens and antibodies can write down, without consulting any reference, the first two lines of table I, and, remembering that a donor's cells must not contain an antigen for which the antibody is in the recipient's serum, can see at once whether a suggested donor is suitable for a particular recipient. The cells of a group-O person contain neither A nor B, and his blood can be given to any group; he is the universal donor, but he can receive from no group other than his own because his serum has both antibodies. An AB person with both antigens can give only to another AB, but, since he has neither of the antibodies in his serum, any type of blood can be transfused into him; he is the universal recipient. Group A can give to the same group but to neither B nor O, which both contain anti-A in the serum, and group B can give to B but to neither A nor O. When numbers are used compatible combinations have to be memorised or a reference consulted; they cannot be arrived at from first principles.

COMPATIBILITY

It will be seen that in all compatible combinations of donor and recipient of different groups the donor's serum contains antibody for an antigen in the recipient's red cells, and it is only because no harmful reactions take place that transfusion, other than between members of the same group, is possible at all. Apart from the small proportion of cases where the recipient is of group AB—between 3 and 4 per cent. in this country—only the universal donor, group O, can give to a person of another group.

The most obvious and likely explanation of the absence of reactions is that a relatively small amount of antibody introduced in the donor's serum and diluted by the recipient's is not enough to agglutinate the large number of the latter's red cells which it meets, for the extent of all antigen-antibody reactions depends largely on the proportions in which the reagents are mixed. The position is otherwise when the relatively few cells of the donor's blood meet the antibody of the whole of a recipient's serum; reactions are then almost certain to arise. It is true, however, that when red cells and antibody-containing serum are mixed outside the body in proportions similar to those found in vivo between donor's serum and recipient's cells agglutination may take place. Besides being present in the red cells antigen is found in the tissue cells, and in small amounts in the serum, and neutralisation of the donor's antibody by the recipient's tissue cells and serum will play a part, with dilution, in preventing reactions in the latter's circulation.

The donor of choice is undoubtedly a person of the same group as the recipient, but, unless a well-organised service of donors of all groups is available, it often happens in practice that a universal donor, group O, must be used for a recipient belonging to another group. That the population is distributed very irregularly in the four groups adds to the difficulties of finding a donor of the recipient's group in every case. Only a small proportion of people belong to groups B and AB. The proportions vary considerably in different parts of the world. In southern England the proportions are:

O	A	B	AB
43–44%	43–44%	8–9%	3–3·5%

INHERITANCE OF BLOOD-GROUPS

The blood-group factors of the ABO system are handed on from parents to children in accordance with well-established Mendelian principles first explained by Bernstein (1924, 1925). A child gets from each parent one of three antigens A, B or O.

O is more than merely an absence of A and B, it is itself an antigen, although a poor one. Antibodies to O can be produced by immunising animals, and they do occur spontaneously in some animal sera and very rarely in human serum. The factors or genes which determine the heredity are carried on the chromosomes in the nuclei of the cells. In the spermatozoa and ova there are 24 chromosomes which, at fertilisation, pair up with their opposite numbers to make the 24 pairs of chromosomes found in the somatic cells, the rest of the cells in the body; each of a pair is complementary to the other. Since a child can receive A, B or O from each parent the combination of antigens it receives may be:

$\left.\begin{matrix}AA\\AO\end{matrix}\right\}$ both group A; $\left.\begin{matrix}BB\\BO\end{matrix}\right\}$ both group B; AB or OO

When A or B is handed on with O, only A or B shows up; A and B are both "dominant" to O, or O is "recessive" to the other two; A and B are equally dominant and both show up in the group AB. AA, the homozygote, and AO, the heterozygote, both belong to group A; and up to now no serological method of differentiating the homozygote and the heterozygote has been devised. The position of BB and BO is similar. Of the two factors in the body cells half the germ cells carry one and half the other; thus an AB person produces A and B gametes in equal numbers; AO produces O and A in equal numbers, and so on; whilst AA, BB, and OO yield only germ cells of one sort—A, B or O. No child can have an antigen not present in one or other of his parents.

With a knowledge of these principles it is a simple matter to work out the types of children which can result from any particular mating; the details are in table II. No AB parent can have an O child, and

TABLE II—POSSIBLE CHILDREN WITH VARIOUS MATINGS; ABO SYSTEM

Groups of parents	Possible groups of children	Groups of parents	Possible groups of children
O × O	O	B × B	O, B
O × A	O, A	O × AB	A, B
O × B	O, B	A × AB	A, B, AB
A × A	O, A	B × AB	A, B, AB
A × B	O, A, B, AB	AB × AB	A, B, AB

an O parent cannot have an AB child. Only one undoubted exception to Bernstein's theory of the inheritance of the ABO groups has been discovered, the Haselhorst case in which the mother was AB, the child O. The diagnoses were confirmed by several reliable workers on different occasions, but it has been reported that the child was almost blind, a deaf mute, and had gross congenital deformities; it seems likely that grave abnormalities of development accounted for the anomalous blood-group. It is only possible to be certain of exceptions to the theory which involve the mother, for those which involve the father may be due to illegitimacy.

SUBGROUPS OF THE ABO SYSTEM

In 1911 von Dungern and Hirszfeld described the subgroups A_1 and A_2, A_1B and A_2B, which result from the bipartition of the antigen A. The nature of the subgroups can probably be most easily made clear by saying that there are two types of A antigen, A and A_1, and subgroup A_1 contains them both, whilst A_2 has only A; corresponding antibodies a and a_1 are found in most group-B sera. To test for the subgroups, the antibody a_1 is obtained free from a by mixing a group-B serum containing both a and a_1 with a suitable quantity of group-A_2 cells. These cells absorb the a antibody and leave the a_1, which can be separated from the cells by centrifuging. Cells of groups A and AB which react with the a_1 fluid so prepared belong to subgroups A_1 and A_1B; those which do not react belong to subgroup A_2 and A_2B. The terminology is confusing.

The sera of some A_2 and A_2B people contain the antibody a_1, and in theory the transfusion of blood from an A_1 donor into such a person might lead to a reaction. The antibody a_2, so-called because it reacts with A_2 cells, is really anti-O and gives strong reactions with O cells. A_2 cells appear to contain the factor O and in most cases react with anti-O.

The original four groups of the ABO system are, by the subdivision of A, increased to six: A_1, A_2, B, A_1B, A_2B and O. Thomsen, Friedenreich and Worsaae (1930 a, b) have shown that the inheritance of this enlarged system of groups can be explained by a simple extension of Bernstein's theory. Instead of the three factors, A, B and O of the original system there are now four, A_1, A_2, B and O, with A_1, A_2 and B dominant to O, and A_1 dominant to A_2. A child gets one of these four factors from each parent and may be:

$\left.\begin{matrix}A_1A_1\\A_1A_2\\A_1O\end{matrix}\right\}$ all subgroup A_1 $\left.\begin{matrix}BB\\BO\end{matrix}\right\}$ both group B; A_1B

$\left.\begin{matrix}A_2A_2\\A_2O\end{matrix}\right\}$ both subgroup A_2 A_2B; OO

The types of children which may result from the various matings are set out in table III. Exceptions

TABLE III—POSSIBLE CHILDREN WITH VARIOUS MATINGS; A_1A_2BO SYSTEM

Groups of parents	Possible groups of children	Groups of parents	Possible groups of children
O × O	O	A_2B × O	A_2, B
A_2 × O	O, A_2	A_1B × O	A_1, B
A_1 × O	O, A_1, A_2	A_2B × A_2	A_2, B, A_2B
A_2 × A_2	O, A_2	A_2B × A_1	A_1, A_2, B, A_1B, A_2B
A_1 × A_2	O, A_1, A_2	A_1B × A_2	A_1, B, A_2B
A_1 × A_1	O, A_1, A_2	A_1B × A_1	A_1, B, A_1B, A_2B
B × O	O, B	A_2B × B	A_2, B, A_2B
B × B	O, B	A_1B × B	A_1, B, A_1B
A_2 × B	O, A_2, B, A_2B	A_2B × A_2B	A_2, B, A_2B
A_1 × B	O, A_1, A_2, B, A_1B, A_2B	A_1B × A_2B	A_1, B, A_1B, A_2B
		A_1B × A_1B	A_1, B, A_1B

to the four-gene theory of Thomsen, Friedenreich and Worsaae are not so rare as with the Bernstein theory and the original four groups. There have been exceptions, perhaps to some extent due to technical errors, especially with the blood of new-born infants, but family investigations have shown that the four-gene theory is fundamentally correct. The workers in the Galton laboratory unit have met no great technical difficulty in distinguishing A_1 from A_2; the diagnosis of the M-N factors presents far greater difficulties.

THE M-N BLOOD-GROUPS

Nearly thirty years after his discovery of the ABO groups, Landsteiner with his collaborator Levine (1928a) described a quite different and distinct system of human blood-groups depending on two antigens, M and N. According to which of these antigens are in the red cells, people can be divided into three groups M, MN and N, which have no connexion at all with those of the ABO system. Later the same workers (1928b) showed that both M

TABLE IV—POSSIBLE CHILDREN WITH VARIOUS MATINGS; M-N SYSTEM

Groups of parents	Possible groups of children	Groups of parents	Possible groups of children
MN × MN	M, MN, N	M × N	MN
MN × N	MN, N	M × M	M
MN × M	M, MN	N × N	N

and N are inherited as Mendelian dominants so that when they occur together, in group MN, they are both manifest, and nobody has yet been found who has neither M nor N in his cells; there is no group corresponding to O. A person of group M has received M from each parent, will produce only M germ cells, and is homozygous, MM; the position of group N is similar, homozygous, NN. The heterozygote, MN, gets M from one and N from the

other parent, and produces M and N gametes in equal numbers. If one parent of a mating is M no N child, and if one parent is N no M child can result. The children which are possible from each of the six matings are given in table IV. The few reported exceptions to the theory of inheritance of the M-N groups can all be reasonably attributed to illegitimacy.

Unlike anti-A and anti-B, the antibodies anti-M and anti-N do not occur naturally in human serum, though three cases of human serum containing spontaneous anti-M have been reported; that is why the M-N groups need not be considered in relation to blood-transfusion. In theory antibodies formed in a recipient's serum in response to an antigen such as M or N in a donor's red cells might cause reactions at a subsequent transfusion but actually there is no evidence that they do. The antibodies are obtained by immunising rabbits; for anti-M, cells of the type OM, and for anti-N cells of the type ON are injected. O cells are used to avoid producing antibodies to A and B. In addition to the specific antibody, anti-M or anti-N, the immune rabbit-serum contains a large amount of species antibodies which will react with all kinds of human blood, and these unwanted antibodies must be removed by mixing the serum with cells that do not contain the antigen whose antibody it is desired to isolate; cells of type N are used for absorbing anti-M, and M cells for absorbing anti-N. After the mixture of suitably diluted serum and absorbing cells has been left for a time the supernatant fluid removed by centrifuging will, if the preparation has been successful, react only with cells containing the specific antigen.

While in theory the inheritance and diagnosis of the M-N factors are simple and straightforward, in practice the preparation of the necessary reagents and their proper use is full of pitfalls, and correct diagnoses can only be expected from workers with considerable experience of the tests. In England the distribution of the M-N groups in the population is approximately:

M	MN	N
30%	49%	21%

APPLICATIONS OF BLOOD-GROUP STUDIES

With the six groups of the A_1A_2BO system and the three M-N groups mankind can be divided into 18 different blood-group types, and the discovery of even a few further factors which were present in some and absent in other people would give us a very large number of types. Further blood-group factors have in fact been found and tried out, but because of technical difficulties or because the necessary antibodies are not easily obtained they are not yet widely used. Landsteiner has suggested that in time it may be possible to establish the individuality of blood just as can be done with finger-prints.

The importance of blood-groups is not confined to their relationship to transfusion. Since they provide markers for the chromosomes which carry them, they are of interest to the geneticist. For the factors or genes determining another hereditary character may be carried on the same pair of chromosomes as the genes for a system of blood-groups, and the transmission of the two characters may be related. It appears, too, that the genes of the ABO and M-N systems are on different pairs of chromosomes. The most spectacular application of the study of blood-groups is where a child's parentage, usually its paternity, is in doubt. The groups of a mother and her child may be such that a particular man cannot be the father. By testing for the A_1A_2BO and M-N systems of groups, one man in three in England, if wrongly accused, would be exculpated. If the tests do not exculpate a man that does not, of course, mean that he must be the father. The amount of protection against false accusations given by the tests varies according to the group of the man and woman concerned; it has been calculated for England, and set out by R. A. Fisher as in tables V and VI.

Table V deals with the A_1A_2BO groups, and it will be seen that this system will exonerate 17·29 per cent. of men wrongly accused, that the percentage protection ranges from nil to 86·6 according to the man-woman combination involved, and that the chances of both the man and the woman in a disputed case depend to a considerable extent on their blood-groups. Table VI shows the position of men in the different A_1A_2BO groups when the M-N tests are also used. By the additional use of these the protection afforded to men as a whole has been raised from 17·29 to 33·32 per cent.

TABLE V—PERCENTAGES OF FALSE-PATERNITY ACCUSATIONS THAT CAN BE DISPROVED BY USING A_1A_2BO SYSTEM

Group of alleged father	Group of mother						
	O	A_1	A_2	B	A_1B	A_2B	ME†(%)
O	33·3	6·6	26·6	26·6	16·6	26·6	22·70
A_1	6·6	6·6	6·6	0	0	0	5·81
A_2	26·6	6·6	26·6	20·0	13·3	20·0	18·96
B	26·6	0	20·0	26·6	3·3	20·0	16·46
A_1B	73·3	32·26	73·3	38·41	3·3	36·6	54·19
A_2B	86·6	26·6	51·75	51·75	0	20·0	57·25
FA*(%)	24·74	6·90	20·85	17·69	9·05	16·74	17·29

FA*.—False accusations by women of different groups that can be disproved.
ME†.—Men of different groups that can be exculpated.

TABLE VI—PERCENTAGES OF MEN THAT CAN BE EXCULPATED BY USING BOTH A_1A_2BO AND MN BLOOD-GROUPS

Group of alleged father, A_1A_2BO system	Group of alleged father, MN system			Aver. ABO
	MM	MN	NN	
O	48·88	22·70	54·69	27·68
A_1	37·71	5·81	44·79	24·06
A_2	46·40	18·96	52·50	34·66
B	44·75	16·46	51·04	32·65
A_1B	69·70	54·19	73·15	63·07
A_2B	71·73	57·25	74·94	65·53
Aver. MN	45·30	17·29	51·52	33·32

Note that heterozygote MN obtains no additional protection from the use of these factors.
Aver. MN = Average percentage exculpated in each MN group.
Aver. ABO = Average percentage exculpated in each A_1A_2BO group.

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* Those requiring further information about blood-groups should consult:

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MEDICAL SICKNESS, ANNUITY AND LIFE ASSURANCE SOCIETY.—At the annual general meeting it was announced that this society had ceased to grant loans on practices or houses. Great caution would have to be exercised in buying or selling practices after the war; an entirely new method of valuing might have to be introduced. Although war claims are expressly excluded under the conditions of all policies under the sickness fund, war claims from members on active service or in H.M. Forces originating abroad will be eligible for full benefit up to a period of thirteen weeks ex gratia from the date of their arrival in the United Kingdom; further benefit at the end of that period will be subject to individual consideration. The same conditions will apply to civilian members or members in H.M. Forces in the United Kingdom who may be totally incapacitated by conditions due to the war.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

CARE OF CRIPPLES

In moving the adoption of the annual report of the Edinburgh Cripple and Invalid Children's Aid Society Sir John Fraser said that in Scotland there is increasing consciousness of the significance of crippling. Other countries have recognised their responsibilities, but we, he was afraid, have shunned them. The society must be proud that 37 years ago they had the foresight to launch a scheme which has brought comfort and help to thousands. They have been the means of initiating schemes which have even wider applications than their services to local crippled children. He referred to the Princess Margaret Rose Hospital at Fairmilehead and to the Cripples' Welfare Association. The society has been the inspiration behind most of the orthopædic schemes established in Edinburgh and the neighbourhood. The need for action is still imperative, for there are probably not less than 10,000 cripples in the country, an appreciable number of whom might never have become cripples had adequate measures been taken for their treatment. These represent a heavy potential or actual economic loss, but the most tragic aspect is their sense of handicap and frustration. Sir John Fraser spoke about plans whereby orthopædic care might be made available for cripples all over Scotland. Local authorities and the Department of Health are interesting themselves in these, and he looked forward to a time when the problem of the cripple would be tackled in a way worthy of the national tradition.

FRACTURE CLINIC IN GLASGOW

There has been no formal opening of the new fracture clinic given to the Victoria Infirmary of Glasgow by Viscount Weir but last week a memorial tablet was unveiled by Viscountess Weir. A fracture clinic has been wanted for a long time by employers of labour in the west of Scotland and some of them have promised to give donations towards its upkeep. The official opening should have been about five months ago but on account of the war and for other reasons it was not possible to carry out arrangements. In spite of this the clinic has been open during these five months and 11,000 attendances have already been recorded. At the ceremony the value of the clinic as an adjunct to the various services of the infirmary was stressed, as was the opportunity which it offered to the orthopædic staff of developing their work.

TUBERCULOSIS IN WAR-TIME

The annual report of the Royal Victoria Hospital Trust states that during the last war conditions were inevitably provided which were favourable to the spread of tuberculosis, particularly overwork and mental strain and increased industrial demands, especially on women. The death-rate from tuberculosis rose between 1915 and 1918 and thereafter declined. The effects were more pronounced in England than in Scotland, and in France more still. In Germany the losses were even greater, the death-rate rising from 142 to 230 per 100,000, while in certain of the enemy-occupied territories—for example, Warsaw and Belgrade—rates were recorded which to us were fantastic. During these years in all European countries, the mortality was greater among women than among men. The experience gained then showed that war-time conditions can be withstood for a year or more but that the after-effects are cumulative and the results may be disastrous unless the danger can be anticipated. The campaign against tuberculosis may receive a check in the next few years but the trust intends to play its full part in the struggle. Sir John Fraser, in speaking to the adoption of the report, said that medical men have perhaps the best opportunity of estimating the value of the splendid work done by the trust. It was Sir Robert Philip who initiated the scheme and who by his genius and wisdom and driving power brought it to the highest state of efficiency. The high standard which he set is being maintained. He hoped that the trust and the colony will continue to obtain the support of the public—it certainly has the whole-hearted backing of the medical profession.

IRISH HOSPITAL BED BUREAU

(FROM OUR IRISH CORRESPONDENT)

In the middle of March the Government introduced to the Dáil a bill to provide for the establishment of an Irish hospital bed bureau. The terms of the bill were not published, and application from the Irish Medical Union for information as to the intentions of the Government, and offers of help by consultation with the Minister for Local Government and Public Health received no response. A fortnight ago this bill was withdrawn without seeing the light, and a fresh bill under the title of "Public Hospitals (Amendment) (No. 2) Bill, 1940" introduced. The main part dealt with the establishment of a bed bureau, but the rest was concerned only with a few formal provisions to legalise arrangements for carrying on sweepstakes in aid of the hospitals in the present world conditions. These sections were non-controversial and were urgently needed if the sweepstakes were not to be delayed, and they would probably have passed both Houses in the course of an afternoon. The clauses dealing with the bed bureau, on the other hand, were highly controversial. In their original form they seemed to give a power to the Minister to override the authorities of the voluntary hospitals in any or every particular and in any direction if he should think fit. It was remembered that some eighteen months ago, after long consultation between the then Minister and representatives of certain of the Dublin hospitals, a scheme for the establishment of a bed bureau had been agreed upon, with the proviso that until additional beds had been provided the scheme could not be made effective. In that scheme there were safeguards which protected and preserved the independence of the voluntary hospitals. In the present bill all these safeguards had disappeared. A lively newspaper agitation began immediately following the publication of the bill, and representations were made to the Minister as to the opposition, not limited to Parliament, which would meet any attempt to force the bill on the voluntary hospitals against their will. In his speech on April 30 at the second reading the Minister announced his willingness to make far-reaching concessions, and he has since tabled amendments which appear to remove most of the dangers. It is possible that he will in debate be willing to go further, and to render his bill not only harmless but possibly useful.

Until there is a large increase of the bed accommodation in the Dublin voluntary hospitals, a bed bureau has little if any material to work on. A bed is rarely an hour vacant before it is filled. It is some four years since the Hospitals Commission estimated that there was a shortage of some 600 beds in Dublin; the need has greatly increased and few would estimate the present shortage as less than 1000. The bureau

may find itself with no beds at its disposal, and its establishment is therefore not urgent. It was inept for the Government to link it in the same legislative measure with provisions far carrying on the sweepstakes, a very urgent matter. The bill itself appears to have been prepared in a hurried and even haphazard way, and shows no traces of any consultation either with those experienced in hospital management or with the medical profession. It would probably have been better, when the Minister recognised the faults in the bill, to withdraw it altogether, and deal with the different subjects of the bill in two separate measures.

MEDICINE AND THE LAW

Metaphysics for Medical Referees

PARLIAMENT, when legislating on workmen's compensation, has hesitated to let the medical referee replace the county-court judge as the tribunal to decide the issues. Some weeks ago, in Edinburgh Collieries *v.* Flockhart, the House of Lords criticised a medical referee's certificate for referring to "extraneous causes." The Scottish official corresponding to the county-court registrar in England directed a medical referee to examine the workman (under section 19 of the act) and to certify his condition and fitness for employment, stating whether he had wholly or partly recovered from his accident, and specifying if necessary the kind of employment for which he was fit and whether or to what extent the incapacity was due to the accident. The medical referee certified that the workman had markedly improved since last examined, that he was fit for any form of surface work, and that his incapacity was "largely due to his own mental attitude." This answer did not quite cover all the questions. The official therefore asked for an amended certificate which would specifically say (1) whether the man had wholly or partly recovered from the injury by accident, and (2) whether the incapacity due to the accident had ceased or to what extent (if any) the incapacity was due to the accident. The medical referee amended his certificate by saying: "(1) he is not yet wholly recovered; (2) 25 per cent. of his incapacity is due to his accident." This might seem to be a substantially sufficient reply; but the Scottish courts thought the certificate must go back for still further amendment. The House of Lords agrees.

The certificate, it is held, is ambiguous. When the referee wrote "25 per cent. of the incapacity is due to his accident," it was not clear whether he meant deterioration in the man's pre-accident physical condition or deterioration in his pre-accident wage-earning power. The law lords order that the medical referee is to say whether in his opinion 25 per cent. of the incapacity due to the accident would or would not of itself be sufficient to prevent the claimant from doing anything but surface work; the medical referee is also to add any explanation he may think necessary as to the sense in which the percentage finding of his certificate is to be read. Lord Romer remarked that, if the medical referee was referring to deterioration in pre-accident physical condition, the certificate was useless. If he was referring to deterioration in pre-accident wage-earning power, the certificate was meaningless. The medical referee had measured the loss of wage-earning power due to the accident by the numerical ratio it bore to such loss treated as due to the accident plus the mental attitude. The measurement could not indicate the loss of wage-earning power due to the accident alone. The medical referee could not properly answer the question by attributing to the accident a percentage of a wage-earning incapacity alleged to exist as the result of a combination of the accident and some extraneous cause. It seems that the judges could not forget the reference to the man's mental attitude. "Incapacity" in section 19 of the act means, it is clear, wage-earning and not physical incapacity.

IN ENGLAND NOW

A running commentary from our Peripatetic Correspondents

I remember once hearing that in order to get good obituaries you must time your death properly. To be famous or heroic is not enough. Die while your laurels are green, or you might as well not die at all; to live beyond the telling moment is, in this sense, fatal. In war-time, acts of heroism are as common as blackberries; it seems as though nearly everybody has some ability to respond to a crisis. This makes it stirring to remember someone whose courage was not a response to abnormal events but a routine part of his duty as a member of a scientific expedition. When Shackleton planned to cross the Antarctic in 1914 he arranged that food should be laid, at agreed points, from the opposite side of the continent. His own party would only carry food enough to reach the Pole, and after that would have no means of survival but the stores left for them. He gave the task of laying the depôts of food to Captain E. Mills Joyce; and while the *Endurance* was attacking the continent from the Graham Land side, Joyce and his party sailed in the *Aurora* to the Ross Sea to establish their base. But one day, while the depôt-layers were inland, the *Aurora* was carried away, locked in the ice floes; and with her went nearly all the personal stores and gear of Joyce's party. With inadequate clothing and footgear, with poor and insufficient food, Joyce and his party set out to lay the depôts for Shackleton. They met exceptionally bad weather, they slowly developed scurvy, and they carried untouched the food which they had to place at hundred-mile intervals to await the other party. Those who became too ill from scurvy were carried from time to time; and one, entirely incapacitated, was carried continuously for over forty days and left at last in a tent with a supply of food, to be picked up again on the way back. When the last black marking-flag was in place over the last store of food, Joyce and his party set out on the 300-mile trail back. They picked up the sick man and returned along the track of Scott's unhappy journey until they were checked by blizzards and their food was almost gone. Twelve miles from their own food depôt they came to a halt, and it seemed that they were going to share Scott's experience in full; but Joyce and two volunteers, with three starving dogs, set out into the blizzard and covered the last twelve miles in five days, living on a biscuit and a pot of tea a day. Joyce steered by compass over a measured twelve miles, and then waited for a lull in the blinding snow; when it came the black flag of the food depôt was directly in his path. They made drinks from dried milk, and drank them through the night, and in the morning turned back to fetch their friends; the dogs could hardly be persuaded to come with them. It took only four hours to cover the twelve miles back, even with the heavier load of food; and they picked up the rest of the party. Shackleton never crossed the continent, and the food depôts left by Joyce and his friends are still where they put them. Joyce died at the beginning of this month.

* * *

Being a medical commandant of a large voluntary hospital in war-time is anything but a bed of roses. To begin with coming into residence again after a gap

of fifteen years or so has its disadvantages. The noise in Central London after a northern suburb seemed terrific, and although I took over command long enough after the beginning of the war to have lost the habit of confusing whining motor engines with the warning of syrens, I found sleep was hard to come by for many nights. The lack of privacy after a home of one's own is also galling. I live and sleep in a converted ward, which has neither lock nor bolt on the door and there is a constant stream of visitors, each with a problem or a grievance, from early dawn to late at night. Relations with one's colleagues on the honorary staff are not always cordial. There still seems to be a certain amount of antagonism between those in the Emergency Medical Service and those who are not and never have been. There is also an almost constant sense of conflict between serving the board of management who want the hospital to resume its normal services in every possible way, and one's obligations to the Ministry of Health, who, having taken over certain facilities for the use of possible casualties naturally expect this aspect of the hospital's organisation not to be neglected. Moreover, the ordinary work goes on daily and is slowly growing, whilst the provisions for casualties tend to recede into the dim light of theory. The very title of the office is somewhat anomalous. It is very debatable who is to be commanded and what will happen if the commands are not obeyed. The existence of alternative titles is symptomatic of this uneasiness in the minds of the subordinates who prefer to talk of the "Führer" (they even gave me a "Sieg heil" at one of the Christmas festivities), or occasionally of the "Master," by analogy with a corresponding office at a converted "workhouse" in the sector. Lord Baldwin once taxed the press with having power but no responsibility, the perquisite of the prostitute throughout the ages. Here the position is the opposite—responsibility with very doubtful powers, at any rate during the present lull on the home-front. Perhaps a uniform would solve this problem.

There is a lot to be said, now that conscription of the profession is accepted, for putting us all in the services and then seconding us for duty where we are most needed, with the possibility of exchanging offices from time to time. I imagine that a naval surgeon, who has been doing nothing much at a naval hospital, might welcome an exchange with a surgical registrar at a London hospital who is as busy as in peace-time. At present for many of the specialist rank the armed forces have frankly offered an escape from the trials and troubles of the whole-time civilian service. And since in some quarters there is already appearing that "why aren't you in khaki?" tone, it would help a lot if the E.M.S. armlet were expanded into a whole suit—especially now that one's civilian clothes are getting a little shabby, with little prospect of renewal.

Meanwhile the struggle with the official mind and its circumlocutory literary style continues to exercise the grey matter and prevent that "mildew on the meninges" which threatened many of us in the early weeks. I have a lovely file about nightshirts: I passed on a feminine comment in signing an invoice that the finish was poor. After some weeks of correspondence I had the satisfaction of seeing the manufacturer (a peace-time maker of gowns) come to take the lot back in a plain van. But this victory has to compensate for a lot of strategical withdrawals and frank setbacks. However, perhaps this grumbling is out of place. This is a war-time job and the posters talk still about courage, cheerfulness and resolution. We certainly need them all.

* * *

It was a beautiful spring morning. Though not so preoccupied with professional cares that I could not savour the sights and sounds of the smiling countryside, I was, nevertheless, feeling slightly depressed. The reason for this may well have been that the last patient I had visited, an intelligent man of the world, had given it as his opinion that the war would last a minimum of 20 years. It was, I suspect, the word "minimum" that had cast me down. However, as so often happens in such circumstances, something heartening happened almost at once. I met a stallion. He was a magnificent, sleek creature, his black coat shining like silk, his mane and tail braided gaily. His stud-groom told me something of the life of a stallion. During the next three months he will lead a Don Juan existence, visiting at least three or four ladies a day and sometimes as many as twelve. (Whether he has his Sundays off and the usual half-holiday on Saturday I forgot to inquire.) For each successful service his owner receives a fee of two guineas and his groom three shillings. From August to April inclusive he will do no manner of work but will live on the fat of the land. "He doesn't have a bad time," I observed. "'Twould suit me right 'nough," said the groom.

* * *

The conscription of doctors came as no shock to medical students, and we accepted its necessity and essential fairness. But we were rather anxious whether due regard would be given to the period after qualification, for the house-jobs we do then constitute the major part of our non-academic training. Fortunately the Central Medical War Committee have recognised this fact, and they say "it is probable that for the present no practitioner within less than six months of registration will be accepted for military service." We hope there will be no cause for going back on this principle.

We are all still rather vague about exemptions from military service. The selection of doctors to meet service demands is in the hands of the local medical war committees who are now not allowed to take into account either physical fitness or personal hardship, which are the affair of the Ministry of Labour. Hardship, we take it, means financial involvement in newly-made practices and the like. This will affect most young doctors who have been qualified more than a year, but the degree of this hardship depends less upon conscription itself than upon the precautions taken to see that conscripted doctors do not suffer on their return to civilian life at the end of the war. Then again, what about the student who intends to take up research? It seems essential that research should be carried on in war-time and there is a minority of students who have taken up medicine with this end only in view. Will they be allowed to do research when they qualify, or should they begin now to fit themselves for clinical or clinical-laboratory work in the Services?

It is a strange anachronism in these days of democratic government that students should never be consulted in matters affecting them. It is students in their final year who will mostly be affected by conscription, and yet, although at 23 or so these men should have views worth hearing, no official contact has been made between the advisory authorities to the Government and the representative student bodies, such as the London Medical Committee of the National Union of Students, which includes representatives from ten of the London teaching hospitals. A truly democratic method is often an unwieldy weapon where time counts, but it achieves a measure of coöperation unattainable by other means. However, I know of a doctor of thirty who is still referred to by his mother as "baby." Perhaps it is an ineradicable tradition.

* * *

Most of the ideas which in disorder fill the mind when one is febrile, seem at the time, like those produced by alcohol, to have a rare and brilliant lucidity: in more normal circumstances they appear dull and futile. Nevertheless, when my temperature was still hovering between 100° and 101° F., an idea occurred to me which even now that I am subnormal still seems to have point. My idea, in brief, was the foundation of a Laboratory Infections Club, membership of which would be strictly limited to those who while studying diseases in the laboratory had themselves become infected. The credentials of each applicant for membership would have to be carefully examined.

Few helminthologists, for instance, could satisfy the scrutineers, for there would be insuperable difficulties in proving that tænias and other worms were not acquired under natural conditions. Protozoologists, too, would not be numerous, though there is certainly one who inadvertently infected his thumb, in place of a mouse, with a strain of *Trypanosoma gambiense* which had lived so long under laboratory conditions that it was thought to have lost all pathogenicity for man. A fortnight after the accident, however, trypanosomes were flourishing luxuriantly in the patient's blood. Some applications would, certainly, come from the ranks of those who specialise in spirochætes, especially *Leptospira icterohæmorrhagiæ*, though, curiously enough, one hears little of accidental infections with *Spirochæta pallida*; possibly the same difficulties would be encountered as in the case of the helminthologists. Bacteriologists would be able to apply in somewhat larger numbers, especially those who in earlier days worked with the *Brucella* group: now the wiles of this family seem to have been overcome, though its cousin *Bacterium tularense* is still such a menace that the disastrous effects produced by it in a London laboratory in the early '20s will long be remembered. The majority of the club members, however, will be drawn from those interested in rickettsias and viruses. Hardly anyone has worked with rickettsias for long and got away with it. Exanthematic and murine typhus, fièvre boutonneuse and Rocky Mountain spotted fever have all had their victims, the latest recruit to live up to the family reputation being the rickettsia of Q fever: the motto of Scotland—*Nemo me impune lacessit*—might, in fact, be applied to the whole clan. Those who have suffered from virus infections will be a somewhat varied bag. Yellow fever, though the list one hopes is now closed, should provide the greatest numbers, but psittacosis and Rift Valley fever would be good runners up, while influenza, equine encephalomyelitis, louping ill, lymphocytic choriomeningitis and lymphogranuloma inguinale would all add one or more to the list. In view of the preponderance of virus and rickettsial experts the club colours should undoubtedly be eosin red and azure.

The club would meet for occasional dinners as this would give ample scope for all to describe at length their own symptoms and sufferings. The chairman, however, would have to exercise strict supervision to see that no faction fights developed between those who asserted that psittacosis was worse than equine encephalomyelitis, lymphocytic choriomeningitis than louping ill. If members could be induced to listen to the conversation of their neighbours, they might hear some curious tales. One of my friends, for instance, while working on yellow fever, contracted the disease and took himself off to the local hospital: his attack was only moderately severe and he recovered. A month or so after his discharge, wishing to verify a few points about his illness, he returned to the hospital and asked if he might see his case notes. After some delay the notes appeared and this is what he read: "X. Y., medical bacteriologist, admitted with a high temperature, which has affected his brain as he is under the delusion that he is suffering from yellow fever." Dinners would also have the advantage of allowing members to sample exotic dishes more familiar to them in other forms. "Bouillon d'Hartley"; "embryon de poulet à la Tyrode"; "foie gras de perroquet, sauce Pacheço"; "escalope d'herisson," and above all, "souris confites." The last dish, baby mice, preferably of the Swiss strain, preserved in syrup, was, I am given to understand, a speciality of the ancient Carthaginians: luckily the Romans, who whatever their ruthlessness were at least gourmets, carefully preserved the recipe. In addition to the edification and entertainment of its members, the club might well perform another function. Antivivisectionists are wont to ask why instead of hundreds of mice, rats and guineapigs, research workers do not employ human material. The club could usefully inform such antivivisectionists of the frequency with which human material is employed, and of the value of the results obtained. In fact, it might be a rule of the club to entertain at each of its dinners, officials from one or other of the far-too-numerous antivivisection societies. After listening to the members' conversation, the said officials would almost certainly recant and acknowledge the error of their ways. If they still remained obdurate the chairman could enlarge on the value of pyrotherapy in curing abnormal mental conditions, and suggest that the officials should immediately offer themselves as experimental material. The toastmaster might have indemnity forms ready for signing and witnessing.

One other function also the club would carry out as its most important trust; to keep for ever green the memory of those whose laboratory infections claimed their lives—Lazear, Stokes, Noguchi, Young, Lillis, Hayne, Ricketts, von Prowazek, Bacot, Brebner, Saddington, to mention but a few.

PUBLIC HEALTH

Infectious Disease in England and Wales

DURING THE WEEK ENDED APRIL 27, 1940

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 931; whooping-cough, 646; diphtheria, 680; enteric fever, 37; measles (excluding rubella), 4568; pneumonia (primary or influenzal), 925; puerperal pyrexia, 172; cerebrospinal fever, 385; poliomyelitis, 4; polio-encephalitis, 2; encephalitis lethargica, 6; dysentery, 42; ophthalmia neonatorum, 90. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on April 26 was 926 made up of: scarlet fever, 144; diphtheria, 122; measles, 4; whooping-cough, 60; enteritis, 68; chicken-pox, 62; erysipelas, 39; mumps, 13; poliomyelitis, 1; dysentery, 7; cerebrospinal fever, 90; puerperal sepsis, 22; enteric fevers, 10; german measles, 92; meningitis, 2; other diseases (non-infectious), 84; not yet diagnosed 106.

Deaths.—In 126 great towns, including London, there was no death from smallpox, 1 (0) from enteric fever, 1 (0) from scarlet fever, 8 (0) from measles, 7 (0) from whooping-cough, 21 (0) from diphtheria, 26 (6) from diarrhœa and enteritis under 2 years, and 41 (7) from influenza. The figures in parentheses are those for London itself.

Birkenhead reported the fatal case of enteric fever. There were 4 deaths from influenza at Heston and Isleworth. Tottenham and Liverpool each reported 4 deaths from diarrhœa.

Points from Annual Reports

Dr. J. Yule in his annual report for 1939 to *Stockport* education committee records that out of a total of 14,500 children on the roll, 1262 were found to have unclean heads. This number for the first time for many years shows an increase attributed to the fact that attendance at school has not been compulsory since the outbreak of war, so the worst offenders are not under the supervision of teachers and school nurses. Stockport schools were closed only for one fortnight at the beginning of the war so the interference with the school medical service was slight, but in all districts and at all times, a rise in the percentage of dirty heads is the most sensitive index of interference with the school medical service.

Warrington is a small county borough of 78,140 population engaged in a variety of industries which suffers comparatively little from the ups and downs of trade. Such towns have sanitary problems rather different from those of greater towns or those engaged in single great industries, which give the health department continuous work of an exacting, but not very exciting character. Dr. Stuart F. Allison, M.O.H., reports that in 1938 an effort was made to finish with the property scheduled under the Housing Acts. Demolition orders were made on 234 houses; 290 cases of overcrowding were remedied, and 2069 persons rehoused. Pail-closet conversions were

completed in 404 houses and a scheme for the conversion of a further 720 was prepared. Schemes for a new maternity hospital and for a cubicle-block at the isolation hospital were passed, but no further progress was made in the provision of a public abattoir. Routine estimation of hæmoglobin in pregnant women is carried out in the antenatal clinics. It is found that during "normal" pregnancy the hæmoglobin value begins to fall in the seventh month. Attempts to counteract this by diet and iron have met with "very gratifying results." This is important, for we do not know if the hæmoglobin poverty of pregnancy is physiological or pathological. Treatment might raise the value in either case, but in the former the "remedy" would cause troubles, in the latter, relieve them. This is a problem which only extensive and prolonged clinical study can settle.

In *Eastbourne* the average number of children on the elementary-school roll in 1938–39 was 4978. About 670 children attended the secondary schools and some children go to private schools and public schools away from the borough. The population of Eastbourne is 56,770 so the proportion of children is low. By evacuation 4657 unaccompanied school-children were billeted in Eastbourne, so the school child-density was nearly doubled. Dr. John Fenton, M.O.H. and S.M.O. of Eastbourne, in his school report for 1939 tells us that on arrival the newcomers were medically inspected with the help and coöperation of 58 local medical practitioners. They found 259 children requiring treatment, of which 95 were skin cases and 76 dirty heads. During the year 456 children were found with head vermin or nits, but it is not clear how many of these were natives. Dr. Fenton's chief fear was increase in the incidence of infectious disease, especially of diphtheria, from which Eastbourne has been remarkable free for many years. There had been only three cases of diphtheria amongst the school-children prior to Sept. 1, but between Sept. 1 and the end of the year 36 cases occurred, 23 local children and 13 evacuees. Immunisation had made no progress in Eastbourne, but last year an attempt was made to encourage it, but only 205 immunisations were completed, so Eastbourne was practically virgin soil for diphtheria at the time of evacuation. Of scarlet fever there were 13 cases before evacuation and 20 locals and 19 evacuees in the last four months of the year.

LETTERS TO THE EDITOR

DEFENCE BONDS FOR THE R.M.B.F.

SIR,—The publicity so kindly given by the medical press to the needs of the Royal Medical Benevolent Fund has had an immediate result in the welcome gift from a medical man of a cheque for £100. The generous donor wishes the amount to be invested in defence bonds, and thus helps both his country and the fund—a most praiseworthy example which it is hoped may be followed by others who are minded to perform a double duty. Smaller amounts (minimum £5) would be equally acceptable. The address of the fund, on and after May 24, will be: 1, Balliol House, Manor Fields, Putney, London, S.W.15.

I am, Sir, yours faithfully,

Royal Medical Benevolent Fund, Wormingford, Essex. D'ARCY POWER.

INFECTION FROM WITHIN

SIR,—In his article on the treatment of infected wounds in THE LANCET of March 30, Mr. W. H. Ogilvie wrote: "The chief danger at an operation where the dressings and instruments have been properly sterilised is by droplet infection from some member of the team, or a spectator who harbours a streptococcus in his pharynx." In the same number you say in a leading article on keloids: "It is probable that some degree of infection is present in many wounds that are thought to be healing by first intention," and possible sources of exogenous infection are briefly described. The same theme, in the same number, is treated of in the leading article "When the Skin Defence is Breached." These papers, to use a military metaphor, ignore the well-tried expedient of the Trojan horse, "the attack from within"—with modern examples—or, in the terminology of the police, "the inside job."

Some years ago puzzled clinicians referred to me a patient who had developed large granulomatous "meaty" tumours on his arms and legs after scratching his extremities on thorn bushes while out shooting in the desert. At the time of the "scratching" he was recovering from a quinsy, due to a hæmolytic streptococcus, and it was found that his peculiar skin lesions were also due to a hæmolytic streptococcus. At that time we had no means of typing the two strains of streptococci, but it seems likely that they were identical. This case was recalled to memory recently when I was re-reading "Infections of the Hand" by A. B. Kanavel (6th ed. 1934. Baillière, Tindall and Cox) where, on page 147, is the following passage:

> In winter months, when tonsillitis was most prevalent, hand infections among employees have been found to be considerably more frequent. A number of these hand infections have been due to the action of a hæmolytic streptococcus, and have been either associated with or following an attack of tonsillitis. A careful bacteriological study of a series of these cases resulted in finding the same hæmolytic streptococcus as the cause of both tonsillitis and the hand infection.

Kanavel gave a table of statistics, including many hundred cases, to support his statement.

It is still hardly realised by industrial medical officers and military surgeons that wound infection may originate in a focus of infection in the patient. Perhaps these cases could be described as "When the Skin Defence is Taken by Enfilade."

I am, Sir, yours faithfully,

Abadan, Iran. FRANK MARSH.

SCIATICA AND THE INTERVERTEBRAL DISC

SIR,—Dr. Walshe, in his very sane letter of May 4, asks that the sciatica patient should receive careful thought and examination before surgical treatment is embarked upon. But he could have gone one further and helped to draw up a scheme whereby that vast conglomerate mass of cases labelled "sciatica" might be segregated into clinical types with appropriate symptoms and suitable treatment. Every case cannot have cisterna puncture with intrathecal Lipiodol, and yet the variety of available treatments is striking proof of the inefficacy of most of them.

I have been particularly interested recently to see so many cases of sciatica in a military hospital. Many of the men have volunteered the information that the wearing of battle-dress during the hard winter in France gave less protection than the tunic, as the rain was able to soak in to the projecting buttock instead of being diverted over it by the skirt of the tunic. It would be interesting to hear the views of others who have seen large numbers of men of the B.E.F.

What should be the routine treatment of the true acute "sciatica" (if, indeed, such exists)? Rest? Heat? Massage? Stretching and manipulation? Salicylates? Local counter-irritants? Local injec-

tions of saline? Oxygen? Air? Mild local anæsthesia? Sacral injections of saline or antipyrine? Tooth extraction? Regarding this last, one does not want at the moment, when dyspepsia among the troops has reached such important proportions (whether real, functional or due to newspaper advertisements), to reduce all soldiers with sciatica to an edentulous condition as well! Cures have been obtained with each and all of these, and, on the other hand, there have been a greater number of failures. Many go one further with their treatment of sciaticas than even Ambroise Paré did with his wound infections—they do nothing, and God cures them.

I am, Sir, yours faithfully,

IAN FRASER.

THE AMERICAN MEDICAL ASSOCIATION

SIR,—For a good many years I have been watching your correspondent from the United States. Recently, I have become more and more convinced that your correspondent is someone who is opposed to the work of the American Medical Association, and I am inclined to think he is perhaps an official especially interested in government affairs rather than in the practice of medicine.

I am not asking you to give me his name, but I am asking you to please inform your readers, perhaps by publication of this letter, that the American Medical Association has a membership of 117,000 out of 145,000 physicians practising in the United States and 165,000 licensed to practise. I am asking you to tell them also that the tone and trend of your correspondent from the United States in no way represents the opinion of the vast majority of physicians who hold membership in the American Medical Association.

I am, Sir, yours faithfully,

MORRIS FISHBEIN,
Editor of the *Journal of the American Medical Association.*
North Dearborn Street, Chicago.

BLOOD-DONORS

SIR,—The four London blood-transfusion depôts established by the Medical Research Council receive daily inquiries from blood-donors who are leaving the depôt district and who are anxious to offer their services to some hospital near their new address. At the moment no list of hospitals which run a transfusion depôt is available, and the good will of possible donors is therefore lost. If hospitals or doctors responsible for such depôts will send their name and address to Dr. Janet Vaughan, Emergency Transfusion Service, Social Centre, Slough, it will be possible to make a list of hospitals requiring blood-donors; this will then be available for reference and a satisfactory transference can be arranged. Dr. Vaughan will supply such a list on demand to any medical officer who would like to have one.

We are, Sir, yours faithfully,

H. F. BREWER, J. O. OLIVER,
M. MAIZELS, JANET VAUGHAN.

Slough.

SULPHATHIAZOLE

SIR,—The leading article in your issue of May 11 drawing attention to the use of sulphathiazole in the treatment of acute microbic infections is of great interest, since this compound, termed for short M. & B. 760, was first prepared in the research laboratories of Messrs. May & Baker early in 1938. Experimental investigation at that time indicated that although an effective antistreptococcal agent it was less active against pneumococci than M. & B. 693. Evaluation of antistaphylococcal drugs of this type, both experimentally and clinically, is far from easy, but in view of the recent claims made by numerous observers in the United States investigation of M. & B. 760 is being renewed. The critical assay of the efficacy of this and similar compounds in staphylococcal infections requires that a large series of cases must be treated before real conclusions can be drawn as to whether the clinical use of M. & B. 760 presents material advantages over M. & B. 693 in this respect.

I am, Sir, yours faithfully,

W. R. THROWER.

Temple, E.C.4.

DIPHTHERIA IMMUNISATION

SIR,—These notes relating to a boy resident in a local institution may be of some interest. He first attended the Diphtheria Immunisation Clinic in September, 1938, when he was nine years old, and the following is a brief record of his case.

May 18, 1938. Primary Schick test positive +++.

First course.—Sept. 20, 1938, T.A.F. 1·5 c.cm.; Oct. 10 T.A.F. 1·5 c.cm.; Jan. 10, 1939, Schick test positive +++.

Second course.—Jan. 24, 1939, T.A.F. 1·5 c.cm.; June 20, Schick test positive +++.

Third course.—Oct. 24, T.A.F. 1·0 c.cm.; Feb. 13, Schick test positive +++.

Fourth course.—Feb. 20, A.P.T. 0·1 c.cm.; May 5, A.P.T. 0·5 c.cm.; April 30, Schick test negative.

It will be noted that a total of 5·5 c.cm. of floccules was administered and that this amount completely failed to convert a positive Schick reaction into a negative one. There was, in addition, the stimulus afforded by four Schick tests. The positive Schick reactions were very marked. Finally a single course of alum precipitated toxoid comprising the relatively small amount of 0·6 c.cm. produced the desired result. The treatment and tests were administered by Dr. P. F. Fitzpatrick (assistant M.O.H.).

I am, Sir, yours faithfully,

J. C. SAUNDERS,
Medical Officer of Health.

City Hall, Cork.

CONTACT LENSES

SIR,—A candidate applying for a commission as an officer in the Royal Air Force the other day presented himself wearing a pair of contact glasses. He was not a little dismayed when on undergoing the eye examination the presence of the contact glasses was noticed, and he was requested to remove them in order to have his vision properly tested. He confessed that he had hoped to get away with it. He was a myope with unaided vision of 6/60 in the right and 6/36 in the left eye. Wearing contact glasses his vision was 6/5 in each eye.

For the last six years he has worn the original contact lenses, which were made for him in Budapest, continuously day and night, only removing them for a few minutes each evening to wash them. He has never had any trouble or discomfort in his eyes, which appeared healthy and free from redness.

I am, Sir, yours faithfully,

T. KEITH LYLE.

On Sunday, May 19, at 8.40 P.M., in the Home Service programme, Dr. Clement C. Chesterman, hon. secretary of the British Advisory Board on Medical Missions, is appealing on behalf of British medical missions overseas. Contributions should be sent to the medical secretary of the board, 2, Eaton Gate, London, S.W.1.

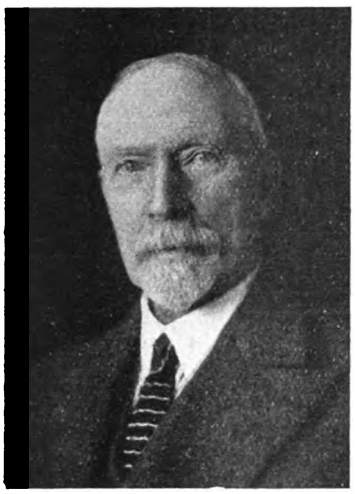
Corrigendum.—The letter on the treatment of hernia on page 901 of our issue of May 11 was from Mr. Kenneth Heritage, F.R.C.S.

OBITUARY

HARRY GILBERT BARLING

BT., C.B., C.B.E., M.B. LOND., F.R.C.S.

Sir Gilbert Barling, who died at Edgbaston on April 27, had been for many years the honoured leader of the medical profession in Birmingham and the Midlands. Earlier that week, at the annual general meeting of the Birmingham United Hospitals, he had been presented with an address on completion of sixty years of service. It was in 1880 that he came to a Birmingham roused from mid-Victorian complacency by Joseph Chamberlain and entering an era of rapid development in every direction. Barling soon placed himself in the van of progress in surgery and medical education, and later on of education in the widest sense; over a span of two generations he exerted an ever-growing influence on the social welfare of the city.



Lafayette

A Gloucestershire man, born at Newnham-on-Severn in 1855, Harry Gilbert Barling entered St. Bartholomew's Hospital in 1874 and in the following year was placed fifth for the Treasurer's prize in practical anatomy, later winning the Kirkes gold medal in clinical medicine. He took his M.B. Lond. in 1879, serving as house-surgeon at Bart's in the halcyon days of Luther Holden, Savory, Callender and Tom Smith. His colleagues on the junior surgical staff included Eve, Bruce Clarke, Lockwood and Mansell Moullin. Barling was of powerful physique and distinguished himself in the football field. Cautious in judgment, but tenacious of his own opinions, he was popular alike with the staff and his dressers. He came to Birmingham as resident pathologist to the General Hospital where he carried out all the pathological work connected with some 3000 inpatients a year, and in addition administered the anæsthetics for operations. There was one theatre with furniture, including the operating-table, made of wood, where rather more than 200 operations were performed annually.

Barling became a fellow of the Royal College of Surgeons in 1881, was appointed resident surgical officer in 1883, and in 1885 was elected assistant surgeon to the hospital. At that time surgery was in the transition stage, and Listerian principles and methods were slowly making way against the conservatism of the older surgeons, who were all in general practice. In 1891 Barling became full surgeon, and began to exert an ever-increasing influence on the work of the hospital. Improved antiseptics and later aseptic methods were steadily evolved, and when by their means a safe method of entering the abdominal cavity had been found he was among the early successful operators on the appendix, the gall-bladder, kidneys, stomach and intestines. At the time of his appointment to the full staff the project of building a new hospital had just come under serious consideration, and for the next seven years he spent much labour and time in helping to plan, organise and equip the fine new buildings in Steelhouse Lane, which were opened in 1897. They were soon taxed to the utmost by incessant demands made by the rapid evolution of medical and surgical practice which began in those years. In the initiation and planning of all the consequent changes and developments, Barling continued to take a full share.

His long connexion with the Birmingham medical school began in 1885 when he became demonstrator of anatomy at Queen's College; in the following year he was appointed professor of pathology. In 1892 the school was transferred from Queen's College and became a faculty of Mason College. In 1893 Barling became co-professor of surgery and in 1905 he was made dean of the medical faculty in succession to Bertram Windle. Mason College had in the meantime flowered into Birmingham University, and in these rapid developments he also played an active part. His work as dean lasted for six years, and his surgical professorship for twenty years, until 1913, when he was made vice-chancellor of the university, becoming pro-chancellor in 1927, and retiring in 1932, after a further twenty years' service.

In the first year of his office of vice-chancellor when the last war began, the university buildings at Bournbrook were at once taken over to house the First Southern General Hospital, and immediate arrangements had to be made to carry on the work of the university during the difficult years that followed. In addition to carrying the chief responsibility for the university, Barling placed his services at the disposal of the Army medical department, and for most of the war was consulting surgeon to the Southern Command. He took an important share in organising the First and Second Birmingham War Hospitals at Rubery and Hollymoor; and in raising locally a medical unit that went to Salonica in 1917. In the same year he went for six months to France as consulting surgeon to the British forces on the western front. At the end of the war he retired with the rank of colonel A.M.S., and his services were recognised in 1917 with the C.B. (military), and in 1919 with the C.B.E. (military). In the years following the war the reorganisation of the work of the university made enormous demands on the time and energy of the chief administrative officer. Under Barling's skilful guidance the difficulties were gradually overcome, and the university once more entered upon a time of fruitful and progressive development. About this time the union of the General and Queen's Hospital and the provision of a new hospital and new medical school buildings in close association with the university at Edgbaston were projected. By the last year of Barling's pro-chancellorship the hospitals had been united, and the new buildings were already started; six years later, in 1939, they were completed and opened.

Among many outside activities Barling had served on the council of the Royal College of Surgeons from 1904–12, and as representative of the university on the General Medical Council from 1917–27. At the annual meeting of the British Medical Association in London in 1910 he gave the address in surgery, choosing for his subject malignant disease. Many honours were paid to him. Of these the greatest was his baronetcy, conferred in 1919. His friends and colleagues knew that it had been truly earned; and it was carried with his characteristic modest dignity.

On his retirement from the active staff in 1915 the General Hospital presented him with an illuminated address, his portrait was hung in the board room, and ten years later he became the first medical president of the hospital. In 1925 the university presented him with his portrait in oils, and in 1937 conferred on him the honorary degree of LL.D. After his retirement from the university Sir Gilbert kept an active interest in the advances of medicine until the very end of his life. He continued to be chairman of the committee of the Hospital Sunday fund, and retained his presidency of the Birmingham branch of the British Empire Cancer campaign, of which he had been chairman since its origin in 1923. He also continued as chairman of the joint board of research in mental diseases set up by the city and the university in conjunction with the asylums of the district.

Sir Gilbert was a surgeon of outstanding capacity and sound judgment; he paid great attention to thorough and complete diagnosis; his operations were free from attempts at brilliance, and were carried out methodically, carefully, and without waste of time. He undertook the after-treatment of his patients with gentleness and assiduous attention to detail. His wide knowledge and logical mind made him a valued and stimulating teacher whose aim was always not mere instruction but education. An agreeable and polished speaker, with a pleasant voice and without rhetoric, he impressed and persuaded his hearers. A tireless and persistent worker, never hasting, never wasting time, methodical and thorough, he was able to get through a great amount of business. Wide culture and experience, and a strong infusion of common sense, made him a wise counsellor and an administrator of outstanding ability. Genial and unaffected to his intimates, courteous and dignified always, he was a good companion and a staunch and trusty friend. Until a few years ago he was devotedly fond of shooting, fishing and golfing. He died of a sudden heart attack three days before his 85th birthday. Sir Gilbert married Katherine Edmunds, who died in 1920. They leave two daughters.

PARLIAMENT

The New Cabinet

The War Cabinet now consists of:

Prime Minister and Minister of Defence, Mr., Winston Churchill; Lord President of the Council, Mr. Neville Chamberlain; Lord Privy Seal, Mr. C. R. Attlee; Secretary of State for Foreign Affairs, Lord Halifax; Minister without Portfolio, Mr. Arthur Greenwood.

Other Ministerial appointments are:

First Lord of the Admiralty, Mr. A. V. Alexander; Secretary of State for War, Mr. Anthony Eden; Secretary of State for Air, Sir Archibald Sinclair; Lord Chancellor, Sir John Simon; Chancellor of the Exchequer, Sir Kingsley Wood; Home Secretary and Minister of Home Security, Sir John Anderson; Secretary of State for the Colonies, Lord Lloyd; President of the Board of Trade, Sir Andrew Duncan; Minister of Supply, Mr. Herbert Morrison; Minister of Information, Mr. Alfred Duff Cooper; Secretary of State for India and for Burma, Mr. L. S. Amery; Minister of Health, Mr. Malcolm MacDonald; Minister of Labour and of National Service, Mr. Ernest Bevin; Minister of Food, Lord Woolton; Dominions Secretary, Viscount Caldecote; Secretary for Scotland, Mr. Ernest Brown; Minister for Aircraft Production, Lord Beaverbrook; President of the Board of Education, Mr. Herwald Ramsbotham; Minister of Agriculture, Mr. Robert Hudson; Minister of Transport, Sir John Reith; Minister of Shipping, Mr. Ronald Cross; Minister of Economic Warfare, Mr. Hugh Dalton; and Chancellor of the Duchy of Lancaster, Lord Hankey.

Government Policy

In the House of Commons on Whit Monday Mr. WINSTON CHURCHILL, Prime Minister, in moving that the House welcomed the formation of a Government representing the united and inflexible resolve of the nation to prosecute the war with Germany to a victorious conclusion, declared he could only say to the House as he had said to those who had joined his Government: "I have nothing to offer but blood, toil, tears and sweat." We have before us, he continued, an ordeal of the most grievous kind. We have before us many, many long months of struggle and of suffering. You ask what is our policy; I will say: "It is to wage war, by sea, land and air, with all our might and with all the strength that God can give us, and to wage war against a monstrous tyranny, never surpassed in the dark, lamentable catalogue of human crime." (Loud cheers.) That is our policy. You ask what is our aim; I can answer in one word: it is victory—(cheers)—victory at all costs—(cheers)—victory in spite of all terrors, victory, however long and hard the road may be; for without victory there is no survival—(cheers)—let that be realised—no survival for the British Empire, no survival for all that the British Empire has stood for, no survival for the urge and impulse of the ages, that mankind will move forward towards its goal. (Cheers.) I take up my task with buoyancy and hope, and I feel sure that our cause will not be suffered to fail among men. At this time I feel entitled to claim the aid of all, and I say: "Come then, let us go forward together with our united strength." (Loud and prolonged cheers.)

ON THE FLOOR OF THE HOUSE

By MEDICUS, M.P.

EVENTS move so swiftly now that the fact that Mr. Chamberlain resigned after the debate last week has already become history. Current events on the political field are dominated by Mr. Winston Churchill's speech as new Prime Minister on Monday last and the change in the allocation of government offices to include the Labour and Liberal opposition parties. No less significant is that the Government includes the anti-Munich ministers who resigned because of disagreement with Mr. Chamberlain. Mr. Duff Cooper, who has already held the offices of First Lord of the Admiralty and Minister of War and is a writer and lecturer, now becomes Minister of Information. Mr. Duff Cooper's recent speaking tour of the United States has impressed him with the need for more information from our side over there and he has many recently formed connexions which will be of great value. The war widens its area almost every hour and to have the ear of the United States is an asset of the first importance. Mr. Anthony Eden is Minister of War and the serving soldiers will know they have a man at the War Office who has an intimate personal acquaintance with the service. Sir Archibald Sinclair has drive and vigour and has been an unsparing critic of delay and vacillation; he will have full scope for his powers at the Air Ministry, for the Air Force may well be the decisive factor.

To have got Sir Archibald Sinclair in the War Cabinet of five puts the Opposition Liberals behind the Government; the inclusion of Mr. Attlee and Mr.

Arthur Greenwood will ensure the support of the many millions of the Labour Party, and Mr. Chamberlain's presence will allay the fears of his many supporters. It is a really national team Mr. Churchill has to lead and his victory speech to Parliament and the unanimous vote of confidence he received has set the vast machine of war vibrating at an even greater speed than before. Mr. Attlee was only able to spare one hour for the Labour Conference meeting at Bournemouth but he got a vote of confidence and support by over 2,400,000 to 170,000, and the majority vote was not only that of the Trade Unions but of the constituency organisations of the Labour Party.

* * *

The new ministers are now working at their posts and others will be appointed before Parliament meets again next Tuesday. But a curious situation has arisen. There is no opposition except that of Mr. Maxton and his two colleagues, who could not register any votes on Tuesday last because both the members present were required as tellers in the voting lobbies. But the British Parliament without some kind of opposition is almost unthinkable and it is probable that a special kind of opposition will be formed. An opposition is a part of the constitution and "His Majesty's Opposition" has recently been made more a part of it than ever by having a salary of £2000 a year from Government funds attached to the office of leader. There are other privileges of an opposition—a room and ante-room in the House of Commons almost equal in dignity to that of the Prime Minister, other rooms and offices, and a special department for the Whips.

It is the play of thrust and parry between Government and Opposition which makes the parliamentary machine work. It is the Opposition who demand, and have the recognised right to demand, debates on matters of public interest, and who bring constructive or destructive criticism to bear on ministerial efforts. It was the Opposition action which forced the resignation of Mr. Chamberlain and the reconstitution of the Government on a national basis. If the present arrangement continued we should have in effect a one-party system of government in Great Britain on lines parallel with the systems in Italy, Germany and Russia. But the totalitarian arrangement even on the British pattern will not work the parliamentary machine and a way out will have to be found. Proposed arrangements are already being discussed.

* * *

On the field of war the tremendous battle which has been developing since the early morning of May 10 grows in vastness and savagery and will make demands on all of us. The demand already made to the medical profession for volunteeers up to 55 is an indication of what will be a general demand. The scale of modern war extends over miles where the 1914–18 war extended over as many furlongs. The distances to be covered in an army moving on the wheels of motor transport is very great and for this reason, as well as because of the great extent of the battle front, more doctors are required. What the effect of this will be on civil medical practice can only be guessed, but it may well involve the regional organisation of private practice with a view to economy of personnel. The extension of air warfare to Great Britain is another fact which must be provided against and which will make still further demands on the medical profession and indeed on all of us.

Fortunately the food situation is good, and so is the naval situation, and the civil defence system of the country, although as yet untested in any major struggle, is ready to show what it can do. Writing five days after the beginning of the German onslaught on Holland, Belgium and Luxemburg, it is difficult to reconstruct the relatively peaceful atmosphere of this day last week. In another five days it may be more difficult still. We are, we are told, beginning the greatest battle of history. Parliament and the nation are facing the situation with calm and working with immense energy. But where will the war spread? One appointment to the Government may be significant—that of Lord Lloyd to be Minister for the Colonies. Lord Lloyd is, to use the old phrase which fits him so perfectly, a great pro-consul, he is a man of vision and determination who has been governor of an Indian province and representative of the Crown in Egypt. He is a fighter as well as an administrator.

FROM THE PRESS GALLERY

Conduct of the War

THOSE who have long experience at Westminster know how varied are the moods of the House of Commons. Like the sea, it may be calm to the point of dullness for days and then almost without warning the clouds gather and the storm breaks. To close observers there have been many indications in the last few weeks that members of all parties (including many supporters of the Government) were becoming more and more restive and anxious about the conduct of the war. Yet until the grave and important two days' debate on the Norwegian campaign last week there was little to show that that restiveness and anxiety had reached a point where only a change of political leadership, combined with a complete reconstruction of the Government by the inclusion of all parties and possibly outstanding personalities from outside Parliament, could secure the national unity which is vital to the winning of the war.

There were portents on Tuesday that feeling was running high. The Prime Minister in opening the debate was subjected to a series of interruptions which moved the Speaker to intervene with an unusually stern rebuke. After that Mr. Chamberlain was allowed to proceed in the unfolding of the defence of the Government's policy. Towards the end of his speech he gravely warned the House against bickerings and divisions among themselves when we might soon be faced by war in its most violent form; it is rather a time, he said, for closing our ranks and setting our teeth. He went on to reveal that the military advisers of the Government had warned the Cabinet in solemn terms of the danger of holding this debate. But ministers had felt that in a democratic country they must be allowed to defend themselves whatever the risk might be.

Whatever effect the Prime Minister's speech may have had on the House was largely discounted by the later intervention of Admiral of the Fleet Sir Roger Keyes, who produced something of a sensation by asserting that everything that Mr. Chamberlain had said had strengthened his conviction that the capture of Trondheim was "essential, imperative and vital." Moreover, with all the weight of his immense reputation, he asserted that the naval hazards of such an operation would have been trifling compared with those overcome in other operations which he had organised and led. The position of Trondheim and its aerodrome was so important strategically that almost any effort would have been justified, even if it involved some naval risk and sacrifice.

* * *

On Wednesday the atmosphere of the debate was even more heated, and it soon became plain that the rebels on the Government side were more numerous than had been generally supposed. This was particularly noticeable among the younger Service members, some of whom roundly cheered any reference to the need for a change in political leadership. A striking speech was made by Commander Bowyer,

who, while stating that his position as a member of the Naval Staff made it necessary for him to be careful what he said, nevertheless committed himself to possession of the knowledge of the "dead hand" responsible for stopping the naval operations which he thought might have retrieved the situation in Norway and completely turned the tables on the Germans. Wild horses, however, would not drag from him what dead hand it was; all he would allow himself to disclose was that it came from above. War was a continuation of policy, and he was certain that the way we were conducting this war was a continuation of the policy which led up to it, a policy which would lead us only to inevitable disaster. The dead hand must go.

Challenging speeches of this kind continued to come from both sides of the House. The tension and excitement in a crowded chamber rose to its peak when Mr. Lloyd George charged the Government with having gambled on the chance of getting air bases in Norway. He declared that while there was no cause for panic there was grave cause for "pulling ourselves together," and that could not be achieved unless the country was told the facts and the reality of the peril. He advised the Prime Minister to separate his personality from the issue before the House: "I say solemnly that the Prime Minister should give an example of sacrifice, because there is nothing that can contribute more to victory in this war than that he should sacrifice the seals of office."

After the Government had been further attacked by Sir Stafford Cripps and Mr. Duff Cooper the stage was set for Mr. Churchill's reply. Those who expected that the First Lord would rise to the importance and gravity of the occasion were not disappointed. In a speech that was certainly one of the finest in his career he made a spirited defence of the Government's policy in Norway and of his own part in it. He refused to recede from his statement that Hitler's invasion of Norway had been a cardinal political and strategic error. Although Germany had overrun large parts of Norway the result on balance in his judgment rested with the Allies. Finally, he strongly deprecated the tactics of the Labour Opposition in launching a vote of censure on the Government at a few hours' notice. Such a grave question as whether the Government should continue in office should not be decided precipitately. He pleaded for a cessation of pre-war feuds. "Let us," he said, "forget our personal quarrels, and keep our hatreds for the common enemy."

When the division was taken and it was found that the Government majority had dropped to 81 in a House in which the Government hold some 400 seats against the Opposition's 200, it was obvious that the Government had suffered a severe reverse. Next day there were a few desultory echoes of Wednesday's great political drama. Then members separated for the Whitsuntide recess in a state of uncertainty as to the final outcome of an historic parliamentary week.

Hours of Work

In the House of Commons on May 9, Mr. RHYS DAVIES drew attention to the oft-quoted report of the Industrial Health Research Board, which said:

> One of the lessons learned in the last war was that excessive hours of work do not ultimately pay, even when considered solely on the basis of output and apart from the effects on the health of the workers.

The sickness of our population for the first quarter of 1940 was, said Mr. Davies, 20 per cent. higher than any figure recorded in history. While the severe winter weather probably accounted for most of that, he was not sure that speeding up in industry was not also partly responsible. He trusted that the factory inspectorate would see that employers carried out the suggestions made by the Home Office in their pamphlet that covers the effects of the blackout on factory workers. The fact that women were now flocking into industry made it necessary that that aspect of the problem of industrial accidents should also be carefully considered. Above all, he pleaded that the unscrupulous type of employer should not be allowed to take advantage of the national emergency to exploit his workpeople and endanger their health for his personal aggrandisement.

Dr. EDITH SUMMERSKILL said it was important to remember that increasing hours of work did not necessarily increase output in the same proportion. What struck her chiefly in the report referred to was the statement that industrial accidents were in large measure due to sickness and fatigue. The conclusion to which this report arrived was that the basic problem was one of health—health of mind and body—since the healthier and more contented the individual was the more energy he had available. Why in these enlightened days did the authorities examine only boys and girls under 16 before they went into the factory? Why did not the state assume responsibility for the health of boys and girls over 16 and of men and women? It could not be argued, particularly in war-time, that these people were provided for under the national insurance system. Thousands of people were being introduced into our factories who had never had a medical examination at all. Workers went to a doctor only when there were actual symptoms of illness. If there was proper inspection, many hours of labour could be saved which were now lost through sickness.

THE LESSON OF TYNESIDE

Mr. DAVID ADAMS said that Tyneside had the unenviable notoriety of having a tuberculosis-rate which was probably the highest in the country. This ought to receive the constant attention of the Ministry of Health. When questions were put to him the Minister replied that action was being taken in the provision of additional hospitals and so on, but it was to methods of prevention that attention ought more particularly to be directed. The high tuberculosis-rate was alleged to be due to the low nutritional standards on the north-east coast and also to overtime worked by women and girls in the factories. It was, however, interesting to notice that the figures showed that 50 per cent. of the cases of tuberculosis in children under one year resulted from direct infection. It was a serious fact that during the last three years there had been an average of 50,000 new cases of tuberculosis in the country. Probably the municipal authorities were dealing with this matter as well as they could, but it required a much greater effort from the central authority, particularly as regards nutrition.

HOME OFFICE POLICY

Mr. PEAKE, under-secretary of state for the Home Department, assured the House that, apart from carrying out its statutory responsibilities for the protection of factory workers against ill-health and accidents, his department were constantly issuing pamphlets giving advice to employers and delivering lectures to secure a wider adoption of safety, health and welfare arrangements than was required to meet the minimum standards of the law. As regards operations or processes which might involve specific danger to health, it was the constant duty of the Factories Department to mobilise specialised knowledge for the purpose of devising protective measures to counteract such dangers. Special safeguards, for example, had been devised in regard to radioactive processes. While there was no statutory power at present to enforce medical examinations for entrants into factories and industries over the age of 16, he claimed that a good deal had been done recently by the employment of whole-time doctors in the larger factories, and in particular those established by the Ministry of Supply. Furthermore, since the war there had been a considerable addition to part-time medical supervision in factories of moderate size. The Home Office fully supported the observations in regard to hours of work made in the report of the

Industrial Health Research Board, and it was the policy of the Government, while authorising, where necessary, hours of work which would not be permissible in peace-time, not to authorise hours which were found in the light of experience and scientific investigation to be detrimental to health or to efficient production.

QUESTION TIME

Grading Hardship

Mr. SORENSEN asked the Minister of Labour and National Service whether he was aware of the hardship of unemployed young men whose low medical category might involve indefinite delay in their calling up for military service, but who, nevertheless, were refused employment because of their age group; and whether he would take any action in the matter, either by guaranteeing them a long period before being called up, or in some other way, enabling them to assure possible employers that the calling up would be postponed.—Mr. ASSHETON, parliamentary secretary to the Ministry, replied: Men placed in grade IV medical category are informed that they will not be called up. Men placed in grade III will not be called up until further notice, unless they have been so graded on account of defective vision. Men placed in grade III on account of defective vision may if they wish apply to be called up early and those who do so will be called up before the remainder.

Service Patients in Mental Hospitals

Mr. SORENSEN asked the Minister of Health whether he had given or would give guidance to mental hospital committees respecting charges to be made to the War Office to cover the use of mental hospital premises and services or whether any specific agreement had yet been reached on this matter.—Mr. WALTER ELLIOT replied: The matter is primarily one for settlement between the War Office and the local authorities concerned. I understand, however, from the Board of Control that agreement has been reached in principle and it is hoped that the details will be settled at an early date.

Overcrowding in a Mental Hospital

Mr. CHARLES BROWN asked the Minister if he was aware that the Notts County mental hospital (female block) was gravely overcrowded; and if he could state the reason for the continued refusal to allow necessary extensions to be undertaken.—Mr. ELLIOT replied: I am afraid I am not clear to what refusal of necessary extensions the hon. member is referring. I shall be glad to inquire fully into the position if he will send me the details of what he has in mind.

Women Factory Workers

Mr. TINKER asked the Minister of Supply if he was aware that, at some of the government works in Lancashire, excessively long hours were being worked by women on night-shifts; that this was having effect on their health; and if he would have inquiries made to see if this could be avoided.—Colonel LLEWELLIN, parliamentary secretary to the Ministry, replied: The hours worked are those agreed between the department and officials of the trades-unions representing the workpeople concerned. The health of the employees is being constantly watched, and there is no evidence that the hours at present being worked in Royal ordnance factories are having any effect detrimental to their health. The question of the best hours to be worked, regard being had both to the essential needs of production and to the welfare of the workpeople, is one which is under continual review.

School Feeding Centres

Mr. DAVID ADAMS asked the Parliamentary Secretary to the Ministry of Food whether he was aware that certain local food-control officers had classified school feeding centres as common catering establishments, and issued permits for only 60 per cent. of meat with corresponding reductions in bread, cheese, sugar, &c., necessitating a serious reduction in the number and quality of meals supplied; and whether he would take steps to have full ration allowances restored forthwith.—Mr. LENNOX-BOYD replied: School feeding centres requiring to obtain supplies of rationed foods are enabled to do so by registering under the rationing regulations as catering establishments. As such they are, for the time being, permitted to serve meat meals free of the coupon, but in relation to these establishments, the rationing of meat takes the form of a restriction of supplies to 60 per cent. of their normal requirements. Sugar is rationed in catering establishments by reference to the number of meals and hot beverages served. There is at present no restriction on the supply of bread or cheese.

Women Auxiliaries in Hospital

Major-General Sir ALFRED KNOX asked the War Secretary what hospital arrangements had been made in London and generally in Great Britain for the treatment of women auxiliaries.—Mr. OLIVER STANLEY replied: Members of the Women's Auxiliary Services serving with the Army may be admitted to any military hospital when accommodation is available, any military families hospital, or any of the emergency medical service hospitals of the Ministry of Health under the same conditions as Army personnel.

Medical Evidence in Pension Appeals

Captain PLUGGE asked the Minister of Pensions whether, when a person had a right of appeal to the Minister, the facts submitted were considered by the Minister personally or by an independent tribunal or by civil servants in the employ of the Ministry.—Sir W. WOMERSLEY replied: The practice in a case of this nature is that all the facts are fully reviewed by an officer of superior rank to the one who gave the original decision. Where a medical issue is involved a principal medical officer is consulted and if thought desirable the opinion of an independent medical expert is sought. It would be clearly impossible for the Minister to see every case of complaint or appeal but wherever the issue is one of importance the case would be put before me.

Chiropodist and War Service

Mr. JAMES GRIFFITHS asked the Secretary of State for War if he had considered the offer from the National Institute of Chiropodists to place the skill and experience of their members at the service of the Army; and if he would favourably consider their offer so as to utilise their services to the advantage of the men serving in the Army.—Sir E. GRIGG, Financial Secretary to the War Office, replied: The offer from the National Institute has been considered. The institute was informed that chiropodists sufficient for the needs of the Army were trained at military hospitals, and, should further assistance be required, the advice of the British Medical Association would be taken.

Medical News

Royal College of Surgeons of England

An ordinary meeting of the council was held on May 9 with Mr. Hugh Lett, the president, in the chair. Sir Percival Nicholls, medical director general of the Navy, and Sir Richard Needham were admitted to the fellowship.

The president was appointed, ex officio, a member of the governing body of the British Postgraduate Medical School for one year.

It was decided to recognise the schools attached to the Royal College of Surgeons in Ireland as places at which the course of study for the primary fellowship examination of the college may be taken. The City General Hospital, Sheffield, was recognised for the six months' surgical practice required of candidates for the final fellowship examination in respect of the posts of senior assistant in surgery and senior house-surgeon.

A diploma of fellowship was granted to B. B. Bhatia of Lucknow and London.

Diplomas of membership were granted to Alexander Lang (Camb. and St. Bart's) and Frank Livesey (Manc.) and to the candidates mentioned in the report of the committee of the Royal College of Physicians which appeared in our issue of May 4.

Mr. E. B. Dowsett, has gone to Egypt to act as visitor to the dental schools of the Fouad I. University, Cairo, on behalf of the College.

University of Oxford

At a congregation held on May 14 it was decided to confer the honorary degree of D.Sc. on Dr. Mariano Rafael Castex, professor of chemical medicine at Buenos Aires.

University of Cambridge

On May 10 the degrees of M.B., B.Chir. were conferred by proxy on T. L. Oliver.

Chadwick Prize and Medal

Sir William Collins will present this prize and gold medal to Group-Captain P. C. Livingston on Thursday, June 20, at 3.45 P.M., at the Chelsea Physic Garden, Swan Walk, S.W.3. The award is made once in every five years to an officer of the Navy, Army, or Air Force medical service who has specially assisted promoting the health of the men. Afterwards Prof. William Brown, F.R.S., will deliver a Chadwick lecture on plant disease in relation to the public.

Royal College of Physicians of Edinburgh

A quarterly meeting of the college was held on May 7, with Dr. Alexander Goodall, the president, in the chair. Dr. C. G. Magee (London), Prof. F. A. E. Crew (Edinburgh), Dr. A. J. Wilson (Coventry), and Dr. J. L. Henderson (Edinburgh) were introduced and took their seats as fellows. Dr. J. P. Leckie (Edinburgh), Dr. J. R. Boyd (Wellington, N.Z.), Dr. Donald Stewart (Birmingham), Dr. John McMichael (London), Dr. D. M. F. Batty (Edinburgh) and Dr. J. H. Croom (Edinburgh) were elected fellows. The Lister fellowship was awarded to Lieut.-Colonel W. Glen Liston.

Evacuation of School-children

Increased billeting allowances for school-children evacuated under the Government scheme will be available during the week beginning May 31. Under the new scale householders will receive 10*s.* 6*d.* weekly for children between 10 and 14; 12*s.* 6*d.* for those between 14 and 16; and 15*s.* for those over 16.

Preliminary arrangements have been made for the evacuation of over a million school-children should the need arise, and children were recalled to school over the Whitsuntide holiday. In evacuation areas outside London school doctors and nurses began the medical inspection of all children who will be sent away. In London the L.C.C. medical staff has been examining the children day by day during the past weeks.

Welfare officers have been added to the staff of the Ministry of Health to organise work among evacuated children.

Lieut-Colonel D. C. Monro, R.A.M.C., has been appointed honorary surgeon to the King in succession to the late Major-General G. G. Tabuteau.

Vacancies

Birmingham and Midland Eye Hospital.—Res. surg. O., £200.
Blackburn Royal Infirmary.—Res. H.S., £175.
Boston General Hosp.—Res. M.O., at rate of £150.
Brighton, Royal Sussex County Hosp.—Hon. med. and surg. reg. Also res. surg. O., £300.
Brighton, Sussex Maternity & Women's Hosp.—Res. H.S., £130.
Bristol Eye Hosp.—Res. H.S., 6 guineas per week.
Bucks County Council.—Temp. H.P. for emergency maternity home, at rate of £200.
Bury St. Edmunds, West Suffolk General Hosp.—H.S., £150.
Chester Royal Infirmary.—H.P., £150.
Chester, Upton Emergency Hosp.—Jun. res. H.P., £200.
Chorley, Chorley and District Hosp.—H.S., at rate of £150.
Coventry and Warwickshire Hosp.—Two H.S.'s to spec. depts., each at rate of £150.
Derbyshire Education Committee.—Temp. asst. school M.O., at rate of £500.
Derbyshire Royal Infirmary.—H.S. for cas. dept., £150.
Durham University.—Demonstrator in pathology in medical school and asst. pathologist to Royal Victoria Infirmary, £300.
Essex County Council.—Asst. county M.O.H., £500.
Essex County Council and Thurrock Urban District Council.—Asst. M.O.H., £500.
Halifax Royal Infirmary.—Second H.S. and cas. O., £175 and £150 respectively.
*Hosp. for Sick Children, Great Ormond Street, W.C.*1.—H.P.'s and H.S.'s, each at rate of £100.
Ilford, West Ham Hosp. for Nervous and Mental Disorders, Goodmayes.—Asst. M.O., £350.
Lancashire County Council.—Sen. and jun. H.S.'s for Biddulph Grange Orthopædic Hosp., at rate of £300 and £250 respectively.
Liverpool, Bootle General Hosp.—H.P. and H.S., each £150.
Liverpool Royal Children's Hosp.—Res. M.O. and res. surg. O., each at rate of £120.
Manchester City.—Jun. res. asst M.O. (Grade 2) for Monsall Hosp., at rate of £250.
Manchester Royal Children's Hosp., Pendlebury.—Res. M.O., at rate of £150.
Manchester Royal Infirmary.—Med. chief asst., £300. Also Second res. clin. path., £150. Res. jun. M.O., at rate of £150. Also three H.S.'s to spec. depts., each at rate of £5.
Middlesbrough, North Riding Infirmary.—Cas. O. & H.P., at rate of £150 and £140 respectively.
*Miller General Hosp., Greenwich, S.E.*10.—Out-patient and cas. O., each at rate of £150. Also two H.S.'s, each £100.
Nottingham and Midland Eye Infirmary.—Res. H.S., £200.
Nottingham General Hosp.—H.S. and res. cas. O., each at rate of £150.
Plymouth City.—Temporary asst. M.O.H., £500.
Preston and County of Lancaster Royal Infirmary.—H.S. to eye, and ear, nose, and throat depts., £150.
Princess Beatrice Hosp., Earl's Court, S.W.5.—Res. H.S. and cas. O. and res. H.P. and cas. O., each at rate of £110.
*Princess Elizabeth of York Hosp. for Children, Shadwell, E.*1.—Res. M.O. and res. surg. O., at rate of £250 or £150.
Rochdale Infirmary and Dispensary.—Second H.S., £150.
Rowley Regis, Borough of.—Deputy M.O.H. and asst. school M.O., £500.
Royal Masonic Hosp., Ravenscourt Park, W.6.—Res. surg. O., at rate of £250.
*Royal Waterloo Hosp. for Children and Women, Waterloo Road S.E.*1.—Hon. med. reg., honorarium £75. Also anæsthetist at rate of £50.
*Samaritan Free Hosp. for Women, Marylebone Road, N.W.*1.—H.S., at rate of £100.
Sheffield Children's Hospital.—H.S., at rate of £100.
Sheffield Royal Hosp.—Clin. asst., £300. Also H.S.'s to ear, nose, and throat and ophth. depts., £80 and £120 respectively.
Stockton-on-Tees, Winterton Emergency Hosp.—H.S.'s, each £200.
Stoke-on-Trent, North Staffordshire Royal Infirmary.—Orthopædic H.S., at rate of £150–£200. Also res. cas. O. and H.P., each £150.
Southampton Free Eye Hosp.—H.S., at rate of £150.
Stourbridge, Corbett Hosp.—H.P. and H.S., at rate of £125 and £100 respectively.
Tilbury Hosp., Essex.—Res. house O., at rate of £200.
Wolverhampton Royal Hosp.—H.S.'s and cas. O., each at rate of £100.
York County Hosp.—Res. H.S. and res. H.P., each £150.

Births, Marriages and Deaths

BIRTHS

ARMSTRONG.—On May 10, at Rothbury, Northumberland, the wife of Major Reginald Armstrong, R.A.M.C.—a son.
COOPER.—On May 11, at Princess Risborough, the wife of Dr. J. D. Cooper—a daughter.
FURLONG.—On May 6, at Woking, the wife of Mr. Ronald Furlong, F.R.C.S.—a son.
PAYNE.—On May 5, at Windsor, the wife of Mr. R. Vaughan Payne, F.R.C.S.—a daughter
PICKERING.—On May 5, at Chalfont St. Peter, Bucks., the wife of Prof. George W. Pickering, F.R.C.P.—a son.
PLAYFAIR.—On May 3, at Wolverhampton, the wife of Mr. P. H. L. Playfair, F.R.C.S.—a son.

MARRIAGES

MACKENZIE—JOYCE.—On May 9, at Haifa, Palestine, Kenneth George Frederick Mackenzie, F.R.C.S., Major, R.A.M.C., to Sheila Heath Joyce, of Greywell, Hants.

DEATHS

BRADBROOKE.—On May 8, at Sutton Courtenay, William Bradbrooke, M.R.C.S., aged 81.
DONNELLAN.—On May 12, at Lowisham Park, S.E.13, Robert Vincent St. Clair Donnellan, L.R.C.P.E.
DOUGLASS.—On May 8, at Eastbourne, Percy Clarence Douglass, M.R.C.S., Lieut.-Colonel, R.A.M.C. (retd.).
FAULKNER.—On May 7, at Banbury, Hugh Faulkner, M.D. Edin., of Mirabel Jurancon, France.
LINDESAY.—On May 2, at Burley, New Forest. Victor Edward Hugh Lindesay, M.B. Manc., Lieut.-Colonel, I.M.S. (retd.), aged 70.
MANNING.—On May 12, at Royal Masonic Hospital, London, Harry Paul Owen Manning, M.R.C.S., aged 78.
MCKECHNIE.—On May 13, at Hastings, William Ernest McKechnie, M.B. Edin., Lieut.-Col. I.M.C., (retd.), aged 65.
MICKLETHWAIT.—On May 10, at St. Albans, George Whitley Micklethwait, M.D. Camb.
MUDIE.—On May 8, at Claygate, Henry Ferguson Mudie, M.B. Edin., J.P., aged 89.
NORTHCOTE.—On May 7, in London, Augustus Beauchamp Northcote, M.D. Edin.
RAE.—On May 10, at Broadwindsor, Dorset, Francis Lionel Rae, M.A., M.R.C.S., of Ponsmaen, Feock, Cornwall.
RAWLING.—At Exmouth, Louis Bathe Rawling, M.B. Camb., F.R.C.S., aged 69.
SHORE.—On May 7, George William Shore, O.B.E., M.D. Lond., D.P.H., D.P.M., Colonel A.M.S., medical superintendent, Shenley Hospital.
STABLES.—On May 10, at Pitgaveny, Elgin, Alexander Stables, M.B. Edin., Major R.A.M.C. (retd.).
WADE.—On May 11, at Ryde, Arthur Breedon Wade, M.B. Edin.

NOTES, COMMENTS AND ABSTRACTS

TAVISTOCK CLINIC

THE annual luncheon of the clinic was held on May 6. Lord Alness, chairman of the council of management, who was in the chair, said that he knew of no institution that has so courageously and stubbornly stood the shock of warfare. It had to evacuate its familiar premises in Malet Street, but had found a real home in Westfield College, Hampstead. The clinic has to contend with a falling revenue, the Store-street site, with its capital debt, is a millstone round the council's neck, and the medical officers have had to forgo their honoraria. The clinic has, however, received a substantial legacy from an admirer, and a grant of £600 a year from the Rockefeller Foundation. The children's department is the only children's psychiatric clinic that has been kept continuously open during these dark and difficult times. Lord Alness appealed to those present to do all in their power to give a lift forward to this enterprise of truly national importance. Sir Walter Monckton said that the Tavistock Clinic is a war baby, for it was founded on the experience of the last war. Today it has a still greater opportunity. Many good men suddenly taken from civilian work and put into the Services are likely to be assailed by neurosis, and the more sensitive and responsible the man the greater the likelihood that he will suffer from nervous disorder. The Tavistock Clinic is able to help these people and such a task cannot be abandoned in wartime. The aim of psychological medicine is the cure of the individual soul. If the present war is one of nerves and wills, those who are happy enough to avoid nervous ailments must steel their wills lest they should throw away for the sake of living everything that gives value to life.

Colonel J. R. Rees, medical director of the clinic, said that the appeal for financial support at the luncheon was a breach of custom dictated by necessity. A charity helping the morale of the country is a real war charity, and as consultant to the Army he finds the clinic's research work invaluable. The council's aim is to provide psychological treatment for every man and woman in the country through local-authority clinics and National Health Insurance. The times hold an illuminating challenge. This struggle against international delinquency and on behalf of sanity, for this country and all Europe, is largely a psychological one, and in building up an effective prophylaxsis the clinic can, if properly supported, play an important part.

MEDICAL LIBRARY WITH THE B.E.F.

THE medical library established by the council of the Royal College of Surgeons of England for the use of medical officers serving in France was opened in March at one of the medical bases of the B.E.F.

The original funds allocated by the college have been supplemented by grants from the Royal Society of Medicine and the editorial committee of the *British Journal of Surgery*. Many authors of text-books and monographs have presented copies of their works and several medical periodicals have been supplied free by their editors. The original scheme has been expanded so that every branch of medicine and surgery is represented on the shelves and at least two journals in each specialty are available. Gifts of books and periodicals have been received not only from the United Kingdom but from France and the United States. The library is housed in two rooms provided by the British Red Cross Society in its head-quarters at the medical base. The society has also undertaken to be responsible for the transport of books and periodicals from London. This has effected not only a great saving in the cost of transport but in the time taken for the packets to reach the library.

There are now 57 periodicals and 260 volumes on the shelves. These form a most effective working collection which grows week by week to keep pace with requests from readers. In addition to the usual standard texts, books have been provided to enable junior officers to continue their studies for the higher diplomas in medicine and surgery.

QUININE SUPPLIES AND THE INVASION OF HOLLAND

As a consequence of the German invasion of Holland and Belgium the outlook on several commonly prescribed drugs is temporarily obscured. The most important of these is quinine, and while there is no reason to suspect a shortage of supplies of this drug in this country the fact that the world market for the alkaloid is controlled from Amsterdam and that more than 90 per cent. of the raw material, cinchona bark, is produced in the Netherlands East Indies suggests the advisability of economy in the use of stocks at least until it is possible to form an opinion as to the prospects of replenishing them. Other drugs derived chiefly from Holland are caffeine and theobromine. Supplies of both of these products are slight and the prices of both were already far in excess of the pre-war figures before the most recent extensions of the war. Two of the vegetable drugs for which this country depends largely on Belgium are valerian root and camomile flowers; the former is collected in the autumn and the latter in the late summer. Both these drugs are cultivated in England but not on anything like the scale needed to satisfy the demand.

HARVEY CUSHING'S LAST BIRTHDAY

THE Harvey Cushing Society have recorded their celebrations in honour of their patronym at his seventieth birthday on April 8 last year in an unusual book (Harvey Cushing's Seventieth Birthday Party. Baillière. 27*s.* 6*d.*) It includes the programme of the scientific proceedings; the speeches at the dinner at which the society presented Dr. Cushing with a bibliography of his own writings; a selection of the many letters and telegrams from friends, pupils and patients; and reprints of valedictory articles in the medical press. At the end there is an account by Henry Viets of Cushing as a student and house-surgeon at the Massachusetts General Hospital in the nineties. The birthday, Cushing's last, was evidently a felicitous occasion, with "the Chief" in his best form, distributing shafts of that kindly but terribly discerning humour which the recipients could never resist. To absent friends this book will bring cheer and comfort. Others will marvel that one man could have earned so many tributes of personal affection and gratitude, and that he could have found time to cultivate his large family of friends, pupils and patients during forty years of exacting toil.

RED CRESCENT HOSPITAL, CAIRO

This special hospital has the task of canalising part of the flood of traumatic material which tends to overwhelm the surgical activity of Cairo. Of 1404 admissions to this hospital 692 were fractures. The bulk of its second annual report is therefore devoted to their consideration. Fracture treatment is dominated by the Böhler technique, so much of which is really French, though other methods take due place—the Smith-Petersen nail for example, which we note the surgeon in charge, Dr. Kamel Hussein, F.R.C.S., prefers to introduce by the Broque technique. Clear reproductions of X-rays will be found on almost every page, and there is everywhere evidence of enthusiasm and hard work. Details of varieties of treatment which were given in the first report have been excluded from this one, and it is difficult to be clear, for example, whether wounds are completely closed after operative cleansing of compound fractures, and whether any antiseptic enters into that phase of the treatment. Bitter experience teaches how sudden disaster, from gas-gangrene or septicæmia, will spoil a long series promising perfec-

tion. The report also deals with 84 cranial and 54 abdominal injuries and a number of burns and wounds. Dr. Hussein and his co-workers have great opportunities for sifting and developing methods and we look forward to further accounts of their activities. It will give real pleasure to many to see the name of Aly Ibrahim Pasha, that most skilled surgeon-administrator, as president of the society under which this work has been done.

TREATMENT OF HEAD LICE

THE makers of Jeyes Fluid have sent us a leaflet recommending the following procedure for getting rid of Pediculi capitis.

1. Put a dessertspoonful of Jeyes Fluid in a quart of fairly hot water.
2. Wet all the hair with the solution, and, after rubbing the head well with a tablet of toilet soap, shampoo the head, using sufficient of the solution to create a generous lather, which should be rubbed in for a couple of minutes.
3. Sponge the head with the solution to remove any lather that remains, and repeat the process of shampooing with soap.
4. While there is still a lather on the head from the second application, put a towel round the head in the form of a turban, and if time permits leave it on for an hour; then wash the head with soap and warm water, and rinse with lukewarm water. After drying, comb the hair with a very fine comb, and also brush it thoroughly over a newspaper, which should afterwards be carefully folded and burnt.

THE PHARMACEUTICAL REGISTERS

ACCORDING to the annual report for 1939 of the council of the Pharmaceutical Society, presented at the annual meeting on May 15, the number of names on the registers of Pharmaceutical Chemists and Chemists and Druggists was 24,661 (an increase of 471). Of these 1578 were registered as pharmaceutical chemists, an increase of 51. The number of apprentices or students registered during the year was 651, an increase of 26, and the number of registered premises was 15,381, an increase of 44.

JOHNS HOPKINS STUDENTS

"Miss Susie Slagle" (Heinemann. 8*s*. 6*d*.) kept a boarding-house for medical students at Johns Hopkins and apparently acted as moral tutor and mother-confessor to her guests. Miss Augusta Tucker tells us the story of one generation of Miss Susie's students, a mixed bag of characters differing widely in origin, ability and achievement. The novel is said to be in production as a film and was obviously written with that end in view. The cover states that it is "sweeping America," which may be true or mere wishful thinking on the part of the publisher. Ingenuous and sentimental to the point of being saccharine, it is unlikely to sweep this country.

AN INDEX OF PHYSICAL TYPE

THE great difficulty in discussing the pros and cons of Kretschmer's theory of correlation of mental and physical types has been the absence of a reliable definition and standard. Raymond Pearl (*Amer. J. phys. Anthrop.*, March 30, 1940, p. 26) has exposed the fallacies of the indices previously suggested and has put forward another to take their place:

$$\frac{100\ (\text{chest girth} + \text{belly girth})}{\text{height}}$$

This index has been applied to the measurements of a series of apparently healthy men, of whom one group later died of cardiovascular disease, a second group of tuberculosis, and a third of diabetes. The results show that, as a group, the persons who died of tuberculosis differed in physical type from those who died of diabetes. Those who became tuberculous were at the asthenic end of the scale of physical types; those who became diabetic were pyknic; and those who later developed cardiovascular disease were of an intermediate physical type.

Medical Diary

Week beginning May 20

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.1.
TUESDAY—2.30 P.M., Dr. George Graham: Second Croonian lecture.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1.
TUESDAY
Pathology—5.30 P.M.—demonstrations at the Bland-Sutton Institute, Middlesex Hospital, W.1.
THURSDAY
Urology—3 P.M.—annual general meeting. Cases and specimens, demonstration of instruments.
FRIDAY
Disease in Children—2.45 P.M., annual general meeting. Cases.
Epidemiology and State Medicine—5 P.M., annual general meeting. Dr. N. M. Goodman: The Teaching of Social Medicine. Miss Cherry Morris (almoner of St. Thomas's Hospital) will also speak.

ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION.
WEDNESDAY—2.30 P.M. (11, Chandos Street, W.1.), quarterly general meeting. Dr. Joshua Bierer: Psychotherapy in Mental Hospital Practice.

PADDINGTON MEDICAL SOCIETY.
TUESDAY—9 P.M. (St. Mary's Hospital, Paddington), Dr. C. J. Donelan: Epidemics in War-time.

WEST LONDON MEDICO-CHIRURGICAL SOCIETY
WEDNESDAY—8 P.M. (De Vere Hotel, S.W.), Mr. R. Watson Jones: Problems in the Treatment of Compound and Infected Fractures.

BRITISH PSYCHOLOGICAL SOCIETY.
Medical Section.
WEDNESDAY—8.30 P.M. (11, Chandos Street, W.1). Dr. S. W. Patterson (for Sir Edmund Spriggs) and Dr. W. C. M. Scott: Anorexia Nervosa.

CHADWICK LECTURE.
TUESDAY—2.30 P.M. (London School of Hygiene, Keppel Street, W.C.1.), Prof. S. P. Bedson, F.R.S.: Human Virus Infections of Animal Origin—their Mode of Spread and Control.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W.12.
WEDNESDAY—11.30 A.M., clinico-pathological conference (medical): 2 P.M., Prof. J. H. Dible: Pathology of Meningitis. 3 P.M., clinico-pathological conference (surgical).
THURSDAY—2 P.M., Dr. Duncan White: radiological conference.
FRIDAY—2 P.M., clinico-pathological conference (gynæcological). 2.30 P.M., Mr. V. B. Green-Armytage: sterility clinic. 2.30 P.M., Dr. Hinds Howell: ward clinic.
DAILY 10 A.M.–4 P.M., medical clinics, surgical clinics and operations; obstetrical and gynæcological clinics and operations. 1.30–2 P.M., post-mortem demonstration.

MEDICO-LEGAL SOCIETY.
THURSDAY.—8 P.M. (26, Portland Place, W.1), Dr. Hugh Grierson: The Medical Examination of Prisoners.

FELLOWSHIP OF MEDICINE AND POSTGRADUATE MEDICAL ASSOCIATION, 1, Wimpole Street, W.1.
MONDAY and THURSDAY—5 P.M. (Brompton Hospital, S.W.3), M.R.C.P. course in chest diseases.

Appointments

DUNLOP, P., J.L., M.D. Glasg., D.P.H., D.T.M. & H., county medical officer of health for Hertfordshire.
FAISON, J. B., M.B. Glasg., assistant resident surgical officer in the obstetrical, gynæcological and children's departments at St. Mary's Hospitals, Manchester.
HASLEGRAVE, IRENE, M.B. Leeds, assistant school medical officer for Leeds.
HEWITT, SELWYN, M.B., B.Hy. Durh., D.P.H., temporary resident assistant medical officer, tuberculosis wards, Withington Hospital, Manchester.
HILLIARD, L. T., M.B. Camb., D.P.M., deputy medical superintendent (temporary) at the Fountain Hospital, L.C.C.
LAWLER, A. W., M.D. Winnipeg, M.R.C.O.G., resident surgical officer in the obstetrical, gynæcological and children's departments at St. Mary's Hospitals, Manchester.
MACKAY, S. G. M., M.B. Durh., resident medical officer at the General Hospital, Newcastle-on-Tyne.
MILLS, J. P. TYNAN, L.R.C.P.E., temporary deputy medical superintendent at Park Prewett Hospital, Basingstoke.
Colonial Medical Service.—The following appointments and promotions are announced:
MERSON, G. P., M.B. Aberd., medical officer, Zanzibar.
FERGUSON, V. L., M.B. Aberd., D.P.H., D.T.M. & H., deputy director of medical services, Trinidad.
FRASER, E. M., M.B. Edin., senior medical officer, Gold Coast.
GREER, W. N., M.D. Edin., D.T.M. & H., senior medical officer, Gold Coast.
The Chief Inspector of Factories announces a vacancy for an examining surgeon at Battle, Sussex.
Examining Surgeons under the Factories Act, 1937: Dr. G. S. MORGAN, Horsham, Sussex; Dr. K. P. D. GRIFFITHS, Llanwrtyd Wells, Brecon.

ADDRESSES AND ORIGINAL ARTICLES

A RATIONAL APPROACH TO RESEARCH IN CHEMOTHERAPY

By Paul Fildes, O.B.E., M.B.Camb., F.R.S.
DIRECTOR OF THE DEPARTMENT OF BACTERIAL CHEMISTRY, MEDICAL RESEARCH COUNCIL

(*From the Bland-Sutton Institute of Pathology, and from Courtauld Institute of Biochemistry, Middlesex Hospital*)

Several authors have expressed the view recently that the action of sulphanilamide in vivo depends on an interference with some bacterial enzyme reaction which is necessary for the growth of the organism. Lockwood (1938), for instance, thought that proteolytic enzymes of streptococci are inhibited, but since such enzymes are unknown in the case of this organism, and in any event are demonstrably not necessary for growth, the basis for such a view appears to be slight. McIntosh and Whitby (1939) thought that sulphanilamide might act by blocking the vital food-supply of bacteria by inactivating an enzyme. Stamp (1939) extracted from streptococci a substance which antagonised the action of sulphanilamide and concluded that this extract might contain a necessary nutritive factor, the production of which was interfered with by sulphanilamide. The nutritive factor might be of the nature of a co-enzyme. Green (1940), who also obtained an extract from bacteria which counteracted the action of sulphanilamide, concluded that the latter acted by inhibiting an enzyme reaction fundamental in the metabolism of bacteria and that the active substance in his extract stimulated it. Finally Woods (1940) has obtained an extract from yeast which counteracted the action of sulphanilamide and has identified the active material as *p*-aminobenzoic acid. This substance is looked upon as an "essential metabolite" with which sulphanilamide interferes as will be discussed later. These authors are thus in agreement in ascribing the action to interference with bacterial enzymes associated in some way with nutritive substances.*

The wider aspects of inhibition of bacterial growth have been the subject of study in this department for a number of years, following as a natural sequence on our studies of bacterial "growth factors," and evidence has been accumulating that inhibition of bacterial growth in general may be exerted through interference with one of these "factors." Since the definition of a growth factor has tended to become modified it will be necessary for a proper understanding of the theory of interference to outline our present views on this subject.

BACTERIAL GROWTH FACTORS

The growth and multiplication of bacteria (and no doubt of all cells) involves the synthesis of new bacterial substance from simpler compounds. In the case of protein the simplest compound is ammonia and from this and a suitable source of carbon some bacteria can synthesise protein, the energy required in the process being liberated from a combustible material such as glucose. Although little or nothing is known about the mechanism of this synthesis, it is inferred that it is achieved in steps by a series of enzymes operating on each stage as it is completed.

The main evidence in support of this view is that whereas *Bacterium coli* can grow (i.e., synthesise all its nitrogenous compounds) from ammonia, *Bact. typhosum* cannot, except when certain amino-acids which are constituents of protein are added. The amino-acids which must be supplied to *Bact. typhosum* are demonstrably synthesised by *Bact. coli*, and it is concluded that the failure of *Bact. typhosum* to grow from ammonia is due to a failure to synthesise the amino-acids. These amino-acids which must be added to the nutrients are "growth factors" for *Bact. typhosum*. They represent stages in the synthesis of protein which *Bact. typhosum* cannot achieve, but it will be understood that these stages are equally present in the syntheses carried out by *Bact. coli*, though in this case they are not growth factors since the organism can synthesise them. Each stage in any synthesis necessary for growth is referred to as an "essential metabolite," without which, either synthesised or supplied from outside, growth cannot occur. A growth factor is thus an essential metabolite which cannot be synthesised. The requirement by a particular species for an essential metabolite to be given as a growth factor is not characteristic for the species. Some strains can synthesise it more or less or can be induced to do so. At the moment the view is gaining ground that the essential metabolites at present known in bacteriology, or at any rate many of them, are common to all or most cells whether bacterial or not.

Although the process of growth has been represented as a building up of bacterial protoplasm, there are other processes to be carried out subsidiary to this main object. For instance the process by which energy is set free must be catered for. This involves the synthesis of various co-factors which take part in the process. Thus cozymase, a substance of known composition containing nicotinic acid, is a constituent probably of all cells and is associated with the process by which glucose, for instance, is combusted. Since *Bact. coli* grown on ammonia contains cozymase it is concluded that it can synthesise it from ammonia. On the other hand *Proteus vulgaris* can only grow from ammonia when cozymase is added, showing that the failure to grow is due to a failure to synthesise cozymase. Actually the failure is due only to failure to synthesise the nicotinic acid fraction of cozymase, since when this alone is added growth will occur. The other constituents of the cozymase molecule can be synthesised. *Bact. typhosum* cannot grow from ammonia, even when cozymase is added, but it can grow from amino-acids when no cozymase is added, and thus can synthesise all fractions of the cozymase molecule from amino-acids. Staphylococcus can only grow from amino-acids if nicotinic acid is added. *Hæmophilus influenzæ* is different in that, though it is given nicotinic acid, it cannot finish the synthesis of cozymase and must be supplied with the final product ("V" factor of the bacteriologists). Thus cozymase is an essential metabolite for all these bacteria, but it is a growth factor only for *H. influenzæ*, while nicotinic acid, a stage in the synthesis of cozymase, is a growth factor for proteus and staphylococcus. These relationships are indicated in the figure:—

SYNTHESIS OF COZYMASE

NH_3 ——→ Amino-N (Stage 1) ——→ Nicotinic acid (Stage 2) ——→ Cozymase (Stage 3)

Essential metabolite—
Stage 1 = growth factor for *Bact. typhosum*
„ 2 = „ „ staphylococcus and proteus
„ 3 = „ „ *H. influenzæ*

It will, of course, be understood that the direct discovery of an essential metabolite can only be made in the case of a bacterium for which it is a growth factor—i.e., which cannot synthesise it. In addition to the many growth factors which have been described already, it is presumed that there are others which cannot be detected until a bacterium is found which cannot synthesise them.

* Fleming (1940) showed that suspensions of a number of bacteria in a solution of sulphanilamide, even when dead, counteracted the action of the drug. The effect was due to substances given off by the bacteria under these conditions.

Bacteria (and other cells) are thus looked upon as organisms which are potentially able to synthesise their structure and accessory reagents from simple compounds, though many as a result of altered environment have more or less lost the power to carry out one or more stages of essential syntheses (cf., Lwoff 1932, Knight 1936). In such cases the particular stage of synthesis which fails becomes a growth factor which must be added to an artificial nutrient mixture or borrowed from a host which has either synthesised it itself or ingested it in its nutrients. Whether, however, an organism can synthesise the stage or not it remains an essential metabolite, interference with which will inhibit growth.

MECHANISM OF BACTERIAL INHIBITION

The evidence on which we have been led to associate bacterial inhibition with interference with essential metabolites is broadly as follows.

Fildes (1929) and Knight and Fildes (1930) showed that anaerobes would not grow if the oxidation-reduction potential of the medium was maintained positive to a certain level. In less technical language this implies that anaerobes will only grow when a certain degree of reducing intensity is present in the medium. If the degree of reducing intensity is diminished by oxygen or by an oxidising agent such as ferricyanide, thionine or methylene-blue no growth takes place until these have been reduced. The metabolism of an anaerobe is "anaerobic"—i.e., it involves the presence of reduced substances in the nutrients or at least an absence of oxidising substances. A similar inhibiting effect of thionine or methylene-blue is also observed with aerobes, for the reason that conditions *within* an aerobic cell are anaerobic and a sufficient concentration of these diffusible dyes imposes aerobic conditions within the cell.

This subject was discussed by Fildes (1937), who pointed out that the inhibition was only observed with diffusible dyes and not with non-diffusible dyes of a similar oxidising capacity. It was concluded that the inhibition was due to oxidation of some substance within the cell, which in metabolism required to be reduced. In more recent phraseology it was due to an interference by oxidation with an essential metabolite which required to be reduced in order that the enzyme associated with it might function normally as in growth.

At this stage a number of essential metabolites had been isolated, and in particular the group -SH was known to be necessary for staphylococci (Fildes and Richardson 1937) and moulds (Volkonsky 1932). In view of the fact that H-SH combines with mercury, and H-SH reverses the antibacterial action of mercury was it possible that the antibacterial action of mercury was due to combination with essential -SH groups within the cell? This subject has been dealt with recently by Fildes (1940). He showed that mercury combined in the test-tube with -SH in certain molecular proportions to form a soluble compound devoid of -SH. This compound was not in itself inhibitory. Inhibition was only observed when mercury in a mixture of mercury and -SH was in excess of the molecular proportions noted. It was concluded that the antibacterial action of mercury was due to the diffusible salt entering the cell, thus depriving it of an essential metabolite. And in the concentrations used this was the only action of mercury, since addition of excess of -SH allowed the inhibited organisms to grow normally—i.e., excess of the essential metabolite did away with the inhibition.

MODE OF ACTION OF SULPHANILAMIDE

With the introduction of the sulphanilamide drugs, it became a question whether the same argument could not be applied and in this matter we were able to profit by the experience of McIntosh and Whitby. Prolonged experiments were carried out to test whether any known essential metabolite could be associated with the action of sulphanilamide, in the sense that a quantitative relationship could be shown to exist between the inhibitory concentration of sulphanilamide and the counter-action of the essential metabolite. These experiments were unsuccessful. At this stage Stamp (1939) showed that he was able to reverse the action of sulphanilamide by an extract obtained from streptococci. We assumed at once (as also did Stamp) that this extract contained an essential metabolite which was not a growth factor for streptococci, since at this time all these were known (McIlwain 1940). As has been explained we do not look upon essential metabolites as specific to one species of bacterium or even to bacteria at all, and thus for convenience made extracts from yeast following more or less the procedure of Stamp. The result of this work has been published by Woods (1940). By fractionation of yeast extracts he obtained a material with well-defined chemical characters which reversed the action of sulphanilamide. This material could not for quantitative reasons combine with sulphanilamide on a molecular basis as does -SH with mercury, but it might act by competing with sulphanilamide for an enzyme of which it was the natural substrate. In this case it should follow that the substance in the extract had some structural similarity with sulphanilamide, and it became a question as to what substance similar to sulphanilamide had the chemical characters of the extract substance; *p*-aminobenzoic acid was tried and was found to antagonise sulphanilamide quantitatively and in very high dilutions. At the moment, therefore, it is supposed that *p*-aminobenzoic acid is an essential metabolite for bacteria, although for technical reasons it has not yet been isolated from them nor has it yet been proved to be a growth factor in the absence of a bacterium which cannot synthesise it This essential metabolite is normally associated with an enzyme, and sulphanilamide, being structurally similar to it, is capable if in sufficient concentration of displacing *p*-aminobenzoic acid from its enzyme and stopping this essential line of metabolism.

On this view the "sensitivity" of a microbe to sulphanilamide would depend at least in part upon whether it could synthesise *p*-aminobenzoic acid readily or not. An organism whose synthetic powers were poor would be more sensitive than one with greater power. Similarly a large number of bacteria would be less affected by a certain concentration of sulphanilamide than a small number. Inhibition or not would become a question of the proportion of sulphanilamide to *p*-aminobenzoic acid affecting the enzymes of each cell.

It is of interest that *p*-aminobenzoic acid also antagonises sulphanilamide in vivo (Selbie 1940), so that animals die from a streptococcal infection in the presence of a curative dose of sulphanilamide when *p*-aminobenzoic acid also is added.

Since, in our view, *p*-aminobenzoic acid is an essential metabolite not only for bacterial cells but also for animal, curative interference with it in vivo will affect both bacterium and host. Success in treatment must then depend upon the relative "sensitivity" of the two types of cell or upon whether the host as a whole can survive the inhibition of this enzyme reaction for sufficiently long. It is possible that this inhibition may account for some of the later toxic effects of sulphanilamide. These effects might then be looked upon as due to a deficiency in *p*-aminobenzoic acid and might be treated by administration of this deficient substance.

LINE FOR FUTURE RESEARCH

If further work confirms the conclusions drawn from experiments with the three different antibacterial agents, dyes, mercury and sulphanilamide—that the antibacterial actions are due to specific interferences with essential metabolites—it should follow that an antibacterial substance should be capable either of combining with an essential metabolite to form a product devoid of the essential metabolic function, or of blocking an enzyme specifically associated with the metabolite. In this latter case it is to be expected that the antibacterial substance should have a chemical similarity to the essential metabolite. Chemotherapeutic research might then reasonably be directed

to modification of the structure of known essential metabolites to form products which can block the enzyme without exhibiting the specific action of the metabolite. It is curious to note that chemists are already to some extent proceeding along these lines. In sulphapyridine, for instance, the base attached to the sulphanilamide is related to nicotinic acid, and in sulphathiazole to vitamin B_1.

SUMMARY

An "essential metabolite" is a substance or chemical group which takes an essential part in a chain of syntheses necessary for bacterial growth. A "growth factor" which must be supplied in the nutrients is an essential metabolite which the cell cannot synthesise. Nicotinic acid, for instance, is an essential metabolite for all bacteria but a growth factor for only a few.

Antibacterial substances function by "interfering" with an essential metabolite and thus inhibit growth. The interference may be (1) by oxidising a substance which requires to be reduced, (2) by molecular combination forming an inactive product, or (3) by competition for an enzyme associated with the essential metabolite. It is claimed that sulphanilamide acts as in (3), the essential metabolite being *p*-aminobenzoic acid. Class (3) inhibitions require an inhibitor so closely related in formula to the essential metabolite that it can fit the same enzyme, and sufficiently unrelated to be devoid of essential metabolic activity. It is suggested that research in chemotherapy might reasonably be directed to making such modifications of known essential metabolites as will have these characters.

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TREATMENT OF FRACTURES OF UPPER THIRD OF SHAFT OF FEMUR

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I HAVE recently seen several similar cases of closed transverse fractures of the shaft of the femur close to the junction of the middle and upper thirds in young healthy adults. In each one there was a history of treatment by skeletal traction in a Braun's splint for some months after the injury. Accurate reduction was never obtained, and union in a faulty position was slow. Ultimately the patients were allowed to walk wearing a calliper. In spite of the calliper bending took place at the site of the fracture; in one case there was complete redisplacement of the fragments. Open operation with reduction and plating was next resorted to. There followed a period of months when union was not firm enough to permit of weight-bearing, and the patients were again allowed to get about wearing a walking calliper. On examination at this stage, although from twelve months to two and a half years had elapsed since the date of original injury, the prognosis in each case was still in doubt. Study of the histories and serial radiograms of these cases indicated that a common factor had influenced the results.

DEFORMITY

In a fracture of the shaft of the femur close to the junction of the middle and upper thirds there is a typical displacement—flexion and abduction of the upper fragment, due to the action of the psoas and short muscles inserted on the great trochanter, with posterior inward and upward displacement of the lower fragment, due to the action of the hamstring and adductor muscles (fig. 1). The reduction and immobilisation of this fracture is best effected by skeletal traction, with a Kirschner wire passed through the upper end of the tibia, the limb being supported with a suitable splint. Since the upper fragment is short and cannot be controlled, traction should be applied in the line of this fragment—i.e., with the leg abducted and flexed at the hip. The flexion deformity of the proximal fragment is usually about 50°. If a Braun's splint is used, the amount of flexion at the hip must be constant and is about 30° (fig. 2).

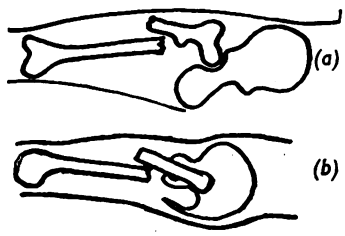

FIG. 1—Diagrams of deformity produced by fracture of the upper third of the shaft of the femur: (*a*) anteroposterior view; (*b*) lateral view.

In advocating the use of a Braun's splint for this type of fracture Böhler (1935) says "flexion of the upper fragment will disappear when shortening is corrected," but he offers no reason for this. The flexion is due to the postural tone of the psoas and pectineus muscles and, with an intact femur, is counterbalanced by the gluteus maximus and hamstring muscles. Of these only a quarter of the gluteus maximus is inserted on the upper fragment, and this is the least effective part of the extensor mechanism. There seems to be no reason to suppose that the postural tone of the psoas and pectineus muscles should be abolished by a simple distraction of the shortening which has taken place.

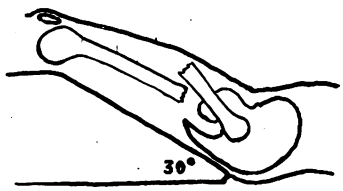

FIG. 2—Diagram of amount of flexion (30°) produced at the hip when a Braun's splint is used.

If this flexion deformity is not corrected, the bone ends are left in an unsuitable position for union, because the raw surfaces are not in apposition (fig. 3), and union, when it does take place, is mechanically unsound, because weight-bearing exposes it to a shearing force (fig. 3*b*).

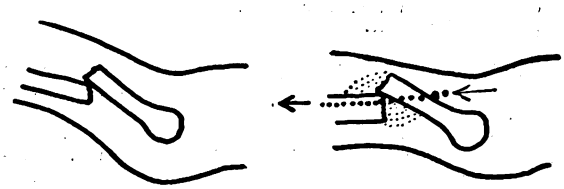

FIG. 3—Diagrams of results of uncorrected flexion deformity: (*a*) non-union; (*b*) unsound union liable to shearing force (indicated by arrows).

SPLINTS

The use of the Braun's splint, as recommended by Böhler for the treatment of all types of fractures of the shaft of the femur, is becoming increasingly common, to the exclusion of the Thomas type of splint. This is probably due to two factors: (1) the teachings of the Vienna school represent such a general advance in the treatment of fractures that

there has been a tendency on the part of surgeons in this country to accept them in toto to the exclusion of all other methods; and (2) a Braun's splint can be used by itself, without the necessity for slinging from an overhead beam. It is consequently a cheaper and more compact piece of apparatus than the Thomas type of splint slung from a Balkan beam, and it is less trouble to adjust than the latter. In fact it represents the "easy way" of treatment. Nevertheless for fractures of the type described the "easy way" may prove in the long run the most troublesome for both surgeon and patient. In the cases already mentioned flexion of the short proximal fragment was never adequately corrected, and this flexion was in each case more than can be obtained by immobilising a leg in a Braun's splint.

By skeletal traction and with a Thomas or Robert Jones type of splint with a bent-knee attachment, slung from a Souttar's modification of the Balkan beam, it is possible to procure traction in the long axis of the femur with the hip in any degree of flexion required. Moreover, by proper adjustment and slinging of the splint it is possible to maintain this traction in the same axis while lifting a patient for a bedpan or for attention to the back.

TREATMENT

The results of treatment of fractures of the femoral shaft of the type described are excellent when this apparatus is used and attention is paid to the following points:—

(1) *Fitting of ring at upper end of splint.*—This should fit closely round the thigh and should bear on the posterior surface of the tuberosity of the ischium. These are most important points. A loose ring tends to slide up and down and shift from side to side, chafing the skin. When the ring bears on the posterior surface of the tuberosity of the ischium, the upward pull of countertraction is transmitted to the pelvis (fig. 4*a*); whereas, if it bears on the femur below the tuberosity, this pull increases the flexion deformity of the proximal fragment (fig. 4*b*).

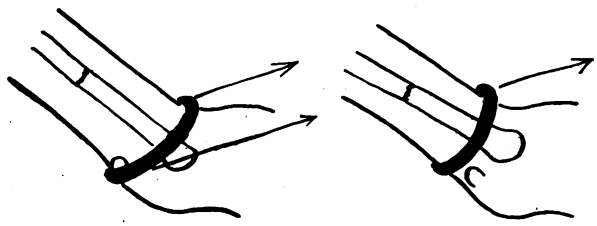

FIG. 4—Diagrams of fitting of the ring at the upper end of a Thomas splint: (*a*) with the ring bearing on the posterior surface of the tuberosity of the ischium, the pull of countertraction is transmitted to the pelvis; (*b*) with the ring bearing on the femur below the tuberosity, the pull of countertraction increases the flexion deformity of the proximal fragment.

(2) *Slinging of splint.*—The splint is slung from an overhead beam with two double pulleys (fig. 5). By this method countertraction on the splint caused by the weight (w) is kept constant and equally distributed. The patient is lifted in the line of traction on the femur, movements of the splint being compensated by movement of the ring from which the weight is slung.

(3) *Slinging of leg from splint.*—The leg should be slung with strips of flannel fastened with clips at each side. If the leg is slung with one clip, as is the common practice, when the flannel sags, it can only be tightened from one side, and the leg is rotated.

(4) *Skeletal traction* is best effected with a Kirschner wire passed through the tibial tuberosity. Watson-Jones (1940) has pointed out the disadvantages of using a wire passed through the lower end of the femur. From a horseshoe a cord passes over a pulley (fig. 5). Flexion at the hip-joint is regulated by raising or lowering this pulley, with suitable adjustment of the bent-knee attachment and the weight (w).

(5) *Reduction of fracture.*—Deformity is reduced by varying the force and axis of traction. It is convenient to start with a weight of a seventh of the body-weight of the patient. Position is checked by radiography after twenty-four hours, and traction is adjusted according to the degree of overlap. At the same time the degree of flexion and abduction at the hip is adjusted, so that traction is in the line of the short proximal fragment. It is important to remember that, as soon as overlap is corrected, the

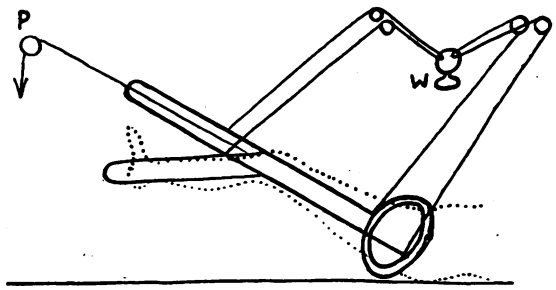

FIG. 5—Diagram of the slinging of the splint (see text): P, pulley; W, weight.

traction should be reduced until it is just sufficient to prevent recurrence of the deformity. If this is not done, separation of the fragments is produced and, if allowed to persist, will cause non-union. Countertraction is provided by raising the foot of the bed on blocks, thus utilising the patient's weight, and by the weight (w), which should be sufficient to support the leg with the hip flexed at the required angle and varies from 4 to 8 lb. according to the size of the patient and the degree of flexion at the hip. When reduction is satisfactory and no change in position has taken place for forty-eight hours, further radiography is only necessary once a week for four weeks, then once every four weeks until firm union has taken place. By these methods it is rarely necessary to resort to lateral pressure to achieve accurate reduction.

(6) *Routine checking of position by radiograms* has already been referred to but may be summed up as follows: examination every twenty-four hours until accurate reduction has been achieved and maintained for forty-eight hours; then examination every seven days for four weeks; then every four weeks until union is firm.

(7) *Union.*—If accurate reduction has been achieved and distraction of the bone ends avoided, firm union is to be expected in three to four months. When on clinical and radiological grounds it has been decided that union is firm, the wire is removed and the leg is allowed to remain in the splint without traction for a week. A further radiogram is now taken, and, provided position is unchanged and no untoward symptoms have developed, the splint is removed, and the patient remains in bed for a further week. If a second examination is then satisfactory, the patient is allowed to get up and begin weight-bearing with the aid of a stick.

(8) *Physiotherapy.*—From the first the patient is instructed to move his patella by contracting his quadriceps muscle. This quadriceps drill should be practised five minutes every hour or so. Movements at the knee should be begun at the end of the first week, and the knee should be put through as full a range of movements as possible three times a day. If this is done, there should be little wasting of muscle and a fair range of movement at the knee when the patient is able to get up. Massage exercises and, if necessary, faradism to the quadriceps muscle are then begun and continued for a few weeks.

(9) *Drugs.*—The main factor in producing firm union is early and accurate reduction of bony displacement with subsequent effective immobilisation of the limb. No amount of therapy can compensate for failure to achieve these requirements. If the patient is undernourished or anæmic, however, the administration of vitamins, calcium, and iron is beneficial, and in the ordinary case these can do no harm.

(10) *Regular examination.*—The splint should be examined daily and any necessary adjustments made.

(11) *Coöperation of patient.*—It is always worth while to attempt to get the patient to take an intelligent interest

in his splint. With this type of apparatus a patient can keep the upper ring of the splint well pulled up and, by twisting this ring, can correct any rotation of the leg. The success of the quadriceps drill and knee exercises already referred to also depends to a large extent on the coöperation of the patient.

By this method it should be possible to obtain accurate reduction and firm union in almost all fractures of this area of the shaft of the femur. Open operation on such a fracture should be regarded as a confession of failure. The total cost of the apparatus required works out at about £8 a bed; this should be well within the means of any hospital. To keep the patient in bed until union is firm enough to begin weight-bearing may seem to occupy a hospital bed longer than is absolutely necessary; but only too often, as in the cases already mentioned, an attempt to mobilise a patient, before union is quite firm, by the use of a walking calliper, plaster, or other means consumes more time in the long run. In conclusion I emphasise that any attempt at an "easy way" or "short cut" in the treatment of a fracture of the shaft of the femur is a snare and a delusion.

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VITAMINS D_2 AND D_3 AND A.T. 10

IN CONGENITAL THYROID AND PARATHYROID DEFICIENCY

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The patient on whom these investigations were made first came under the care of the Medical Unit, University College Hospital, in January, 1934, when he was 13, and he has continued under regular observation since. This long period of observation provided the opportunity to assess the value of several different therapeutic substances which have been used in the treatment of parathyroid deficiency. The patient proved to be unusually suitable in that his clinical and biochemical reactions to forms of treatment remained constant and easily reproducible, so that conclusions regarding the relative potency of the different therapeutic substances tested, for this particular case, could be made with some degree of confidence. A preliminary report of the case was made by Elliott (1935).

The boy was the only child of healthy parents. He was delivered at full term by cæsarean section. Growth was retarded, and for this reason he was occasionally given thyroid extract. When he was 5, major and minor epileptic fits began, and in 1933, when he was 12, he came under the care of Dr. E. A. Blake Pritchard for this condition (Pritchard 1934). At this time cataracts in both eyes and tetany suggested the correct diagnosis. In 1934 he was admitted to University College Hospital. He was a sturdy youngster with a mop of violent red hair. His height was 4 ft. 5 in. and his weight 5 st. 11 lb. The cataracts in both eyes had developed only to the stage of impairing vision. The mental development was incommensurate with his years. He could answer simple questions but could neither count nor spell. The thyroid could not be felt in the neck, and hard irregular deposits about the size of a bean were found round the tendons of the knee-joints. Radiography showed that these deposits were calcareous. No evidence of disease of the skeletal bones was found. Chvostek's and Trousseau's signs were positive, and the electrical reactions of the nerves were increased. His fits were of two kinds: typical carpopedal and laryngeal spasms, and equally typical major epilepsy occurring independently. The blood-calcium and plasma inorganic phosphate have been estimated about every month since January, 1934, always in the same laboratory and by or under the supervision of one of us (M. M.). Calcium-balance experiments were not made. Ordinary diet was allowed and no attempt made to limit the intake of phosphates. A pint of milk was usually taken every day.

THYROID DEFICIENCY

When the patient first came under observation, his basal metabolic rate (B.M.R.) was − 25 per cent. At this time his serum calcium was 5 mg. per 100 c.cm. and the plasma inorganic phosphate 9·0 mg. per 100 c.cm. When the parathyroid deficiency was treated, the serum calcium rose to 9·4 mg. and the plasma phosphate fell to 5·6 mg. At this time the B.M.R. still remained low, at − 18 per cent. Thyroid siccum gr. 1½ daily was then given, and the B.M.R. rose to + 10 per cent. This dose of thyroid extract has been continued ever since, and the B.M.R. has remained normal despite subsequent lapses into calcium deficiency and tetany. Today the boy looks strong and can walk ten miles. His early thyroid deficiency has left him mentally backward, but he can now do simple work in a shop. It appears that the thyroid deficiency is functionally independent of, and exerts no influence on, the parathyroid deficiency.

FITS

With remarkable constancy the signs of tetany disappeared when the boy's blood-calcium rose above 7 mg. per 100 c.cm. and reappeared when the blood-calcium fell below this figure. The epileptiform attacks similarly disappeared when the blood-calcium rose, and they never reappeared except when the blood-calcium was deliberately allowed to fall to a level below 5·5 mg. per 100 c.cm.

TREATMENT

The first year of treatment was occupied in determining the form of therapy which would stabilise the patient. In this period the cataracts were successfully removed by Mr. Humphrey Neame. The effect of parathyroid extracts was first tried. Euparatone was given first in doses of 10 units daily for a week and then in doses of 20 units daily for ten days; it did not affect either the symptoms or the blood-calcium. One injection of 100 units of Parathormone was then given; this raised the blood-calcium from 4·8 mg. to 6·8 mg. per 100 c.cm. The patient then left hospital but returned at the end of May to receive a course of the German product A.T. 10 (dihydrotachysterol) by mouth.

On readmission the patient's blood-calcium was 5·1 mg. per 100 c.cm. Over the next two months he received doses of A.T. 10 up to 5 c.cm. twice a week, and under this treatment the blood-calcium rose to 9·6 mg. and the plasma phosphate fell to 5·6 mg. Thereafter the patient received a solution of Calciferol (vitamin D_2) in oil, finally receiving for a fortnight 1,500,000 international units daily. Treatment was then stopped, the blood-calcium having risen to 12·2 mg., while the phosphate had fallen to 3·6 mg. This huge supply of calciferol was apparently stored to some extent, for with no further treatment the blood-calcium remained steady for three months at about 9 mg. and thereafter slowly fell until, after a further five months without treatment, mild symptoms of tetany reappeared, the blood-calcium then being 6·7 mg. and the plasma phosphate 7·2 mg. Treatment was resumed a month later, and ultimately the boy was stabilised on a dose of 500,000 I.U. of vitamin D_3 weekly, given by mouth in oily solution with milk,

half the dose on the third, and half on the seventh, day of the week. This dosage did not seem to lead to storage, for withdrawal was followed in two or three weeks by a fall in the calcium. For four long periods—the first two periods each of one year's duration, the third of four months, and the fourth which has continued since May, 1939—the boy has received this dosage of vitamin D_2. Throughout each period the blood-calcium has oscillated within narrow limits round 8 mg., but the plasma phosphate has varied more widely, most of the monthly estimations being 3–5 mg. but occasionally reaching 6 mg. per 100 c.cm. Despite this continued high dosage the patient has at no time shown any of the symptoms ascribed to overdosage of vitamin D (see Wyatt, Hicks, and Thompson 1936–37), nor does he show in either arteries or kidneys any signs of metastatic calcification. The absence of abnormal calcification, apart from the unchanged calcareous deposits round the knees, is probably to be ascribed to the fact that in him, unlike normal subjects, the large dose of calciferol did not produce hypercalcæmia; if so, this supports the view that the signs associated with excessive dosage of vitamin D are to be attributed not to the effect of the vitamin but to the concomitant production of hypercalcæmia.

COMPARISON OF VITAMIN D_2 AND A.T. 10

After a preliminary period of ten months' stabilisation on 500,000 I.U. of vitamin D_2 weekly the patient was given A.T. 10 for ten months, and then for a further period of twelve months he returned to his weekly dosage of 500,000 I.U. vitamin of D_2. The estimations of the blood-calcium and the plasma phosphate are summarised in the accompanying table, which shows that administration of A.T. 10 prevented the blood-calcium from falling to the low levels found before any treatment was given, and to this extent the preparation was effective. This

COMPARISON OF VITAMIN D_2 AND A.T. 10

Substance	Weekly dose	Test period	Blood-calcium (mg. per 100 c.cm.)			Plasma phosphate (mg. per 100 c.cm.)		
			Obsv.	Mean	S.D.	Obsv.	Mean	S.D.
Vit. D_2	5×10^5 units	Aug., 1935–May, 1936	11	8·0	0·70	7	6·0	0·92
A.T. 10	1–6 c.cm.	June, 1936–March, 1937	12	7·1	0·94	12	3·8	1·02
Vit. D_2	5×10^5 units	April, 1937–March, 1938	10	8·4	0·61	10	3·2	0·87

Obsv. = Number of observations.
S.D. = Standard deviation of series.

effect, however, was only achieved by steadily increasing the dosage of A.T. 10. For three months 1 c.cm. a week appeared to be sufficient, but later this dose had to be increased, until finally the patient was receiving 6 c.cm. a week. Further, the blood-calcium levels varied erratically, and the frequency with which the Chvostek sign was positive indicated that the patient was on the verge of full tetany. The impression gained from the comparison of A.T. 10 with vitamin D_2 was that in this patient vitamin D_2 produced a more stable state than did A.T. 10. The reason for the high values for plasma phosphate in the preliminary period of treatment with vitamin D_2 is unknown.

VITAMIN D_2 AND VITAMIN D_3

After the period from March, 1937, to March, 1938, when the patient was receiving 500,000 I.U. of vitamin D_2 weekly and the blood-calcium averaged 8·4 mg. per 100 c.cm. and the plasma phosphate 3·2 mg. per 100 c.cm., the effect of vitamin D_3 was tested. Over a period of a month 250,000 I.U. weekly of vitamin D_3 were given. The blood-calcium fell to 6·8 mg. with a plasma phosphate of 4·7 mg. per 100 c.cm. The dose was then increased to 500,000 I.U. of vitamin D_3 weekly, and this dose was continued for two and a half months. The blood-calcium rapidly rose and remained round 8·8 mg., while the plasma phosphate fell to 3·2 mg. Thereafter for a period of four and a half months the patient returned to his original dosage of 500,000 I.U. vitamin of D_2 weekly, and during this period the blood-calcium and plasma phosphate remained at their usual levels. The action of vitamin D_3 therefore seemed to be identical in this patient with the action of vitamin D_2.

VITAMIN D_2 AND OSTELIN HIGH-POTENCY TABLETS

After the last period of treatment with vitamin D_2 the effect of Ostelin high-potency tablets was tried. Each tablet contained 50,000 I.U. of the same preparation of vitamin D_2 provided by the same firm, and the dosage of 10 tablets was distributed over the week. Soon after the start of this treatment the patient's blood-calcium began to fall. In view of the possibility that this might be attributable to retardation of absorption from the gut owing to the hard coating of sugar, the tablets were taken crushed in milk. Despite this the level of blood-calcium fell progressively to 6·6 mg., the plasma phosphates rising to 5 mg. The dosage was then increased from 500,000 to 800,000 I.U. a week, and although the blood-calcium rose and the blood-phosphate fell a little, they did not reach the levels which were produced and maintained when the weekly dosage of 500,000 I.U. of vitamin D_2 in oil was resumed. It appears that, either because of difficulty of absorption or perhaps through deterioration of the vitamin D_2 contained, the Ostelin concentrated tablets were not so effective as the same dose of vitamin D_2 dissolved in oil.

SUMMARY

(1) A case of congenital thyroid and parathyroid deficiency associated with tetany and epilepsy is described.

(2) Successful treatment of the tetany had no effect on the symptoms of thyroid deficiency, nor did treatment of the thyroid deficiency alone influence the development of tetany. The tetany was therefore independent of the thyroid deficiency with its partial cretinism.

(3) When the blood-calcium rose above 7 mg. per 100 c.cm., the epileptic fits and tetany disappeared. When the blood-calcium fell below this level, tetany and epileptic fits reappeared.

(4) The parathyroid deficiency was controlled by the oral administration of vitamin D_2 (calciferol) in oil, 500,000 units weekly. Despite the continued administration of this large dosage of vitamin D_2 or comparable dosages of related substances, for nearly six years no signs of hypervitaminosis D have appeared.

(5) The German preparation A.T. 10 was effective in controlling the parathyroid deficiency, but it appeared less reliable in its action than vitamin D_2.

(6) Vitamin D_3 was simply equivalent to vitamin D_2 in controlling the parathyroid deficiency.

During most of these investigations the patient was at University College Hospital under the care of Prof. T. R. Elliott, whom we thank for permission to publish his records. We also thank Prof. E. Holz, of the Charité Hospital, Berlin, for supplying the preparation A.T. 10; to Dr. A. L. Bacharach, of the Glaxo laboratories, for the calciferol in oil and the ostelin tablets; and Sir Henry Dale for the supply of vitamin D_3.

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POTENCY OF VITAMINS D_2 AND D_3

IN OSTEOMALACIA AND LATE RICKETS

BY DAGMAR CURJEL WILSON, M.D. Glasg., M.R.C.P., M.R.C.O.G., D.P.H.

THE relative values of vitamin D_2 or calciferol from irradiated ergosterol and of vitamin D_3 from irradiated 7-dehydrocholesterol, in which form vitamin D is present in cod-liver oil, in the treatment of human rickets are of considerable importance. The antirachitic potency of vitamin D_2 in rats is 40,000 I.U. per mg., and that of vitamin D_3 is about the same (Schenck 1937). In chickens vitamin D_3 has a relatively much greater antirachitic activity than vitamin D_2—sixty times greater, weight for weight (Brockmann 1938). As regards the treatment of infantile rickets, there are conflicting reports of the relative activities of vitamins D_2 and D_3, given either as the pure substance or in cod-liver oil or fish-liver oils. The evidence has been reviewed by Morris and Stephenson (1939), who found no detectable difference in the relative potencies of pure vitamins D_2 and D_3 in infantile rickets.

EXPERIMENTS

Our samples of vitamins D_2 and D_3, supplied by Sir Henry Dale, were similar to those tested on rats and found to have equal antirachitic potencies in an experiment carried out by nine laboratories in collaboration and organised by the vitamin-D subcommittee of the Accessory Food Factors Committee. The results of this test are being published by Coward (1940). Our samples of vitamins D_2 and D_3 were also similar to those used by Morris and Stephenson (1939), and to those used by Himsworth and Maizels in their work described elsewhere in this issue.

The patients chosen for treatment were Indians living in the Kangra valley, Punjab, where rickets and osteomalacia affect, at all ages and in both sexes, a community which lives an out-of-door life. My previous experience (Wilson 1929) led me to classify the patients before treatment into three grades, +, ++, +++, according to the severity of their symptoms. Since radiography was not available, this classification had to be based on clinical signs of present activity of the disease; for osteomalacia these included pain, muscular spasm and difficulty in walking rather than deformity of pelvic and other bones which might be long-standing and incurable. The criteria in the diagnosis of late rickets were slightly different and included enlarged epiphyses and stunted growth. In assessing the value of treatment attention was paid to subjective symptoms, including pain in the lumbrosacral region, pelvic girdle, legs, ribs, shoulder girdle, and arms; flexor (carpopedal) spasm was also taken into account. The patients were chiefly females aged 20–40, but a few males were included, and the total range of the ages was 6–70. For the therapeutic trials patients with osteomalacia or with late rickets of similar grades of severity were grouped into pairs; pure vitamin D_2 was given to one of each pair and pure vitamin D_3 in the same dosage to the other. The deformity and pain before treatment and the improvement after treatment were assessed independently by members of the staff of the Canadian Mission Hospitals in the Kangra valley, who have a wide experience of rickets. The patients were examined weekly, and the degree of improvement in the flexor spasm and pains was classified as none, slight, definite, good, or cured.

The samples of pure crystalline vitamins D_2 and D_3, prepared by Mr. T. A. Webster of the National Institute of Medical Research, Hampstead, were dissolved in olive oil so that the solutions contained 5250 I.U. of the vitamin per c.cm. as calculated from the biological tests on rats (Coward 1940). The solutions were stored in dark glass bottles in a cold place and protected from light. The clinical tests were carried out in the winter season between autumn, 1938, and spring, 1939. One large dose of either vitamin was given once a week. For convenience and accuracy of administration the dose was put directly into the patient's mouth from the barrel of a graduated hypodermic syringe. The observations were made on thirteen pairs of patients with osteomalacia and two pairs with late rickets, and treatment was continued for three or four weeks. The dose given to both members of a pair was either 10,500 or 21,000 I.U. of vitamin D weekly, and the total amount given over the whole period of treatment varied from 21,000 to 84,000 I.U.

TABLE I—RESULTS OF TREATMENT OF OSTEOMALACIA AND OF LATE RICKETS WITH WEEKLY DOSES OF 10,500 OR OF 21,000 I.U. OF VITAMIN D

No. and description of case	Degree of severity before treatment	Total dosage (I.U.)	Duration of treatment (weeks)	Improvement	Vitamin found superior
31 OM	+++	84,000	4	D_2 definite	D_3
32 „	+++	„	„	D_3 good	
27 OM	+++	„	„	D_2 definite	Neither
28 „	+++	„	„	D_3 „	
25 OM	+++	42,000	2	D_2 „	„
26 „	+++	„	„	D_3 „	
1 OM	+++	52,500	4	D_2 good	„
2 „	+++	„	„	D_3 „	
3 OM	+++	„	„	D_2 cured	D_3
4 „	+++	„	„	D_3 good	
5 OM	+++	„	„	D_2 definite	D_3
6 „	+++	„	„	D_3 cured	
7 OM	+++	42,000	„	D_2 slight	„
8 „	+++	„	„	D_3 definite	
9 OM	+++	„	„	D_2 good	Neither
10 „	+++	„	„	D_3 „	
11 OM	+++	31,500	2	D_2 „	D_3
12 „	+++	„	„	D_3 definite	
13 OM	+++	21,000	„	D_2 cured	„
14 „	+++	„	„	D_3 definite	
15 OM	+++	42,000	4	D_2 good	„
16 „	+++	„	„	D_3 definite	
21 OM	+++	„	„	D_2 „	D_3
22 „	+++	„	„	D_3 good	
29 OM	+++	„	2	D_2 cured	D_3
30 „	+++	„	„	D_3 almost cured	
17 LR	++	52,500	4	D_2 definite	D_3
18 „	++	„	„	D_3 good	
19 LR	++	31,500	„	D_2 „	„
20 „	++	„	„	D_3 cured	

OM = Osteomalacia; LR = Late rickets.

RESULTS

To make a quantitative comparison it is essential to ascertain the minimal curative dose of each substance. With a weekly single dose of 10,500 I.U. of either vitamin progress was extremely slow, and the patients, noticing little improvement in their symptoms after two such weekly doses, became restive and unwilling to have further treatment. Improvement followed subsequent treatment with a weekly single dose of 21,000 I.U. Of the fifteen pairs of patients, five pairs were treated with 10,500 I.U. from the start and observed for two or three weeks before the dose was increased (see table II). Another group of four pairs received 21,000 I.U. from the start and were observed for a similar period (table III). The results obtained in these nine pairs, after increase of dosage in some cases, and in the remaining six pairs, most of whom received 10,500 I.U. once and 21,000 I.U. subsequently, are shown in table I, with the total dosage and full period of treatment.

Tables I and III seem to indicate that there was no difference in the clinical effectiveness of the two forms of the vitamin. The results obtained in the five pairs treated with minimal dose (table II) and therefore the most important show, however, vitamin D_2 as the more active in one case and vitamin D_3 as the more active in three cases, while the two vitamins appear equal in one case. It is a pity that there are not more than five of these crucial pairs of cases, because, in view of the small number of cases, the smallness of the difference to be assessed and the subjective nature of the assessment, the result cannot be regarded as significant of any difference in potency between vitamins D_2 and D_3.

TABLE II—RESULTS OF TREATMENT OF OSTEOMALACIA AND OF LATE RICKETS WITH WEEKLY DOSES OF 10,500 I.U. OF VITAMIN D

No. and description of case	Vitamin given	Improvement after			Vitamin found superior
		1 week	2 weeks	3 weeks	
7 OM	D_2	None	None	Not examined	D_3
8 ,,	D_3	Slight	Slight		
9 OM	D_2	None	Definite	,,	Neither
10 ,,	D_3	,,	,,	,,	
13 OM	D_2	Slight	Cured	,,	D_2
14 ,,	D_3	None	Definite	,,	
21 OM	D_2	,,	Slight	,,	D_3
22 ,,	D_3	Slight	Definite	,,	
19 LR	D_2	None	Slight	Definite	D_3
20 ,,	D_3	Slight	Cured	Cured	

An additional pair of patients with late rickets is not included in the above. Two boys, about 11, were admitted to a hospital where radiography was available. One of them received each week 21,000 I.U. of vitamin D_2 and the other a similar dose of vitamin D_3. In both boys increased density of bone was observed at the end of three weeks.

No ill effects from the method of dosage were observed, and the weekly spacing was convenient and popular with both patients and staff. In comparison with the degree of cure previously effected in treating similar cases (Wilson 1931) with a total vitamin dosage approximately the same but administered daily as cod-liver oil or as irradiated ergosterol, the use of spaced large doses was considered to shorten the treatment by at least two weeks. Bischoff and Brieger (1938) also found that, in early rickets and spasmophilia, the signs of cure were evident several days earlier with the one large dose of vitamin D_2 or of vitamin D_3 than with the same amount of vitamin given in smaller daily doses.

TABLE III—RESULTS OF TREATMENT OF OSTEOMALACIV WITH WEEKLY DOSES OF 21,000 I.U. OF VITAMIN D

Case	Vitamin given	Improvement after		Vitamin found superior
		1 week	2 weeks	
31	D_2	None	None	D_3
32	D_3	Slight	Definite	
27	D_2	,,	,,	Neither
28	D_3	,,	,,	
25	D_2	,,	,,	,,
26	D_3	,,	,,	
29	D_2	Definite	Cured	D_2
30	D_3	,,	Almost cured	

SUMMARY

(1) The therapeutic effects of pure specimens of vitamin D_2 from irradiated ergosterol and of vitamin D_3 from irradiated 7-dehydrocholesterol were compared in thirteen pairs of patients with osteomalacia and in two pairs with late rickets among Indians, aged 6–70, in the Kangra valley, Punjab.

(2) The results, assessed by clinical estimates of the patient's progress and by the disappearance of carpopedal spasm, of pain in specified sites, and of difficulty in walking, showed the two preparations to be equally effective. For both preparations a dose of 10,500 I.U. of vitamin D weekly caused only slow improvement within a period of two weeks, whereas a dose of 21,000 I.U. caused improvement in a week.

(3) The advantages of spaced weekly doses are indicated.

This investigation was made possible by a grant from the Royal Society. I am indebted to Sir Henry Dale for the preparations of vitamins D_2 and D_3; to Dr. W. R. Aykroyd and the Indian Research Fund Association for the assistance of Dr. K. L. Shourie in the Kangra valley; the Canadian Mission for their hospital facilities; and Major G. Taylor, I.M.S., for looking after the two Kangra boys whose treatment was controlled by radiography at the Mayo Hospital, Lahore.

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ZINC PROTAMINE INSULIN AND SOLUBLE INSULIN

INTERACTION IN COMBINED DOSES

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The introduction of the slower-acting insulins has made it possible to balance the metabolism of many diabetic patients on one injection of insulin a day consisting of enough soluble or ordinary insulin (S.I.) to promote the utilisation of food eaten at breakfast, drawn into the same syringe with an equal or larger amount of zinc protamine insulin (Z.P.I.) which comes into play later in the day for the other meals. In practice this usually works well, and the total quantity of insulin needed to keep the blood-sugar within normal limits during the day is less than when two doses of soluble insulin are used. Case 2 (fig. 1 and table I) shows typical estimations of the blood-sugar throughout the day, where S.I. 50 U. in the morning and 38 U. in the evening produced a fluctuating curve, whereas a combined dose of Z.P.I. 40 U. with S.I. 38 U. kept the blood-sugar within normal limits. The total quantity of insulin can be still further reduced if the doses of S.I. and Z.P.I. are given in separate injections, one immediately after the other, instead of being drawn into the same syringe and injected together.

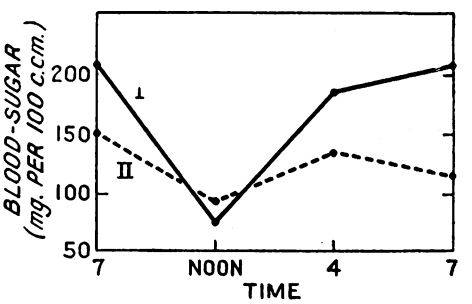

FIG. 1.—Blood-sugar values in case 2 (see table I): (I) S.I. 50 U. given at 7.15 A.M. and 38 U. at 6.45 P.M.; (II) Z.P.I. 40 U. and S.I. 38 U. given at 7.15. A.M.

Attention was drawn to this point by an active diabetic (case 12), who for several months had given himself one injection containing Z.P.I. 20 U. with S.I. 16 U. half an hour before breakfast every morning; he changed the method one day and gave the two kinds of insulin in separate injections. He had an attack of hypoglycæmia before luncheon. He has continued the separate injections and has reduced the S.I. to 8 U., the Z.P.I. remaining the same. Fig. 2 and table I, case 12, show better control of the blood-sugar throughout the day after Z.P.I. 20 U. and S.I. 8 U. given in separate injections than after Z.P.I. 20 U. with S.I. 16 U. in the same syringe.

EXPERIMENTS AND RESULTS

Z.P.I. is ordinary S.I. with a minute quantity of zinc combined in a firm suspension with protamine, which delays the absorption from the tissues and thus retards the hypoglycæmic action. It therefore seems reasonable to suppose that this suspension may also delay the absorption of S.I., if mixed with it before injection, and perhaps convert it in effect into Z.P.I. This supposition was tested in the following way:—

Seventeen hospital patients, women over middle age, who were being balanced on a combined dose of the two kinds of insulin, had a blood-sugar curve

TABLE I—BLOOD-SUGAR IN TYPICAL CASES

Case 2	Fig. 1, I							Fig. 1, II					
	Time							Time					
	A.M.		Noon	P.M.				A.M.		Noon	P.M.		
	7.0	7.15		4.0	6.45	7.0	11.0	7.0	7.15		4.0	7.0	11.0
Blood-sugar (mg. per 100 c.cm.) ..	206	—	75	200	—	215	—	150	—	93	131	118	—
Insulin (units) ..	—	S.I. 50	—	—	S.I. 38	—	—	—	Z.P.I. 40 S.I. 38	—	—	—	—
Case 12	**Fig. 2, I**							**Fig. 2, II**					
Blood-sugar (mg. per 100 c.cm.) ..	100	—	112	281	—	168	68	81	—	118	175	137	231
Insulin (units) ..	—	Z.P.I. 20 S.I. 16 together	—	—	—	—	—	—	Z.P.I. 20 S.I. 8 separately	—	—	—	—

Case 4	Fig. 3, I									Fig. 3, II								
	Fasting	Br.	Half-hour intervals							Fasting	Br.	Half-hour intervals						
			2	3	4	5	6	7	8			2	3	4	5	6	7	8
Blood-sugar (mg. per 100 c.cm.) ..	162		212	225	225	200	231	212	175	137		200	212	212	193	187	137	62
Insulin (units) ..	Z.P.I. 22 S.I. 22 together		—	—	—	—	—	—	—	Z.P.I. 22 S.I. 22 separately		—	—	—	—	—	—	—
Case 18	**Fig. 4, I**									**Fig. 4, II**								
Blood-sugar (mg. per 100 c.cm.) ..	225	Br.	262	250	418	225	250	237	237	193	Br.	225	231	243	225	231	225	193
Insulin (units) ..	Z.P.I. 60 S.I. 40 together		—	—	—	—	—	—	—	Z.P.I. 60 S.I. 40 separately		—	—	—	—	—	—	—
Case 12	**Fig. 5, I**									**Fig. 5, II**								
Blood-sugar (mg. per 100 c.cm.) ..	100	Br.	112	124	224	162	206	156	131	93	Br.	312	337	510	418	281	281	256
Insulin (units) ..	Z.P.I. 20 S.I. 8 separately		—	—	—	—	—	—	—	Z.P.I. 20 S.I. 8 together, not mixed		—	—	—	—	—	—	—
	Fig. 5, III									**Fig. 5, IV**								
Blood-sugar (mg. per 100 c.cm.) ..	168	Br.	250	374	424	468	518	424	393	87	Br.	156	268	312	398	418	412	368
Insulin (units) ..	Z.P.I. 20 S.I. 8 together well mixed		—	—	—	—	—	—	—	Z.P.I. 20 alone		—	—	—	—	—	—	—
	Fig. 5, V																	
Blood-sugar (mg. per 100 c.cm.) ..	218	Br.	225	281	293	268	237	218	143									
Insulin (units) ..	Z.P.I. 20 S.I. 16 together		—	—	—	—	—	—	—									

Z.P.I., zinc protamine insulin.
S.I., soluble or ordinary insulin.
Br., breakfast.

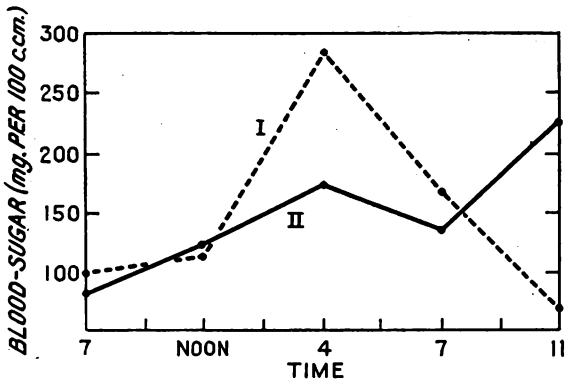

FIG. 2.—Blood-sugar values in case 12 (see table I): (I) Z.P.I. 20 U. and S.I. 16 given together at 7.15 A.M.; (II) Z.P.I. 20 U. and S.I. 8 U. given separately at 7.15 A.M.

estimated on two different days: on the first the Z.P.I. and S.I. were given in the same syringe as usual; on the second day they were given separately. The diet was constant and contained about 180 g. of carbohydrate. The fasting blood-sugar was estimated; insulin was injected forthwith and followed in half an hour by breakfast; and post-insulin estimations were begun an hour after the injection and continued half-hourly till four hours had elapsed.

The results show that, when the injections were given separately, the S.I. had the expected effect of bringing the blood-sugar to near the fasting level at the end of four hours. In twelve cases it was below the fasting level, five being hypoglycæmic; in one case the fasting and end points were the same; and of the remaining four the highest end point was 156 mg. per 100 c.cm. When, however, the same doses of insulin were mixed, the result was different; the end point was higher than the fasting level in twelve cases, equal in two, and, although lower in the remaining three, had risen to over 300 mg. per 100 c.cm. during the four-hour period in two of these cases, while in the third there was hypoglycæmia when the injections were given separately. Moreover, the shape of the curve was altered when the dose was combined, in all the cases except one and fell into one of three groups, of which case 4 (fig. 3) and case 18 (fig. 4) show typical forms. The findings on which the graphs are based are given in table I. The first type occurred in one case only. The post-insulin estimations ran in almost straight lines parallel to each other; there was no normal rise or fall, the greatest fluctuation being from 110 to 118 mg. per 100 c.cm. The patient was obese, receiving only 16 units of insulin (Z.P.I. 10 U. and S.I. 6 U.) and was probably insensitive to insulin. The second type of curve, after following a normal course for two or three hours, rose or ceased to fall towards the end (fig. 3). Six cases were in this group, in two of which there was hypoglycæmia after the first one and a half hours when the injections were given separately. In the third and commonest post-insulin graph (ten cases) there was a remarkable peak where the blood-sugar rose suddenly and usually fell in half an hour to the former level (fig. 4). There was apparently a short escape from insulin control, which was pronounced in seven cases and slight and more gradual in three. In all the cases the S.I. was more active, and less was needed when separate injections were used.

Case 12 presents a contrast to the hospital cases; the subject had been taking insulin for fourteen years and was doing full work in an active profession; at the time of the experiment he was receiving separate injections of Z.P.I. 20 U. and S.I. 8 U. every morning, whereas the other patients had been recently balanced on insulin and were receiving the combined dose until the second day of the investigation. Five experiments were made in case 12 to find out whether the degree of mixing in the syringe affects the action of the S.I., and whether, if a large proportion of S.I. is given, some of it escapes and performs its normal action. In the first test the separate injections were continued, the resulting curve (fig. 5, I) being approximately normal. Secondly, the patient drew the two kinds of insulin into the same syringe, taking the heavier Z.P.I. first and trying not to mix them. The curve (fig. 5, II) was of the "escape" type but rose much higher than in any of the hospital cases—to 510 mg. per 100 c.cm.—and did not fall so suddenly; it had reached 250 mg. per 100 c.cm. at the end of four hours. In the third experiment the two insulins were deliberately mixed; the blood-sugar soared to 518 mg. per 100 c.cm., though rather more slowly; it was falling very slowly, having only reached 393 mg. per 100 c.cm. at the end of four hours (fig. 5, III). It is rather in the slow fall than in the height of the maximal point that this curve shows less insulin control than the last and in this respect the mixing diminished the

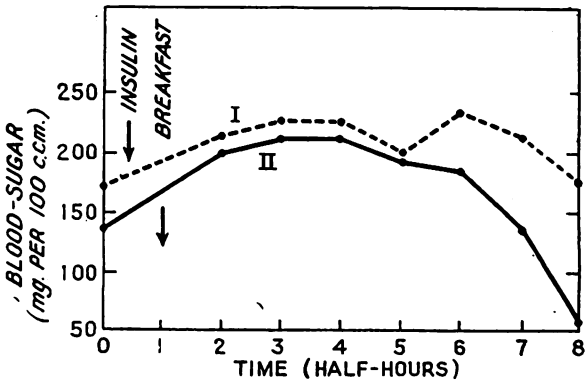

FIG. 3—Blood-sugar values in case 4 (see table I) after administration of Z.P.I. 22 U. and S.I. 12 U. half an hour before breakfast: (I) together; (II) separately.

action of the S.I. Lastly, the patient took Z.P.I. 20 U. alone, omitting the S.I. altogether. The curve (fig. 5, IV) is almost parallel to the previous curve (fig. 5, III), starting lower and not rising so high, but it shows even less fall.

The action of the S.I. may be assessed in two ways in these curves: (1) the difference between the maximal height and the end point, which shows the extent of the hypoglycæmic action; and (2) the difference between the fasting point and the end point, which should be nil if the insulin is sufficient; the nearer they approximate the better the action of the S.I. These figures are shown in table II. It is evident that the mixing of the two insulins in the syringe diminished the action of the S.I. but did not abolish it altogether.

The proportion of S.I. to Z.P.I. was greater in the hospital cases than in case 12, where it was 4 to 10. In two cases it was 5 to 10 and ranged upwards to 10 to 10. Although in case 12 the S.I. 8 U. given in the same syringe with Z.P.I. exerted some effect on the post-insulin curve, the escape from insulin control was greatly exaggerated compared with even the worst of the hospital cases, and the curves provide a remarkable contrast to the one which shows the effect of the same

insulin given separately. It seemed therefore probable that in the hospital cases there was enough S.I. for some to escape and to act within the first four hours, whereas in case 12 there was not. To test this hypothesis a fifth curve was estimated in case 12 after injecting a double dose (16 U.) of S.I. from the same syringe with the original amount, 20 U. of Z.P.I. Fig. 5, v, shows that the end point was well below the

TABLE II—CASE 12

BLOOD-SUGAR DIFFERENCES (MG. PER 100 C.CM.)

Insulin (units)	How given	Maximum to end point	End point to fasting point
Z.P.I. 20 S.I. 8	Not mixed	254	163
Z.P.I. 20 S.I. 8	Mixed	125	225
Z.P.I. 20 S.I.0	Alone	50	281

fasting level, and that enough of the S.I. did escape to exert a strong hypoglycæmic action. This curve is a great contrast to Fig. 5, II and III, where only 8 U. of S.I. was used. The larger proportion of S.I. needed in the hospital cases is therefore due to the combined method of administration, and it is probable that with this method more S.I. will always be needed.

The next question that arose was more difficult to answer. What happens to that part of the S.I. which does not act within the first four hours? Does it act late in the day? Estimations of the blood-sugar were made at 7 P.M., twelve hours after the injection of the insulin in three hospital cases on the two days of the experiment. Table III shows the blood-sugar at noon and at 7 P.M. It will be observed that when the insulins were given together the 7 P.M. estimation was always lower than when the injections were separate, whereas at noon the blood-sugar was lower after separate injection in each case. Fig. 2 shows similar fluctuations in case 12. Twice the amount of S.I. was given when the insulins were combined. The blood-sugar reached a hypoglycæmic level at 11 P.M., whereas with separate injections it was highest at this time. On the day of the combined injection the subject ate about 20 g. of carbohydrate after the 11 P.M. estimation; the blood-sugar was 125 mg. per 100 c.cm. at 7 A.M. the next day, but hypoglycæmic symptoms developed at noon. This evidence suggests that the action of

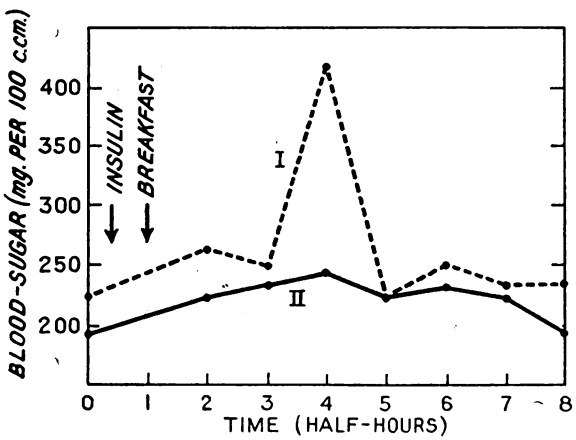

FIG. 4—Blood-sugar values in case 18 (see table I) after administration of Z.P.I. 60 U. and S.I. 40 U. half an hour before breakfast: (I) together; (II) separately.

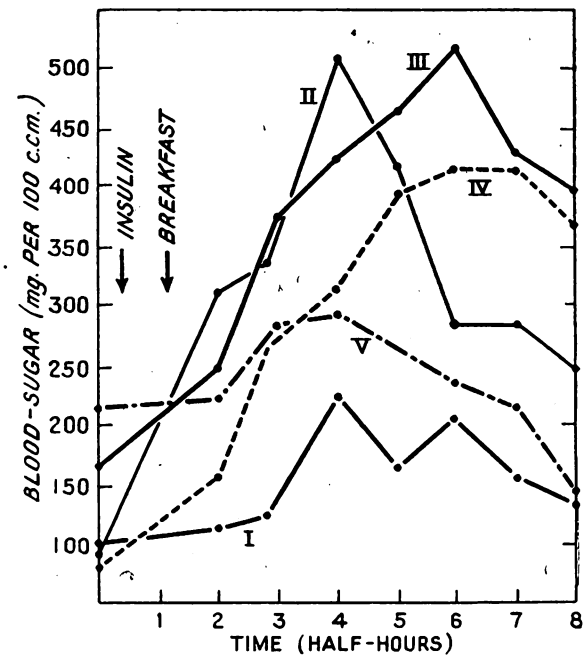

FIG. 5—Blood-sugar values in case 12 (see table I) after insulin given half an hour before breakfast: (I) Z.P.I. 20 U. and S.I. 8 U. separately; (II) same doses together but not mixed; (III) same doses together and well mixed; (IV) Z.P.I. 20 U. alone; (V) Z.P.I. 20 U. and S.I. 16 U. together.

part of the S.I. is delayed, acting later in the day and even into the next day. It also seems that part of the S.I. is lost. In case 12, for instance, less total insulin is needed when the injections are given separately, and the patients who became hypoglycæmic within four hours of the separate injections did not become hypoglycæmic later in the day or the next day when the combined injections were continued.

TABLE III—BLOOD-SUGAR (MG. PER 100 C.CM.) AT NOON AND 7 P.M.

Case no.	Insulin (units)	7 A.M.	Noon	7 P.M.
15	Z.P.I. 18 Together	75	87	131
	S.I. 24 Separately	68	43	231
17	Z.P.I. 24 Together	93	193	93
	S.I. 20 Separately	93	175	231
18	Z.P.I. 60 Together	225	231	137
	S.I. 40 Separately	193	193	218

DISCUSSION

It is clear that the process of drawing S.I. into the same syringe with Z.P.I. altered its action to some extent in all these cases and made it less effective during the four hours after injection. Three details in administration seemed to be important: the degree of mixing; the relative proportions of Z.P.I. and S.I.; and the total quantity of insulin.

Degree of mixing.—For instance, in fig. 5, II, where mixing was avoided so far as possible, the blood-sugar fell sooner and farther than in fig. 5, III, where mixing was deliberate. There is less mixing if the heavier Z.P.I. is drawn into the syringe first; the lighter S.I. remains floating on the top until the moment of inverting the syringe to thrust the needle through the skin. It is essential to avoid injecting even a minute particle of the Z.P.I. already in the syringe, into the bottle containing S.I.

Relative proportions of Z.P.I. and S.I.—The more S.I. there is, the more escapes and produces its typical effect—e.g., in case 12 twice the usual quantity of S.I. was needed when given as a combined dose, and all the hospital patients were given a dose of S.I. equal to a half or more of the Z.P.I.

The total quantity of insulin must also be considered because if part of the S.I. is converted into the slower acting insulin this will accumulate and continue to act longer and longer as time goes on. In the cases with the escape type of curve we may suppose that the previous day's Z.P.I. continued to act at the beginning of the experimental period, leaving a gap before the delayed S.I. came into play. In case 12 there was probably no accumulation, the Z.P.I. 20 U. taken alone being just enough to keep the blood-sugar low during the night, with none to carry over till the next day; but, when the patient doubled the dose of S.I., some did carry over and cause symptoms of hypoglycæmia the next day.

SUMMARY AND CONCLUSIONS

Two post-insulin blood-sugar curves of seventeen hospital diabetic patients recently balanced on a combined dose of zinc protamine insulin (Z.P.I.) and soluble insulin (S.I.) and five of a long-standing diabetic in full activity were plotted, one in each case being estimated after separate injections and the others after the two kinds of insulin had been mixed in the syringe.

When the two insulins were drawn into the same syringe, the action of the S.I. was modified, some of it being delayed in action and some of it apparently lost; in all cases a larger proportion of S.I. was needed when given in the same syringe with Z.P.I. to produce a hypoglycæmic action in the early part of the day.

It seems from this investigation that it is more economical and ensures more accurate balancing to give S.I. and Z.P.I. in separate injections. If drawn into one syringe they must not be allowed to mix.

The hardened diabetic does not mind two pricks, and all who lead active lives prefer to take all their insulin in the morning, rather than have to remember a second injection before tea or before dinner; hence the use of the two kinds of insulin is preferred by the patient besides ensuring a more steady blood-sugar level throughout the day and night.

My thanks are due to Dr. Mary Leslie-Smith, pathologist to the hospital, who performed the blood-sugar estimations, and to Dr. Ruth Pike, house-physician, who organised the hospital experiments and took the blood for the estimations; also to Sir Robert Hutchison for his interest and helpful suggestions.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF THERAPEUTICS

AT a meeting of this section on May 14 with Sir WILLIAM WILLCOX, the president, in the chair, a discussion on modern methods in the

Treatment of Cerebrospinal Fever

was opened by Dr. H. STANLEY BANKS, who demonstrated on the screen the data on which his present practice was based.

In 1937–38, when the treatment was serum intravenously and sulphanilamide by mouth, there was a gross fatality-rate of 16·9 per cent. in 71 cases. In 1938–39, when either sulphanilamide or sulphapyridine was used without serum, the gross fatality-rate in 80 cases of similar age-grouping was only 6·25 per cent. On this and other clinical evidence he was unable to detect any practical advantage to be gained from serum administration provided that the drugs were used in correct dosage. In the present year he had treated 120 cases of all ages from infancy to over 70 years, and the gross fatality-rate was 10 per cent. These epidemic cases contained a much higher proportion of acute cases than the former series, and 93 per cent. were group I infections, compared with 65 per cent. before the epidemic. Petechial and purpuric rashes were present in no less than 46 per cent. and there were many with large hæmorrhages. The complications were not serious, apart from two cases of deafness, one absolute and one partial; those which cleared up included eleven cases of polyarthritis, two of glycosuria with ketosis, two of multiple vesicles and ulcers in the purpuric areas, one of severe myocarditis with gallop rhythm, several cranial-nerve palsies involving III, IV, VI and VII, and Jacksonian convulsions in six cases which recovered. The drug effects included three cases of hæmaturia, eight of drug rash and fever, and twenty-six of nausea and vomiting which cleared up when the drug was changed to sulphanilamide. One case of granulopenia was discovered on the day after the drug treatment stopped (ninth day) but 24 hours later the polymorph-count began to rise rapidly. Provisional figures supplied to him by the Ministry of Health, and subject to some amendment, for the first quarter of 1940, in England and Wales were: civilian cases 4388; deaths 1040; fatality-rate 23·7 per cent.; non-civilian cases 705; deaths 80; fatality-rate 11·3 per cent. The age-group fatality-rates of 787 cases treated with the drugs alone or in combination with serum which had been reported to the Ministry of Health showed the highest fatality-rates to be in infants (49·2 per cent.) and over the age of 45 years (50 per cent.). The fatality-rate for the whole series at all ages was 22 per cent.

Dr. Banks showed that the main cause of death in his series, accounting for six of the twelve deaths, was the encephalitic type of disease, characterised by rapid onset of coma, purpuric rash and a short course to a fatal issue generally in 15–36 hours. Post-mortem there was little or no meningeal exudate but the whole brain showed congestion, œdema, hæmorrhage, widespread capillary thrombosis and degeneration of nerve-cells. In two cases of the six there was also adrenal hæmorrhage, and in these the pulse had been imperceptible on admission to hospital. This might be called the "encephalitic-adrenal" type. It was known in the United States as the Waterhouse-Fredericksen syndrome. Dehydration in young children was another common cause of death but it could be prevented. His conclusions as to treatment were:

(1) Sulphapyridine by mouth is the drug of first choice. If, however, it causes vomiting twice, nausea, depression or hæmaturia, it should be immediately changed to sulphanilamide. This was necessary in about a quarter of the cases admitted and was almost invariably successful. It was better policy than that of substituting intramuscular injection of the sodium salt, since the latter caused necrosis of muscle-fibres and ulcers and sloughs of subcutaneous tissue. Since sulphanilamide is a less potent drug, dosage must be high for the first three days and gradually reduced.

(2) The period of administration need rarely exceed 6–7 days.

(3) Intravenous sodium solution of sulphapyridine in two initial doses of 2 g. for an adult, diluted in three volumes of saline, is recommended for very acute cases and where the drug cannot be given by mouth or nasal catheter.

(4) Spinal drainage for two or three days is desirable in a small proportion of cases to relieve pressure symptoms—e.g., slow pulse and respirations, headache and restlessness.

(5) Fluid administration, especially to small children, is of major importance in order to prevent or relieve dehydration. The technique of the nasal and pharyngeal tube should be mastered. In dehydration delay in giving parenteral fluid may be fatal. The intraperitoneal route is often convenient and should be more widely used. Repeated vomiting as a cause of dehydration can be prevented by change of drug.

(6) Acute coma, accompanied by a purpuric rash —symptoms suggestive of the encephalitic type— should be an indication for immediate sulphapyridine treatment pending admission to hospital.

Dr. G. EMRYS HARRIES described the treatment of 200 cases this year in Cardiff. Their ages ranged from 10 weeks to 70 years. There were 22 deaths, giving a case-fatality rate of 11 per cent. The cases were generally more severe than sporadic cases in former years. Petechial hæmorrhages were present in 41 per cent. Group I strains were isolated in 90 out of 93 cases. Complications included bronchopneumonia, iridocyclitis, bilateral nerve deafness, orchitis, adrenal hæmorrhage, arthritis, transient hemiplegia and other transient paresis. Treatment consisted of 2 g. sulphapyridine by mouth on admission, repeated after four hours, and then 1 g. four-hourly for 72 hours; then, if the sugar content of the C.S.F. was approaching normality, 0·5 g. six-hourly for 24 hours followed by 0·5 g. t.d.s. for three or four days. Children under 12 had half the adult dose. To comatose patients the crushed tablets were given in nasal feeds. For vomiting, the sodium solution was given by intramuscular injection. In severe cases the sodium salt was given intravenously in 0·5 to 1 litre of 5 per cent. glucose saline by the drip method. No serum was given intrathecally, but 30–60 c.cm. meningococcal antitoxin was given intravenously in severe cases. Fluids were pushed, as dehydration might be fatal. Cases in coma up to 10 days were given fluids by nasal feeds at four-hourly intervals, and recovered. In fulminating hæmorrhagic cases cortical extract and large amounts of saline were given intravenously in order to support sodium metabolism. Three patients whose pulse was imperceptible on admission recovered under treatment on these lines. As a sedative sodium bromide was given instead of potassium bromide. No masks were worn by attendants owing to the risk of induction of nasopharyngeal congestion and lowered resistance. He uttered a word of warning against small doses of sulphapyridine as a prophylactic in suspected cases.

Dr. W. R. THROWER pointed out that the sodium solution of sulphapyridine had an alkalinity equivalent to N/10 caustic soda. He showed sections to illustrate necrosis of muscle-fibres after intramuscular injection, and epithelialisation of a sinus after subcutaneous injection.

Lord HORDER referred to the encephalomeningitic type and the septicæmic type as two extremes between which occurred the bulk of the meningeal cases. He emphasised the need for drainage especially in cases treated at a late stage. Years ago he had demonstrated to colleagues the simplicity and advantages of intraperitoneal injection and he supported the suggestion that this route should be used for fluid administration.

Dr. MERVYN GORDON, F.R.S., recalled that the epidemic of 1915 had been due entirely to the type I meningococcus. Type II was quite a different organism which absorption tests showed to have an affinity with the gonococcus. From so-called sterile cerebrospinal fluids he had sometimes found the meningococcus to grow after four days in glucose broth. He remarked on the difference in the case-fatality rates obtained by experts and those shown in the Ministry of Health's figures for all cases. Just as in the days of serum treatment, so now the best results in this disease were obtained by expert treatment. He considered that there should be a definite plan for diffusing this new information and applying it.

Flight-Lieutenant WILLIAMS stated that of his 45 cases of the favourable age-group represented by airmen, he had not had a single death. He used high dosage of sulphapyridine for three days and gradually reduced it. In a controlled experiment he had found no advantage in repeating lumbar puncture after the first diagnostic one. He considered clinical signs of response to treatment more reliable than sugar estimations of the C.S.F.

Dr. GERALD SLOT asked whether isolation was necessary. Could this disease be nursed in a general hospital?

Dr. J. A. STRUTHERS called attention to possible fallacies in the published figures for weekly notifications and deaths in London.

The PRESIDENT considered that drainage by lumbar puncture had still its value. He observed that even purulent arthritis cases generally cleared up. He used Prontosil soluble as an intravenous injection but had doubts as to the potency of Soluseptasine.

Dr. BANKS in reply stated that case-to-case infectivity was low. In his opinion, the most important point in management was not isolation but treatment in skilled and experienced hands. Treatment should be centred wherever this could be found. He considered that sodium solution of sulphapyridine was the most potent agent for intravenous injection.

Dr. HARRIES in a brief reply mentioned that of his 200 cases this year lumbar puncture had been accomplished in all without a general anæsthetic.

REVIEWS OF BOOKS

Sclerosing Therapy

Injection Treatment of Hernia, Hydrocele, Varicose Veins and Hæmorrhoids. Edited by FRANK C. YEOMANS, M.D., F.A.C.S., professor of proctology and attending surgeon, New York Polyclinic medical school. London: Baillière, Tindall and Cox. 1939. Pp. 337. 27*s.*

IN this book a mass of information is gathered together about the four surgical conditions that have proved amenable to cure by injection. The editor is the author of the section on hæmorrhoids, and he tells the novice clearly and concisely when, where and how to inject. Unfortunately he has not kept a restraining hand on his co-authors. In the section on hernia it is difficult to acquaint oneself quickly and accurately with the precise steps of the technique. The instructions for carrying out the actual injection are placed as foot-notes to the illustrations—a clumsy method of imparting information, especially as there is no summary in the text. It would be possible to read the chapter on technique without realising the importance of making sure that the hernia is completely controlled by a truss throughout, and without being certain which end of the inguinal canal to start injecting. The anatomical relations of the hernial sac should have been more precisely described, for in injection treatment they are all-important. The differential diagnosis of inguinal and femoral hernia, which can be a pitfall for the uninitiated, is worthy of more than the cursory mention given it. And it hardly seems wise to teach that a strangulated hernia is "one which may or may not be reducible." For the sake of the inexpert practitioner these defects should be corrected in an account that has evidently been prepared with much care, and is well illustrated.

The author of the section on hydrocele is probably right in saying that sclerosing therapy in this condition may replace operation, for it is far more straightforward than the injection of hernia. The few difficulties are clearly set out here. The hundred pages on varicose veins are a mine of information, and every complication before and after injection is dealt with.

There is no doubt a place for a book on sclerosing therapy, but a simple account of technique and complications would perhaps have made a wider appeal than a work as elaborate as this.

Textbook of Occupational Diseases of the Skin

By LOUIS SCHWARTZ, M.D., medical director, United States Public Health Service, in charge of dermatoses investigations, and lecturer, department of dermatology and syphilology, New York University, college of medicine; and LOUIS TULIPAN, M.D., clinical professor of dermatology and syphilology in the college. London: Henry Kimpton. 1939. Pp. 799.

TEXTBOOKS on occupational diseases of the skin are mostly nothing more than grim catalogues only meant for reference, but Dr. Schwartz and Professor Tulipan have produced one which makes fascinating reading. They have proved that to elucidate the problems of the occupational dermatoses some knowledge of the industrial processes involved is necessary and with this end in view they have visited hundreds of factories and workshops. Their accounts of these processes are simply written and easily understandable. In this branch of dermatology the instincts of a detective are also required and there are numerous examples of the authors' skill in this direction. They attach great importance to patch testing, and it is a pity that this simple procedure is not more often employed at an early stage in cases of industrial skin disease in this country. In cases of mild occupational dermatitis arising early in employment the authors recommend that the workmen should continue with their work and so acquire an immunity to the irritating substance. This recommendation should be accepted with reserve, for the usual experience is that such a course leads to aggravation of the skin eruption.

The book contains full and useful bibligraphies and is undoubtedly an important contribution to dermatological literature.

Sexual Perversions and Abnormalities

By CLIFFORD ALLEN, M.D. Lond., M.R.C.P., D.P.M., assistant physician to the Tavistock Clinic. London: Humphrey Milford, Oxford University Press. 1940. Pp. 193. 7*s.* 6*d.*

WRITING on the subject of this book was at one time evidence more of personal courage than of scientific endeavour. Since then the prejudices have been largely removed and modern genetics, endocrinology and psychological observations in higher animals and children should now be able to provide a scientific basis for a psychiatric outline of the anomalies of sex in man. Dr. Allen here tries to lay down such a basis, but the result is not wholly satisfactory. He deliberately omits endocrinology from consideration because "the laboratory worker finds the problem artificially simplified." With genetics he deals incidentally on two pages, and he makes small use of the wealth of material in infant and child psychology collected in the last twenty years. There is an instructive chapter on sexual development in the subhuman primate, reviewing the observations of Zuckermann, Koehler and others.

By far the largest space is given to Freud's theories of sexual development and to the psycho-analytical interpretations of the perversions. The book contains many quotations from Freud and still more from minor psycho-analytic writers, which make no easy reading. Some of these "cuttings" appear to have been collected in a hurry. For instance, more than a page is filled with a psycho-analytical classification of types and causes of frigidity, and at the end the author remarks that it is of little value. Here and there one finds criticisms of Freudian views, often rather lukewarm; but the interpretation of ten "representative cases" reported is predominantly psycho-analytical. All but two have been successfully treated by the author. Dr. Allen says he specialises in the treatment of prepsychotics, yet he seems uninterested in the important relations of sexual perversions to the major psychoses and to drug addiction, though just in these fields a certain amount of reliable clinical observation has been accumulated.

Some of Dr. Allen's psychiatric statements challenge opposition—for example, that alcoholism in manics is the result of their increased sexuality. He invites misunderstanding when he speaks of the taboo against sex present "in excessively narrow religious families" as ending in paranoid schizophrenia. And his belief that psychotherapy of a sexually abnormal patient can prevent him from falling into a grave psychosis will not be shared by many experienced psychiatrists. The concluding chapter on prevention and treatment makes up for some of the disappointment caused by the book's scientific window-dressing in offering plain, sound and practical advice, besides recommending deep transference analysis as the "sheet anchor" of treatment in sexual abnormalities.

Mineral Metabolism

By ALFRED T. SHOHL, M.D., research associate in pediatrics, Harvard University. London: Chapman and Hall. 1939. Pp. 384. 30*s.*

SINCE Voit and Rubner laid the foundations of the subject there have not been many books on mineral metabolism and no comprehensive reviews have appeared for ten years or more. Time was ripe, therefore, for another, for there have been great discoveries in the last decade. Dr. Shohl's book is characteristically American in style, outlook and arrangement. There is an introduction, in which the author wisely includes a section on terms and definitions, and this is followed by chapters on the mineral composition of the body, secretions and excretions, internal secretions, total base, chloride, ammonium and bicarbonate, calcium and magnesium, phosphorus, sulphur, iron, iodine, traces, water metabolism, anion-cation relationships, and mineral intakes, balances and requirements. Each chapter ends with a bibliography. There are some blemishes in this painstaking piece of compilation. Too many of the references are to American authors. Only a passing reference is made to sodium-chloride deficiency in man and there is no mention of the experimental reproduction of the syndrome. In the chapter on the trace elements there is no description of the effect of copper in curing sway-back disease in lambs or the possible implications of this discovery on the whole problem of demyelination. There is no reference to the discovery that cobalt cures coast disease in sheep, although this is a proven fact of great economic importance. Nothing is said of the presence of barium in the eye tissues of oxen, and the account of zinc is far from up to date. Nevertheless, there is a great deal to praise in the book and it can be certain of a welcome from both teachers and research workers.

THE LANCET

LONDON: SATURDAY, MAY 25, 1940

SUPPLY AND DEMAND

THE Army needs more doctors, and though no doubt they will soon get them, it is regrettable that they must appeal in this way as if doctors were mere comforts, like woolly mittens. The medical profession is a most patriotic body, and it may surprise the layman that its members need any persuasion at this stage to don uniform. When war broke out doctors did, in fact, respond magnificently, but their ardour was damped by disappointments, some due to the unexpected mildness of the enemy's attack and therefore unavoidable. Those who joined the Army sometimes found themselves marking time and the news spread to potential volunteers who felt they were doing more useful work where they were. But now that active warfare has come there should be no danger that the doctor who volunteers for service will find his efforts wasted—there is every prospect that they will be extended to the utmost. The need is now a real one and the object must be to see that the places are filled by the doctors most fitted to fill them. It is questionable whether the present system whereby doctors are on the same footing as fighting men will attain this object. A doctor is not qualified until several years after the age at which he could have been a first-class fighting man. Under the age of 30 he is unlikely to have reached his full capacity as a doctor; he is often at his best when over 60. Although youth is necessary for the highest physical endurance, long periods of steady application to routine are often easier in middle age. For Army work a doctor of 37 would probably correspond in efficiency to a fighting soldier of 21. Even the necessity for physical fitness does not apply with the same force. There are doctors doing useful work in hospitals and elsewhere with disabilities which would disqualify them for the Army. And many jobs at the base could be done as well by women as by men.

There are good grounds then for placing doctors on a special footing as regards recruitment. A case might be made out for extending conscription to doctors up to 55, so that the local medical war committees could make up their quotas from the majority of the doctors in their areas, and not be confined to young men and older volunteers. But whether actual conscription is necessary or not is a minor point. Many no doubt object strongly to compulsion, though others would be glad to be relieved of the necessity to decide between the claims of their practices and families and their country. If the whole profession knew that it was efficiently organised a request from the central body to take up a particular duty would rarely be refused. With thorough organisation it should be possible to supply the armed forces and the E.M.S. with as many doctors of each type as they need and at the same time to ensure that doctors were not wasting their time in evacuated towns while others were working overtime in the reception areas.

The present distinctions between the different medical services should be abolished. We are involved in total war, and for efficiency unity and simplicity of organisation are essential. As Medicus, M.P., suggests after his tour of the B.E.F., doctors should all be enrolled in a unified and if necessary uniformed national service whose members could be drafted into whatever branch, civil or military, most needed them. The individual branches already exist. Their administrations are all there except for ordinary civilian practice. What is missing is the unifying authority, and even for this the organising machinery exists in the Central Medical War Committee and its complex derivative bodies. It should not be difficult to evolve a supreme committee from these. There is a widespread objection to state medicine, but state medicine under a bureaucracy in peacetime and a national service in war are very different things, and the danger of the thin edge of the wedge could be avoided by putting the service not under a government department but under a public utility board, with members nominated by the Services, the medical organisations, and through Parliament by the general public. Now is the time, before direct assault is made on us, to face the difficulties and inevitable confusion of the transition period, and Mr. MACDONALD might well make this his first concern in his new office.

THE POTENCY OF VITAMINS D_2 AND D_3

AT the last meeting in 1934 of the International Biological Standardisation Conference, organised by the Health Section of the League of Nations, trouble arose over the vitamin-D standard because vitamin D from irradiated ergosterol and vitamin D in cod-liver oil did not have the same relative potency in rats as in chickens, while it was not known for certain what their relative potency was in human beings. In the end the conference arranged provisionally that, while a solution of irradiated ergosterol should continue as the international standard, a sample of cod-liver oil should be available as a subsidiary standard, and it recommended that the anomalous action of vitamin D from different sources should be further investigated.[1] Since 1934 a great deal has been learned, and but for the war the problem would have been discussed again six months ago. Much of the investigation has been done here and abroad in the normal course of research, but some special inquiries have been instituted by the accessory food factors committee appointed by the Lister Institute and Medical Research Council. The National Institute for Medical Research at Hampstead stands in a special relation to the International Biological

1. *Quart. Bull. Hlth Org. L.o.N.* 1934, 3, extract 15.

Standardisation Conferences, and the work of preparing for and organising the conferences falls largely upon British workers. Two papers that we publish this week answer at least in part the question whether vitamin D from different sources has the same relative potency in human beings as in rats. The question has been in doubt ever since irradiated ergosterol and cod-liver oil have both been available for the treatment of human rickets. Since 1934 the outstanding event in this field has been the identification by WINDAUS and his co-workers [2 3] of irradiated 7-dehydrocholesterol with the vitamin D (D_3) commonly found in fish-liver oils. The vitamin was isolated from natural sources and synthesised from cholesterol, and a supply of it was made available before the war to Sir HENRY DALE for research in this country. Obviously this pure material, for which maximum potency for both rats and chickens was claimed,[4] would have many advantages if adopted as the international standard instead of vitamin D from irradiated ergosterol, now called vitamin D_2.

When changes such as this are contemplated in any of the international standard materials it is essential to know as accurately as possible the biological potency of the new substance in terms of the old. The error of all such biological tests is high, and it is therefore usual to invite a number of different laboratories to make the comparison independently and, if necessary, to obtain a statistical assessment of the pooled results. The vitamin-B_1 standard was recently changed in this way from an acid clay adsorbate of the vitamin to pure synthetic vitamin B_1 hydrochloride after a collaborative biological test organised by Dr. T. F. MACRAE of the Lister Institute. For vitamin D_3 such a combined comparison with vitamin D_2 was similarly organised by Dr. K. H. COWARD of the Pharmaceutical Society. The results, which are shortly to be published,[5] were extremely satisfactory, since there was excellent agreement between the different laboratories, and the findings of WINDAUS and his colleagues were confirmed. The value for vitamin D_2 is by definition 40,000 I.U. per gramme, and the value for vitamin D_3 was found to be the same. The material thus tested was then available for testing the relative potency of these two forms of vitamin D in human beings. In 1937 it seemed fairly certain that for the human infant vitamin D from fish-liver oils, irradiated ergosterol, irradiated cholesterol, and vitamin-D milks of various kinds, had the same relative potency as for rats,[6] but this conclusion is not generally accepted as beyond question and there is a recurring tendency to attribute greater potency to vitamin D_3. The difference in potency is certainly not great, if it exists at all, but a superiority of 50 to 100 per cent. is difficult to establish with certainty because the large error of the most carefully planned animal studies is greatly increased when the experimental subjects are human beings. To obtain a satisfactory comparison the subjects must be as similar as possible, and the doses must be chosen so that the minimum curative dose of each substance is established. It is easy to show whether vitamin D_2 and vitamin D_3 will both cure osteomalacia and rickets, but it is not at all easy to determine the smallest dose of each which will cure at a certain speed.

Three different criteria were chosen in this investigation for measuring the curative efficacy of the two vitamins: cure of rickets in infants, cure of osteomalacia in adults in India, and the relief of tetany after parathyroidectomy. The first subject was inquired into by MORRIS and STEPHENSON,[7] who chose a dosage of 2000 I.U. daily, which they reckoned to be on the low side. With this dosage they treated two groups of six rachitic children, one with vitamin D_2 and the other with vitamin D_3. They reported no difference in the response of the two groups, but unfortunately they obtained no evidence whether 2000 I.U. daily really approached the minimum curative dose for either substance, or whether if a smaller dose had been given healing would have been equally slowed for both the vitamins or more for one than the other. Dr. WILSON has now treated fifteen pairs of cases suffering from osteomalacia or late rickets with large single weekly doses of 10,500 or 21,000 I.U. of vitamin D_2 or D_3. She made a valiant attempt to ascertain the minimum curative dose of each of the vitamins but was defeated by the refusal of the patients to continue treatment when the rate of cure was definitely slowed. When the large doses were given it was certain that no difference could be detected. In five pairs of cases, however, the small dosage of 10,500 I.U. once a week was persisted with for several weeks and of these, cure was thought to be more rapid with vitamin D_3 in three pairs, with vitamin D_2 in one pair, and in the fifth pair the rate for the two vitamins appeared to be the same. The numbers are too small to draw conclusions, but, as always, the difference if there is one is in favour of vitamin D_3. In the second study Professor HIMSWORTH and Dr. MAIZELS have treated a case of parathyroid tetany alternately with vitamin D_2 and vitamin D_3, trying to ascertain the minimum dose of each which would control the tetany. The patient was particularly suitable for the purpose because he had been under observation since the beginning of 1934. It had been ascertained by long trial that a weekly dose of 500,000 I.U. of vitamin D_2 was necessary to maintain his blood calcium at 8·4 mg. and his plasma phosphate at 3·2 mg. per 100 c.cm. It was thus not difficult to change the treatment and determine the minimum dose of vitamin D_3 which would have the same effect. With a weekly dose of 250,000 I.U. of vitamin D_3 the calcium fell to 6·8 and the phosphate rose to 4·7 mg. per 100 c.cm. When the dosage was

2. Windaus, A., Lettré, H. and Schenck, F. *Ann. Chem.* 1935, **520**, 98.
3. Brockmann, H. *Hoppe-Seyl. Z.* 1936, **241**, 104.
4. Schenck, F. *Naturwiss.* 1937, **25**, 159.
5. *Quart. Bull. Hlth Org. L.o.N.* in the press.
6. Hume, E. M. *Nutr. Abstr. Rev.* 1936–37, **6**, 891.
7. Morris, N. and Stephenson, M. N. *Lancet*, 1939, **2**, 876.

increased to 500,00 I.U. the calcium value rose again to 8·8 and that for phosphate fell to 3·2 mg. per 100 c.cm. In this most satisfactory experiment the possible difference in potency of the two vitamins, at any rate for this physiological purpose, is narrowed down so far that the probability of its non-existence is strong.

Even after these special studies it is still not possible to say with absolute certainty whether vitamins D_2 and D_3 have the same relative potency in human beings as in rats. NITSCHKE [8] has recently drawn attention to what appears to be a definite difference in the behaviour of the two vitamins. He tried to cure rickets in children with large single intramuscular injections of vitamin D_2 or D_3 and found that the former was almost inactive when given in this way. Of four other workers who made the same comparison three got the same result as he did, while only one (NADRAI) found vitamin D_2 effective when injected. NADRAI, however, used a Hungarian preparation which may have contained vitamin D_3 also, while the other four workers used Vigantol Merck. NITSCHKE concludes that in the process of absorption from the human gut, vitamin D_2 is subjected in the intestinal wall to some change which renders it active. Studies with monkeys might have yielded helpful evidence but these have been few. LUCAS, HUME and SMITH,[9] from clinical observations on the prophylaxis of rickets in pet monkeys, express doubt whether vitamin D_2 is very effective, and GERSTENBERGER and co-workers [10] claim that vitamin D_3 is decidedly superior for Rhesus macaques, though they give no clue as to the nature of their experiment. In spite of all this work the problem cannot be regarded as settled. Very likely it is impossible to settle it by existing methods because any difference that there is lies within the error of the biological technique.

FOOD POLICY

THE hands of the Ministry of Health have been so full since war began that they have had little time to advise on the nutritional needs of the people, and the question of how best to make supply fit demand has been left to the Ministers of Food, Agriculture and Shipping. If the scientific side of nutrition had been more to the fore on the kitchen front the fourth report of the Select Committee on National Expenditure [11] might have been less critical. The committee point out that the Ministry of Food has grown up piecemeal as the need for each part has become manifest. At the head of each commodity division is an expert in his own particular trade. The policy has been to provide the public with as wide a variety of foodstuffs as possible, and where there has been competition between two commodities the balance has been struck by a process of compromise rather than by a scientific decision as to which of the two is the more dietetically valuable. The controller of each commodity has been concerned largely with not letting his own trade down, and if the nutrition of the nation is at last to be put on an optimum war-time basis many trade interests will have to suffer severely. The committee give sugar as an example. They asked Ministry of Food officials whether sugar would not have a better chance of being distributed to the greatest advantage if it were mixed with cocoa to make chocolate or with fruit to make jam than if it were used in boiled sweets or for icing cakes. The committee were assured that the Ministry recognised this point and that chocolate-makers had therefore been allotted 70 per cent. of their normal requirements as compared with the boiled-sweet makers' 60 per cent. There was, says the report, a pull-devil, pull-baker business between the makers of condensed milk and boiled sweets and the pastry-cooks. The solution the committee proposed is an authoritative body of scientists and practical men to work out a basic plan of war-time food policy for the country. This would aim at providing an adequate diet at the least possible cost in shipping and foreign currency. It would then be for the Ministry of Agriculture to supply as much of the menu as possible from home production leaving the residue to be completed by the Ministry of Shipping. The final transfer from the warehouse to the larder on a basis that would be fair for all would be the concern of the Ministry of Food.

SULPHUR AND CHEMOTHERAPY

SULPHÆMOGLOBIN is less often found in the blood in significant quantities after the administration of sulphanilamide and its derivatives than methæmoglobin, but while methæmoglobin disappears within one or two days of stopping the drug sulphæmoglobin persists for from four to six weeks. During that time it immobilises part of the hæmoglobin, so that in its effect it is the equivalent of an anæmia. There is good reason, therefore, for avoiding sulphæmoglobinæmia, but there is some difference of opinion as to how this should be done. The condition is known to appear in patients receiving sulphanilamide who have much sulphuretted hydrogen or soluble sulphide in their alimentary tract. The presence of these has been thought to be due to an excess of combined sulphur in the diet, and various dietetic prohibitions have consequently been introduced. Some doctors forbid eggs, others eggs and onions, and others again prescribe a low residue diet in addition. The egg theory seems to be based on a misconception. It is true that the bacterial decomposition of eggs outside the alimentary tract gives rise to sulphuretted hydrogen, but in normal digestion the sulphur-containing amino-acids are absorbed with very little formation of sulphides. It has never been shown that eggs in the diet promote the formation of sulphæmoglobin when the intestine is normal. The same applies to other foods containing sulphur, many of which, such as cheese, contain more than eggs. Another prohibition, which is sound though not for the reason usually given, is that of Epsom and Glauber's salts. These

8. Nitschke, A. *Z. Kinderheilk.* 1939, **61**, 385.
9. Lucas, N. S., Hume, E. M. and Smith, H. H. *Proc. zoo. Soc. Lond.* Ser. A. 1937, part 2, 205.
10. Gerstenberger, H. J., Chapman, E. E., Kerbaugh, J. L. and Rose, C. S. *Sci. Proc. Amer. Soc. Pharm. exp. Therap.* March 13, 1940, p. 15.
11. Report of the Select Committee on National Expenditure H.M. Stationery Office. 1940. 1*s*.

lead to sulphæmoglobinæmia not because the sulphates are reduced to sulphides but because they are purgatives. When purgatives are given the fluid contents of the small intestine are hurried into the colon and it is the bacterial decomposition which takes place in these liquid fæces that produces the sulphides. Certain drugs, of which phenacetin is most used, predispose to the formation of methæmoglobin, and, if even small quantities of sulphides are present, of sulphæmoglobin. Confection of sulphur administered by itself rarely results in sulphæmoglobin appearing in the blood, but if the sulphur is given with sulphanilamide sulphæmoglobin soon appears, and it appears rapidly if phenacetin is given as well. Drugs like phenacetin must therefore not be used with sulphanilamide, but aspirin is harmless in this respect. To sum up, then, when giving sulphanilamide and the like purging and phenacetin should be avoided, but there is no reason why the patient should not have as normal a mixed diet as his condition will allow.

ANNOTATIONS

JUVENILE RHEUMATISM

WHILE necessity was the mother of evacuation, such a measure might well have been fathered in more peaceful times by those interested in the prevention of disease in general and of juvenile rheumatism in particular. The latter is notoriously a disease of the "hospital class," especially of those who live in overcrowded and low-lying districts, and prevention means slum clearance, or alternatively child clearance. The part played by overcrowding is brought out in both the comprehensive pre-war survey of London juvenile rheumatism[1] and the recent Dublin survey.[2] In Dublin the heaviest incidence of non-choreic cases is seen in the poorer and more densely populated areas less than 50 feet above Liffey-level. Since this is an evil not to be remedied under present social conditions, except apparently under the still greater evil of war, mitigation is our only resource. In 1936 three supervisory clinics and a small convalescent unit of twenty beds were set up to work in conjunction with hospitals and public-health authorities. The value of such a rheumatism scheme, as Bach and his associates point out, must be measured by its success in reducing the incidence of permanent cardiac damage. That worth-while results are possible is suggested by the gradual and progressive reduction of the incidence of such damage in London elementary-school children from 1·9 per cent. in 1927, when the L.C.C. scheme was started, to 0·77 per cent. in 1937. In London the first substantial reduction occurred four years after the inception of the scheme, so that the incidence of rheumatic heart disease in Dublin (0·5 per cent.) over the first three years of their scheme should show further reduction in the future, even though the total number of cases of juvenile rheumatism remains, as it did in pre-war London, about the same. In England and Wales, however, here and now, there has been since the outbreak of war a considerable reduction compared with last year in the incidence of scarlet fever. This is particularly obvious in the large cities, as Dr. Alison Glover[3] pointed out in his presidential address to the Royal Society of Medicine on April 5, and all the more striking by reason of a rise in the figures for Eire and Northern Ireland. We may hope, perhaps, that the hæmolytic streptococcal infection which invariably precedes an attack of rheumatic fever will likewise be less often seen, as another good result of evacuation.

NERVE SUTURE

MUCH attention was given to nerve suture in the last war, but the disturbing fact remains that the most meticulous technique still cannot ensure success. Leriche[4] has lately examined the possible causes of failure. Anatomical continuity is, as he says, of no avail unless return of function follows. He believes that ischæmia at the point of repair accounts for many failures. In order to ensure accurate apposition there is a tendency to strip the nerve ends from their bed for some distance above and below the lesion, and this may easily destroy their fine vascular connexions. It is also fatal to put too much trust in the power of the nerve to withstand stretching. A gap of 2 cm. will impose too much strain to allow of successful end-to-end suture, and Leriche would not attempt direct suture if the ends could only be brought together by traction. Grafting would be the ideal method to bridge the gap. The environment in which the damaged nerve lies has more to do with its chances of regeneration than is generally recognised. The best chance is for the nerve that lies snugly, free from scar tissue, in a vascular bed. This, in Leriche's opinion, explains the relatively frequent success of musculospiral repair better than the fact that it is less "mixed" than the ulnar and median nerves. Suture of the median nerve stands a better chance of success in the arm than in the forearm, where it lies among avascular tendons. For the same reason the ulnar nerve is badly placed for recovery at the elbow-joint. The displacement of a nerve to a position where it is buried in healthy muscle is therefore worth considering, and this is often done with the ulnar nerve, though in this case rather with the intention of relieving it from tension. The time required for a long stretch of nerve to regenerate is a factor against the recovery of its function. According to Harry Platt nerves sutured in the arm rarely reach functionally to the hand; while those sutured in the forearm have much more chance of reaching the fingers. Presumably by the time the dendrons reach the muscle-fibres at the extreme periphery these have undergone such irreparable change that no physiological connexion is possible. The damage to the fine innervation of joints may also be permanent, even when the nerves to the neighbouring muscles have recovered. Leriche quotes a case of Stopford's in which, though the median nerve had regenerated after suture, joint sensation was permanently lost, so that the patient could only move the fingers under direct visual control. Articular deformities developing in the denervated part may easily prevent full muscular recovery after nerve regeneration, and Leriche insists that orthopædic operations should not be left too late.

Despite the difficulties of nerve-grafting, this method will certainly be developed in the future. As Christophe and Laudron[5] point out, the problem is to find a graft easily permeable to nerve fibres. The preserved heterogenous graft, used in the method described by Nageotte, has not given good results: Leriche condemns it after trial. Better success has been obtained with the fresh graft obtained from an amputated human limb, though this method has its

1. Bach, F., Hill, N. G., Preston, T. W. and Thornton, C. E. *Ann. rheum. Dis.* 1939, **1**, 210.
2. Clarke, P. J. H. *Irish J. med. Sci.* March, 1940, p. 97.
3. See *Lancet*, April 13, 1940, p. 693.
4. Leriche, R. *Pr. méd.* April 3, 1940, p. 345.
5. *Ann. Soc. belge chir.* Séance June 25–26, 1939.

limitations. The difficulty is to find a graft of the right diameter, especially when a fresh graft from a dog is used. Gosset and Bertrand, quoted by Christophe, have reported success with grafts of rabbits' spinal cord. The graft is immediately fixed in formalin, washed in saline a few days before use, and then kept in alcohol till the time of the operation. However the graft is done, the aftercare of the denervated parts is of paramount importance if downgrowth of the nerve is to restore function.

ALKALIS IN PEPTIC ULCER VINDICATED

ALTHOUGH the use of alkalis in the treatment of gastric disorders dates back to long before the 17th century, treatment of peptic ulcer by neutralisation really began with the work of Cruvelhier in 1832. The beginning of the 20th century saw the use of alkalis widely established but the work of Sippy in the United States towards 1915 was probably responsible for the more thorough attempts that have since been made to secure continuous correction of acidity and the consequent improvement in medical treatment. The introduction of fractional gastric analysis has also facilitated the investigation of gastric cases as regards the acidity of the stomach contents after food and treatment, and the work of Rehfuss on the response of the normal stomach to varying foods was important in this respect. But it is somewhat surprising that the medical treatment of peptic ulcer has seldom been carried to its logical end. Few patients with peptic ulcer receive treatment by proper food and alkalis in such a manner that anything like complete neutralisation of the stomach contents throughout the twenty-four hours is secured. The very incomplete neutralisation effected by milk alone, or by milk combined with the popular alkalis has lately been demonstrated by Wyllie.[1] Observation of the actual acidity of the gastric contents at half-hourly intervals throughout the waking hours with various antacids established the outstanding value of magnesium trisilicate and aluminium hydroxide. A year ago Bennett and Gill[2] demonstrated the effective qualities of aluminium hydroxide gel, and their results are borne out by the observations of Wyllie. Whether magnesium trisilicate has advantages over aluminium hydroxide is not shown, but it seems to be established that these modern remedies are superior to many, if not all, of their rivals. It is important to note that Wyllie pays the same attention to food as he does to medicine. His work confirms that of others in demonstrating that six-ounce feeds of milk given every two hours with a drachm of aluminium hydroxide or magnesum trisilicate half an hour after each feed will produce complete control of free acidity in almost every case. With larger feeds and doses the intervals might be extended but even this is doubtful. This vindication of orthodox treatment is welcome from a school which had tended in recent years to revive the centuries old doubt as to its value.

VITAMIN B_1 FOR TIC DOULOUREUX

SINCE synthetic vitamin B_1 has been easily obtainable it has been used in the treatment of nearly every disease of the nervous system. Convincing results have been reported in certain forms of peripheral neuritis, but in other nervous diseases its value has been doubtful. There seems little doubt, however, that some patients suffering from spasmodic trigeminal neuralgia gain relief from the vitamin, and the experience of Borsook, Kremers and Wiggins[3] suggests that the results are best if large doses are given by injection for a long time. They advise giving 10 mg. of vitamin B_1 (thiamin chloride) daily by the intravenous or intramuscular route, and an injection of liver extract three times a week, making up a weekly total of 22·5 U.S.P. units. They prescribed a high vitamin and low carbohydrate diet with 30 c.cm. of an aqueous concentrate of rice polishings daily by the mouth, providing 1500 international units of vitamin B_1 as well as other components of the vitamin B complex. They report 58 cases which have been under observation and treatment for from six to fourteen months, and 37 of these were "markedly improved." But the authors say that the treatment may have to be continued for as long as six months before the maximum benefit is obtained. The pain of tic douloureux shows so many spontaneous remissions that it is difficult to assess the value of a new form of treatment, especially when it has to be continued for several months. This regime is both expensive and laborious, but it has so far been justified by results.

MAKING BABY BREATHE

A BABY may fail to breathe when it is born either because its respiratory centre is depressed or because the stimuli needed for respiration have been applied too soon or are insufficient. Depression of the respiratory centre is most likely to be due to sedative drugs given to the mother. Premature respiration will be encouraged by anything that raises the fœtal carbon-dioxide concentration or by appropriate sensory stimuli. If the anæsthetic given to the mother is too light she may have a laryngeal spasm or may vomit, so raising her carbon-dioxide concentration to a level which will call forth an inspiratory effort from the baby. Exposure of the baby's body in breech deliveries or cæsarean section may also give rise to premature respiratory movements. In such cases the baby will breathe in liquor which may induce laryngeal spasm and may so coat the alveoli that the respiratory surface is seriously interfered with. An insufficient stimulus will produce asphyxia if the mother hyperventilates, as she is likely to do when anæsthesia is too light, so that her carbon-dioxide concentration is low. It then takes an unduly long time for the carbon-dioxide in the baby to reach the threshold level for stimulation of the respiratory centre. By then oxygen lack may have desensitised the centre, widening still further the gap between stimulus and threshold. Nosworthy[4] says it is unwise to promise any patient a painless labour, since in order to keep one's word one may have to give enough sedative to depress the baby's respiratory centre. A middle course between too light and too deep anæsthesia must be steered. The essential measures once the baby is born are to keep the infant head downwards, and to suck out liquor and mucus thoroughly from the upper air-passages. A stimulant to the respiratory centre, such as lobeline gr. 1/20, may be a great help and is used by some as a routine, although prompt and efficient drainage should be sufficient in most cases. Carbon-dioxide administration can be dangerous, for it is accumulating naturally and a further dose may raise the concentration to toxic levels. This gas also tends to quicken rather than deepen breathing. An ample supply of oxygen, on the other hand, is essential both to maintain life and to prevent the threshold of the respiratory centre rising too high. It should be given

1. Wyllie, D. *Edinb. med. J.* May, 1940, 336.
2. Bennett, T. I. and Gill, A. M. *Lancet*, 1939, **1**, 500.
3. Borsook, H., Kremers, M. Y. and Wiggins, C. G. *J. Amer. med. Ass.* April 13, 1940, p. 1421.
4. Nosworthy, M. D., *St. Thomas's Hosp. Rep.* 1939, **4**, 164.

under pressure to inflate the alveoli, either by squeezing a breathing bag attached to a face-piece, or by intubation. The latter method is far more efficient, and is easily applied once the simple technique is mastered. The direct vision method of Blaikley and Gibberd[5] may be used, or a blind oral method advocated by Nosworthy, which requires less apparatus and in his opinion is unlikely to do any damage even in unskilled hands. The left forefinger is introduced into the baby's mouth until the tip rests on the arytenoid cartilages. A No. 12 or 14 French open-ended gum-elastic catheter is then passed into the mouth with the free hand, its tip being deflected forwards into the glottis by the left forefinger, and through this the operator can suck mucus out of the trachea. The catheter is then withdrawn, the mucus blown out, and after a second intubation the lungs are inflated by connecting a bag to the catheter. Normal inflation of the lungs is brought about in the first few hours after birth by crying. In weakly infants who do not cry normally a vicious circle of oxygen want and carbon-dioxide retention may be set up, and Nosworthy feels that early intubation and pulmonary inflation may then save life.

IMMUNISATION AGAINST RICKETTSIAL DISEASES

WITH the possible exception of heart water, which according to Neitz[6] can be successfully treated in sheep by injections of Uleron, rickettsial infections resemble the virus diseases, other than lymphogranuloma inguinale and probably trachoma, in being entirely unaffected by chemotherapeutic drugs. It is therefore not surprising that much thought has been directed to the discovery of methods of immunising against rickettsial infections, more especially against exanthematic typhus in the Old World and Rocky Mountain spotted fever in the New. In opening a discussion on immunisation against rickettsias at the Royal Society of Tropical Medicine on May 16, Dr. F. Murgatroyd pointed out that two methods were now in use involving the injection of rickettsiæ either living, perhaps attenuated, or killed. For immunisation against exanthematic typhus living murine typhus rickettsiæ have been extensively used in North Africa, either coated with egg yolk and mixed with sodium phosphate as in Tunis (Laigret and Durand[7]), or treated with bile immediately before injection as in Morocco (Blanc and Baltazard[8]). As their source of rickettsiæ the latter workers first used fresh guineapig tissues, but more recently they have found that murine typhus rickettsiæ remain active for a considerable time when present in the dried fæces of rat fleas. The flea fæces are treated with bile immediately before injection. Dr. G. M. Findlay, who had recently visited Tunis, said that some three million natives in Morocco and Tunis have been treated with living murine typhus rickettsiæ by one or other of these procedures. Few reactions, it is claimed, have been recorded in natives, but when living murine typhus rickettsiæ are injected into Europeans about 30 per cent. of them show febrile reactions, some of them severe. In addition, Blanc's vaccine, when employed in Chile, gave somewhat unsatisfactory results, for of 800 people vaccinated 23 per cent. developed grave typhus and 5 died. While people who have suffered from murine typhus are solidly immune to exanthematic typhus, almost certainly for life, the exact value of living murine typhus rickettsiæ in bringing epidemics of exanthematic typhus to an end is still uncertain, since critical experiments with adequate controls have not yet been carried out. In the present circumstances living murine typhus rickettsiæ can hardly be used for immunising Europeans. Unfortunately killed murine typhus rickettsiæ produce little immunity in man against living exanthematic typhus rickettsiæ, but dead exanthematic typhus rickettsiæ, if injected in sufficient quantities, do produce immune bodies against living exanthematic rickettsiæ. The problem, therefore, has been to obtain enormous numbers of exanthematic typhus rickettsiæ. The first successful effort was made by Weigl[9] who injected lice with suspensions of *Rickettsia prowazeki* per rectum. After five or six days the intestines of the lice, then teeming with rickettsiæ, were removed, ground up, and treated with 0·5 per cent. phenol. Since nearly two hundred lice are required for the immunisation of a single human being, this method cannot well be applied on a large scale. Within the last year, however, certain other techniques have been developed in order to obtain sufficient numbers of rickettsiæ. Zinsser, FitzPatrick and Wei,[10] for instance, grew the organisms on agar slopes covered with a layer of mouse or chick embryonic tissue. Monkeys and guineapigs were successfully immunised with the rickettsiæ thus obtained after treatment with 0·2 per cent. formol in saline, and more recently Zia, Pang and Liu[11] in China have utilised such vaccines for human immunisation. A further development which is capable of exploitation on a large scale has been made by Durand and Giroud.[12] When exanthematic typhus rickettsiæa are injected intranasally into half-grown mice they set up an intense pneumonia, which after a few intranasal passages proves fatal within forty-eight hours. To obtain the greatest number of rickettsiæ the mice should be killed when their temperature falls to 30°–32° C. By differential centrifugation an almost pure suspension of rickettsiæ may be obtained which after treating with 0·2 per cent. formalin can be used as a vaccine. A number of people have now been immunised by this method both in France and in this country. Immunity is shown by the development of a positive Weil-Felix reaction, and by the presence of specific immune bodies against rickettsia. It is too early to say how long this immunity lasts, but it certainly seems to last longer than six months. If other rickettsial infections should appear in Western Europe it is possible that satisfactory vaccines could be produced by one or other of these methods.

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BLOOD-TRANSFUSION IN NEW ZEALAND.—In 1937 a National Blood Transfusion Council was set up in New Zealand to organise a blood-transfusion service on a voluntary basis throughout the dominion. Since its formation 13 new branches have been established and over a thousand donors have been enrolled. In February the council issued its first bulletin which contains an account of a system of storage of blood which has been successfully undertaken by the North Canterbury branch. The hon. secretary of the association may be addressed at P.O. Box 25, Te Aro, Wellington, C.2.

PREVENTION AND TREATMENT OF WOUND INFECTION

VI

SURGERY OF INFECTED WOUNDS

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(*Continued from p. 937*)

TREATMENT OF WOUNDS UNSUITABLE FOR SUTURE

In a number of accidental wounds, and in the majority of war wounds, immediate closure cannot safely be attempted even after a débridement as thorough as the circumstances will allow. Operation may have been too late, it may have been incomplete, or the general condition of the patient may have been unsatisfactory. The alternative methods then to be considered are packing and immobilisation with the possibility of secondary suture if the progress is satisfactory, and partial closure over Carrel tubes.

The open treatment relies on the experience that a wound which has been carefully excised, but may still contain some organisms and devitalised tissue, can be relied on to escape any serious infection, and may often be brought into a safe condition for secondary closure if it is immobilised and left widely open. The treatment is essentially the same as that for a frankly infected wound except that in more recent cases a germicide is usually included in the dressing in the hope that infection may be averted or overcome. After débridement and careful hæmostasis the wound is packed evenly and firmly with strips of gauze, particularly in all pockets, recesses, and opened planes. The gauze may be soaked in 1/1000 proflavine solution, which is harmless to the tissues, or sulphanilamide powder may be spread over the wound surface before the gauze is packed in, from 5 to 15 grammes being used according to the size of the wound. Both these substances are powerful antiseptics, particularly against streptococci, and sulphanilamide has the additional advantage that it is absorbed and acts through the blood-stream up to 60 hours afterwards. Over the gauze pack an abundant dressing is applied, and the limb is then bandaged over the whole segment to apply firm pressure, and immobilised in a splint or plaster case.

At each visit to the wound the surgeon considers the patient's condition, his chart, the appearance and smell of the outer dressings, and the circulation of the limb beyond them. If all signs indicate that there is no infection, the patient is anæsthetised again after 48 to 72 hours and the packing gently removed. In a case suitable for closure the exposed tissues have a pale and slightly pickled appearance, but there is no sign of pus anywhere. The wound may then be closed, provided that the patient can be kept for at least another week, and that the stress of work allows him to be under constant observation. Deep catgut sutures should be avoided as far as possible and their place taken by mattress or X sutures of silkworm gut approximating the muscles as well as the skin. If the wound is at all deep one or more rubber strips should be laid in its main recesses and brought out between the stitches; they should be removed as soon as the appearance of the wound and the pulse-chart justifies it. If sterility is in doubt the wound should be treated as infected.

INFECTED WOUNDS

A different problem is presented by a wound that is infected either because it is seen too late for decontamination or because decontamination has failed. In such a wound the bacteria have already gained entry to the tissues, and the local and general mechanisms of inflammation have already been put in train. We can still get such a wound to heal, but it must be healing by second intention, and our aim is the simple one of hindering the bacteria and aiding the tissues in the task they have already undertaken.

We can kill bacteria by antiseptics, but it is unlikely that we can damage those in the living wall of the wound by any means that will not hurt the defence mechanism to an equal extent. We can successfully attack those that are free in the cavity and discharges from the wound, thereby depleting reserves and preventing the formation and absorption of toxins; but chemical destruction of these free bacteria has no manifest advantage over mechanical removal of them and the proteins on which they thrive, that is, over free drainage. This same free drainage will also aid the defence mechanism, by evacuating dead leucocytes and spent lymph, and allowing fresh supplies of both to arrive. At the same time, by resting the injured part, the reacting tissues are given their best chance to institute defence and repair damage.

The simple physiological principles of rest and free drainage are thus the basis of the treatment of infected wounds. Operation is necessary in all but the most superficial, but its scope is limited to the removal of dirt and obviously dead tissues, and to exposure of the deeper parts of the track. In the group are all degrees of infection from wounds that are only just too late for excision and suture to those that are suppurating or even gangrenous. The first may be treated by classical débridement, but are left open afterwards. Suppurating wounds must also be cleaned up, but transgression of the early defence zone must be avoided, and the knife therefore plays a small part. The track of the projectile must be laid widely open, as far as possible by separating fascial planes rather than cutting fresh structures. Fragments of projectile and clothing, dirt, blood-clot, loose bits of bone and unhealthy muscle are cleaned out, using the fingers and gauze swabs as far as possible, with occasional help from scissors, but there should be no attempt at cutting back to healthy bleeding tissues. The wound is converted as near to a simple cavity lined with viable tissues as its circumstances will allow.

Drainage may be by rubber tubes, gauze packing, or a combination of the two. Rubber tubes drain their track only, and may erode structures with which they are in contact. They are therefore of little use as the sole method of draining an infected war wound, and have their chief sphere in giving egress through gauze packing, to the discharge from some deep structure such as a damaged kidney or joint. Safe and effective drainage of an excised wound can be assured more simply by packing it widely open with gauze. The essentials are that the wound shall have been rendered of simple shape and as free of foreign matter and dead tissue as possible, that the gauze be packed into every recess and cleft, leaving no pocket in which discharges can accumulate and decompose, and that the wound be left undisturbed for several days or even weeks. Undisturbed packing means that the immobilisation of the part is not interfered with and that the wound surface is not traumatised by changed dressings, but it is possible only while there is no pus dammed behind it.

In comparison to the preparation of the wound beforehand, and the care with which the pack is inserted, its exact nature is relatively unimportant. Plain gauze, flavine gauze, gauze soaked in saturated sodium sulphate or hypertonic saline or mixed with crushed salt tablets, and gauze impregnated with Vaseline have all been recommended. Plain dry gauze is said to act as a capillary drain, but it will cease to do so after a few hours. Flavine gauze can destroy a number of bacteria in the tissues with which it is in contact, and forms an excellent packing in the type of wound so lightly infected that delayed primary suture is hoped for; in heavier infections it ceases to be an antiseptic, and, like plain gauze, becomes soaked with discharge. Hypertonic packs, while making no claim to antiseptic action, are able to promote an outward flow of tissue fluids and where crushed salt is used this flow is evident for a week;

salt packing has therefore special advantages as the first dressing in a wound already heavily infected. All three dressings are eventually saturated with pus and become bacterial hives. Vaseline gauze has no capillary, antiseptic, or osmotic action, but it adapts itself to any shape, keeps the wound surfaces apart, and allows the discharges to escape past it to the outer dressings; it does not stick to granulations but is slowly extruded as the wound heals. The surgeon who has once made vaseline his friend comes to admire its almost human power to do what is wanted, and its more than human willingness to get out when its job is over.

Once an infected wound has been cleansed, laid open and packed it should be disturbed as little as possible, and should be exposed only if there is doubt as to its progress or when the dressings become offensive. An abundant covering of sterile gauze and wool is therefore put over the packing and the whole part is immobilised. The exact mechanism of immobilisation is less important than its efficacy. In the last war the French used plaster-of-paris extensively, while the British relied on splints, chiefly the Thomas. Now that we are familiar with the experiences of the Spanish war and have used plaster-of-paris in the treatment of osteomyelitis for some time it is likely that we will use it also to immobilise war wounds. The advantages of the method are many. The use of plaster for immobilising all wounds greatly simplifies the question of medical supplies. A plaster case gives absolute and unchangeable immobility, allows the patient to be sent in comfort and safety for any distance, and discourages meddlesome interference with his dressings by those who handle him in transit. The disadvantages must, however, not be glossed over. The dreadful smell of an undressed wound, which is not peculiar to this method but is the outward and odorous sign of physiological wound treatment, is worse and appears earlier with a plaster case because the discharges do not dry but are cultivated at body heat. A fracture accompanying a wound is immobilised by plaster but not controlled as adequately as by an extension splint, and shortening or other deformity is likely. Where there is no fracture a plaster case does not immobilise a limb any better than well-applied Cramer's splinting, and it takes much longer to apply. The value and application of traction splints of the Thomas type, and of pliable gutter splints such as Cramer's wire ladders, is well known, and it will be surprising if they do not hold their own in this war. Doubt arises about the Thomas arm splint, so called, for it was a war device, and did not arise in Liverpool but acquired a spurious orthodoxy from its assumed name; this splint, in the opinion of many, holds the arm in an uncomfortable and un-functional position, cannot extend efficiently without at the same time compressing the axilla, is much in the way during transport, and immobilises the upper limb less completely than bandaging to the chest.

THE CARREL METHOD

The method of intermittent irrigation devised by Carrel has several advantages over packing: that adequate drainage of the whole wound can be combined with partial closure, so that healing occurs quicker and with less scar tissue; that secondary suture is often possible; and that, with equal comfort, the smell of the packed wound is avoided. Its drawback is that it demands constant attention and supervision, lacking which it may do harm. The method aims at bringing an antiseptic solution into contact with every part of the wound, and renewing it as soon as it ceases to be active. This object is attained by the use of the familiar Carrel tubes, lengths of soft rubber tubing ¼ in. in diameter, closed distally by a silk ligature, and perforated above this by pairs of ½-mm. holes at half-inch intervals, each pair at right angles to the previous pair. After thorough débridement a group of these tubes is laid in the wound, whose edges are then loosely approximated by a few sutures. The number and length of the tubes and the distance to which they are perforated will be governed by the need to irrigate all surfaces and recesses of the wound, and to bring the tube out through the dressings. When two or three tubes only are put in their outer ends may be left under the dressings, covered with a sterile swab but accessible for irrigation with a syringe.

When there are more than three tubes they should be connected by a glass manifold to a wide connecting tube, which in turn leads to an ampoule containing the antiseptic, and is controlled with a spring clip. The essentials of the Carrel method are a pressure of 1½ to 2 metres of fluid, large conducting tubes, very small outlet tubes, and intermittent irrigation. Under such conditions an equal amount of fluid leaves every hole in the tube system at each irrigation, and all parts of the wound are bathed and cleansed alike, but if the apparatus is joined to a continuous drip—a mistake seen too often—there is a steady trickle at low pressure that will flow along the easiest channels only, and will avoid all holes that are blocked with lymph, and all tubes leading to the deeper parts of the wound. After considerable research, Carrel selected a hypochlorite solution as the antiseptic which appeared to combine the maximum bactericidal efficiency in the presence of body fluids with the minimum damage to living tissues, and advised two-hourly irrigations because the Carrel-Dakin solution ceased to be active after this time.

With intermittent irrigation frequent change of dressings is neither necessary nor desirable. A generous covering of loosely fluffed gauze covered by abundant wool is put over the wound, and the whole limb is immobilised in some form of splint. With the recommended rate of ½ oz. of solution to every tube the amount of antiseptic and wound discharge that soaks into the dressings after each two-hourly irrigation dries up before the next and the outer wool does not become uncomfortably soaked or smelly; but a plaster cast interferes with evaporation and is apt to become sodden, so that some form of traction apparatus or Cramer's wire splinting is preferable. Irrigation is continued two-hourly day and night, and the dressing is changed only when it is uncomfortable. The tubes are left in their original positions, and are finally removed when all signs—the temperature, pulse and general well-being of the patient—indicate that infection has been overcome, and then usually after a trial period during which irrigation has been stopped.

Carrel tubes, since they are placed in every recess and wash out the discharges, satisfy very adequately the needs of wide and unrestricted drainage. Faith in the possibility of disinfecting a wound once infected, and in the value of antiseptics generally, has diminished considerably since 1918, so that few today would claim more for the Carrel technique than that it does most effectively scavenge every recess of a deep and complicated wound without disturbance to the part or the patient, or for the hypochlorite solution that it performs this service better than any bland antiseptic, or than normal or hypertonic saline. But the method combines much of the comfort and refinement of a closed wound with the safety of an open one. While it is possibly too elaborate and exacting for the treatment of war injuries, it has a definite place in normal hospital practice, where the proportion of nurses to patients is adequate and evacuation is not a pressing need. It is particularly valuable in the shearing type of injury so common in road and industrial accidents, where large areas of skin are stripped off the underlying muscles. These flaps are usually bruised and soiled with earth or machine oil, and hang by pedicles of doubtful adequacy. They cannot be cleansed with a completeness that approaches débridement, nor can they be excised or packed aside without the risk of shock and toxic absorption at the time and intractable deformity later, but they can be loosely approximated over Carrel tubes without grave risk. The method is also one of the best for treating civil compound fractures, since it involves little disturbance of the fixation apparatus, and gives earlier healing and less scar tissue than packing.

GAS GANGRENE

Gas gangrene stands apart from wound infection in general in that its cause is a particular opportunity rather than a particular organism. The causative bacteria, *Clostridium welchii* type A, *Cl. septique*, and *Cl. œdematiens* are comparatively harmless in healthy tissues, and in joints, serous membranes or subcutaneous fat cause infections that remain localised and are not particularly serious. When, however, they establish themselves in devitalised muscle, particularly in a patient whose circulation is depressed from shock or hæmorrhage, they cause a fulminating gangrene that may involve the whole limb in a few hours, and rapidly kills the patient. Gas gangrene is a clinical entity but not a specific disease, since three organisms, alone or in combination, may be responsible (see article III in this series, THE LANCET, April 20, p. 750). It is liable to appear whenever three factors coincide: first, the presence of causative anaerobes in the soil or the clothing of the injured man; second, the implantation of the organisms in a mass of muscle deprived of its blood-supply; and third, a sufficient interval between wounding and surgical treatment for the organisms to multiply, produce their toxins, and destroy further muscle by pressure. The disease has been rare in civil injuries and wars before 1914, because the devitalisation of tissues was nothing like as great as that caused by the modern high-speed projectile. It was uncommon in certain campaigns in the last war because the soil was uncultivated and free from causative organisms. It seemed to have been overcome in 1917 because the majority of the wounded were brought within a few hours to casualty clearing stations, and their wounds were excised before gangrene had appeared, but it returned in overwhelming numbers during the fighting of March, 1918, when men were often lying out for hours before they were collected, and when the exigencies of transport prevented many of them reaching a surgical unit for four or five days.

The onset of gas gangrene is unmistakable to the surgeon who has seen it before. The wounded man looks anxious, and his face is pale with a peculiar earthy pallor. Around him is a graveyard smell that is entirely characteristic; it is the smell of a corpse, and quite different from the sickly sweet stench of a stale and decomposing dressing. His skin is cold and moist, his respiration shallow, his pulse rapid and thready, his whole condition one of shock. The onset of gas gangrene in a patient already under observation is immediately suggested by a rising pulse and a complaint of pain and tightness in a dressing that was previously comfortable.

When a gas-infected limb is examined it is obviously swollen. The skin is tense and shiny, and soon acquires a mottled bronze discoloration. The swelling and discoloration may first be local, but they soon involve a whole limb segment and the parts below it. When the part is handled the crackling of gas in subcutaneous and intermuscular planes is obvious. A tympanitic note is heard on percussion, and still more characteristic is a musical hum when the skin is shaved or scratched with the finger nail. X rays will disclose gas in the tissue planes, but the method is not particularly helpful, since the discovery of gas and the diagnosis of gas gangrene are two different things. Two clinical types may be distinguished—that in which a single muscle group is affected and that in which a whole limb is involved; the distinction has no pathological significance, but it is of practical importance, since the first can be treated by myomectomy, while the second demands amputation.

The treatment is above all prophylactic. In wounds that are completely excised within the first four hours gas gangrene does not occur, and in those that are treated surgically before it is manifest it is seen only in its milder forms. When it appears in a clinically recognisable form immediate operation is necessary. Chemotherapy and specific sera should always be employed, but they do not replace surgery, since while there is gangrenous muscle there are bacteria out of reach of drugs carried in the blood-stream and manufacturing toxins in quantities liable to overwhelm the antitoxins administered. The surgical treatment of gas gangrene therefore consists of the removal of gangrenous masses, by resection of muscle groups in the limited type, by amputation if the whole limb is involved. Because tension rises rapidly in its sheath, a muscle once involved is soon killed throughout its length. The excision of muscle groups therefore means a dissection extending to the joint above, and, in removal of the limb, operations such as disarticulation of the knee which are unsound from the point of view of subsequent function are often the best for dealing with the immediate problem.

The antisera available today are far more effective than those employed at the end of the last war. Since the exact infection is in most cases unknown the polyvalent serum will be used till the organism has been isolated. There is experimental and clinical evidence that chemotherapy is also of service in gas gangrene, but not to the same extent as in coccal infections. Sulphanilamide and sulphapyridine both control experimental infections with *Cl. welchii*, sulphapyridine is more effective with *Cl. septique*, and neither has any appreciable action on *Cl. œdematiens*. The action of serum and drug is complementary, the one neutralising the toxins, the other attacking the bacteria, and they are more likely to succeed combined than singly. It is particularly important that serum should be given to those cases likely to develop gas gangrene—that is, men with lacreated wounds involving muscle who are unlikely to undergo débridement within the safe period. For declared gangrene and after operation the serum must be given in therapeutic doses. For further discussion on specific and chemotherapy in gas gangrene the reader is referred to article III, p. 750, and article V, p. 890.

SECONDARY INFECTIONS

The disinfection and mechanical cleansing of soiled wounds takes first place in war surgery, but the problem of avoiding fresh infection in a wound already made clean must not be overlooked. The risk of secondary infection can hardly be exaggerated, for whereas deaths in the army zone are due to shock, hæmorrhage and gangrene most of those at the base are due to streptococcal infection. The dangerous primary infections of war are the anaerobic spore bearers; pathogenic streptococci are not usually found in soil or clothing, and are not therefore often introduced by the missile unless it traverses the upper respiratory tract. The anaerobes can be countered, that of tetanus by specific therapy, those of gas gangrene by timely excision, but the hæmolytic streptococcus group A can establish itself even in minimal quantities and in healthy tissues. That streptococcal infection is usually secondary is suggested by the investigations of Stokes and Tytler (1918–19) who found that on admission to a C.C.S. twelve hours after wounding 12–15 per cent. of the wounded had streptococcal infections, and of Fleming and Porteous (1919) who showed that on arrival at the base the proportion was 20 per cent., and after a week at the base it had risen to 90 per cent. These infections are responsible not only for most of the late deaths but for a high incidence of septicæmia, pulmonary complications and joint infections, and therefore for much prolonged invalidism and ultimate permanent loss of function. Apart from the small number that originate in the throat of the wounded man himself the streptococci are introduced by those who care for him in transit and in hospital, from droplet infection, from unsterile instruments or dressings, or from the air while the wound is uncovered.

One safeguard which the wounded will enjoy in this war that they missed in the last is the profound scepticism of all concerned in the value of any dressing other than the first. A socratic inquiry pushed to its logical conclusion in any surgical mess would probably elicit the opinion that if a wound is excised early and well, dressed properly, immobilised properly and left

long enough in spite of the smell it will eventually heal under the first dressing. Streptococci cannot get into a sealed dressing, and after a week they can only get superficial hold in a wound whose granulation barriers are up. Much good can therefore be done by instructions that dressings are to be changed only at certain places, unless there is some indication in the general condition of the patient that all is not well.

When dressings must be changed simple precautions should avoid the worst dangers. Suitable masks, which have abolished droplet infection at operation, should be worn by all who dress the wounded. They need not be sterile and they need not be air-proof or uncomfortable, but they must be droplet-proof and big enough to exclude all spray. Hands that touch a series of infected dressings cannot be made sterile by any known means; gloves, which should be smooth and for economy may be of the thick kitchen variety, must always be worn. These gloves can be put on dry and sterilised on the hands between dressings by washing them with soap and hot water and then dipping them for one minute in 2 per cent. lysol. Dressings and instruments are probably sterile at the start of a day's round, but it must be remembered that streptococci abound in the air and dust of a ward where infected cases lie, and can easily gain access to the dressing tray. The tongs kept in a jar of lysol for taking instruments in and out of bowls, and the pair of dissecting forceps standing in spirit and used on several dressings before they are re-boiled are obvious sources of contamination. It may be wise to segregate cases of streptococcal infection, and it is certainly advisable, in all but the most advanced units, that patients should be wheeled for dressings to a side room where much of the technique of the operating theatre can be practised, but the cases that really do need dressing on any one day should never be many.

THE PART OF CHEMOTHERAPY

Upon the success of such simple measures to eliminate streptococcal infections will depend to some extent the part that sulphanilamide comes to play in the treatment of wound infections. That this and allied drugs have the power to combat an established infection, and a still more remarkable power if administered shortly before the entry of infection to prevent its establishment, may be taken for granted.

The aim of prophylaxis, as set out by Fuller and James (1940) is to obtain a blood concentration of 2 mg. sulphanilamide per 100 c.cm., and to maintain it at this level during the danger period, in practice for four days. To ensure this concentration a first dose of 1·5 g. of sulphanilamide (3 crushed tablets) is given in 100 c.cm. of hot 1 per cent. citric-acid solution, to ensure rapid absorption. A single tablet (0·5 g.) is give whole two hours later, and after that one tablet four-hourly to the end of the fourth day. After twenty-four hours 2 tablets may be given eight-hourly if this is more convenient. Thus 13·5 g. in all is administered in the four days.

There is abundant evidence that chemoprophylaxis is more certain and requires smaller doses than chemotherapy. On these grounds the case for administration of sulphanilamide to every wounded man appears convincing. The fear that the drug might aggravate to a dangerous degree the collapse of a patient already shocked seems to be belied by the experience of American surgeons in the treatment of severe automobile accidents. The only practical objection to the routine use of sulphanilamide is the doubt whether primary streptococcal infections are sufficiently common to justify a course that may add to the difficulties of administration in the forward areas and to the cost of the medical services.

The place of chemotherapy in the treatment of established streptococcal infections is too well recognised to need elaboration. The slightest suggestion in the way of increased pain, temperature or pulse that anything is amiss with a wound that has been excised will be the indication for the immediate culture, and the administration of three 1 g. doses of sulphanilamide in citric acid at hourly intervals pending a bacteriological report.

The use of sulphanilamide as a local application in wounds after débridement is on trial, but it can be said already that the practice has no obvious disadvantages and much to recommend it. The drug is placed where it will have the greatest action on any bacteria that have escaped mechanical removal, it appears to do no harm to the wound surfaces or to phagocytes in the neighbourhood, and it is absorbed and continues to act through the circulation. The view expressed by Buttle in article V of this series that not more than 15 g. should be used in the dressing to avoid the risk of toxic symptoms from absorption, and that in the presence of clinical infection oral administration should be started after forty-eight hours, by which time the drug absorbed from the wound has been largely eliminated, should be borne in mind.

Sulphanilamide is recommended as a local application in recent wounds only. It has been suggested that a cylinder of the drug should be inserted on the field at the time of the first dressing and this may prove an effective and the simplest form of prophylaxis. In hospital its value is as a coating on a surface that has just been cleansed by surgical excision; it can do little good in the presence of gross contamination and much damaged tissue, and in established infection it is less effective locally than when given by mouth. The safety of an open wound and the danger of a closed one are so well known, that it may be wise, till further experience has been obtained, to pack wounds over the sulphanilamide unless they belong to the small group that would in any case be considered suitable for primary suture. If, however, the first trials indicate that infection is overcome in the majority of wounds so treated, trial will be made of primary closure over the sulphanilamide, first with deep simple wounds, then with through and through tracks, and finally with gunshot fractures. The gain would be on the one hand a more effective action of the drug and on the other a saving of time and a better functional result. It will almost certainly be advisable to pass from local to oral medication after the second day, and to continue till all signs indicate that clean healing has, in fact, been obtained.

(To be concluded)

The Lancet 100 Years Ago

May 23, 1840, *p.* 319.

From a letter to the editor.

Terrible as the death of Lord William Russell has been, by the hand of the ruthless assassin, that amiable nobleman narrowly escaped a much more painful and scarcely less horrible termination of his life, during his last visit to the Continent. His lordship, who had been long afflicted with a great defect in his hearing, happened to be at Paris when the new method occasionally adopted for the removal of that infirmity by the introduction of an instrument through the nostrils, and forcing it into the passage leading to the ear, was the topic of general conversation. Being very desirous, if possible, to be released from his distressing deafness, his Lordship applied to a resident eminent surgeon, conversant with that mode of treatment, who declared the case to be fitted for, and strongly recommended, the novel practice, which he assured his noble patient was an easy and efficient remedy for instances of a similar description. Lord William informed the writer that, prevailed upon at length to submit to the operation, had he been aware of its severity, he would sooner have perished than endured the agony it inflicted,—that the sufferings consequent on its performance lasted, with great intensity, for several days, during which he was in momentary danger and expectation of suffocation, and, what was worse, after all, not the slightest benefit was afforded to the disease, for the promised relief of which the operation had been undertaken.

SPECIAL ARTICLES

ANXIETY AND THE HEART

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ACCORDING to the Oxford Dictionary, anxiety has acquired a special meaning as a medical term—namely, "a condition of agitation and depression with a sensation of tightness and distress in the precordial region." The singling out of a colloquial word as a medical term is the more remarkable because there is a choice of other words describing psychological states with a similar emotional background—e.g., apprehension, alarm, anguish, fear, fright, dread, agony, terror and panic. These words differ one from another in meaning partly in the degree of the affect described, partly in the time-relation between the affect and its cause (the danger), and partly in the type of motor reaction combined with the affect. Anxiety differs from all other members of the group in not implying any particular degree of affect. "It varies greatly from, on the one extreme, a slight abashment, awkwardness, embarrassment or confusion, to, on the other, a degree of indescribable dread that may even rob the sufferer of consciousness" (E. Jones). Anxiety has no relation to any definite danger, object or event, and has therefore been defined as "fear without object." Consequently anxiety is not accompanied by characteristic protective movements, such as running away in fear or panic and cataplexy in terror.

Anxiety is further distinguished from the last-mentioned states by the sensory element which is an integral feature of it. These sensations, which lend themselves so easily to description in terms of symptoms, have certainly helped the word "anxiety" to its favoured position in psychological medicine. The "Dictionary of Psychological Medicine," by Hack Tuke (1892), already gives the definition quoted above; but in Walsh's "Psychotherapy" (1912) the word "anxiety" is not used and the appropriate facts are set out under "Dreads." Walsh thus avoids the confusion which is so easily produced by the broader colloquial meaning of the word "anxious"—i.e., "troubled in mind about some uncertain event, or being in disturbing suspense" (Oxford Dictionary). Anxiety in this sense is related to an indefinite object and contains very little, if anything, of the characteristic emotional background which ranges the medical term with fear and similar affects. Everybody who knows the confusion in terminology of our subject will agree that a discussion on the definition of anxiety is necessary for a proper description of the facts.

SENSATIONS EXPERIENCED IN ANXIETY

Observation shows that, in anxiety, besides the precordial oppression, which is perhaps the most important sensation, other sensations arise, such as dimming of vision, shortness of breath, weakness of the knees, giddiness, tension in the head and pressure in the abdomen. Any one of these may dominate the symptoms in any particular case and may even overshadow the precordial sensations. The sensations can be understood by considering the ordinary physical accompaniments of anxiety. These are, besides increase of heart beat and rise of blood-pressure, frequent and deepened respiration, pallor, sweating, cessation of salivation, increased peristalsis, desire to micturate, and tremor or loss of tone in the voluntary muscles. The principal humoral changes are mobilisation of sugar from the reserves of the liver and the secretion of adrenine from the suprarenal medulla. Cannon has summed up all the factors of this complex reaction as preparatory "for running away in order to escape from danger." From clinical observations it seems proper to apply to human anxiety this teleological interpretation originally intended to explain the accompaniments of fear in animals. Cannon has also shown that the physical accompaniments of anger are very like those of fear, a fact not unimportant in the diagnosis of an attack of anxiety from physical signs only or from their description by the patient. Blending of anxiety with anger and rapid alternation between fear and rage may take place in normal persons but are especially common in neurotics. Blending is facilitated by the identical set of accompaniments.

The whole of the anxiety reaction is integrated by the vegetative-endocrine system, and it can be set going by any of its components, mental or physical. Recollection of a past terrifying experience may release it from the mental side; it may, on the other hand, be produced by an attack of paroxysmal tachycardia. Respiratory embarrassment in an attack of asthma, vestibular stimulation in a descending lift, and sudden vasoconstriction with consequent rise of blood-pressure after administration of adrenaline or of cocaine are further examples; a sudden fall of blood-pressure in fainting can have the same effect.

As regards the subjective sensory experiences characterising anxiety, there is no doubt that, from the medical point of view, the precordial sensations are by far the most important. L. Braun, from his observations in patients with angina, even holds the opinion that anxiety is a specific sensation of a special organ, the heart. However, the subjective experience of cardiac disease cannot be understood in the light of these sensations alone; they must be viewed against the background of popular ideas about the significance of the heart in human life. Although such ideas belong to common knowledge, it seems worth while to review them briefly.

SYMBOLIC VALUE OF THE HEART

The heart is regarded as the most vital part of the body; the end of its beating means the end of life. Its rhythm, propagated by the blood-stream, can be felt everywhere in the body. The blood is the carrier of life; loss of blood means menace to life. Although many organs and functions of the organism have their own rhythm, one is always inclined to relate all vital rhythm to the pulse-rate. In many languages heart is synonymous with soul, vital centres and the seat of the emotions and affection. History shows that this significance of the heart is not derived from the modern knowledge of its functions. Already for the ancients the heart was the seat of the soul and of the predominant emotions. Similar views have been held by many races in all ages. This concordance of opinion points to a common origin, which we are inclined to trace to the sensations common to all, connected with emotions. The normal heart beat at rest is imperceptible. Every variation in the psychological field—e.g., concentration, effort and intellectual activity—is accompanied by changes in the heart-rate, but these are most pronounced and most noticeable when associated with emotions. They tend to become conscious sensations in all emotions which do not lead to immediate activity. These normal sensations are localised in the cardiac region and not referred to another part of the body. Whenever the heart beat enters consciousness, it either confirms the awareness of life or signals danger and produces anxiety. Subjective sensations and their popular elaboration, however, cannot in themselves fully explain the popular significance of the heart. There must be some common urge to centralise or to symbolise the life of the individual in one organ. Diaphragm, solar plexus and pineal body have served their turn, and mental inertia keeps such beliefs going,

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even if their scientific or philosophical basis has gone out of fashion.

SYMPTOMS IN HEART-DISEASE

Another contribution to the idea of the vital importance of the organ comes from the subjective experience in heart-disease. It is generally agreed that sensations are of little use as a diagnostic guide in organic heart-disease. Textbooks emphasise that in cardiac illness symptoms may or may not be present. Variable as the local sensations may be, if they reach a certain intensity they tend to produce feelings of impending death. Coarse disturbances of rhythm are in many cases not perceived at all, whereas in other patients unpleasant sensations may be present without much pathological significance. Fahrenkamp showed statistically an inverse correlation between subjective complaints, especially palpitations and objective findings in the heart. However, it would be a mistake to assume that organic heart-disease prevents the patient from developing neurotic symptoms related to the same organ—a rule which holds true for many other organs of the body.

The starting-point of every psychological approach to "heart neurosis" ("functional debility of the heart," "disordered action of the heart") must be the patient's perception and self-observation of the cardiac region and action. There are several ways in which this may become the centre of a neurosis :—

(1) The simplest way is by a sudden emotional shock—e.g., anxiety during a traffic accident—in which the stronger action of the heart is perceived and becomes the predominant complaint. Normally it disappears with the emotion after a short time, but in special circumstances, such as compensation wishes, unemployment, and other critical situations, it may become a fixed pattern of behaviour comparable to a conditional reflex, ready to reappear under any emotional demand—e.g., a medical examination. Unusual physical exertion or exertion under emotional strain may be a cause. Sexual excitement, for instance, has a pattern of physical accompaniments very like that of anxiety; hence, if a neurosis-producing psychological conflict is associated with the sexual act, the clinical picture is easily converted into that of cardiac neurosis.

(2) In chronic emotional stress—e.g., business difficulties, marriage conflict and overbearing responsibilities—cardiac action can adapt itself to a large extent. The moment, however, that the patient thinks his situation unbearable, or even if he only becomes afraid of this eventuality, anxiety sets in, bringing the newly strengthened cardiac action above the threshold of consciousness. If the person takes refuge in illness as a way out of his difficulties, the attention once drawn to the cardiac sensations remains fixed and a "heart neurosis" ensues.

(3) A similar development may take place where there is already an abnormal psychological state, neurotic or psychotic—e.g., a depression or an obsessional illness—producing high emotional fluctuations with corresponding strain on the heart. For some reason or other, attention may be directed to the heart and the clinical picture be modified by cardiac symptoms, which often first lead the patient to consult a doctor.

(4) There are two types of abnormal personality especially inclined to "heart neurosis": (*a*) sensitive persons ("psychathenics") liable to emotional upsets which render them limp and devoid of all energy; they are worried by trifles and are plunged into a state of anxiety on the slightest provocation; an abnormally responsive circulatory system is constitutional in many such patients, and this favours, from the bodily side, their neurotic concern with the heart; and (*b*) the other type—in some respects the opposite of the former—composed of people who crave for emotions. They like a high pitch of affect and are constantly on the look-out for something sensational and exciting. They always find something to kindle their emotional fire. Such an attitude must be a considerable strain on the cardiac action. "Highly strung" persons of this kind are often inclined to symptoms of "conversion hysteria," and it is easily understandable that in these people such symptoms are usually referred to the heart.

(5) Popular views about the symbolic significance of the heart, as described above, may be an important determining factor in any of the cases enumerated in the former paragraphs. In some instances they can be regarded as the sole factor responsible for the choice of the organ on which the neurotic fixes his complaints, the more so if the views are underlined by an authoritative medical opinion. The student is warned against this danger in all textbooks, and the mere fact that this warning is so often repeated shows that it is still not observed as it should be. One has to guard against this danger not only in patients without morbid physical signs but also in organic heart disease. Heart patients are very liable to keep an anxious watch on their cardiac action. Extrasystoles, paroxysmal tachycardia, and slight anginal symptoms are apt to aggravate their anxiety, causing an additional strain on the circulation and leading to a vicious circle.

There is still much work to be done in relating the subjective experiences of different cardiac disturbances to the psychological make-up of the patient. Much can be said in favour of giving up the concept of cardiac neurosis and organ neurosis in general and describing instead each case as the response of a personality in the light of its heredity, character, and environment. This would emphasise the importance of the psychological approach in addition to the pathophysiological.

MEDICINE AND THE LAW

No Compensation for Workman's Sunstroke

SITTING with a medical assessor at Wellington, the county-court judge refused to award compensation to a postman who had an attack of giddiness after walking up hill in the sun on a hot day in August. According to the brief report in the *Solicitors' Journal* the applicant had served 25 years in the army and then 3 years with the Post Office, losing only a few half-days through illness. After the attack of giddiness there were symptoms of paralysis. Massage and electrical treatment were administered to the left arm and leg. The postman was afterwards retired on grounds of health with a gratuity of £55. He claimed compensation for the partial disability following the incident in August. The court heard medical witnesses on both sides and decided that the postman had not discharged the onus of proof that his incapacity resulted from his employment.

These questions of injury by the forces of nature—e.g., sunstroke or lightning cases—were examined afresh this year by the House of Lords in Dover Navigation Co. *v.* Craig, where a seaman died of yellow fever contracted during a voyage to a West African port. "If," said the House of Lords, "a workman, while on his employment, is accidentally injured by a force of nature which is operating generally in the area where he is, he cannot recover unless he can show that his employment exposed him in a degree beyond other people then present in the area to the injurious effects of the natural force." The claim in Craig's case succeeded because his work as a seaman took him into the dangerous place. The House of Lords was invited by counsel to imagine the case of a seaman sent to a British port where influenza was rife. Would he have a claim under the Workmen's Compensation Act if he caught the prevailing epidemic? True to the judicial tradition of answering one question at a time, the judges "smiling put the question by." Logically, it would seem, they might have answered the influenza problem in the affirmative. So also with the postman. The sun was hot for everyone on that hillside in Somerset in August, just as the mosquitoes were ready to bite everyone

in that West African river. The seaman's work took him to the river and the mosquitoes bit him; he died and compensation was awarded. The postman's work took him up that hill in the sun and he ascribed his illness to the effects of the sun. There must have been some weak link in his evidence. If he could sufficiently have shown that the sun caused the attack of giddiness, ought he not to have obtained his compensation? Does it matter that somebody else on the same hillside on the same day did not feel the sun or that somebody else on the West African river was not infected with yellow fever?

IN ENGLAND NOW

A running commentary from our Peripatetic Correspondents

IN time of war many of the stately homes of England see strange sights. To their new functions they bring their old retainers, and of the hybrid collection inherited by our hospital no-one has afforded more entertainment than "Flannel-feet," the fireman. He was at one time a fireman in his native Lancashire, but left it for a more salubrious clime nigh on twenty years ago. Flannel-feet is not his real name—that, oddly enough, was Burner or "Mr. Burner to you" as he is wont to say on his uppish nights—but the name seemed to suit him as he prowled along our ill-starred corridors, and Flannel-feet it has remained. If the risk of fire is serious in a mansion it assumes added importance when that mansion becomes a hospital, and Flannel-feet was quick to appreciate that he had entered on an enhanced sphere of usefulness. He needed little persuasion to show parties of staff his system of fire control and the gadgets to that end and it was with a lively sense of adventure ahead that eight of us set out in his wake to see the sights.

It was important, our guide explained, to begin at the commencement, and we were taken to the front hall to see a collection of bells and buzzers noisy enough to waken the dead. This was the alarm board, and from its mysteries we went on to explore emergency exits, to learn why it was that in the event of fire patients could not be evacuated through ground-floor windows, and to be initiated into the working of hoses and fire extinguishers. The emergency exits were straightforward enough, but it appeared that in the more palatial days it had been found necessary to seal permanently all ground-floor windows, not from any desire to exclude fresh air or burglars but because unruly members of the staff used these windows to regain the sanctuary of the building when the day was far spent. On one unhappy occasion a servant had actually been known to come through one of the ground-floor bedrooms when it was occupied by a lady guest; the enormity of his offence was not that he had done so but that when doing so he had smoked a cigarette. Fire hoses, it appears, have many uses. Sometimes guests have taken them away to water their gardens, even twenty-five yards of hose, though that must have occupied a fair-sized hat box.

As the tour proceeded certain members of the party began to exhibit a spirit of levity and Mr. Burner did not at all approve of this turn of events. He seized the opportunity afforded by his demonstration of fire extinguishers to let a weapon of heavy type fall on the feet of one of the less responsible surgeons, muttering by way of comfort, "There, you've missed it," though it had obviously been dropped in such a way as to offer little prospect of any other outcome. "When you first suspects fire you do not ring the fire bell. You sniffs for smoke and you tries to put it out. Then you gets the 'ousemaid on the floor."

Flannel-feet was not to be satisfied with any mere tour of the building, however profusely illustrated, and nothing would do but that we should foregather on the morrow to see a practical demonstration of fire-fighting, including instruction in how to cope with an incendiary bomb. The bomb refused to play the game. It consisted of a small mountain of debris reputed to have been doused with precious petrol but it proved to be rather a damp squib and the mass took some persuasion to light at all. The resultant fire was not very formidable, but was not extinguished without some little horseplay. Then we were led to an upper corridor to learn how to cope with a real fire. Two volunteer victims were stowed away at the site of battle and the members of the emergency fire brigade sent about their normal business with strict injunctions to listen for the whistle and be sure to bring something to the fire. Bringing something to the fire is apparently the secret of successful fire-fighting: "the fire brigade does not go to a fire without its hengine." The stage was set, the whistle blown and after a discreet interval the hired assassins came scrambling along the corridor with a weird collection of pails, shovels, hammers and fire extinguishers, for even in these matters the world is ill-divided. The room that housed the victims was pointed out, the door thrown open and in crawled the rescuers to return with two sack-like creatures obviously trying to make themselves as limp and heavy as possible; the response to artificial respiration was brisk.

Flannel-feet is a reminiscent soul. He thinks of everything, and especially do his thoughts linger in the glorious past. When he heard that we were to have our first concert he thought it would be necessary to have a "chooker-out," though surely such a thing or such an expression would be unknown in the palmy days of our stately home, unless indeed the unruly staff had been wont to mingle with the mighty. And yet, perhaps not, for it appears that even in these days there were events reminiscent of boat-race night. On one occasion when 'Enery 'All's band had been leading the praise the "kettle-droom" disappeared in some mysterious way. Great was the consternation and great the searching—in which Flannel-feet played a surreptitious but ineffective part—until at last the drum was run to earth in Edinburgh of all places, having been passed through a billiard-room window to the car of a souvenir-hunter outside. It might have been lost for good but for the vigilance of a bright young page-boy who had noted its nefarious transfer to a car and carefully noted the car's number.

Flannel-feet will remain one of the happy recollections of our strange adventure, a man believing in the importance of his job and anxious to make the most of it, yet possessed of the saving grace of humour. Perhaps most valuable of all in circumstances such as ours, a man willing to lend his hand to whatever came and able to get on with the job.

* * *

Not being used to it, general practitioners are often unskilled in the use of leisure. The very nature of their work, with its uncertainties and interruptions, tends to produce a state of restlessness and inability to settle to anything. This is further aggravated by these troubled times wherein it is doubly hard to come by and retain a quiet mind. Barely two miles from my home there runs a small stream, not much more than a brook, which is heavily overgrown and far too muddy. It is, however, a nice long way from civilisation, and, what is more, holds a few little trout. These run perhaps three to the pound—assuming that the two you don't catch are rather larger than the one you do—but they are game and wary little fish. Sometimes on a fine evening after the sun has left the water I sneak away to my brook clad in an old coat, a disreputable pair of grey bags with a "shirt hernia," and gum boots. I crawl along the banks, among the docks and nettles, and flick—you can hardly call it cast—a march brown and a blue upright into the likely pools and stickles. More often

than not I "hang up" in a tree or bush and have to climb about like a schoolboy to unhitch my cast; very occasionally I am rewarded with a little trout. An hour or two of this sort of thing produces a feeling of honest fatigue and peace that I find singularly satisfying.

* * *

The summer exhibition at the Royal Academy shows evidence of a return to the nude. In the oil paintings the drawing is, in the main, anatomically correct, though for some reason the lower limb, when extended, is often made too long. We see this in the left of the three "Sirens" (177) of Mr. W. G. de Glehn and again in the young lady who is "Reading Goldoni" (205) by Mr. John B. Souter. Our artists are still using their grandmother's figures for their models. Thirty years ago we were taught that of the anatomical differences between the male and female body an important one was that the woman had a thicker layer of fat under her skin and that this prevented the individual muscles being seen beneath it. This we know to be incorrect now that young women take as hard muscular exercise as do men. Yet with one exception all these nudes are painted from figures which retain the covering of adipose tissue, sometimes considerable, that comes from want of exercise. The result is seen in the drawing of the forearms. In Miss Ethel Gabain's "The Little Dancer" (656) the head and figure lean forward full of activity, but the forearms are flat and devoid of it. So experienced a painter as Mrs. Dod Procter in her "Smiling Girl" (90) shows a vivid head and neck with a pair of truncated cones as forearms. The exception is Mr. Harold Williamson's "June Morning" (171). His Portia putting up her hair with her hands above her head is the virile young woman of today. Our artists would do well, I think, to turn from the texture and the tone of the skin to the ripple of the muscles under it. Of this there is one example in the nearly nude figure that the modern bathing suit provides (368). Again it is Mr. Harold Williamson. A young woman, seen from the back, is sitting by a pool on a rock. A wave has splashed up some spray and the figure leans backwards, holding up her arms, with open hands, to protect her face. The deltoids are beautifully depicted, and behind them the other muscles of the shoulder girdle are seen in play.

It seems questionable whether, except as a part of the practice and study of an artist's technique, there is now any room for nudity in art. The settings of the nude have changed from those of religion and mythology to scenes of everyday life, and thereby have lost all reality. Do young women really take off their pyjamas on arising from their couch before they comb their hair (171), or sit unclothed in the middle of a room with open windows through which suburban neighbours can get a full view (322)? I am quite certain that three young women (732) do not get out of a punt to lie or sit, stark naked except for one pair of shoes between the three, on a river's bank just by a lock through which a barge might come at any moment. The lock-keeper's wife would soon be after them. It is this unreality which divorces modern art from the people. These have "a sense of immortality" as much as have the well-to-do, and they know more of the "opposition to mere necessity and chance"; but you must take the art to the people as the wireless has done with music; and it must be, in the main, of home and homely. It has been done before and there are signs in this exhibition that it can be done again and done well.

Anyone who saw the late Earl of Crawford and Balcarres, even if he did not know him, can recognise in Mr. James Gunn's study (739) a good portrait as well as a good picture. It is a pity that the same cannot be said of that of The late Prof. Edward Mapother (294) by Mr. Alfred R. Thomson. However good this may or may not be technically it is meaningless as a remembrance of a great little man. The expression is flat, and Mapother's was never that. It contains none of the vitality that was always in his face, none of the force that changed the lives of men that came in contact with him, none of the zeal, almost fanatical, for his chosen work. Above all it has missed the struggle against illness with which he carried on, and which for years made his life heroic. Then there is the portrait of Sir Joseph Barcroft which Mr. R. G. Eves has deposited as his diploma work. It has caught him to the life—perky and alive. Best of all, in the opinion of an amateur in art, is that of Sir Robert Hutchison by Mr. James Gunn. Here is quiet meditation, with a humour in the eyes and in the folds around the mouth. There is a kindliness with a firmness of purpose seen in the hands as well as in the face which make this my choice as the best portrait in this year's academy.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

RESTRICTIONS ON ALIENS

THE Government decision to intern German and Austrian citizens has had evident effects in Scottish universities and hospitals. A considerable number of alien doctors have been in Edinburgh studying for the qualification of the Scottish Conjoint Board. Their internment will be a serious blow to them, since their financial resources are limited. The order also affects the students and recent graduates of the university who came to this country in order to start their medical course at the beginning. Some of these young graduates have been permitted to take house-appointments on condition that they were not engaged in the treatment of soldiers or civilian air-raid casualties. Their sudden internment will seriously inconvenience their hospitals, although it is, of course, in the national interest. The restriction of aliens applies to non-enemy as well as enemy aliens, and many American undergraduates are now prohibited from being out of doors after 8 P.M. Representations are being made on their behalf to the local police authorities for some amendment of the "curfew" hours, partly on the plea that their freedom of movement at night is necessary for their attendance at emergency work in the hospital. So far as Edinburgh is concerned some 50 or 60 Americans attending the school of medicine of the Royal Colleges are affected.

HOSPITAL SUPPLIES AND NURSES

The Department of Health for Scotland is urging on hospital authorities the necessity for the strictest economy in hospital supplies and in particular in consumable materials. It has become increasingly difficult under war-time conditions to obtain medical and surgical equipment since many of the raw materials are imported from abroad. The conservation of shipping space and of foreign exchange also makes a reduction in the importation of these materials desirable. Among the items detailed are cotton wool, gauze, lint, mackintosh sheeting, quinine, cascara, and castor oil. It is hoped that as far as possible damaged articles will be repaired rather than replaced. Appeals are still being made for nurses and nursing auxiliaries for the emergency hospitals in Scotland, and the Secretary of State has asked all members of the Civil Nursing Reserve to fulfil their undertaking to serve in the emergency hospitals whenever they are called upon. The most urgent need is for full-time staff. Many who have been trained as nursing auxiliaries are in other employment and are prepared to offer full-time service if they can be assured that their jobs would be open to them when they return. The Secretary of State has appealed strongly to employers to release such nurses and auxiliaries as far as possible with an undertaking that their employment will be available to them when they are no longer needed in the hospitals.

OBITUARY

LOUIS BATHE RAWLING

M.B. CAMB., F.R.C.S.

Louis Bathe Rawling, who died on May 10, was educated at Clifton and Caius College, Cambridge. When he came up to St. Bartholomew's Hospital in the 'nineties he quickly won a popularity which was to accompany him throughout his long life there. A contemporary remembers him as a thin, tall man of rather nervous habit which earned for him the nickname "Jumpy," which stuck. He qualified in 1896 and took his M.B. the following year, when he was awarded the Brackenbury surgical scholarship. He was house-surgeon to Alfred Willett and Harrison Cripps, and he won his spurs as a teacher of surgical anatomy while he held the post of demonstrator at the hospital. There too he wrote his book, "Landmarks and Surface Markings of the Human Body," which has been translated into many languages and is familiar to many generations of students. In 1900 he obtained his F.R.C.S. and two years later he was runner-up for the Jacksonian prize with an essay on fractures of the skull. This decided for him the direction of his work and he determined to specialise in cranial surgery. In the years that followed he was three times appointed Hunterian professor, he became a member of the court of examiners of the Royal College of Surgeons and in 1904 he was elected to the staff at Bart's. He was appointed full surgeon in 1919. Of his work there a colleague writes: Few men have lived more useful lives, for to few has been given a larger measure of confidence in his transparent honesty of purpose and the quiet determination with which he pursued the course to which his mature consideration had led him. No man ever had a more genuine colleague in the best sense of that term, and no colleague ever failed to trust him completely. By each of these he will be remembered as one who in Dr. Johnson's phrase "gladdened life."

During the last war Rawling held the rank of major in the R.A.M.C. He commanded the surgical division of the 34th General Hospital and later served on the staff of the 1st and 4th London General Hospitals, and in India. On his return to civilian practice he was appointed surgeon to the West End Hospital for Nervous Diseases. He was married and had two daughters.

Sir D'Arcy Power writes: I knew Louis Bathe Rawling from his early student days when he had just come down from Cambridge to begin his clinical work at St. Bartholomew's Hospital. For some years he was my assistant surgeon, at that somewhat remote period when it was the duty and the pleasure of the assistant surgeon to attend and help his surgeon in the operating-theatre. Tall, good-looking, debonair, of a cheerful countenance and a gentleman, he always met me with a pleasant word and a smile and we never had a misunderstanding during the whole time we worked together. There was an intermediate period when he was a house-surgeon. It was then the duty of C. B. Lockwood and myself, as the two junior assistant surgeons, to supervise the house-surgeons every morning at nine o'clock in the casualty department of the hospital. Rawling never had to be reported for he was never a minute late; he treated the vast hordes of outpatients as human beings and was always on friendly terms with his "dressers." He was somewhat oversensitive because being in the ordinary course assistant surgeon to Lockwood, my immediate senior, he degraded and attached himself to me on the ground that he was not good at repartee. He retired from practice soon after he had become the senior surgeon to the hospital which was the goal of his ambition. When I saw him a few months ago he was as cheerful as usual and said that he was living quietly and happily near Exmouth.

One of his former house-surgeons writes: Although our old chief retired from active practice in 1932, he kept in touch with all of his house-surgeons through the Rawling club, which was founded some fifteen years ago. This club met once every year, when the chief, the assistant surgeon, the chief assistants and all the past and present house-surgeons dined together, and talked over old times. Mr. Rawling had this club very much at heart, and he expressed the wish that it should be carried on as a "Firm" institution when he should be no more. It was always a great pleasure to meet him again, to be greeted by that cheery smile, and to hear his "Well, me lad, how are you?" He combined a kindly and courteous personality with a shrewd clinical acumen, and as a surgeon he was particularly deft and gentle with his hands. In spite of his exalted position in the realm of surgery he was singularly modest, and his nature had no room for jealousy.

GEORGE WILLIAM SHORE

O.B.E., M.D. LOND., D.P.M., COLONEL, R.A.M.C.

Colonel G. W. Shore died in Charing Cross Hospital on May 8, a few hours after being taken ill while travelling on the Underground. He was born in 1888 and educated at Dulwich College and King's College Hospital, where he qualified in 1911. After holding resident appointments at King's he took his M.B. in 1914 and was then appointed Sambrooke medical registrar at the hospital. But at the outbreak of war he left to join the R.A.M.C., in which he served for five and a half years. Much of this time he spent in Mesopotamia as ophthalmic surgeon at No. 40 British General Hospital. He was invalided home and was afterwards appointed assistant registrar and later registrar at the 4th London General Hospital. He also acted as ophthalmic specialist on the War Office medical board and as military representative on the Ministry of Pensions boards. He now had leisure to continue his postgraduate studies, and he took the D.P.H. in 1921 and his M.D. and D.P.M. in the next two years. He was then appointed assistant medical officer at Springfield Mental Hospital, and later he also became a lecturer in mental diseases to the Westminster Hospital, where he held a clinic for early mental disorder. In 1933 he was appointed medical superintendent at the new mental hospital at Shenley. Here his capacity for organisation and his administrative talents stood him in good stead. Meticulous and conscientious, nothing was ever too much trouble for him. He made apparently trivial details which yet affected the welfare of the patients his immediate and personal concern. When war was declared in September part of the hospital was taken over by the military authorities, and as a lieutenant-colonel in the Territorial Army reserve of officers Shore assumed command. Later he was promoted to colonel.

Lafayette

Shore radiated kindliness and sympathy. His humanity and bigheartedness were implicit in every contact with his staff and his patients. Much of the leisure of his busy life was devoted to music. A friend describes him as a delightful colleague, a charming host and an able physician.

VIOLET KELYNACK

M.B. EDIN.

Mrs. Kelynack was born in Calcutta, the daughter of James Grieve McLaren. She was educated at Bedford High School and went on to study medicine at Edinburgh University as a member of the Scottish Association for the Medical Education of Women. This association had been established to secure for women the medical lectures given by extramural lecturers, for only two of the university classes—physics and zoology—were then open to them. In those days women students laboured under a great disadvantage, for special lectures were sometimes difficult to obtain and laboratory facilities were inadequate. In spite of these obstacles Mrs. Kelynack was one of those who in 1903 obtained the degree of M.B. A contemporary recalls that she would often join the rebels in seeking to get the university facilities opened to women, an object which was however not obtained until 1916. To the end of her life she remained a great lecturer on equality of opportunity and pay for medical women and was eager that women should play their full part in world politics. In these early Edinburgh days she was already interested in poor children and she did much work at the Cowgate Mission. After graduation she was for a time a clinical assistant at the Evelina Hospital in London, but she did not long practise her profession for soon afterwards she married Dr. T. N. Kelynack. For a while they lived in Manchester and then moved to Mount Vernon Sanatorium where her husband was appointed medical officer.

Vandyk

From her home at Harpenden she undertook much useful work, principally among children. She was honorary medical inspector for girls at the St. George's Coeducational School, assistant medical adviser to the National Children's Home and Orphanage, and assistant medical officer to the children's sanatorium there. But in 1921 she became medical secretary to the Medical Women's Federation and for the rest of her life she gave her time, thought, and energy to its interests. During its early years when the federation was emerging as an embryo association whose special job was caring for the interests of medical women in all parts of the world it owed much to her skill and guidance. Her contacts with other medical associations and people gave her a wide vision and her organising ability was supported by her tact and courtesy. Almost the last thing she did before she gave up her work on account of ill health in March was to supervise the publication of the current issue of the federation's quarterly journal which she edited. A friend describes her as "a quiet and somewhat unassuming personality but tenacious of her opinions, who would take a strong stand on controversial questions once she decided it was right." Her only daughter is also a medical woman.

Dr. Catherine Chisholm, a former president of the federation, writes: Mrs. Kelynack made the London office of the federation a pleasant centre where medical women, especially those up from the provinces, met a friendly welcome, received every assistance and were at once put into touch with the sources of any information they required. During the time when I was president of the federation, in particular, I realised her tactfulness, her quiet efficiency and her knowledge of all that was going on. She was always ready to take any amount of trouble to ensure the smooth running of the organisation both within and among its own members and in association with other bodies. Our meetings in London and in the provinces have been models of accuracy. Whoever else got ruffled Mrs. Kelynack and her assistants never did. Mrs. Kelynack was so retiring and quiet that it was not so easy to realise how much she was doing and how quietly she was making wise suggestions. I have been impressed by the recognition of her kindness to the younger members of the council coming up for the first time to the meetings. This has been expressed to me by those who have rung me up on seeing the notice of her death. Though latterly she was often suffering physical disability she always remained cheerful and uncomplaining. The debt owed to her by the federation cannot easily be estimated and all those who have worked with her will remember her with gratitude.

CHRISTOPHER KILVINTON MOWLL

M.R.C.S.

Dr. C. K. Mowll, who died in London on May 15, aged 47, was the third son of the late Henry Martyn Mowll of Chaldercot, Dover. He was educated at the King's School, Canterbury, the University of Cambridge, and the London Hospital. He qualified in 1917, and during the last war served in Mesopotamia. In 1921 he joined the headquarters medical staff of the Post Office, where he remained till 1937 when he was appointed chief medical officer to the Southern Railway. Mowll was deeply interested in Sunday-school and missionary work, and was known to many people as a lay preacher.

H. H. B. writes: "Mowll was a man of big physique, with a deep sense of duty, and strongly held, almost fundamentalist, theological views. But his personal religion was a thing apart from these and the mainspring of all his actions. It would have been impossible to imagine him doing a mean or self-seeking thing, however small, or to believe that anybody who wanted help from him ever went in vain."

ALEXANDER GARDNER ROBB

M.B. R.U.I., D.P.H.

THE death of Dr. Robb on May 6 has removed from the Belfast medical school an outstanding and well-loved figure. He was born in 1866, the eldest son of the Rev. James Gardner Robb, of the Irish Presbyterian Church. Two of his brothers, Lieut.-Colonel J. J. Robb and Captain J. Campbell Robb, are also doctors, while a third, Mr. J. H. Robb, is minister of education for Northern Ireland.

Alexander Gardner Robb qualified as M.B. from Queen's College, Belfast, in 1891, and obtained the D.P.H. of the Royal College of Surgeons in Ireland in 1902. He was appointed resident medical officer and afterwards visiting medical officer to the fever hospital of the Belfast Union. When the Belfast Fever Hospital at Purdysburn was begun in 1903 he became its medical superintendent, and under his care

it rapidly became a model of what a modern hospital for infectious diseases should be.

It was in 1907 that Gardner Robb achieved distinction. A severe epidemic of cerebrospinal fever occurred in Belfast, and the death-rate of the first 230 cases was 70·4 per cent. When Robb used Flexner and Jobling's serum intrathecally he reduced the mortality to 29·2 per cent. These cases included fulminant types and patients of all ages. For many years afterwards his death-rate in sporadic cases was consistently less than one in three, and it was only with the advent of the sulphanilamide group of drugs that these results were bettered. He also contributed papers to the medical journals on acute poliomyelitis, on the antitoxin treatment of scarlet fever and on intubation in laryngeal diphtheria. He was a past president of the Ulster Medical Society, and of the Northern Ireland branch of the British Medical Association.

A colleague writes: Gardner Robb was not only an expert in hospital organisation and administration and keenly interested in every scientific and bacteriological advance, he was essentially a clinician, shrewd, observant and gifted with "the experiencing mind." By a few simple pertinent questions he would elicit from any patient capable of coöperation the essential points in the history of his symptoms, and he would describe simply and clearly the features of the case to his students. I remember him watching the choreiform movements of a patient suffering from acute encephalitis lethargica in the epidemic of 1920, and how he said "she has the movements, but these movements haven't the *abandon* of true chorea—the French word describes it best." Few men have achieved unsought so high a place in the esteem of the public and the affection of their colleagues. With no apparent effort he gained the confidence and trust of all who came in contact with him from city fathers to sick children. Generations of students remember his youthful figure as he moved from bed to bed eager to tell them all he knew. He spoke in low tones, because as he said "students listen more attentively if you speak quietly." It is sad to think that his voice is still.

LETTERS TO THE EDITOR

"FUNCTIONAL" NERVOUS DISEASE IN HOSPITAL PRACTICE

SIR,—Figures given of the incidence of psychoneurotic or "functional" disease in general and hospital practice vary widely. The following are drawn from my weekly outpatient department at the Seamen's Hospital, Greenwich, where casualty officers, outside doctors and colleagues within the hospital supplied the material, which was then shared with another physician on a calendar basis. Some selection of cases was made to suit particular interests, and this may have raised the proportion of psychoneurotics in my group to some degree. Otherwise, and essentially, this group represents about half the new medical outpatients attending the hospital in the selected year, 1938. They were men, women and children drawn from the neighbouring waterside district. Only about a quarter of them were or had been seamen.

Of 257 cases seen by me I have picked out 92 as psychoneurotic, because, after examination to the point of diagnosis (which was not necessarily made at the first interview) the psychogenic aspect was regarded as taking priority over the organic, in the sense that the *major* contribution to the patient's illness appeared to me to be an emotional derangement. In many of the cases the emotional factor was also the one with a prior demand for treatment.

INCIDENCE OF CASES OF "FUNCTIONAL" PRIORITY IN PATHOGENY

	New outpatients.	Functional cases.	Percentage.
Men	123 (Seamen 67)	36 (Seamen 19)	29 (Seamen 28)
Women	107	45	42
Children	27	11	41
Total	257	92	36

Some classification of these 92 cases—a third of the total—seemed necessary. The label "neurosis" is merely the start towards diagnosis, though through lack of skill, of time or of expert assistance this title remained on a number of case-sheets at the end of the year. A simple psychological history, often best taken at the second interview, usually permitted classification in one of the following five groups.

1. *With overt anxiety* (41 cases); (*a*) general 13, (*b*) with "conversion" symptoms 22, (*c*) with underlying obsessional or phobic traits 6. The presence or absence of overt anxiety makes a good starting-point in a simple classification. An "anxiety state" usually has localised somatic manifestations, for which some emotional explanation, however tentative, can be found in the history of the case. This somatic feature—e.g., dyspepsia—preceded by the term "anxiety" gives a useful way of subdividing this big group of cases.

2. *Conversion symptoms without overt anxiety* (21 cases).—These were recorded with the prefix letter "N," to indicate their nervous origin. They included dyspepsia, aerophagy, vomiting, dyspnœa, asthma, dermatitis, paroxysmal tachycardia, tics, enuresis, blindness and headache.

3. *True obsessional neurosis* (2 cases); 1 of which was treated by lengthy analysis.

4. *Traumatic and compensation neuroses* (8 cases).

5. *Neuroses incidental to other conditions* which had prior claims on treatment (12 cases).

6. *Unclassified* (8 cases).

The treatment of the cases offered considerable difficulty. Fortunately I was able to refer some to a skilled psychotherapist, who treated most of these by "short" methods, some improved by recognising and accepting the truth of the diagnosis, and for a few beneficial environmental changes were made. In nearly all the waste and expense of treating imaginary "organic" diseases were avoided.

I am, Sir, yours faithfully,

Castlebellingham, Dundalk, Ireland. RANYARD WEST.

A MONGREL

SIR,—Adhesiotomy! May I request the immediate and permanent suppression of this vile neologism which appeared in a leading article of your issue of May 11? This barbarism is not only redundant and mongrelly, it also fails to express the intended meaning: the suffix -otomy means cutting open, as in colotomy, gastrotomy, and many other words. Modern medical literature contains the following correct and widely-used synonyms: internal pneumonolysis, which, like pneumonokoniosis, can with advantage lose a syllable and become pneumolysis; adhesion cutting; and section or division of adhesions. Surely no more are needed?

To those who would neologise may I quote Fowler, in The King's English: "'It needs be that offences come; but woe to that man by whom the offence

cometh.' . . . It is well that each new word that does appear should be severely scrutinised."

I am, Sir, yours faithfully,

London. MAXWELL TELLING.

SULPHAPYRIDINE IN PNEUMONIA COMPLICATING PREGNANCY

SIR,—Reports of the use of sulphapyridine in pneumonia complicating advanced pregnancy are rare, so this case may be worth recording.

A woman of 25 was referred to me by Dr. Adelaide Roberts of Twickenham. She was then about 34 weeks pregnant. On Jan. 8 she was seized with a pain in the right side of the chest and when I saw her on the 10th she showed all the classical signs of a right-sided lower-lobe pneumonia, with temperature 101° F.; pulse 144, regular; respirations 50–60. The pelvis and pregnancy appeared normal and there was a trace of albumin in the urine, possibly due to the pneumonia. I had not had previous experience of the effect of M. & B. 693 at so advanced a stage of pregnancy. She was given 1 g. 4-hourly by day and night on the 10th and 11th. On the 12th her temperature had dropped to 98° F., pulse 100–120, respirations 20–30. The M. & B. 693 was continued in the same dosage until the 13th when the temperature, pulse and respiration were normal. Bronchial breathing was still present. The dosage was then dropped to 2 tablets t.d.s. She vomited once, but was relieved by sodium bicarbonate. On the 14th temperature, pulse and respirations were still normal so the dose was reduced to ½ g. t.d.s. She vomited once. The M. & B. 693 was discontinued on the 15th and the patient stayed in for a further fortnight and made an uninterrupted recovery. A fortnight after leaving hospital Dr. Roberts told me she was delivered of a normal well-developed live baby. The confinement was normal.

The anxiety of this case (a primipara) was the possibility of miscarriage or a dead baby, but nothing abnormal occurred. Advanced pregnancy seems therefore to be no contra-indication to the use of M. & B. 693 in the large doses required.

I am, Sir, yours faithfully,

Harley Street, W.1. GERALD SLOT.

SUGAR IN THE TREATMENT OF ULCERS

SIR,—I read with interest your Budapest correspondent's account in THE LANCET of May 4 (p. 826) of Dr. Szemkeö's treatment of ulcers with sugar. Thirty-five years ago I was an assistant to Dr. Engel-Reimers at St. George's Hospital, Hamburg, and he regularly used sugar with the addition of 1 per cent. naphthalin for the cure of varicose and other obstinate ulcers with great success. Since then I too have used the treatment widely in my practice at Hamburg with the same results.—I am, Sir, yours faithfully,

Swansea. ERNST A. MEYER.

STREPTOTHRIX EMPYEMA

STREPTOTHRIX infections are occasionally met with in the pleural cavity, the responsible organism being a mycelium which shows true branching and grows only on anaerobic culture. Dr. J. C. Gaffney showed films of pleural pus from two such cases to the section of pathology of the Royal Academy of Medicine in Ireland on April 19.

The first was a garage worker of 42, who was admitted to the Adelaide Hospital, Dublin, under Dr. Geoffrey Bewley in February, 1939, complaining of cough and weakness in the legs. About seven weeks before he had had "influenza," after which he had gone back to work but had not felt really well. His tongue was coated and his teeth were bad, his temperature was 100·2° F. and his pulse-rate 100, and there were signs of fluid over the left base. A paracentesis was performed and some thick foul-smelling pus was removed. Microscopic examination showed the presence of a streptothrix in large numbers, and the cells were all polymorphs. The pus was sterile on aerobic culture, but the organism was recovered after a few days anaerobic incubation. It was also found in the sputum. Closed intercostal drainage was performed, the cavity being washed out daily for about a week. The tube was removed at the end of a fortnight and the patient made an uneventful recovery. The second patient was a man of 81, who when seen on Dec. 8, 1939, by Dr. Buchanan had acute abdominal pain with general tenderness and rigidity. His temperature was 103° F. and pulse-rate 120, and there was dullness over the base of the right lung. A diagnosis of pneumonia was made and the presence of fluid was suspected. He was given M. & B. 693. Aspiration produced some opalescent fluid in which all the cells were polymorphs and an occasional diplococcus was seen. It was sterile on culture. The patient improved until Jan. 17, 1940, when his temperature rose to 100° F., and his pulse-rate to 100. On Jan. 23 the chest was explored, and some thick foul-smelling pus was removed. It showed a streptothrix in large numbers which subsequently was grown in anaerobic culture. On Jan. 26 tube drainage was performed, and though his convalescence has been slow his general condition is now good. Dr. J. J. McCann described a case of streptothrix pneumonia in a thin tuberculous-looking child who looked extremely ill and had exceptionally heavy sweats with an intermittent temperature. There were râles and rhonchi all over the chest and signs of bronchopneumonia on the left side. When the sputum was examined there was no thought of streptothrix infection.

Dr. R. A. Q. O'Meara, the president, said that these cases emphasised the importance of examining sputum and determining exactly the type of organism present in empyema fluid. In Dr. Gaffney's cases he thought that the organism was a streptothrix closely related to actinomyces, and in Dr. McCann's he thought the organism was *Streptobacillus moniliformis*. All these organisms appear to respond reasonably well to treatment with iodides. Dr. W. Hayes suggested that streptothrix empyemas nearly always start as a primary condition of the lung, and that a small lung abscess develops and becomes shut off, oxygen being absorbed from the abscess cavity. Such a process would create conditions suitable for the growth of streptothrices, which may often be found in the mouths of normal people. The abscess may then rupture into the pleural cavity. Dr. W. A. Gillespie said that in rats the *Streptobacillus moniliformis* is found in partnership with one of the pleuropneumonic organisms. He asked if any of these were known to be pathogenic for man, to which the President answered no. Dr. A. R. Parsons referred to a patient who had loss of voice and a bad cough. A laryngologist thought that he was suffering from syphilis of the larynx, but the Wassermann test was negative. The radiogram did not look at all like tuberculosis and the radiologist thought that it resembled what he had seen in streptothrix infection of the lungs. On examination of the sputum a streptothrix was isolated, and tubercle bacilli were also found.

Dr. Gaffney, in replying to questions, said that this condition must be more common than is generally recognised. He did not think that the rate of streptothrix infections would be much increased because of rat-infested houses; such houses had been in existence for a long time. The actual source of infection by the streptothrix is still unknown. The sputum in these cases, he said, is always very fœtid, and an ordinary gram stain will nearly always indicate the presence of a streptothrix.

WITH THE B.E.F.

MEDICUS, M.P., IN FRANCE

I WAS at General Headquarters of the B.E.F. on Thursday evening, May 9, and was wakened by the air-raid syren shrieking its warning at about 4.30 A.M. on the morning of May 10. The vast offensive of the Germans had begun. Holland, Belgium and Luxembourg were invaded, bombs were exploding with dull crumps near by. Anti-aircraft guns and machine-guns roared, the drone of bombing planes and the high-pitched note of the fighter engines weaved an infernal tapestry of sound in the air.

When the news from other places came in, it appeared that the Germans had carefully synchronised their attack to begin at many points on the frontiers, by land armies and in the air, over a very wide area. Passing through towns and villages on my way back to England I heard the same story. At the French ports it was the same again—the air-raid warning and the attack from the air. And when I had to wait a day at a French port to get a boat to bring me home, there was, it seemed, a constant succession of air-raid warnings—so frequent, in fact, as to lose their effect. French civilians and soldiers seemed to pay very little attention to them.

But what a difference between France and England. In the fields of France the ground, wonderfully cultivated, being tended by old men and women, children and obviously invalid or unfit men. In the towns and villages very few men of even apparent military age not already in uniform, and women actively engaged in every kind of occupation. Another contrast was that between the "other war" of 1914–18 and this war. Then we, the British soldiers of that day were the politely received and kindly treated guests of the French nation. Our zones were separated from theirs, our liaison with them friendly but not affecting us in our own areas very much. Now the British are almost part of the French nation; we are mixed up with them as their own soldiers are, and our official liaison with them is a matter affecting all of us every day and all the time. The British soldier now is more than a friend courteously received, he is a member of the family.

* * *

Before the German offensive began I had spent five days in France and had seen a great deal of the medical organisation of the armies from the base to the front-line positions. I was privileged to discuss the general plan of the organisation at the Medical G.H.Q. and then to see regimental, divisional, corps and army arrangements. I drove very many miles, I tramped over long distances of the front line along the Belgian frontier, I visited hospitals, field ambulances, mobile bath units, refrigerator units for blood-transfusion, motor ambulance units and many other of the complex adjuncts of the modern medical and sanitary armoury.

The medical organisation of the armies is admirable, its personnel well trained, its equipment very comprehensive, its medical officers and other ranks in very good heart and its only complaint, before the German offensive, was of lack of active work. Now when it is being tested like the rest of the armies as no organisation has ever been tested before it is doing splendid work. And perhaps I may reveal now some things which when I took the notes—some only in my mind as I did not wish to put words on paper—I did not think I should be able to do. The kind of attack to be made by the Germans, with tanks breaking through the lines and surging around fortified positions like the tide around rocks on the shore, was foreseen and planned for. The low-flying dive bomber supporting the tank and machine-gunning was foreseen and planned against. Details I cannot give, but the difference this type of warfare makes is partly the enormous lengthening of medical lines of communication. Where in the last war the distance between the front line, the advanced dressing station, the main dressing station and the casualty clearing station were measured in yards and furlongs, now they are measured in miles. This difference of distances means many changes in the organisation of the medical and other services. It also makes the front less stable. A greater fluctuation of the line of the fighting front will probably be normal. But above all it makes one serious difference to the medical profession. It demands more doctors and again more doctors for the medical service of clearing the wounded from the front line to the C.C.S. In this war too there are more numerous special units of one kind or another. Many more aerodromes, for instance, with large non-Air Force personnel. More engineering and transport units. More artillery units. And more other units from lumbermen and railwaymen to units of Czechs and Poles. Any of these units may need and claim the services of a medical officer. The demand for volunteer doctors up to the age of 55 may fill the gap for a time, but is likely to be followed by more demands still.

The provision of medical services for the Army, the Navy and the Air Force will almost certainly mean rationing of medical services for the civilian population. In a war which includes the civilian population and our own country as well as the armies overseas on a foreign soil the distinction between civilian and Army medical work is more one of degree than of kind. It may therefore be necessary to look at the problem of provision for the civil population and the armed forces as that of one medical service divided up into civilian (including the vital A.R.P. work), Army, Navy and Air Force as sections of the service.

* * *

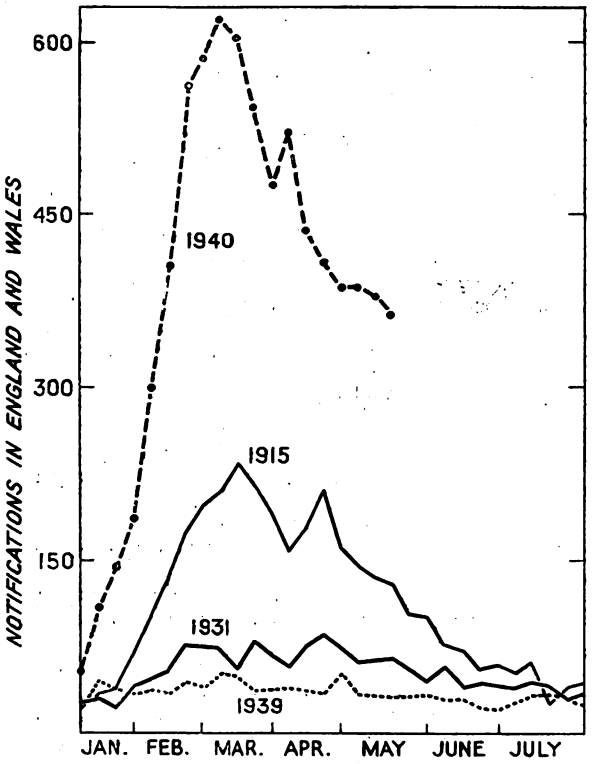
To conclude this preliminary article a few sentences on the general physical condition of the Armies. It is better than that of the armies of 1914–18. The food is of improved quality and is better prepared and cooked. The arrangements for baths are excellent and the mobile bath should be invaluable in this present type of warfare and will greatly lessen skin and parasite infections. The morale of officers and men is very high. The army is fighting for a cause, a cause it understands and in which it believes. And it is a better informed army than that of 1914–18.

THE report for 1939 of the home service ambulance committee of the Order of St. John and the British Red Cross Society is a fine record. During the year the service's ambulances have carried over 220,000 patients, and since the beginning of the war additional convoy work has been undertaken for the R.A.F., while the various coastal ambulance stations have answered many calls from shipwrecks. The committee say that the need today is for four-stretcher ambulances and they do not consider that the chassis of a private motor-car is suitable for conversion into an ambulance. The ambulances from headquarters in London were much in demand during the early days of evacuation, for they are not restricted by boundaries, and during 1939 they carried 5149 patients, which was well over a thousand more than during the previous year. Most of this increase was due to patients carried in connexion with the Emergency Bed Service. The war has postponed the establishment of a 24-hour service in association with this organisation.

PUBLIC HEALTH

Cerebrospinal Fever

IN the first nineteen weeks of this year the notifications of cerebrospinal fever (including non-civilian cases) have reached the unprecedented total of 7398, more than twice as many as in the whole of 1915 and at least five to six times as many as in a normal non-epidemic year. The maximum point of the present epidemic was reached, after a series of rapid weekly rises, at the end of February or beginning of March. An equally rapid decline was not to be hoped for, as was pointed out at the time (LANCET, March 23, p. 567), and is in fact not being realised. The graph shows the relatively slow fall that has been taking place, comparable with the experience of 1915, though the fine weather of the



past three weeks has accelerated the fall. This time last year notifications numbered some 30–35 weekly, in the epidemic of 1931 they were 60–70, at the beginning of the present month the figure was still unfortunately only a little below 400. Recently the counties of Lancashire and Glamorgan have been relatively heavy contributors.

Complete mortality figures are not yet available but on page 966 of this issue Dr. Stanley Banks quotes some provisional figures supplied by the Ministry of Health. For the first quarter of the year they report 1100 deaths and a crude fatality-rate of 22 per cent. (civilian and non-civilian cases combined). Almost the same figure (24 per cent.) is given by Underwood as a result of special inquiry in a few large areas (*Brit. med. J.* May 11, p. 757). This is clearly a great improvement on the rate of 60 per cent. or thereabouts that has usually prevailed in the past but is not as good as the more restricted experiences that have been reported may have led some to hope for. Much local variation in the fatality-rate is, however, apparent. In Cardiff—Dr. Emrys Harries describes the treatment given there on p. 967—it has been particularly low, 11 per cent. only. In Leeds and the West Riding it has, according to Underwood, been 30–35 per cent. There are at present too many unknown factors in these differences to be resolved—e.g., the prevailing age of attack. According to the Ministry's provisional figures the fatality-rate is about 50 per cent. in infancy and at ages over 45.

Infectious Disease in England and Wales

DURING THE WEEK ENDED MAY 4, 1940

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 946; whooping-cough, 630; diphtheria, 701; enteric fever, 33; measles (excluding rubella), 5286; pneumonia (primary or influenzal), 883; puerperal pyrexia, 156; cerebrospinal fever, 377; poliomyelitis, 2; polio-encephalitis, 2; encephalitis lethargica, 4; dysentery, 80; ophthalmia neonatorum 109. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on May 3 was 917 made up of: scarlet fever, 139; diphtheria, 120; measles, 15; whooping-cough, 43; enteritis, 68; chicken-pox, 59; erysipelas, 39; mumps, 14; poliomyelitis, 1; dysentery, 7; cerebrospinal fever, 94; puerperal sepsis, 23; enteric fevers, 11; german measles, 94; meningitis, 1; other diseases (non-infectious), 79; not yet diagnosed, 110.

Deaths.—In 126 great towns, including London, there was no death from smallpox or from enteric fever, 1 (0) from scarlet fever, 7 (0) from measles, 1 (0) from whooping-cough, 15 (1) from diphtheria, 26 (5) from diarrhœa and enteritis under 2 years, and 35 (4) from influenza. The figures in parentheses are those for London itself.

Stockport reported 3 deaths from diphtheria, and there were 9 fatal cases of diarrhœa in Birmingham.

HOSPITAL OF ST. JOHN OF JERUSALEM

THE last report of the ophthalmic hospital maintained in Jerusalem by the Order of St. John reflected the disturbed condition of Palestine; the latest report, for 1939, shows the improved conditions in the country. The total attendances for 1938 were 79,018; in 1939 they were 97,403. The contrast is still more striking if one compares the attendances since the beginning of the war, which has had the effect of bringing the factions of Jew and Arab together and uniting them against a common danger. The importance of ophthalmic work in a country where eye diseases are so rife can hardly be appreciated here, for Sir John Strathearn, M.D., the warden, states that of the new patients seen 90·33 per cent. had trachoma; and the high quality of the work done may be gauged from the fact that during the year 251 cataracts were operated upon. Some idea of the conditions under which the work is carried out may be gathered from a letter from the warden who says "The few fellahin who come (and particularly the children) are literally starving when admitted to hospital and one dare not operate on many until they are better nourished."

For many years the work of the hospital has been restricted for want of better accommodation for patients and improved facilities for the treatment which modern advances demand. In spite of the unsettled times the chapter-general of the order has sanctioned the addition of a new wing which will supply these facilities. Provision has also been made for physiotherapy, and for paying patients. The plans for part of this wing, which will cost some £15,000, have been approved and building is proceeding.

PARLIAMENT

ON THE FLOOR OF THE HOUSE

By MEDICUS, M.P.

THE House of Commons is really a very remarkable institution. On Tuesday evening of this week, with preparations for the organisation of Local Defence Volunteers going on all over the country and with grave news of the fighting in France, our procedure went on much as usual. We had questions and it appeared that the Local Defence Volunteer organisation was to be dealt with in a bill to be passed through all its stages on Wednesday. Treachery is also to be the subject of a bill and it is reassuring to know that the House keeps its balance so well that any clauses which infringe liberty, as apart from reasonable criticism, will be severely handled. At question time a private notice question raised the important matter of how the business of the House is to be conducted when there is no opposition party capable, in an emergency, of forming an alternative government. Sir Stafford Cripps spoke on this and so did Dr. Haden Guest, who raised the point that the selection of the debate on supply, which determines which votes shall be criticised, was not a difficulty as all parties supported the Government.

* * *

The arrangement about the Opposition choosing supply days came into existence in 1896 when the number of supply days was reduced to twenty and the opportunity of criticism was correspondingly reduced. It was then felt that in order to have a fair arrangement the Opposition should choose its field of criticism—that is, when the supply vote should be debated—and the Government would then arrange this. This is not a rule of the House but a custom or convention. How is the arrangement to work now? No-one quite knows, and the Speaker wisely left the question open and suggested that the House should be given time to "shake down."

* * *

Equally difficult questions exist for the party organisations and some serious and intricate problems are being faced by both Conservatives and Labour. Probably all will "shake down," to use the Speaker's words. But members realise that what is involved is not a detail of procedure but the question of the safeguarding of the constitutional right of full and free criticism. After such a recent demonstration of the power of an Opposition in the re-forming of the Government under Mr. Churchill the value of Opposition criticism could hardly be challenged.

After that the House settled down to a debate on the Colonial Development and Welfare Bill and debated until 9.30 P.M. A useful and constructive debate showing that the House is the guardian of the Colonial peoples and is planning to help them even in this grave hour.

MEDICAL NEWS

University of Cambridge

The following examiners for the diploma in medical radiology and electrology in 1941 have been appointed:

Part I: Prof. G. Stead, Prof. Sydney Russ, D.Sc.; *Part II:* Dr. A. E. Barclay, Dr. Philippe Bauwens, and Dr. Russell Reynolds.

Royal College of Surgeons of Edinburgh

At a meeting of the college held recently, with Dr. H. M. Traquair, the president, in the chair, the following were admitted to the fellowship:

J. C. Andreas, M.D. Manitoba; Harigopal Barat, M.B. Calcutta; L. L. Bernstein, L.R.C.P.E.; B. B. Bhatia, M.B. Lucknow; W. A. Coe, M.B. Edin.; R. J. Crompton, M.B. Durh.; B. J. D. Dunne, M.B. N.Z.; K. J. Eager, M.B. Melb.; J. R. Frank, M.B. Edin.; D. F. Freebody, M.B. Lond.; J. G. O. Hamman, M.B. Cape Town; B. A. Jackson, M.D. Toronto; J. O. Kelly, M.B. Edin.; A. B. Morrison, L.R.C.P.E.; K. S. Mullard, M.B. Camb.; G. D. Oliver, M.D. Manitoba; G. I. M. Ross, M.B. Edin.; L. M. Rouillard, M.R.C.S.; Gurbachan Singh-Janda, M.R.C.S.; Ebenezer Thomas, M.B. Madras; L. R. Williams, M.D. McGill; R. W. Wyse, M.B. Glasg.; and J. D. Younghusband, M.B. Camb.

West Kent Medico-Chirurgical Society

The annual dinner of this society will be held on Thursday, June 13, at Chiesman's Restaurant, Lewisham High Street, S.E.13. Further particulars may be had from the hon. secretary, Dr. C. J. B. Buchan, 267, Baring Road, Grove Park, S.E.12.

Second Addendum to B.P.

The General Medical Council will publish shortly a second addendum to the British Pharmacopœia, 1932, in which new monographs, and modifications of existing monographs, will be included. When a new addendum has been ready for publication, it has been customary to give facilities for advance copies to be inspected, during the three months before publication, by medical practitioners, pharmacists, analysts, manufacturers, and others who may be interested. But this addendum has been prepared to deal with conditions arising from the present emergency, and it is expedient that it should be published, and thus made official, without delay. It is not possible, therefore, to provide for the customary preliminary inspection of the completed addendum, but arrangements have been made for a limited number of advance proofs to be available, on application, to manufacturers of the new preparations described in this addendum. The following new monographs will be included:

Emulsio olei morrhuæ	Liquor vitaminorum A et D concentratus
Emulsio olei vitaminati	Oleum amygdalæ volatile purificatum
Extractum malti cum oleo vitaminato	Oleum hippoglossi
Liquor vitamini A concentratus	Oleum vitaminatum
Liquor vitamini D concentratus	Toxinum tetanicum detoxicatum

Manufacturers interested in the production of these articles should apply to the secretary of the British Pharmacopœia Commission, 44, Hallam Street, London, W.1, for advance copies of the monographs.

The addendum will also contain emendations to monographs of the British Pharmacopœia, 1932, authorising the use of arachis oil, cotton seed oil or sesame oil, in place of olive oil, in making liniment of camphor, hydrous ointment, and compound ointment of mercury; and the use of simple ointment in place of the prescribed fatty basis in making ointment of tannic acid and ointment of capsicum. As these alterations are permissive, not compulsory, the usual preliminary inspection of the formulæ is not deemed necessary. No additional monograph, or emendation of a monograph, is official until the second addendum has been published.

Royal Free Hospital

The following scholarships are open to former students of the hospital:

A. M. Bird scholarship—£200 for one year tenable from Aug. 1, to enable a medical graduate to obtain general experience in pathology.

Mabel Webb and A. M. Bird research scholarship—£200 a year for assistance in carrying on research.

Further particulars and form of application can be obtained from the secretary of the medical school, Hunter Street, London, W.C.1. Applications must be received by June 10.

Ministry of Health

The Minister of Health, Mr. Malcolm MacDonald, has appointed Sir Edmund Brocklebank to be his parliamentary private secretary, Mr. S. F. Wilkinson to be his private secretary, and Mr. R. F. Tyas to be his assistant private secretary.

Committee on Recruiting Problems

The Minister of Labour has appointed a committee to advise him on medical problems arising in connexion with the examination of men by civilian medical boards. The committee will take evidence from experts on eyesight and hearing, orthopædics and other matters brought to the notice of the boards. The following have been appointed: Lord Horder (chairman), Surgeon Captain C. H. M. Gimlette (Admiralty), Dr. W. Haward (Ministry of Pensions), Dr. T. D. Kennedy (Department of Health for Scotland), Colonel J. A. Manifold (War Office), Dr. Geoffrey Marshall (Royal College of Physicians), Group-Captain d'Arcy Power (Air Ministry), Dr. N. F. Smith (Ministry of Health), Mr. G. C. Veysey (Ministry of Labour), Dr. R. E. Whitting (Ministry of Health). Dr. A. E. Hallinan and Mr. E. W. Hoyle (joint secretaries).

Irish Hospital Bed Bureau

Our Irish Correspondent writes: The bill to provide for the establishment of a hospital bed bureau has now passed both legislative chambers. Much alarm was created by the terms of the bill as introduced, for it appeared to place so much power in the hands of the minister that little of the independence of the voluntary hospitals would remain. Fortunately, subsequent to the publication of the bill, the minister recognised that public opinion was adverse to many of its provisions, and he consented to make or to accept radical amendments which remove the most objectionable provisions. There is still grave doubt as to the utility of the measure until there has been a considerable increase in the number of beds available in the voluntary hospitals. The bureau is intended to facilitate the admission of patients to hospital, but if no beds are available it will have nothing to work on.

In many particulars, however, the act will differ in essentials from the bill as introduced. The provision that the bill would apply to all hospitals which had ever received help from sweepstake proceeds has disappeared, and instead the measure will only apply to hospitals which receive such help after the date of the passing of the act. In its original form the committee in charge of the bureau was to have been appointed by the minister and its members subject to removal by him at any time, whereas it is now provided that the members of the committee will in fact be nominated by the individual hospitals. The scope of the regulations to be made for the working of the bureau has been carefully limited so as to prevent its interfering with the independence of the hospitals. In several other instances the Minister for Local Government and Public Health, who was in charge of the bill, expressed his willingness to meet the suggestions of his critics in his regulations, while considering it unnecessary that they should appear in the statute. Those who are interested in the voluntary hospitals, while not altogether satisfied with the bill, recognise that the minister took trouble to understand their views, and came a good distance to meet their case.

Cardiac Society of Great Britain and Ireland

The annual meeting of this society was held in the cardiac department of the London Hospital on May 9, under the chairmanship of Dr. John Parkinson. After a debate on fitness for war service, a committee was appointed to investigate and make recommendations on the cardiac examination of recruits. In the afternoon there was a demonstration of cases, radiograms and electrocardiograms. This was followed by a discussion on the effort syndrome, with special reference to military service. Original communications included papers on auricular septal defect, special forms of infective endocarditis and surgical aspects of hypertension with unilateral renal damage.

Medical Diary

Week beginning May 27

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1.
MONDAY
Odontology.—at 5 P.M., annual general meeting. Sir Frank Colyer: Dental Variations in Preuss's Colobus.
FRIDAY
Radiology.—6 P.M., (32, Welbeck Street, W.1), annual general meeting.

BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, W.1.
THURSDAY.—2.30 P.M., Mr. John Read, Ph.D., Dr. F. G. Spear, Dr. J. C. Mottram, and Mr. L. H. Gray, Ph.D.: Physical and Biological Experiments with Neutrons. 6.30 P.M., annual general meeting.

FACULTY OF RADIOLOGISTS, 32, Welbeck Street, W.1.
FRIDAY.—11 A.M., Dr. S. Cochrane Shanks: presidential address. 2.30 P.M., Dr. S. Whately Davidson and Lieutenant J. Dudfield Rose: Gastroscopy and Gastric Radiology. Mr. Hermon Taylor, Dr. G. R. Mather Cordiner, and Dr. J. C. Hawksley will also speak.
SATURDAY.—10.30 A.M., Prof. G. Hadfield, Mr. L. E. C. Norbury, Dr. F. Ellis, Dr. R. W. Scarff, Mr. T. A. Green, Dr. J. R. Nuttall: The Value, Technique, and Limitations of Biopsy.

ROYAL INSTITUTION, 21, Albemarle Street, W.1.
TUESDAY.—5.15 P.M., Prof. V. H. Mottram: Food and the Housewife.
FRIDAY.—9 P.M., Prof. W. W. C. Topley, F.R.S.: Bacteria in the Air.

WEST KENT MEDICO-CHIRURGICAL SOCIETY.
THURSDAY.—4 P.M. (Miller General Hospital, S.E.10), Sir Walter Langdon-Brown: Salt and Water. (Purvis oration.)

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W.12.
MONDAY.—10 A.M., opening of special course on war medicine.
TUESDAY.—2.30 P.M., Sir Walter Langdon-Brown: ward clinic.
WEDNESDAY.—11.30 A.M., clinico-pathological conference (medical). 2 P.M., Dr. T. C. Stamp: The Bacteriology and Diagnosis of Venereal Diseases (Gonorrhœa). 3 P.M., clinico-pathological conference (surgical). 4.30 P.M., Prof. G. R. Cameron, D.Sc.: Pathology of the Liver.
THURSDAY.—2 P.M., Dr. Duncan White: radiological conference.
FRIDAY.—2 P.M., clinico-pathological conference (gynæcological). 2.30 P.M., Mr. V. B. Green-Armytage: sterility clinic.
DAILY.—10 A.M.–4 P.M., medical clinics; surgical clinics and operations; obstetrical and gynæcological clinics and operations. 1.30–2 P.M., post-mortem demonstration.

FELLOWSHIP OF MEDICINE AND POSTGRADUATE MEDICAL ASSOCIATION, 1, Wimpole Street, W.1.
WEDNESDAY and FRIDAY.—6 P.M. (London Chest Hospital, Victoria Park, E.2), M.R.C.P. course in heart and lung diseases.

Vacancies

Barbados General Hosp.—H.S., £325.
*Battersea General Hosp., S.W.*11.—H.P., at rate of £100.
Bradford City Sanatorium, Grassington.—Asst. M.O., £175.
Belfast, Forster Green Hosp., Fortbreda.—H.P., at rate of £150.
Bury St. Edmunds, West Suffolk General Hosp.—H.S., £150.
Cambridge, Addenbrooke's Hosp.—H.P., at rate of £130.
Cardiff, King Edward VII Welsh National Memorial Assn.—Area asst. tuber. O., at rate of £500.
Chester Royal Infirmary.—H.P. and 2 H.S.'s each £150.
Coventry and Warwickshire Hosp.—Two H.S.'s to spec. depts., each at rate of £150.
Exeter, Royal Devon and Exeter Hosp.—H.S., at rate of £160.
Gloucestershire County Council.—Asst. county M.O.H., £600.
Grimsby and District Hosp.—H.P., at rate of £175.
Hertfordshire County Council.—Asst. school M.O.'s, each £500.
Hull Corporation.—A.M.O. at Beverley Road Hosp., £350. Also Temp. asst. M.O.H., £600.
Indian Medical Service.—Emergency Commissions.
London County Council.—Temp. asst. M.O. (Class I) for King George V Sanatorium, Godalming, £350.
Manchester, Ancoats Hosp.—Res. M.O., at rate of £150.
Middlesbrough, North Riding Infirmary.—Cas. O. & H.P., at rate of £150 and £140 respectively.
Newcastle upon Tyne City and County.—Res. surg. O. for Newcastle General Hosp., £550.
Northallerton Emergency Hosp.—Med. supt., £900.
Northumberland County Council, Wooley Sanatorium.—Med. supt., £650.
*Princess Beatrice Hosp., Earl's Court, S.W.*5.—Res. H.S. and cas. O. and res. H.P. and cas. O., each at rate of £110.
Rochdale Infirmary and Dispensary.—Second H.S., £150.
Romford, Oldchurch County Hosp.—Asst. res. surgeon, £350. Also jun. res. M.O., £250.
*Royal Cancer Hosp. (Free), Fulham Road, S.W.*3.—Second asst. pathologist, £300.
*St. Mark's Hosp. for Cancer, City Road, E.C.*1.—H.S., £120.
*Samaritan Free Hosp. for Women, Marylebone Road, N.W.*1.—H.S., at rate of £100.
Wakefield, Clayton Hosp.—H.S., at rate of £150.

The Chief Inspector of Factories announces a vacancy for an examining surgeon at Kirkmichael, Dumfries.

NOTES, COMMENTS AND ABSTRACTS

ANALYSIS UNDER HYPNOTICS

IN the first of two papers read at the meeting of the Medical Society of Individual Psychology on May 9 Dr. Henry V. Dicks said that many patients after anæsthesia with Evipan and Pentothal display a suggestible euphoric state which is very suitable for psychological investigations. He described Campbell's technique which he uses and the precautions he adopts, which render the use of either evipan or pentothal safe even with outpatients. He has found no material difference in the effects of the two drugs. The method sometimes yields surprisingly rapid insight into "depth mechanisms" which are entirely forgotten by the patients in their normal state. He quoted as examples a case of paranoid jealousy in a married woman, where the essential projection mechanism and other important factors came to light in one session, and a case of claustrophobia in a young married woman where a complicated identification and displacement were discovered, the nature of which had been unsuspected. Other cases have been less successful, while in some the investigation has been without result owing to absence of the desired euphoria or to resistance factors the nature and incidence of which is unknown. In treatment evipan is most useful in cases of hysterical conversion and amnesia, when it serves as a reliable substitute for hypnosis. This may prove a valuable way of obtaining quick relief in many hysterical war neuroses where time has to be saved. Where evipan has been used to overcome resistance during the progress of an analysis, or with the object of promoting emotional abreaction, it has not been uniformly successful, for not all patients display the necessary "post-anæsthetic" state. In a case of alcoholism evipan has proved of value both as a substitute and as a means of facilitating the recital of distasteful early memories. Dr. Dicks also quoted an experiment designed to test the power of evipan to cause a person to divulge information he wished to withhold, such as might be practised on criminals or prisoners. This experiment failed, for the subject had complete control over his words on waking. In conclusion, Dr. Dicks said that evipan and allied substances are a useful weapon in diagnosis and in psychopathological research. In treatment they can take the place of hypnosis in the rapid cure of hysterical phenomena, but are no substitute for the real work of analysis of underlying conflicts. The factors making for success or failure cannot yet be defined; the existence of good rapport or a positive transference seem important, and the element of surprise is also useful. Patients are evidently able to form resistances to repeated injections. There is also a pharmacological limitation to frequent administration of what are, after all, toxic substances.

In the second paper Dr. Ellis Stungo said analysis is a superficial investigation into the psyche, and the use of drugs in that connexion implies an even more superficial type of inquiry with the object of achieving rapid results. This is not necessarily the case, for it is possible to gain a profound knowledge of the patient's personality, character, motives, goals and conflicts by means of evipan analysis. His technique consists of injecting evipan sodium intravenously in sub-anæsthetic doses, so producing a light narcosis or hypnotic state. Evipan acts on the higher cortical centres and its effect is to inhibit inhibition. The patient's resistance, conscious or unconscious, is thus overcome, and the doctor can obtain intimate details of personal history which do not depend on the discretion, judgment or good taste of the patient. Information is neither suppressed nor distorted. Uncoöperative patients become accessible, and the development of transference is not as essential as with other psychological techniques. Dr. Stungo maintained that evipan analysis is a practical measure, which is what the patient wants. In his opinion too much time is taken up by psychotherapeutists in searching for life conflicts when all that is required is the eradication of symptoms produced by an acute conflict. This has been successfully achieved in several cases by one evipan investigation and there is no reason to fear relapse on account of rapidity of treatment or analytical superficiality. Cases of long-standing neurosis require deeper analysis, and this can sometimes be achieved by repeated evipan investigation. There are no contra-indications to such a procedure. The most practical application of evipan analysis at the present time is in the treatment of nervous war casualties. These will comprise traumatic cases, cases of anxiety, anxiety hysteria and hysterical conversion, neuroses associated with organic disorders and malingering. Such cases require prompt and effective treatment and evipan is particularly well suited for the purpose. Readily administered, rapidly effective, short-acting, safe in moderate doses, it presents a means of combining diagnosis and treatment. A small dose will immediately calm cases of simple panic. Agitated patients can be anæsthetised by larger quantities, the injured can be relieved of pain and the evipan used for anæsthetic purposes, and malingerers can be readily detected.

HUMAN VIRUS INFECTIONS OF ANIMAL ORIGIN

IN his Chadwick lecture at the London School of Hygiene and Tropical Medicine on May 21 Prof. S. P. Bedson discussed the mode of spread and control of human virus infections of animal origin. None of these, he said, constitutes a major public-health problem but the underlying principles concerned in their control are of general application. Viruses are spread directly in the same way as are micro-organisms, it is only when one comes to the indirect method of spread of infection by water, milk and food that a difference between bacteria and viruses is found, for virus diseases are rarely, if ever, spread by these means. The four virus diseases cowpox, rabies, equine encephalomyelitis and psittacosis represent three modes of transmission: by direct contact, by insects and by the inhalation of infective particles. The eradication of rabies from this country has been rendered possible by our geographical position and the thoroughness with which antirabic measures have been applied. The importance of psittacosis as a disease of man has been increased by the demonstration that birds of the parrot family are not alone susceptible even under natural conditions. Human beings have contracted the disease from fulmar petrels in the Faroes and in Iceland and the other seabirds may be susceptible. The partial failure of the embargo on the importing of parrots and parrakeets in the control of psittacosis in this country is attributed to infection of the home stocks and the occurrence of apparently healthy carrier birds; the existence of the latter largely nullifies quarantine measures applied to incoming birds though the application of the complement-fixation test in the detection of the infected birds might render quarantine effective.

NEW PREPARATIONS

"HYPOLOID" STIBOPHEN.—Under this name Burroughs Wellcome and Co. (Snow Hill Buildings, London, E.C.1) are now producing in this country a trivalent antimony compound of sodium pyrocatecholdisulphonate containing the equivalent of 1 per cent. of antimony trioxide in organic combination. Its manufacture is undertaken by licence under the English patent No. 376346, the objective substance of which is Fouadin (Stibophen). It is presented in an isotonic solution (6·3 per cent.) for intramuscular injection in the treatment of schistosomiasis and is issued in two different packings, one for adults and the other for children. Each package contains the

required number of Hypoloid ampoules in graduated doses for a single course of treatment.

BRITISH JOURNAL OF SURGERY

THE April issue (Vol. 27, No. 108) contains the following articles:

COLLES'S FRACTURE. By J. H. Mayer (London). The frequent failures in the treatment of Colles's fracture are attributed to slipping of the lower fragment in the splint after reduction. The essential part of the reduction is described as being a pronation-twist, and the author holds that to retain the correct position the elbow must be included in the plaster.

A FURTHER REVIEW OF THE INTERINNOMINO-ABDOMINAL OPERATION: ELEVEN PERSONAL CASES. By Gordon Gordon-Taylor (London). Six further operations are reported, making the author's total eleven. Seven of the eleven have survived operation. The technique is briefly discussed, and the importance of nerve-blocking and also of instituting drip infusion before operation are stressed.

A NEW CONCEPTION OF PARATHYROID FUNCTION AND ITS CLINICAL APPLICATION. By Arthur J. Helfet (London). The theory expounded is that parathormone controls the inorganic-phosphate level in the blood by stimulating excretion of phosphate by the kidney, and by mobilising calcium ions from the bones to combine with the phosphate and render it soluble and excretable as calcium phosphate. The phosphorus intake is lessened by administration of aluminium acetate, which combines with the phosphate. The application to diseases of bones is described.

ANNULAR PANCREAS. By G. J. Cunningham (Brighton). In the case described the condition was symptomless. The abnormal part of the pancreas originated from a ventral bud, and its duct had an independent entrance into the common bile-duct.

OSTEO-ARTHRITIS OF THE HIP. By L. W. Plewes (Oxford). In slightly more than half of the 242 cases analysed a definite cause was found and the majority of these were unilateral. Injury and slipped epiphysis were the commonest ætiological factors. Deep X-ray therapy gave encouraging results.

THE SURGICAL TREATMENT OF MID-ŒSOPHAGEAL CARCINOMA. By Harold Wookey (Toronto). The operation is performed in stages. First a gastrostomy is made; then the œsophagus is exposed in the neck and marked by a silver wire. Five days later the œsophagus is exposed by the intrathoracic route, approaching from the right side, aided by division of the vena azygos major. The œsophagus is divided below the growth and removed via the neck. Later the œsophagus is reconstructed by a skin tube. Two of four cases survived operation. One is still well.

BIRTH FRACTURE OF THE TIBIA. By Bryan McFarland. The extreme difficulties of obtaining union are described. The author has been successful in two cases by use of a "by-pass" graft.

SIALOANGIECTASIS. By George Swinburne (Melbourne). The condition is a dilatation of the ducts, terminal ductules and alveoli of the salivary glands. A well-marked case is described, secondary to chronic parotitis. The patient developed pernicious anæmia. The pathology is discussed.

POST-TRAUMATIC CEREBROSPINAL RHINORRHŒA WITH CASE REPORT. By William Gissane and B. K. Rank (London). The early and delayed forms of the complication are distinguished and the lethal nature of the latter commented on. Operative closure of the defect is advised. A successful operation, performed four months after the original injury, is described. A tibial graft was used to close a defect in the roof of the frontal sinus.

ON THE MUSCLE-FIBRES OF THE ANAL SUBMUCOSA, WITH SPECIAL REFERENCE TO THE PECTEN BAND. By J. Fine and C. H. Wickham Lawes (London). Histological examination of post-mortem and biopsy specimens have shown the presence of involuntary muscle-fibres in the submucosa, which form a dense band in cases with annular thickening of the anal submucosa. This thickening, it is concluded, is the "pecten band."

A CASE OF ADRENAL CORTICAL HYPERPLASIA, ASSOCIATED WITH PSEUDO-HERMAPHRODITISM. By I. Douglas Miller and P. J. Kenny. The child had been unsuspectingly brought up as a male till the age of ten years. He had a very marked cortical adrenal hyperplasia, and at operation a well-developed uterus, adnexa and a small vagina opening into the urethra, with a rudimentary penis and hypospadias.

THE TECHNIQUE OF BRACHIAL PLEXUS BLOCK ANÆSTHESIA. By J. Patrick (Sheffield). The supraclavicular route has been used successfully in a consecutive series of 44 cases, with only 1 failure and a complication in 11 other cases. The technique is described, with the dangers to be avoided.

CANCER OF THE STOMACH AS A SURGICAL PROBLEM. By Reginald T. Payne (London). An analysis is given of 506 cases admitted to the wards of St. Bartholomew's Hospital during 1921–32. Only 10 of every 100 cases were submitted to partial gastrectomy, and 7 out of these 10 survived the operation. The possibilities of improving the proportion of operative cures is discussed.

DOUBLE GALL-BLADDER. REPORT OF A CASE AND REVIEW OF 38 CASES. By E. Stolkind (London). The specimen described was obtained at autopsy. It had caused no symptoms. There was a septum of congenital origin dividing the gall-gladder into two equal loculi. The reported cases are analysed.

SUBMARINE SALVAGE. By Surgeon Lieut.-Comm. S. Jenkinson.

DEEP DIVING. By Surgeon Lieut.-Comm. P. K. Fraser.

There are also short notes on rare and obscure cases, and an appreciation of the life and work of Wilfred Trotter.

Births, Marriages and Deaths

BIRTHS

ELLIOT-SMITH.—On May 16, at Oxford, the wife of Mr. Arthur Elliot-Smith, F.R.C.S.—a son.

LISTER.—On May 20, at Bishop's Stortford, the wife of Major Arthur Lister, F.R.C.S., R.A.M.C.,—a daughter.

MCSWEENEY.—On May 13, in Dublin, the wife of Dr. C. J. McSweeney—a son.

RENDALL.—On May 20, at High Wycombe, the wife of Surgeon Lieutenant D. C. Shuttleworth Rendall, R.N.V.R.—a daughter.

STEVENS.—On May 15, in Jersey, the wife of Dr. A. E. Stevens—a son.

WINDER.—On May 16, in London, the wife of Dr. Anthony Winder, of Westerham—a daughter.

MARRIAGES

HAWKINS—SLADEN.—On May 18, at Haddenham, Bucks, Gerald Francis Cæsar Hawkins, B.M., Lieutenant, R.A.M.C., to Patricia Enid Lambart Sladen, of Princes Risborough.

DEATHS

CROSBY.—On May 18, Herbert Thomas Crosby, M.B. Camb. of Gordon Square, W.C.1.

GOLDSMITH.—On May 19, at Aldeburgh, Suffolk, George Harvey Goldsmith, M.D. Camb., aged 72.

HUMPHRY.—On May 17, at Abergavenny, Gilbert Percy Humphry, M.R.C.S.

KELYNACK.—On May 17, at Harpenden, Violet Kelynack, M.B. Edin.

LEVACK.—On May 16, in Norwich, John Sutherland Levack, M.B. Edin., D.M.R.E., aged 53.

MOWLL.—On May 15, in London, Christopher Kilvinton Mowll, M.R.C.S.

PATERSON.—On May 21, in Glasgow, Herbert John Paterson, C.B.E., M.D., M.Chir. Camb., F.R.C.S., of Berkhamsted, aged 73.

RUSSELL.—On May 19, at Instow, Devon, George Blakeley Russell, M.B. Dubl., Major, R.A.M.C. (retd.), aged 79.

ST. AUBYN-FARRER.—On May 20, Claude St. Aubyn-Farrer, F.R.F.P.S.

STEPHENS.—On May 18, at Emsworth, Hants, Lockhart Edward Walker Stephens, C.B.E., M.R.C.S.

TAYLOR.—On May 14, at Perth, William Atkinson Taylor, M.B. Edin., aged 69.

Appointments

DICKINSON, H. J. L., B.M. Oxfd, casualty medical officer at the West Middlesex County Hospital.

KAY, E. JEAN, M.B. Edin., temporary first assistant medical officer at King Edward VII Sanatorium, Hertford Hill, Nr. Warwick.

KEANE, C. A., M.R.C.S., D.P.M., medical superintendent at Northampton County Mental Hospital, Berrywood.

ROSE, W. L., M.B. Sheff., clinical pathologist at the Children's Hospital, Sheffield.

SCOTT, E. D., M.D. Lond., M.R.C.P., hon. physician to the King Edward VII Memorial, Eliot Hospital, Haywards Heath.

STANFORD, SYDNEY, M.B. Lpool., resident surgical officer at Mount Gold Orthopædic and Pulmonary Tuberculosis Hospital, Plymouth.

STEVENSON, D. LANG, F.R.C.S.E., resident assistant surgeon at the David Lewis Northern Hospital, Liverpool.

WILLS, K. L., M.B. Camb., temporary hon. physician to the skin department of the Willesden General Hospital.

ADDRESSES AND ORIGINAL ARTICLES

DEATH IN THE FIRST MONTH AND THE FIRST YEAR

By CHARLES MCNEIL, M.D. Edin., F.R.C.P.E., F.R.S.E.

EDWARD CLARK PROFESSOR IN CHILD LIFE AND HEALTH IN THE UNIVERSITY OF EDINBURGH

IV—Towards Better Control

IN the three preceding papers I have dealt with the causes of death in the first month and the first year of life, and have sketched in a general way defects in our medical and nursing organisation for this period. In this concluding paper I shall summarise briefly what has been said about causes of death, make some definite statements about the faults in our medical and nursing control, and finally make concrete proposals for improvement in our control.

CAUSES OF DEATH IN THE FIRST MONTH AND THE FIRST YEAR

This can only be a general survey of an immense and complicated problem of which our present knowledge is imperfect. These causes may operate before, or during, or after birth; they may be predisposing or immediate. More than one cause may be present—for example, prematurity predisposes to intracranial hæmorrhage, and hæmorrhage may be combined with infection.

Stillbirths and the early neonatal deaths form one great group, with similar predisposing conditions and similar immediate causes.

Prematurity (or immaturity) is an important predisposing condition in stillbirths, in early and later neonatal deaths, and in deaths after the first month. The premature baby is much more liable to intracranial hæmorrhage and is equally liable to earlier and later postnatal infection. If we could control prematurity, we would greatly reduce the infant death-rate. Before we can do that, we must know much more about its causes; this is one of the major problems that require further thorough investigation.

Intracranial hæmorrhage.—In the autopsy series given in the first paper, intracranial hæmorrhage formed a third of the immediate causes of neonatal deaths. Its importance needs no further emphasis; here also research into the predisposing conditions, both antenatal and natal, is needed. Other forms of fatal hæmorrhage may be included—e.g., into the lungs or the abdomen.

Asphyxia is another of the big factors, both in its grosser forms actually causing death and in its minor degrees favouring other factors. Treatment has been improved by more knowledge of the complicated mechanism of respiration. The part played by anæsthetics, analgesics, and other drugs is still uncertain; attention is being paid to these factors at the present time.

Congenital defects form a group which is not negligible but in the present state of knowledge is beyond control. And with this group may be taken that of miscellaneous conditions—hæmorrhagic disease of the newborn, icterus gravis, renal thrombosis, and shock.

Infections.—Antenatal and natal infections occur; but of much greater importance are postnatal infections; these fall into two groups:—

(1) The first occurs soon after birth when natural immunity is weak and when pneumonia, meningitis, and septicæmia can easily develop if a strict nursing routine is not maintained. The prevalence of these early postnatal infections probably varies a good deal; in the first paper it was shown to play a large part in the aggregate of autopsies; but its extent can only be gauged when autopsies are carried out. But it is not enough to know that death has been caused by bacterial invasion of the lungs, the meninges, and the brain. We need to know, and as yet we do not know, by what channels these bacteria enter the body, and from what sources—e.g., food, air, attendants—they come. When we have certain knowledge of the sources and channels of infection, it will probably be easy to create the technique of defence. And among the infections, thrush must be included; it certainly plays a part in fatal neonatal infection.

(2) The second group of postnatal infections come into play after the first fortnight of life and continue throughout the first year of life and later. In this group the two great infections are gastro-enteritis and pneumonia. In all countries gastro-enteritis has been greatly reduced in the last forty years. To this end the motor-car has been a great blessing in removing the horse and the stable from the towns; we have also learnt how to give clean milk to infants. But in our country respiratory infection still takes a heavy toll of infant and child life. Not one, but many factors contribute to this. In the second paper the importance of malnutrition, as one of these factors, has been emphasised—disturbed nutrition produced by mismanagement of feeding, especially of breast-feeding, in the first month of life, lowering the resistance to every kind of infection.

This catalogue of the causes of death from birth to the end of the first year shows how formidable and complex is the problem we are dealing with. In the third paper I have given figures of infant death-rates of our own and of other countries. These figures show that our country as a whole has a much heavier wastage of infant lives. Comparison between one country and another in these matters is subject to allowance for many varying factors, such as climate, housing, and poverty; and strict comparison is hardly possible. But, even if fair allowance could be made for these local variations, we cannot escape the conclusion that the high infant death-rate in Britain is largely due to defects in our medical and nursing control after birth.

PRESENT MEDICAL AND NURSING CONTROL

So far as obstetrical control is concerned, we have little to fear in comparison with that of other countries. Here obstetrics and gynæcology form a completely organised and integrated service, much more so than the other great clinical subjects which make up the material of medical practice—medicine, pædiatrics, surgery. Obstetrics and gynæcology in their teaching provide a thorough grounding in anatomy and physiology; and in Britain they have developed the preventive side of the subject in their antenatal clinics to a greater extent than in most other countries. They have also provided a well-trained nursing service and are at the moment extending the training of midwives.

Pædiatrics is moving towards this standard but is still far short of it. The subject, diseases of children (or disease in childhood), takes a larger place in the medical curriculum than it used to do; but it is still too small, when the important place of the subject in medical practice is considered. More important, the subject is neglected in the professional examinations. In how many medical schools is there carried out the recommendation of the General Medical Council of a test of the candidate's knowledge of disease in children and infant hygiene by the teachers of those subjects? Infant hygiene means the protection of infant health and includes the dietetics of infancy and the healthy regulation of its environment. This subject cannot be taught thoroughly at a children's hospital but only at pædiatric clinics attached to maternity hospitals where is available the clinical material of the newborn in the nurseries and the older babies attending the hospital welfare clinics. A little clinical teaching of infant care and dietetics at maternity hospitals is being given here and there; it is at least a move

in the right direction; it can and ought to be extended. It is only in such clinics that the future family doctors can be trained to deal efficiently with breast-feeding, bottle-feeding, and all the other factors that maintain health in infancy.

Child-welfare service.—So much for teaching, which is fairly adequate as regards disease in children but is quite inadequate as regards health. Consider next the preventive branch of pædiatric practice, corresponding to the antenatal service in obstetrics. Here we have the special health services of school inspection and child welfare. Let us deal only with the child-welfare service, which bears upon our subject of infant health. Entrance to the child-welfare service is secured by the Diploma of Public Health given in the medical schools. The teaching courses for the D.P.H. give a sound training for the work of a medical officer of health, but their training in the work of a child-welfare officer is lamentably scanty. The child-welfare medical officers take up their duties with little more knowledge of infant hygiene than that given to them as medical students; and we have seen how inadequate this is. They are left to learn their subject as they go along; but they have not had a thorough graduation in it at any medical school.

The *nursing service of child welfare* is provided by health visitors or by district nurses holding that certificate. In their short training course of six months, pupil health visitors are taught many things besides infant hygiene, but they do not receive a concentrated thorough clinical training in infant dietetics; and yet, in their practice, that is the subject in which, if properly trained, they might do their most valuable work. In her practice, the great potential value of the health visitor is not realised because of inadequate training. Her training cannot compare in thoroughness with that given to the health nurses of Australia, New Zealand, Holland, and the great towns of U.S.A.

Another serious defect in our health nursing service is the change-over in the critical first month of life from the home midwife or the maternity-hospital nurse to the health visitor. This change and gap in nursing control is often the cause of unnecessary weaning and spells disaster to the baby. In some areas medical officers of health, appreciating this defect, have made special provision for the attendance of health visitors in the first week of life; but this is not the general rule.

The child-welfare service might be described as semi-detached. It tends to work apart from the family practitioner, who often finds himself ousted from his supervision of the baby. Its liaison also with the children's hospitals is weak. The degree of detachment varies in different areas; but, on the whole, the service tends to revolve in an orbit of its own, separated from general medical practice and from the hospitals and medical schools. In too many cases the child-welfare medical officers, giving excellent service to the community, live in professional isolation and spend their lives in a monotonous treadmill of baby clinics.

This list of defects is offered for discussion; and discussion may show some of them to be overstated or incorrect. The child-welfare service is little more than twenty years old, and the broad lines of its organisation are sound. If these alleged faults are genuine, the blame cannot be put upon the medical and nursing personnel of the service; nor upon the medical officers of health who direct the work; nor indeed upon the Government departments of health. The root cause of these defects is the poor training on infant dietetics and hygiene given to the nurses and doctors of the child-welfare service in our medical schools and hospitals. The removal of town children to the country last autumn, showing the low level of cleanness in many of our city homes, and the high infant death-rates in most of our large towns are accusing facts. They are blots on our social and our medical prestige, which have disturbed the medical profession and the general public. The new medicine of health can make some contribution even to the social side of the problem; and it can surely provide a more effective medical control of our heavy loss of life in the first year.

BETTER CONTROL

As regards the sick child, the material of study and of teaching is provided in the children's hospitals. The problem of health in infancy and childhood, if it is to become an applied science, also must have its material of study, its clinical material of healthy babies followed from birth through childhood. Where can this material be found in a form suitable for study and teaching, so that the science of child health can be applied in practice in the homes of the people? Only in a maternity hospital where students and nurses are taught, with modern equipment for pathological and physiological investigations, with an adequate clinical and scientific staff, and with a child-welfare clinic attached, so that the baby can be kept under continued observation. The problem of health in childhood is not a simple affair and certainly not an automatic process which solves itself. Health is wholeness or integrity of life, the life of the soma and of psyche also. The problem of health in the child is immense and complicated; it is one of the major problems in the world of human society; and it is one to which medicine can make a great contribution. As yet only a beginning has been made, but the approach to the problem of study and teaching has been made in the right place—the nurseries and follow-up infant clinics of maternity hospitals. It is by the furtherance of pædiatric study and pædiatric teaching at maternity hospitals that we can win and disseminate fuller knowledge of infant and child health.

Maternity-hospital pædiatric unit.—The pædiatric service at maternity hospitals needs to be extended and strengthened both on its clinical and scientific side. At present in most hospitals the staff consists of one pædiatrician with perhaps an assistant. Such a staff can do little more than deal with cases of illness, supervise the nursing routine, and keep a register of deaths. It is important that some kind of clinical record should be kept of every baby; and each maternity hospital has its own type of baby chart. The first fortnight of life is crowded with events, physiological as well as pathological, and the baby chart should be so planned as to include a record of these and of relevant data of the labour and pregnancy. With a small staff and many cases the keeping of good records can be made easier by the use of abbreviations and symbols. Fig. 6 shows a chart based on that used in the Edinburgh Maternity Hospital. These symbols have been of great use in allowing a full record to be made with the minimum of trouble, in giving the pædiatrician and obstetrician a clear and full *picture* of the clinical story, and in training the nursing staff in clinical observation. A good neonatal record is also invaluable when the baby returns for supervision at the infant clinic. The maternity hospital has the complete charge of the baby for the first two weeks, and in a few cases for longer. But these two weeks are crowded with cases of fatal and non-fatal illness; and even health is then a doubtful equilibrium and requires close observation. Under these conditions good records are essential for an efficient clinical routine; and, if to this routine are added research and teaching, not only is a strong clinical staff required, but there must be as well a pathologist and bacteriologist and a secretary to index and file records. And if, as is now the case at most maternity teaching hospitals, an outpatient baby clinic is attached, the need for strengthening the pædiatric staff is still stronger. The first month and the first year of life form a great field for research and for teaching, a field which ought to yield a rich harvest of life-saving knowledge; but it can only be made to do so by the labour of research and of teaching.

Maternity-hospital training school in infant care and dietetics.—It will be agreed that all whose work is the protection of infant health—doctors in family practice and the child-welfare service and nurses—should be well trained. The complete clinical material for

FIG. 6

BABY CHART: THE FIRST MONTH

Name BABY X.Z. *Sex* m. *Address* 9 Y. STREET, EDINBURGH

PREGNANCY:—*No.* 3 *Mother's Age* 29 *Illness* PRE-ECLAMPTIC TOXAEMIA – SEVERE.

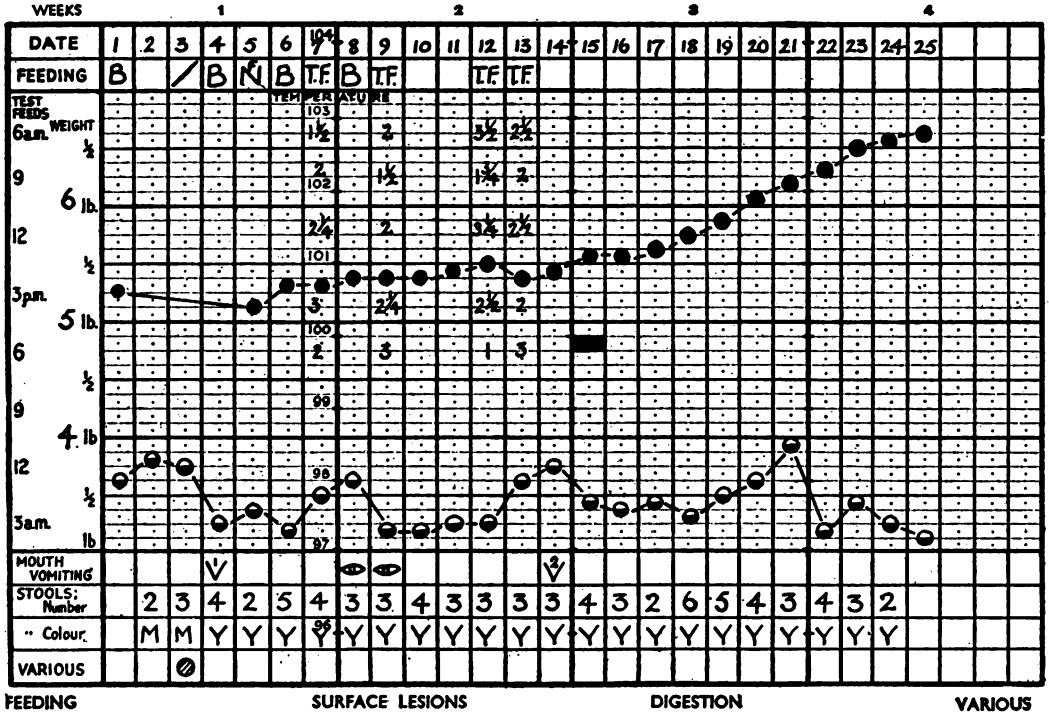
Previous Pregnancies:— ♀ ♂ ○ ○ ○ ○ ○ ○ ○ *PUERPERIUM*: RAPID RECOVERY

LABOUR:—*Presentation* VERTEX R.O.A. *Character* MID-CAVITY FORCEPS. *Duration* 13 45/60 hours.

INFANT:—*Condition at Birth* SHOCKED – ASPHYXIA PALLIDA. *Maturity* ? 36 weeks.

Birthday 1st November, 1939.

CLINICAL CHART



FEEDING

BREAST-FEEDING	B
" " Test feed	T.F
" " Supplemented	B
BOTTLE-FEEDING (Cow's Milk)	
" " Fresh	Af.
" " Condensed	Ac.
" " Dried	Ad
NIPPLE, RETRACTED, FISSURED	N., N

SURFACE LESIONS

MOUTH, thrush	
EYES, catarrh —right, left	
NOSE, "	
EARS—right, left	
SKIN	
UMBILICUS	
JAUNDICE	J

DIGESTION

VOMITING, slight	V
" definite	V
" blood	V
BOWELS, diarrhœa	A
" constipation	A
" blood	A

VARIOUS

CONVULSIONS, major	*
" minor	*
COUGH	∧
COLOUR CHANGE (cyanosis)	⊘
PREVIOUS PREGNANCIES, miscarriage	●
" " stillbirth	♂ ♀
" " postnatal death	♂ ♀
" " alive	♂ ♀

Clinical Notes, and Directions for Use of Chart, on the back.

Weight ●

Temperature ⊖

Separation of Cord ▬

teaching them is to be found at maternity hospitals. It is there that training schools in infant care and dietetics should be established. Research goes hand in hand with teaching. But for our present evils teaching offers the more immediate remedy; and I shall now make suggestions about the way in which the remedy of teaching may be applied.

These papers have discussed the infant death-rates in the first month and the first year. Everyone agrees that these deaths can be controlled more effectively by the prevention of the diseases that cause them, than by their cure: this is true both of the deaths in the first month and of those in the later months. The early neonatal deaths from prematurity, hæmorrhage, and asphyxia are hard to reduce but are being dealt with by a well-trained and organised obstetric service. The nearly neonatal deaths from infection can be reduced by a stricter nursing technique in the first week or two after birth. Our infant death-rates in the first fortnight after birth are as low as those of other countries and testify to the efficiency of our obstetric service. But after the first fortnight our infant wastage continues to be heavy, while that in Holland, Australia, New Zealand, and U.S.A. rapidly falls off. The claim has been made in the second paper that this is largely due to the mismanagement of feeding, especially of breast-feeding, in the first month. If this is true, heavy loss of infant lives after the first fortnight can be reduced by giving to all doctors and nurses in charge of infants thorough instruction in the dietetics of the first month. Breast-feeding and bottle-feeding in the first month must therefore be the principal subject in the training of all who are concerned with child welfare. If sound digestion and good nutrition can be established in the first month, the baby is given its best defence against later infections.

The nurse.—Not merely by courtesy but also because of the more important part played by the nurse in infant health, the training of the nurse will be

considered first. Our nursing service of health visitors can best learn the theory and management of breast-feeding (and of bottle-feeding) at maternity hospitals, where they can be taught the process at its very beginning in the nurseries and its early difficulties in the follow-up baby clinic. This can be done without any change of policy but by arrangement between the authorities of the medical schools and hospitals and the Departments of Health. This change in teaching would make a great improvement in nursing practice. The health visitor, well trained in dietetics and in the other points of infant care, should herself manage these problems of normal dieting, and should do so in the home.

It is essential that nursing control should be exercised by the same individual from birth; and that the vicious fault of transfer from the midwife to the health visitor sometime in the first month should be abolished. The health visitor is responsible for the baby throughout the first year; and it is she who should be in charge, either from birth or from the end of the first week, when lactation and digestion come into full play.

The whole training of health visitors and their previous hospital experience needs drastic revision; this will probably have to wait for easier times. But a careful study of the training of nurses and of their use in child-welfare service in those countries in the old and new world that lead us in their control of infant mortality strongly suggests that these low infant death-rates are due more to the thorough and concentrated training of the nursing service than to any other factor.

The doctor.—The maternity-hospital pædiatric clinic can give medical students and child-welfare doctors that thorough and practical training in infant dietetics and health which at present is lacking. The part played by the general practitioner in child-welfare work is too often forgotten; of the benefits claimed for the official child-welfare service a considerable and unacknowledged part is due to the family practitioner working in the home. The value of the work done by both these types of child-welfare doctors can be greatly increased by better teaching. It is common talk in the official health services that the work of the general practitioner in preventive medicine is passing from him. That forecast will be settled by the medical practitioner. He touches the problem of infant and child health at its centre—in the home where the battle of health is fought, and won or lost. If he is taught in his medical school something of that physiology which is infant health, especially about infant feeding, digestion, and nutrition, the family doctor, practising in the home what he has been taught, can make a more powerful contribution to the problem than can the doctor in the clinic. It will be a disaster if this contribution is weakened by poor training or by the encroachment of the official child-welfare service. The medical profession may be trusted in this to safeguard its own interest and the welfare of the child.

Some remarks may be made about the direction of this trained health service of nurses and doctors in their practice. There should be a change in direction. The nurses should be in the first line; the doctor should be in support. The centre of action should be in the home; the clinic should be subsidiary. This is a double shift of emphasis, from the doctor to the nurse, and from the clinic to the home. There should be a concentration upon breast-feeding, and a special effort should be made to overcome difficulties, thus ensuring at once good nutrition and the best defence againt disease. These are the hallmarks of the infant-health service in those other countries that have gone far beyond us in their reduction of the infant death-rate.

Dr. J. S. Fairbairn* has urged for years a policy of coöperation in the protection of health of the mother and the child—a policy to be worked out in maternity hospitals, beginning in the antenatal clinic and ending in the infant and child clinic, and accompanied by a combined course of teaching of what he has called constructive physiology. This is no castle in the air. The fabric of the policy is already provided by the organisation of our maternity hospitals; and its maternal side is now well developed. It remains to develop and link up the study and teaching of health problems in the child; and we have hardly begun this immense task. In the whole plan of child health the first month of life is of great strategical importance. If we can bring death and disease in the first month under more effective control, this mastery will show itself throughout the first year in better health and fewer deaths. At present our infant death-rates throughout Britain, especially in our towns, are far too high, because our control of infant health is second-rate.

* Fairbairn, J. S. *Lancet*, 1927, 2, 163, and *Edinb. med. J.* 1935, (transactions) p. 63.

I wish to express my thanks to members of the pædiatric unit of the Edinburgh Maternity Hospital who have helped in the preparation of these papers; to Dr. Agnes Macgregor, pathologist; Dr. J. L. Henderson for his analysis of the pathological records; and to Miss M. E. Dixon, secretary, for the graphs and figures. I am also greatly indebted to Prof. van Creveld of Amsterdam; Prof. A. Wallgren of Gothenburg; and Dr. H. M. Bundesen of Chicago for giving me recent verified figures and other information.

INTERSTITIAL EMPHYSEMA AND PNEUMOTHORAX

AFTER OPERATIONS ON THE NECK

BY H. J. BARRIE, B.M. Oxfd

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AMONG the postoperative catastrophes following operations on the neck mediastinal emphysema, often with single or bilateral pneumothorax, has received very little attention. A possible explanation is that the test for pneumothorax is often omitted in routine necropsies and, when the ribs are cut through with a knife, the strong downward pressure masks the rush of air that may take place when the pleural cavity is opened.

This test for pneumothorax is a routine at the London Hospital. After median incision the skin and pectorals are stripped away from the chest wall in one flap. Each gutter so formed is filled with water, and a narrow bladed knife is plunged through the water into the pleural cavity. The blade is rotated to enlarge the opening, and air, if present, bubbles out through the water.

The most probable fate of such cases is that they are pigeon-holed with the uneasy group of massive collapse of the lungs. The distinction during life is a very practical one; for, if the proper negative pressure in the thorax could be restored, death might be prevented. The following four cases illustrate this condition. In three the operation was partial thyroidectomy. I saw the first two in the post-mortem room and found the third in the records of the Institute of Pathology of the London Hospital. In the fourth the operation was tracheotomy for œdema of the glottis. In a fifth case (not reported here, because necropsy was refused) the patient had shock and cyanosis after partial thyroidectomy. The next morning she had greatly improved. Oxygen was given for residual cyanosis. Twenty-two hours after the operation she suddenly collapsed, with symptoms of obstructed respiration, and died within two minutes.

CASE-RECORDS

CASE 1.—Female, aged 42, with loss of weight and symptoms of hyperthyroidism for a year.

Operation.—Partial thyroidectomy. Avertin was given in the ward and no atropine. In the theatre an attempt was made to introduce an intratracheal tube; this produced coughing, with excess mucus and cyanosis. Atropine gr. 1/75 was then given, and then open ether, with a change to gas and oxygen as soon as the patient was under. Ten minutes after the start of the operation and before the hyoid muscles had been divided the patient became cyanosed and stopped breathing. She improved and was again given open ether but never regained her proper colour. Nine hours later, in the ward, she suddenly became dark blue and died.

Post-mortem findings.—A stout woman with recent sutured semicircular incision on the lower part of the neck. Deep cyanosis of face. Puffiness from subcutaneous emphysema of the face, especially round the left eye. The thyroid has been removed except for the posterior borders on each side, which consist of bars 4 × 1 × 1 cm. Bed dry and clean. Field of operation separated from the cupula of the pleura on each side by an intact layer of fascia. The only place where the fascia is loosely disposed and appears to provide access to the thoracic cavity is round the innominate artery. Considerable interstitial emphysema of the tissues round the field of operation and in the anterior mediastinum. Pericardium and mediastinal pleura in places lifted up by bullæ of air. Air under pressure in both pleural sacs, more in the right than in the left. Abundant tenacious mucus throughout the trachea and bronchi. Both lungs collapsed; the right contains no air, and the left only a little in the upper lobe and anterior borders. Apart from this the parenchyma appears normal. There is diffuse lymphatic hyperplasia but no other notable changes in the remaining organs.

Experimental procedures.—With the corpse lying head downwards the cupulæ of the pleura were filled with a solution of methylene blue, and there was no leakage of the solution into the neck. Removal of the lungs had so damaged the mediastinal pleura that a similar test was not possible in the middle line. With the lungs under water, air was introduced under pressure, first into each main branch of the pulmonary artery, and then into the bronchi. No air escaped, except from a small area at the reflexion of the pulmonary ligament, where the underlying lung parenchyma had been injured during removal.

CASE 2.—Female, aged 53, with nodular enlargement of the right lobe of the thyroid and symptoms of hyperthyroidism. The left lobe had been removed some four years previously.

Operation.—Removal of nine-tenths of right lobe and isthmus. The left lobe was absent. A sucking noise was heard during the operation; so the right internal jugular vein was tied. Omnopon and scopolamine anæsthesia. Local infiltration with Procaine and adrenaline. Gas and oxygen. There were no symptoms of obstructed respiration during the operation. At 6 A.M. the next morning the patient became very blue, gasped, and died.

Post-mortem findings.—A fat muscular woman. Dry cavity at site of right lobe of thyroid with tube leading out through transverse incision. Considerable emphysema of connective tissue throughout prevertebral tissue of neck, in superior and anterior mediastinum, and in interlobar septa of lungs, but only a few scattered blebs in interlobular septa under the pleura. Strong rush of gas from both pleura in pneumothorax test. Collapse of greater part of left lower lobe, of rather less than half of left upper lobe, of posterior half of right lower lobe, of subpleural zone 1·5 cm. deep over right upper lobe and with œdema of lower posterior and mesial two-thirds of right middle lobe. Acute vesicular emphysema of rest of lungs. No detectable perforation of domes, visceral pleura, or trachea. No tuberculous lesions found in lungs. Bilateral small remnants of largely colloidal and nodular goitre; left remnant bound by dense scar tissue to trachea. Slight subcutaneous emphysema for a distance of only 2 cm. around operation wound. Slight hypertrophy of heart chiefly left ventricle.

CASE 3.—Female, aged 50, with a small lump in the right lobe of the thyroid, associated with three years' breathlessness and palpitations.

Operation.—Partial thyroidectomy. Anæsthetic: Procaine and adrenaline infiltration and then gas and oxygen. Immediately after the intratracheal tube was removed there was deep cyanosis, despite a free upper airway. The tube was replaced, but she still had distress of respiration, and the chest was not moving at all. Retraction of the lower part of the chest. Breathing sounds like asthma. Percussion note resonant. She improved with oxygen. The nasal tube was removed at 11 P.M. At this time the ankle-jerks and knee-jerks were increased, and the chest signs were the same, with distress on respiration. Patient died at 2.50 A.M.

Post-mortem findings.—A wasted edentulous grey-haired woman. Clean collar incision with a tube leading into dry clean cavity on the left side. Phrenic and recurrent nerves on each side free from ligature. Collapse of all lower lobe of left lung, except a few small areas on posterior and mesial aspects. Collapse of lower border of left upper lobe and of posterior two-thirds of right lower lobe, and of a subpleural area in posterior part of lower border of right upper lobe. Considerable alveolar emphysema of rest of lungs. Thick viscid mucopus in bronchioles in the collapsed areas, completely filling the bronchi and forming plugs filling segments of the lumen of the trachea. Collapsed areas in lung dark red, containing a considerable amount of blood. Great distension with gas of superior and anterior mediastinal tissues. Subcutaneous emphysema of lower neck and anterior chest as far down as breasts. Bilateral pneumothorax proved by the water test and by the diaphragm being pushed down like a partly inflated balloon as far as the right sixth and left fifth ribs. No rupture seen between mediastinal tissues and pleural cavities. Glandular thymus. Tonsils enlarged.

CASE 4.—Female, aged 55, underwent tracheotomy for œdema of the glottis.

Post-mortem findings.—Cellulitis of neck extending from small abscesses in connective tissue outside left tonsil. Severe œdema of the glottis. Tracheotomy wound 2 cm. long in right side of the trachea, through fourth to seventh rings. Subcutaneous emphysema of face, eyelids, neck, chest, and axillæ. Bilateral pneumothorax, determined by rush of gas on opening the chest; water test not made. Collapse of greater part of lower lobe of right lung and anterior and lower part of right upper lobe and of right middle lobe. Collapse of left lung, except a few central areas in left upper lobe.

DISCUSSION

The origin of the interstitial emphysema and that of the pneumothorax require elucidation.

Source of interstitial emphysema.—There is no evidence that air escaping into a pleural cavity from a ruptured superficial vesicle of the lung ever gets through intact pleura into the surrounding tissues. Interstitial emphysema besides pneumothorax might possibly result from operative perforation of the cupula of the pleura in thyroidectomy. In cases 1 and 2 the cupula was found at necropsy to be intact. In the necropsies on cases 3 and 4 the cupula is not mentioned, but it is the rule in the summaries of necropsies of the London Hospital to mention lesions and omit negatives. It is, moreover, very unlikely that surgeons as skilled as those who operated would damage the pleura without knowing it. There can be little doubt that the interstitial emphysema was caused either by air being drawn into the wound by

the suction of the thoracic pump or by air from a ruptured vesicle of the lung entering the pulmonary interstitial tissue and extending thence into the mediastinum. Pulmonary interstitial emphysema often follows obstruction of respiration, as in bronchopneumonia, diphtheria, and asthma. Obstructed respiration was an outstanding feature in cases 1, 3, and 4, and in the fifth case mentioned the right recurrent nerve was compressed with forceps. In these cases no pulmonary interstitial emphysema was observed at necropsy, though in case 3 there was considerable alveolar emphysema of the parts that were not collapsed. In case 2, in whom there was no sign of obstruction of respiration during the operation, pulmonary interstitial emphysema was observed at necropsy, but it could have extended from the mediastinum. A sucking noise heard during operation makes it virtually certain that the wound was the site of entry of air. The distribution of the subcutaneous emphysema in cases 1, 2, 3, and 4 suggests that it was spreading from the wound. In none of the cases was there any evidence of rupture of a pulmonary vesicle into the interstitial tissue. There can be little doubt that the air entered through the operation wound in most, if not all, cases.

Source of pneumothorax.—Reasons against damage to the cupula have been given above. Pneumothorax might result from pulmonary interstitial emphysema. Macklin (1937) has produced mediastinal emphysema and bilateral pneumothorax by experimental localised over-inflation of the lung. As mentioned above, however, there is no certain evidence that pulmonary interstitial emphysema was the source of the air in my four cases on which there were necropsies. Also, in Macklin's experiments the pneumothorax was bilateral and could not, therefore, be attributed directly to the pulmonary interstitial emphysema of the inflated lung. There can be no doubt that the bilateral pneumothorax was directly due to the mediastinal emphysema in his experiments. Keis (1934) collected seven cases, all fatal, of mediastinal emphysema following thyroidectomy. Four had bilateral pneumothorax also. In two cases mediastinal emphysema was observed during the operation. He inflated the mediastinum of a corpse and produced pneumothorax. I have repeated his experiments and found that, if the mediastinum is inflated with even moderate pressures, the mediastinal pleura is lifted up, small blebs form within it, and air percolates into the pleural cavity. The process can be watched best by removing part of the lateral chest wall and filling the pleural cavity with water. The air usually escapes first just above the hilum of the left lung. Watching the air infiltrating through the tissue planes I got the impression that it infiltrates through the connective tissue and passes along under the pleura until it reaches a weak spot, where it then passes through. It can be concluded, therefore, that in such cases the pneumothorax is caused by rupture of air from the mediastinum, whether the port of entry of the interstitial emphysema be the wound or the lung.

In all cases death was sudden, even although cyanosis had existed. This may be explained either by a stage being reached when the compensatory respiratory movements were rendered inadequate by the mounting pressure within both thoracic cavities, or by a pneumothorax of one cavity being suddenly followed by that of the other. It is surprising that with the powerful suction exerted by the thorax air does not enter into the mediastinum more often during operations on the neck. It may enter more often than has been recognised, because a small amount may be symptomless. For great and extensive interstitial emphysema, obstruction of respiration is undoubtedly an important factor, as Keis emphasised. The dyspnœa causes the chest movements to be more powerful. In thyroid operations intubation, formation of mucus, œdema, pressure by goitre, and surgical interference with the recurrent nerves are all possible causes of dyspnœa. In case 1 respiration was obstructed even before the operation, and the attempts at anæsthesia were a series of catastrophes. In case 3 respiration was almost completely obstructed whenever the tube was removed. In the fifth case mentioned a note was made during the operation that the right recurrent laryngeal nerve was found to be grasped in artery forceps.

Diagnosis in these cases should be easy. During or soon after operation the patient becomes cyanosed and dyspnœic. This may be associated with obstructed respiration, but, when the obstruction is relieved, the cyanosis remains, though it may not be quite so deep. The heart may not be displaced, for the pneumothorax may be bilateral. None of the case-records mention any signs that might be characteristic of mediastinal emphysema, but the houseman (Mr. F. K. S. Hirschfeld) diagnosed the pneumothorax in case 3 before death. The diagnosis should be most easily confirmed by inserting a needle into the pleural cavity with one end attached by a short length of tubing to a mercury or water manometer, and by noting the existence of a decreased negative, or even a positive, intrapleural pressure.

Treatment.—We have not had the opportunity of trying the effect of treatment on any of these cases. Three lines suggest themselves:—

(1) Removal of air from the pleural cavities. Relief could be obtained by draining out some of the air with a needle inserted between the ribs. The rationale of this method lies in the fact that the opening in the pleura from the mediastinum is almost certainly valvular, and so the air accumulates in the pleural cavities under pressure. If a pneumothorax apparatus or vacuum bottle is available, it might be possible to go further and restore the negative intrathoracic pressures. It should be remembered that the pneumothorax is most likely bilateral, and that in this case constant suction with a Roberts bottle on one side is essential if an under-water drain is being used on the other side.

(2) Removal of the obstruction of respiration, if any exists.

(3) Prevention of entry of any free air into the deep tissues of the neck. In the case of thyroidectomy wounds any tube drain should be removed and the wound closed.

SUMMARY

Four proved cases of death from interstitial emphysema with bilateral pneumothorax, three following partial thyroidectomy and one tracheotomy, are described and discussed. A fifth case, after partial thyroidectomy, is also mentioned, but there was no necropsy.

It is concluded that the air entered the tissues from the wound rather than from the lung and never from a damaged pleural cupula, while the air entered the pleural cavities from the emphysematous mediastinum.

My thanks are due to Prof. H. M. Turnbull for permission to make use of the records of the Bernhard Baron Institute of Pathology for cases 2, 3, and 4 and for his valuable assistance.

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ANTISERUM AND SULPHAPYRIDINE IN MENINGOCOCCAL INFECTIONS IN MICE

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THE spectacular results of using sulphonamides in cerebrospinal meningitis are founded on laboratory studies of experimental meningococcal infection of mice.

Buttle, Gray, and Stephenson (1936) showed that *p*-aminobenzenesulphonamide (sulphanilamide) would protect mice against experimentally induced meningococcal septicæmia. Proom (1937) demonstrated that this preparation was effective when given by mouth, and that it could protect against a million fatal doses of meningococci, provided that the administration of the drug was begun immediately after the inoculation of the organisms. When treatment was delayed for several hours, however, much less protection was obtained.

In the treatment of an established infection in mice both Branham and Rosenthal (1937) and Brown (1937) reported that the combined administration of sulphanilamide and antimeningococcal serum gave better results than either drug or serum alone.

Cerebrospinal fever in man was at first treated with the drug and the serum, and the results were far beyond expectation (McIntosh, Wilcox, and Wright 1937, Mitchell and Trachsler 1937, Jewesbury 1938). Successful results obtained with sulphonamides without serum were later reported by Schwentker, Gelman, and Long (1937), Crawford and Fleming (1938), Somers (1939), and Bryant and Fairman (1939). Of particular interest, however, are the papers by Banks (1938, 1939), both because of the relatively large number of cases treated and because of the carefully controlled manner in which his investigations were carried out. In one series of 65 cases serum ("meningococcus antitoxin" P. D. and Co.) was given intravenously in large amounts and sulphanilamide in various dosages, and there were 8 deaths. A comparable series of 72 cases was treated by chemotherapy alone in large dosage, and there was 1 death. This remarkable result may be regarded partly as a personal triumph for Dr. Banks and his nursing staff, because the results obtained elsewhere are far less remarkable. Banks (1940), for example, gives some figures, supplied by Dr. E. L. Sturdee, of the results obtained by chemotherapy alone in hospitals throughout England and Wales in 1937–39. There were 100 patients, and 29 died. Harries (1940) has described another 100 cases treated with sulphapyridine only, with 8 deaths.

The following figures may serve as a basis for comparison with these. Before the introduction of serum therapy the case-mortality of cerebrospinal fever was 60–80 per cent. Treatment with adequate amounts of serum at the earliest possible moment will reduce this figure to a third or even less, provided that the serum contains specific antibodies for the prevailing type of meningococcus. Wadsworth (1932), for example, obtained a case-mortality of 18·4 per cent. among 742 patients of all ages; and Banks (1938) has reported a series of 38 cases with 6 deaths.

The question at issue is whether antimeningococcus serum can still be usefully employed as an adjuvant to chemotherapy, or whether, as Banks insists, it should be entirely dispensed with. The Ministry of Health (1940) appears to favour the latter view. Laboratory studies, which can be conducted under controlled conditions impossible in clinical practice, do not support this contention. The practical importance of this problem at the present time justifies the publication of the following experiments which, it is hoped, may induce clinicians to give a further trial to combined treatment with sulphapyridine and antimeningococcus serum.

TECHNIQUE

Mice were inoculated with a highly virulent strain of meningococcus suspended in mucin. One group received the test dose of organisms alone, while other groups received also serum, or sulphapyridine, or a combination of these. The interval between the inoculation of the meningococci and the institution of treatment was varied in different experiments, while the dosage of the drug or of the serum was kept constant.

Two group-I meningococcus strains, here designated 198 and 220, were chosen for this work because of their exceptional virulence to mice. Both of them were originally obtained from Dr. W. M. Scott, of the Ministry of Health, No. 198 in May, 1939, and No. 220 in February, 1940. Each had been recently isolated from a case of cerebrospinal fever. They were maintained on nutrient agar containing 2 per cent. of bacteriological peptone (Evans Sons Lescher and Webb), 0·5 per cent. of glucose, and 5 per cent. of defibrinated horse blood. Subcultures were made at intervals of twelve hours, and the strains were passed through mice at least once a week.

A five-hour culture was used for infecting the mice. After the water of condensation had been removed and discarded, the growth was thoroughly dispersed in plain nutrient broth and then further diluted with the same medium until the suspension matched the opacity of a standard suspension of barium sulphate. The number of organisms required to produce this degree of opacity was approximately 600 million. No great importance is attached to the estimate of the number of cocci injected, because the usual methods of enumerating bacteria are associated with a large experimental error. In each experiment the activity of the suspensions was tested by determining the minimal lethal dose (M.L.D.) by titration on groups of 5 mice, and in this way it was possible to express the test dose in terms of the number of M.L.D. injected. All dilutions were made in plain broth, except the final dilution, which was prepared in a 5 per cent. solution of mucin. This mucin was obtained from the Wilson Laboratories, Chicago, under the designation Granular Mucin Type 1701 and was prepared according to the method of Miller and Castles (1936).

The infecting dose was injected intraperitoneally in a volume of 1·0 c.cm. The dose of sulphapyridine was 20 mg. suspended in 0·5 c.cm. of physiological saline. This was injected into the lumen of the œsophagus with a wide-bore needle, of which the point had been removed and the end ground to a smooth bevel. The serum used in each experiment was taken from a batch of multivalent antimeningococcus globulin prepared for normal issue. A volume of 0·004 c.cm. of this solution of globulin protected mice against 1000 minimal infective doses of group-I meningococci. The serum was injected intravenously. The mice weighed 17–21 g. A pure-line strain not being available, it was necessary to use about 20 mice in each test group. The time between infection and treatment varied in different experiments between four and thirteen hours. With the two strains of meningococci employed invasion of the blood-stream could be demonstrated two hours after the injection of the test dose of organisms.

RESULTS

The results of thirteen therapeutic and two prophylactic experiments are summarised in table I. The inclusion of several variable factors renders these numerical data unsuitable for statistical analysis, but it is admissible to give the totals obtained by adding the figures of each experiment, provided that it is clearly recognised that these totals (table II) must be regarded as an indication of the trend of the results and not as an accurate analysis.

In every experiment the number of deaths was least in the group of mice that received both sulphapyridine and serum. In some cases the superiority of the combined treatment is admittedly not great, and the differences are not statistically significant. In

TABLE I

RESULTS OF TREATMENT OF EXPERIMENTAL MENINGOCOCCAL INFECTION OF MICE

Expt.	Strain	M.L.D. injected	No. of cocci in 1 M.L.D.	Interval between test dose and treatment	Controls (no treatment)			Treatment								
								Serum only			Sulphapyridine only			Serum and sulphapyridine		
					No. of mice	Died	Survived	No. of mice	Died	Survived	No. of mice	Died	Survived	No. of mice	Died	Survived
1	198	1000	2000	6 hours	10	10	0	10	10	0	10	7	3	10	6	4
2	,,	10,000	200	6 ,,	10	10	0	20	18	2	20	18	2	20	3	17
3	,,	100	20,000	6 ,,	20	16	4	40	10	30	20	3	17	20	1	19
12	,,	1000	2000	5 ,,	20	20	0	20	16	4	20	13	7	20	8	12
13	,,	1000	2000	5 ,,	20	20	0	20	15	5	20	10	10	20	0	20
4	220	10,000	200	6 ,,	20	18	2	20	10	10	20	1	19	20	0	20
5	,,	10,000	200	6 ,,	20	19	1	20	20	0	20	19	1	20	17	3
6	,,	10,000	200	5 ,,	20	19	1	20	18	2	20	20	0	20	10	10
7	,,	100,000	20	4 ,,	20	17	3	20	8	12	20	13	7	20	1	19
8	,,	10,000	200	4 ,,	20	20	0	—	—	—	50	16	34	50	10	40
9	,,	1000	2000	5 ,,	20	19	1	20	18	2	20	10	10	10	0	10
10	,,	100,000	20	5 ,,	20	19	1	20	19	1	20	20	0	20	8	12
11	,,	100,000	20	5 ,,	20	20	0	20	20	0	20	15	5	20	6	14
P	198	100	20,000	0 ,,	10	10	0	10	0	10	20	0	20	10	0	10
P	220	100,000	20	0 ,,	20	20	0	10	0	10	20	2	18	20	0	20

P = prophylaxis. In the two prophylactic experiments the amount of serum injected was 0·01 c.cm.

experiments 2, 6, 9, 10, and 11, however, the results indicate that the drug and serum exerted a synergic action, the combined effect being considerably greater than that produced by either alone.

The case-mortality should not be taken as the sole criterion of success. Further information can be obtained by a comparison of the average duration of illness in the mice (see table III).

COMMENTS

The results, taken as a whole, clearly demonstrate the value of giving serum besides sulphapyridine to cure experimental meningococcal septicæmia in mice. Such a procedure is, moreover, entirely rational. Without treatment the host's natural defences, inhibited by the mucin, cannot prevent rapid multiplication of the invading organism. Sulphapyridine prevents this multiplication and so gives the host time to reorganise its immunological mechanism. If the administration of the drug is unduly delayed, the overwhelming number of organisms already present precludes the possibility of recovery, because the toxins liberated by autolysis of the meningococci will exert a lethal effect after the cocci have ceased to proliferate. On the other hand, when the combined treatment is given, sulphapyridine holds the organisms in check while the specific antibodies injected, together with such natural defences as the host may succeed in mobilising, are rendered immediately available for killing the invading organism and neutralising its toxins. These fundamental principles are valid whether the host is a man or a mouse. Clinical experience, however, does not favour the addition of serum to sulphonamides; yet the results of the experiments here recorded seem to call for further trial of a method so essentially rational.

TABLE II—ANALYSIS OF RESULTS SHOWN IN TABLE I

Treatment	Infecting strain, 198		Infecting strain, 220	
	No. of mice	Survivors	No. of mice	Survivors
None (controls) ..	80	4	160	9
Serum only	110	41	140	27
Sulphapyridine only ..	90	39	190	76
Sulphapyridine and serum	90	72	180	128

SUMMARY

A meningococcal septicæmia, normally fatal, was produced in mice by intraperitoneal injection of a highly virulent group-I strain of meningococcus suspended in mucin. At various periods after infection the mice received sulphapyridine, or antimeningococcus serum, or a combination of these. The combination of drug and serum gave better protection than that obtained with the drug alone. The average case-mortality in mice treated with sulphapyridine only was 59 per cent., whereas the giving of serum besides the drug reduced it to 26 per cent. It is suggested that the use of antimeningococcus serum, given intravenously, as an adjuvant to chemotherapy in human cerebrospinal fever deserves further clinical trial.

TABLE III—VALUE OF COMBINED TREATMENT IN CUTTING SHORT THE ILLNESS

(Figures taken from protocol of expt. 13)

Treatment	Average duration of illness (hours)	
	In mice that died	In mice that survived
None (controls)	22	—
Serum only	45	52
Sulphapyridine only	45	61
Sulphapyridine and serum ..	—	21

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ATROPINE AND ERGOTOXIN AS ANTIDOTES TO SCORPION TOXIN

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ONE of us (A. H. M.)[1] has demonstrated that scorpion toxin[2] is a powerful stimulant of the autonomic nervous system. Solutions of the toxin, freed completely from other telson proteins, produce a rise of blood-pressure in the anæsthetised dog which is abolished or even reversed by the administration of ergotoxin. In the rabbit scorpion toxin produces a hyperglycæmia lasting three or four hours. In the isolated toad's heart it causes acceleration and augmentation of the beat, and it produces immediate relaxation of the virgin guineapig's uterus.

As a stimulant of the parasympathetic system it excites salivary secretion and lacrimation, which are two characteristic manifestations of poisoning by scorpion toxin in the rat and in the dog. It also causes diarrhœa in many animals—e.g., the rabbit and the dog.

INVESTIGATION

These observations led us to study the action of paralysants of the sympathetic and parasympathetic nerves, such as ergotoxin and atropine, on animals poisoned with scorpion toxin.

We found that in the rat a subcutaneous injection of ergotoxin, though it does not abolish the salivation and lacrimation completely, may save the rat from otherwise certain death. Atropine had a similar effect, as shown in table I.

TABLE I—SURVIVAL AFTER ATROPINE OR ERGOTOXIN OF RATS INJECTED WITH A MINIMUM LETHAL DOSE OF SCORPION TOXIN

Ergotoxin (mg.)	Result	Atropine (mg.)	Result
0·06	Died	0·4	Died
0·18	,,	0·8	,,
0·24	,,	1·2	,,
0·30	Survived	1·6	Survived
1·20	,,	2·0	,,
2·40	,,	2·4	,,

The combined influence of both drugs was then investigated, and it was found that the best protective combination was one made of atropine 1·6 mg. and ergotoxin 0·24 mg. This mixture injected simultaneously with the toxin saved rats injected with as much as three times the minimum lethal dose (m.l.d.).

Believing that the above result might be applicable to man, we decided to determine how long after receiving a lethal dose a rat might be saved. Therefore rats weighing 200 g. each were divided into groups of three, and each rat received a subcutaneous injection of 0·14 mg. of a toxin whose m.l.d. was 0·12 mg. At various intervals after the injection of toxin each rat received ergotoxin 0·24 mg. and atropine 1·6 mg. as an antidote. Table II embodies the results obtained.

1. Unpublished thesis for the M.Sc. degree, Egyptian University, Cairo.
2. Toxin prepared from a mixture of the telsons of the three most common Egyptian scorpions but with a marked preponderance of those of *Buthus quinquestriatus*.

The protective influence of these drugs was next studied in dogs, which are much more sensitive than rats to scorpion toxin. Earlier investigators have already shown that the sensitivity of different species of animals towards scorpion and similar toxins varies. The m.l.d. of a pure specimen of scorpion toxin prepared in this laboratory was found to be 0·042 mg., 0·20 mg., and 0·03 mg. per kg. of body-weight for the guineapig, the rat, and the dog respectively. The ergotoxin-atropine combination was found to be equally effective when given to dogs. Here, however, it was possible to lower the dose of ergotoxin to 0·005 mg. and that of atropine to 0·1 mg. per kg. of body-weight. Thus, for a dog weighing 6 kg. ergotoxin 0·03 and atropine 0·60 will be required to protect it against one m.l.d. or 0·18 mg. of pure toxin. These quantities will be ineffective when given to a rat weighing 100 g. injected with 0·02 mg. of toxin only. One may therefore conclude that in different species the protective amount of ergotoxin and atropine is not determined so much by the amount of toxin injected as by the sensitivity of the animals to these drugs.

TABLE II—INFLUENCE OF TIME ON THE PROTECTIVE ACTION OF ATROPINE AND ERGOTOXIN

Group	Time elapsed between injection of toxin and injection of antidote	Rats injected	Rats survived
1	20 minutes	3	3
2	75 ,,	3	2
3	90 ,,	3	2

One injection of the two drugs given simultaneously within two hours after 1 m.l.d. of toxin can save the dog. Dogs injected with 2 m.l.d. die unless given two doses of the drugs with an interval of an hour between each dose. The following is an actual example of such a case:—

A dog weighing 5·5 kg. was injected subcutaneously with 2 m.l.d. of scorpion toxin at 3 P.M. There was local pain, salivation, lacrimation, diarrhœa, and vomiting. At 4 P.M. the dog was given a dose of atropine and ergotoxin. The symptoms cleared up completely but returned in a milder form towards the end of the second hour. When the injection of atropine and ergotoxin was repeated at 5 P.M., the symptoms disappeared for good this time, and the dog was saved.

It was not possible to save dogs injected with more than 2 m.l.d., and, unlike rats, dogs could not be saved by atropine alone or ergotoxin alone.

DISCUSSION AND CONCLUSIONS

The antagonistic action of atropine and ergotoxin not only proves that scorpion toxin stimulates the autonomic nervous system but also suggests the possibility of employing these drugs alone or in conjunction with the specific antiserum as curative agents against poisoning by this toxin. The result obtained in dogs is encouraging, for it shows that a dog injected with as much as 0·36 mg. of pure toxin can be saved by injections of these drugs. This amount of toxin (0·36 mg.) is definitely large; but, if it can be shown that a scorpion seldom injects so much in one sting, one may be justified in entertaining some hopes about the application of this procedure in man.

The dry telsons of Egyptian scorpions yield on an average 0·55 mg. of toxin per telson. A fully grown specimen of *B. quinquestriatus*, excited to strike seven times a stretched rubber membrane, gave a few

droplets of venom whose content of toxin was 0·5 mg. Another scorpion of the same species and size, excited to strike thrice, gave only about 0·2 mg. of toxin. By electrical stimulation of the junction of the terminal segment with the telson of a living *B. quinquestriatus* 0·6 mg. of pure toxin was obtained.

The amount of toxin was determined by a simple means. Since the m.l.d. for a rat weighing 100 g. is 0·02 mg. of toxin, the toxin content of any solution can be easily obtained by finding the smallest lethal dose and calculating the total amount accordingly. It thus appears that the greatest amount of toxin which this species can inject is not large, and its action may be successfully antagonised in man by an appropriate amount of ergotoxin and atropine.

SUMMARY

(1) Atropine alone or ergotoxin alone may save rats injected with a lethal amount of scorpion toxin.

(2) A combination of the two drugs is more effective than one alone. This is also true in the case of dogs, which can be saved after receiving even 2 m.l.d.

(3) The employment of this procedure in the treatment of scorpion sting in man is suggested.

AUTOGRAFT OF AMPUTATED DIGIT

A SUGGESTED OPERATION

BY SIR HAROLD GILLIES, F.R.C.S.

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ATTEMPTS have been made in the past to graft severed fingers or to replace them by transplantation of a similar digit from elsewhere, but the results have only occasionally been successful. This failure appears to be due to the impossibility of providing an adequate blood-supply for the skin and deeper tissues through the line of division. The essential parts of the fingers are the bones and tendons; these tissues require but little blood-supply and can be transplanted with a reasonable certainty of success. The skin and subcutaneous tissues are less essential but are much more avid of an immediate blood-supply. Fortunately, however, both the skin and the subcutaneous tissues can be replaced as a secondary procedure with every chance of success. It is therefore suggested that the following method or some modification of it holds out great hope of being able to restore a functional digit after clean amputation of a finger.

TECHNIQUE

The skin of the stump is cleansed and trimmed, and the ends of the tendons are picked up. The undamaged skin on the dorsum of the stump should be removed ½ in. or more proximal to the amputation line, so that the line of junction of skin and skeletal tissues is at different levels. The severed finger is thoroughly cleaned in soap and water and immersed in spirit for a short period. The skin, subcutaneous tissues, and nail are dissected away (fig. 1). The

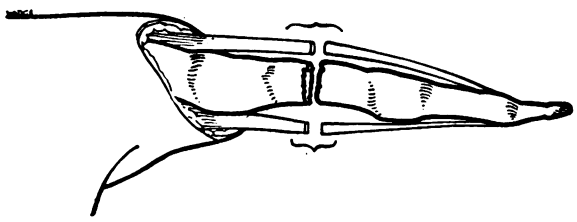

FIG. 1—Skin and nail dissected from amputated digit and damaged tissues trimmed. Skin removed proximal to traumatic section.

FIG. 2—Insertion into abdominal pocket. Curved free end of pocket sutured to hand.

tendons are united in the usual fashion, and the cut ends of the bone are held in correct position by a few silk or catgut sutures. In other words, the severed finger minus its cutaneous covering has been replaced on the hand. Next a subcutaneous pocket is created in the abdominal wall to receive the denuded finger. This pocket should be in such a position that the hand will lie comfortably and will be capable of accurate fixation in that position. The pocket should be as near the skin as possible, so that the skin, with little intervening subcutaneous tissue, will become adherent to the skeletal structures of the finger. The mouth of the pocket should be accurately sutured to the skin of the hand in its complete circumference, and if it is curved it will fit better and give a larger catchment area to the grafted skin (fig. 2). The severed bone and tendon should thus acquire a blood-supply partly from the skin covering and partly from the subcutaneous tissues of the abdominal wall. After a minimal period of three weeks a flap of skin sufficiently large to restore the whole covering of the finger is outlined on the abdominal wall and is partly raised from its bed on each side of the finger and replaced (fig. 3). The final division may be made a week later and the two halves sutured round the digit (fig. 4). There will at first be no sensation in the finger, but this should begin to return at the end of six to twelve weeks. It is possible that complete restoration of tactile sensibility might never be completely re-established, but it is certain that sufficient sensation would be acquired to render the regrafted digit useful.

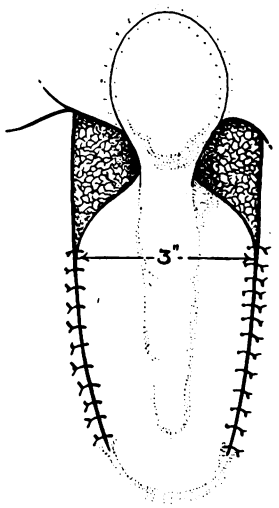

FIG. 3—After three weeks. Delay operation—i.e., flap incised on each side, undermined, and replaced.

ALTERNATIVE PROCEDURE

An alternative procedure might be employed when there are reasons against undertaking a complete repair. In these circumstances the denuded finger might be inserted into the abdominal wall without prior attachment to the hand. The amputated digit should be thoroughly scrubbed and cleansed with soap and water and washed in spirit, and its skin and nail carefully dissected off. The abdominal skin likewise is thoroughly cleansed, a small incision made under local anæsthesia, and the skin undermined for about 1 in. longer than the digit to be implanted. The amputated digit, completely denuded of skin and

subcutaneous tissue and nail-bed, should then be inserted into the pocket to lie close under the skin with its dorsal surface forwards and its base well inside the incision, which is then closed with a few stitches. The stump would be best closed as far as possible, probably after fixation of the tendons, with a few silk sutures to avoid retraction. The union of the digital elements could be undertaken at a later date. The case can then be sent for plastic treatment on the lines indicated above.

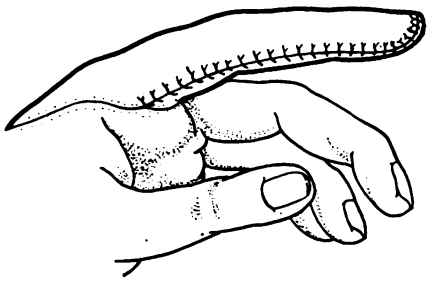

FIG. 4—After four weeks. Completion of plastic operation.

The details of the operation were worked out some years ago, but owing to lack of material there has not been any opportunity of performing it. The idea of denuding the amputated portion completely of its skin is believed to be new; and, if it proves satisfactory, it opens up the possibility of grafting a digit from a recently dead patient or from a recently amputated arm. It is known that skin cannot be transplanted from one patient to another, but cartilage, bone, and possibly tendon are more amenable. This note is published in the hope that others, possibly factory surgeons, may have the opportunity of trying the operation.

THE CONCUSSIONAL AND POST-CONCUSSIONAL SYNDROMES *

BY C. T. VAN VALKENBURG, M.D. Amsterdam

THE diagnosis of concussion is usually based on the association of unconsciousness and an injury to the head (Symonds 1935), but this combination may also be found in epilepsy, minor apoplexy and even simple syncope. The second cardinal symptom of concussion, retrograde amnesia, may also be due to these other conditions, though less often. The remaining symptoms, such as headache, vomiting and dizziness, though important, are neither constant nor pathognomonic. A more objective sign of concussion is therefore wanted, and I believe I have found it in lymphopenia (van Valkenburg 1931). In most cases this is present only during the first day after the injury; in others it may be found till the third or fourth day, but seldom longer. At the same time the eosinophils disappear and there is a polymorphonuclear leucocytosis (10,000–30,000); the leucocytosis decreases as the eosinophils reappear and the lymphocytes increase again. Since leucocytosis and absence of eosinophils are by no means uncommon in other conditions, I have laid special emphasis on the lymphopenia. My experience in the last few years has confirmed that it is pathognomonic. In 241 cases of concussion I have found a low lymphocyte-count in 91 per cent., unconsciousness in nearly 98 per cent.,† and retrograde amnesia in 94 per cent. Unconsciousness, retrograde amnesia and lymphopenia after an injury to the head therefore constitute the triad of concussion. When these three things are absent I do not consider the condition to be concussion, even if headache and dizziness are present.

A lymphocyte-count of less than 1500 is regarded as an absolute lymphopenia; where the lymphocyte-count is over 1500 but the lymphocytes make up less than 10 per cent. of the total leucocytes I regard this as a relative lymphopenia. In children, whose lymphocyte-count is normally high, the proportion of lymphocytes falls as a rule to 10–20 per cent., though this is not invariable (see case 1). In children, therefore, it is important to watch for a rise in lymphocytes after the first day or so (see case 5).

ILLUSTRATIVE WHITE-CELL COUNTS (CASES 1–5)

CASE 1.—A girl, aged 4, with unconsciousness, lymphopenia, vomiting, fractured skull, and transient aphasia.

Time	Leucocytes	Basophils (per cent.)	Eosinophils (per cent.)	Polymorphs (per cent.)	Lymphocytes (per cent.)	Monocytes (per cent.)
1st day	23,000	0	0	91·0	5·5	3·5
2nd ,,	20,400	0	0	85·0	8·0	7·0
3rd ,,	22,500	0	0	82·5	12·0	5·5
4th ,,	18,600	0	0	86·5	6·5	7·0
5th ,,	18,000	0	1·5	—	13·5	5·0
8th ,,	10,000	0	4·5	57·5	28·5	10·5

CASE 2.—A man, aged 26, with unconsciousness, retrograde amnesia, lymphopenia, vomiting, headache, and restlessness.

1st day	16,500	0	0	88	4	8·0
2nd ,,	10,900	0·5	0	86	11	10·5
3rd ,,	8,300	0	0	62	27	11·0

CASE 3.—A man, aged 81, with unconsciousness, doubtful retrograde amnesia, posterograde amnesia, lymphopenia, vomiting, and headache.

1st day	15,300	0	0	87·0	5·0	8·0
2nd ,,	15,200	0	0	79·5	11·5	9·0
3rd ,,	13,500	0	0	87·0	8·0	5·0
4th ,,	11,500	0·5	0	83·0	7·5	8·5
5th ,,	8,200	0	0	69·0	18·5	12·5

CASE 4.—A woman, aged 47, with no unconsciousness and no retrograde amnesia.

1st day	10,400	0·5	0	84	10·5	5·0
2nd ,,	6,000	0·5	0	89	9·0	6·5
3rd ,,	6,700	0	1·5	71	18·0	9·5

CASE 5.—A girl, aged 3, with unconsciousness, vomiting, restlessness. There was no lymphopenia, and the lymphocyte-count suddenly increased on the fourth day.

1st day	11,400	0	0	77·0	19·5	3·5
2nd ,,	10,500	1	0	74·0	21·0	4·0
3rd ,,	5,900	0	4	42·0	45·5	8·0
4th ,,	8,500	1·5	8	43·5	42·0	7·0

* Based on a lecture delivered before the Zuidholland Neurological Society, June 2, 1939.

† Gamper (1938), whose views on the localisation of concussion correspond with mine, accepts the possibility of unconsciousness being absent on theoretical grounds.

PHYSIOLOGY OF CONCUSSION

Concussion is caused by a shock to the head (almost always a direct blow) which is propagated most probably through the ventricular fluid and affects mainly the region about the third ventricle. The damage to the autonomic nervous structures of that region (hypothalamus) is the necessary condition for the appearance of the triad. This damage is reversible, except sometimes when there is hæmorrhage. (Strictly speaking, the possibility of death after uncomplicated concussion cannot absolutely be denied; but no such case has come to my knowledge.) All other lesions of the brain are distinct from concussion, although they may complicate it. I have seen all sorts of severe neurological troubles, such as hemiparesis and aphasia, after injury to the head, especially after depressed fractures, where concussion was definitely absent. The difference between concussion and contusion of the brain is absolute; the current opinion, that it is a matter of degree, appears to be erroneous.

Changes in the blood, both chemical and cellular, after lesions of the hypothalamic region are well known from experimental and pathological findings (Ginzberg and Heilmeyer 1932); but a more or less constant lymphopenia in such cases has not been reported, as far as I know. I have not made in all cases a complete routine chemical examination of the blood. Albumin and glucose were occasionally found in the urine. Other symptoms, such as changes in the rate and character of the pulse, headache, vomiting, and dizziness, may support the diagnosis of concussion but are in themselves not of importance in diagnosis, because each of them may be found in different conditions, with or without injury to the head. The same may be said of a lowered blood-pressure, which is often found; moreover, the examiner's ignorance of the patient's blood-pressure before the accident makes the observation less conclusive. Granting the importance of all these signs, particularly when a diagnosis has to be made a posteriori, I have made it a rule, immediately after any injury to the head, to look for the above-mentioned triad.

POSTCONCUSSIONAL STATE

After a patient with concussion has regained consciousness, lymphopenia is the first sign to disappear; vomiting ceases generally after one or two days. The other symptoms decrease more or less slowly under adequate treatment. The postconcussional state is generally dealt with under the heading of craniocerebral injury (traumatic encephalopathy). It is a part of the clinical picture of concussion but should be considered as a separate entity, in which the symptoms due to primary impairment of vegetative neurological functions do not arise. It is somewhat arbitrary to fix the period after the primary accident when the postconcussional state begins. Most patients gradually return to ordinary life after four to six weeks' rest and resume their occupations about three months after the accident. I consider those who are not able to do so to be in the postconcussional state. Their typical symptoms, most of which are objectively demonstrable, are the following:—

(1) Impairment of memory.
(2) Fatigability, mental and bodily.
(3) Hypersensibility.
(4) Vasomotor and emotional instability.
(5) Headache, particularly after exertion.
(6) Giddiness, of various degrees.

The intimate connexion of symptoms (4), (5), and (6) with autonomic functions needs no further explanation. Hypersensibility, particularly visual and acoustic, does not depend on a primary derangement of function of sense organs or their cerebral representation; it is at once understandable if we remember that the activity and the reactivity of the animal nervous system finally depends on the coöperation of the autonomic system (Hess 1936). Fatigability is similarly explained. Memory is closely bound to the activity of the nervous structures about the third ventricle, whose aid is essential for the activation of cortical mechanisms. The retrograde amnesia which immediately follows concussion is the first sign of disturbance of memory; complete restoration of memory, especially of retention, is usually obtained only after a long time, if ever (de Morsier 1936). To sum up, the initial syndrome of concussion depends directly on a disturbance of autonomic structures about the third ventricle, whereas the postconcussional syndrome depends on the secondary impairment of general cerebral and vegetative functions due to the diencephalic disturbance.

It is usual to lay stress on the "nervous" character of the postconcussional syndrome, particularly where claims for compensation seem to play an important part. In Holland "compensation neurosis" is not seen to any great extent. Whether a man suffering from the sequels of concussion has or has not a claim to compensation, his symptoms are essentially the same. There may, however, be circumstances that make the patient nervous; in most cases they are caused by the attitude of those round him, including his doctor, and by the suspicion shown towards him by the medical officers of the insurance company, which raises a comprehensible opposition in the patient, who in turn is inclined to aggravate his symptoms. An injury to any other part of the body would produce the same state of affairs.

Elderly people, nervous people, and patients with severe concussion are more liable to a severe postconcussional syndrome. After the age of 50 or 60 the human brain is as a rule less able to recover from traumatic and other lesions, even when it seemed to be in good condition before. The vegetative system of nervous people, particularly those of the constitutionally anxious type, is characterised by its instability. Its reaction to injuries of all kinds is therefore stronger and lasts longer than in better balanced people. In severe concussion we have to do with a severe trauma that disturbs the activity of diencephalic autonomic centres to an extreme degree. Even if the patient's nervous system had been in perfect order before, it is understandable that for a long time after concussion the autonomic nervous system is impaired, and the brain regains but slowly its regular activity.

The condition described bears a striking resemblance to so-called neurosis. Indeed this term is applied to postconcussional states; practically it postulates a mental cause (Ryle 1939). If the neuroses affecting the heart, stomach, intestine and other organs were not so much associated with the presumption of a merely psychic causation, the definition would suit the late postconcussional condition well. It might be defined as a functional disorder, following concussion, affecting the autonomic system, in which inborn or traumatically acquired "nervous" qualities take a part—a brain neurosis.

The possibility of purely emotional (hysterical) symptoms after uncomplicated concussion must be admitted; they are much rarer than is generally accepted, and they do not differ from those after traumatic lesions elsewhere.

SUMMARY

The syndrome of concussion is chiefly characterised by unconsciousness, retrograde amnesia, and lymphopenia. The lesion is localised about the third ventricle (hypothalamus). The postconcussional syndrome depends on the impairment of autonomic functions and their relation to cerebral activity; it is directly related to the primary injury to the brain.

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RADIOLOGICAL DEMONSTRATION OF ADENOIDS

BY G. T. CALTHROP, M.D., D.M.R.E. Camb.

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THE diagnosis of "adenoids" can usually be made with little difficulty, but there are cases, especially in children, in which it is impossible to obtain a view of the nasopharynx either by anterior or by posterior rhinoscopy. The only other method of direct diagnosis is that of inserting a finger into the posterior nasopharynx—a procedure which, in my view, should never be carried out in the unanæsthetised child.

In cases in which symptoms remain in spite of tonsillectomy, or arise after this operation, the question is sometimes raised whether adenoids have been removed or whether they have grown again. In children sent to me for radiological examination because of coughs, low-grade fever or debility I have sometimes found that the chest and antra showed no abnormality, but that in the radiogram of the nasopharynx there was an opacity due to soft tissue in the situation of the adenoids. Examination under an anæsthetic confirmed this, and on each occasion a mass of adenoids was surgically removed and the symptoms were relieved.

The method is simple, but it appears to have been neglected both in practice and in the literature. Groth,[1] of Upsala, described the radiological appearances and mentioned that, except for a statement by Mignon in 1898 and by Scheier (quoted by Bonchard in 1904) that adenoids could be seen on the fluorescent screen, he had found no reference to them in radiological or otolaryngological literature.

1. Groth, K. E., *Acta radiol., Stockh.* 1933, **14**, 463.

The technique is to take a true lateral view of the skull with the chin raised; the central ray must pass 1 in. in front of and 1 in. below the external auditory meatus. It is preferable to use a soft ray, so as to show up the details of the soft tissue.

It is not claimed that it is possible to show small remnants left behind by incomplete operation, but a large or moderate mass of adenoid tissue should be easily visible in the nasopharynx (see figure).

My thanks are due to Mr. Charles Keogh, F.R.C.S., for his help and advice.

PURPURA HÆMORRHAGICA AFTER ARSENIC THERAPY TREATED WITH VITAMIN P

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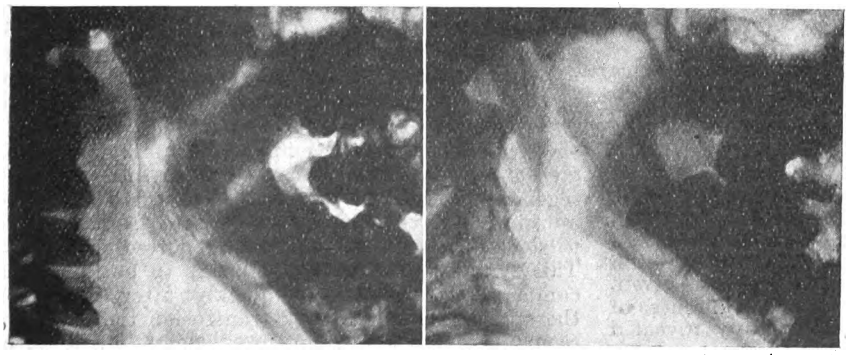
BLOOD dyscrasia after arsphenamine therapy is comparatively rare, yet in 1932 McCarthy and Wilson found seventy-nine cases recorded and added two of their own. I have found a further twenty-one cases recorded since that date. Vitamin P has given good results in Schönlein-Henoch purpura (Jersild 1938) but only two cases of purpura hæmorrhagica developing after arsenic therapy and treated with this substance have been reported in this country (Scarborough and Stewart 1938).

CASE-RECORD

A man, aged 30, unemployed and unmarried, had gonorrhœa in 1935 and again in 1936. He had primary syphilis in 1937, for which he was given a course of twelve injections of Neo-kharsivan, totalling 7·05 g., and twelve injections of bismuth metal, amounting to 2·4 g. This was followed by six injections of a second course of treatment, during which 3·45 g. of neoarsphenamine and 1·2 g. of bismuth metal were given. There was no history of any tendency to hæmorrhage. The blood Wassermann reaction was positive at the beginning of the first course of treatment and negative at the end of the second (unfinished) course.

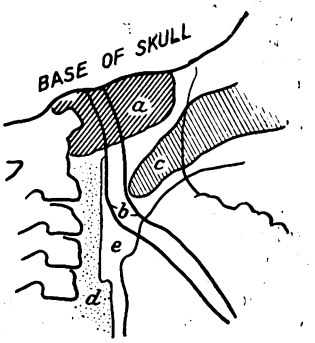
On Oct. 19, 1939, he developed a preputial chancre, from which *Treponema pallidum* was obtained. In view of the positive Wassermann reaction of the blood-serum, this could only be considered as a probable reinfection. Between Oct. 25 and Nov. 27 he received seven injections of neoarsphenamine, amounting to 4·05 g., and seven injections of bismuth metal, totalling 1·4 g. Eighteen hours after his last injection of neoarsphenamine, he complained of a rash on the legs and bleeding from the mouth and bladder.

LATERAL RADIOGRAMS OF NASOPHARYNGEAL AREA



(1) (2)

(1) before and (2) after removal of adenoids.



Key—(*a*) adenoid tissue; (*b*) ascending rami of mandible; (*c*) soft palate; (*d*) soft tissues of posterior pharyngeal wall; (*e*) lower part of nasopharyngeal space.

BLOOD EXAMINATIONS

Date	Red cells (per c.mm.)	Hb. (per cent.)	Colour-Index	White cells (per c.mm.)	Polymorphs (per cent.)	Lymphocytes (per cent.)	Monocytes (per cent.)	Reticulocytes (per cent.)	Platelets (per c.mm.)	Bleeding time (min.)	Coagulation time (min.)	Petechiæ
1939												
Dec. 7	2,620,000	50	0·9	4400	60	26	13	Nil	Nil	11 +	15 +	44
,, 12	2,705,000	58	1·07	5700	—	—	—	—		—	—	—
,, 13	2,540,000	55	1·1	5200	76	12	11	—	Much reduced in blood film	—	—	—
,, 14	2,590,000	59	1·1	—	—	—	—	4·4	—	—	—	—
,, 15	3,090,000	60	0·9	4600	—	—	—	—	—	—	—	—
,, 17	3,130,000	61	0·9	4800	—	—	—	—	—	2	15	3
,, 19	3,080,000	62	1·01	4000	—	—	—	—	—	—	—	—
,, 20	3,130,000	64	1·03	5300	—	—	—	—	—	—	—	—
,, 22	3,235,000	66	1·03	—	63	29	8	5·4	Abundant in blood film 339,499	—	—	—
,, 26	3,310,000	75	1·10	5200	—	—	—	—	—	—	—	—
1940												
Jan. 3	3,990,000	85	1·07	5600	—	—	—	—	—	—	—	—

On his admission to Belvidere Hospital on Nov. 31 examination revealed a well-nourished man of good physique. The temperature, pulse, and respirations were normal. Over the lower two-thirds of both legs was a profuse eruption of fresh petechiæ 2–10 mm. in diameter. Scanty petechiæ were present also on the forehead, trunk, and upper limbs. There were ecchymoses at the sites of injections in the antecubital fossæ and buttocks. The gums were bleeding and a few petechiæ were seen on the tongue. The urine was loaded with blood but otherwise normal. The nervous system, heart, and lungs showed no abnormality. A radiogram of the chest was normal.

The patient was treated with intravenous injections of sodium thiosulphate and intramuscular injections of calcium gluconate, without any clinical improvement. On Dec. 3 his temperature rose to 100° F., and he complained of a sore-throat. The left tonsil was swollen and covered with greyish adherent exudate, which seemed to be invading the adjacent buccal mucosa. The breath was fœtid. Since the appearance suggested faucial diphtheria, 40,000 units of antitoxin was given intramuscularly; but subsequent culture was negative for *Corynebacterium diphtheriæ*, and a direct smear showed Vincent's spirochætes and fusiform bacilli. On Dec. 5 and 6 pyrexia continued, and the necrotic process spread to the uvula, which was now displaced to the right by swelling of the left tonsil.

The blood was examined on Dec. 7 (see accompanying table). The clotting-time was measured by the method of Lee and White with a test-tube 14 mm. in diameter. The bleeding-time was determined by Duke's method. Hæmolysis of the red cells took place in a 0·35 per cent. solution of sodium chloride. Van den Bergh's test for bilirubin gave a negative result. The tourniquet test of Göthlin (1933) was used in counting petechiæ.

On the 9th vitamin P was given by mouth in doses of 0·25 g. at two-hour intervals. The preparation used was Hesperidin (Glaxo). On the 11th, forty-eight hours after vitamin P therapy was begun and after 5·75 g. had been given, for the first time no blood was seen in the urine on naked-eye examination, and microscopically the sediment showed only a few red blood-cells. Further, the necrotic angina appeared to be resolving, and bleeding from the mouth had ceased. During the evening of this day a transfusion of 525 c.cm. of compatible group-IV blood was given.

On the 14th the patient complained of dimness of vision in the left eye. Ophthalmoscopy revealed three small recent intraretinal hæmorrhages, one lying just above the optic disk, between the superior temporal and the superior nasal arteries, and the other two in the region of the macula. The right fundus was normal. An estimation of the amount of ascorbic acid in the blood on the 9th and a skin test for ascorbic acid on the 14th (Dr. W. McAdam) indicated saturation. The subsequent progress of the case is summarised in the accompanying table.

The sternal marrow was examined on the 10th. The following is Dr. McAdam's report: segmented neutrophils 12 per cent.; segmented eosinophils 0; segmented basophils 0; neutrophil metamyelocytes 8 per cent.; eosinophil metamyelocytes 0; basophil metamyelocytes 0; neutrophil myelocytes 9 per cent.; eosinophil myelocytes 1 per cent.; basophil myelocytes 2 per cent.; premyelocytes 3 per cent.; myeloblasts 2 per cent.; lymphocytes 11 per cent.; monocytes 7 per cent.; normoblasts 30 per cent.; erythroblasts 8 per cent.; and megaloblasts 0.

It will be seen that the number of white blood-cells remained low throughout. The red cells and hæmoglobin increased steadily with treatment. Ferrous iron was given from Dec. 13, 1939, to Jan. 3, 1940, gr. 6 thrice daily; and from Dec. 19, 1939, to Jan. 3, 1940, vitamin C 100 mg. was given daily. The preparations used were Fersolate (Glaxo) and Redoxon (Roche).

COMMENTS

Purpura hæmorrhagica appeared in this case after only seven injections of neoarsphenamine. McCarthy and Wilson (1932) reported the average number of injections of arsphenamine in such cases to be twenty-three. In the present case increased capillary permeability was associated with thrombocytopenia but not related to any deficiency of ascorbic acid. Leucopenia and necrotic angina are usually regarded as grave signs, but here the prognosis was less grave, probably because of the relatively high proportion of granulocytes in the circulating blood and in the sternal-marrow smear. It is of interest that the severity of the necrotic process in the throat was not in proportion to the granulocytopenia. The blood-counts showed a normocytic anæmia, and examination of the sternal-marrow smear revealed a picture of blood regeneration. There were therefore no signs of aplasia. I have found no record of hæmaturia in thirteen out of twenty-one cases reported since 1932. This symptom accordingly appears to be fairly uncommon. It cleared up quickly after vitamin-P therapy, and after a blood-transfusion there was no recurrence of skin purpura. Some days after hæmaturia and skin purpura had disappeared, retinal hæmorrhage took place. This is a rare symptom, the

only other cases reported being those described by Scarf (1934) and Stigaard (1937). In the latter case cerebral hæmorrhage was also present. As already mentioned, Scarborough and Stewart (1938) reported two cases of purpura hæmorrhagica after arsenic therapy successfully treated by administration of vitamin P. They employed a dosage of 1 g., given by mouth for approximately three days. These cases, however, were mild and can in no way be compared with the present case of severe hæmorrhagic purpura.

SUMMARY

A case of acute purpura hæmorrhagica developing after seven injections of neoarsphenamine is reported. Notable symptoms included profuse hæmaturia, retinal hæmorrhage, and necrotic angina. The blood picture was one of thrombocytopenia, leucopenia, and normocytic anæmia. There is no deficiency of ascorbic acid. Recovery took place rapidly after treatment with vitamin P and a blood-transfusion.

I wish to express my indebtedness to Dr. W. R. Snodgrass for encouragement and advice; to Dr. W. McAdam for investigating the vitamin C and bone-marrow; to Dr. T. Archibald, medical superintendent of the hospital, for permission to publish this case; and to Mr. Simmons, the chief attendant of the ward, for his care in supervising the nursing.

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MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF EPIDEMIOLOGY AND STATE MEDICINE

AT a meeting of this section on May 24, with Dr. ALISON GLOVER in the chair, a discussion on

The Clinical Teaching of Social Medicine

was opened by Dr. N. M. Goodman of the Ministry of Health and Miss CHERRY MORRIS, lady almoner of St. Thomas's Hospital.

Dr. GOODMAN defined his use of the term "social medicine" as one aspect of preventive medicine—namely, the social factors affecting the patient's health. In some cases failure to take these factors into consideration resulted in grave errors in diagnosis, prognosis and treatment. He was not concerned with postgraduate education in public health and he recognised that considerable advances had been made in the teaching of undergraduates in preventive medicine. The "long glacial period" of air, soil and water had ended. Hygiene had been divorced from its unnatural partnership with forensic medicine. As far as he knew, however, no attempt had yet been made in this country to link up the teaching of social medicine with the individual clinical case, as had been done in other countries. Dr. Richard Cabot had begun this practice in Boston as long ago as 1905 and his work had spread widely in the United States. It had been instituted at Yale, Johns Hopkins, Vanderbilt, Syracuse and Louisville universities. The coöperation of a social assistant was required and in this country the almoner appeared to be the person of election for this task. In the States this teaching took the form either of a study of a selected case by the clinical teacher, social assistant and student or by the participation of the social assistant in the ward round. At Brussels Dr. René Sand demonstrated cases selected from the point of view of their social aspects and at other places on the Continent, notably at Nancy, clinical teaching was closely linked with social medicine. Dr. Goodman looked forward to a time when the notes of the social assistant or almoner would be considered a necessary adjunct in all cases admitted to hospital.

Miss CHERRY MORRIS urged the importance of social-mindedness in the doctor, both to the community and to the individual. She cited tuberculosis and orthopædics as spheres in which coöperation had been achieved and discussed the methods by which a social outlook and a knowledge of the social services available might be instilled into the student. The almoner might be included in the ward round but this was wasteful in time. As much weight should be given to the social history as to the reports from other special departments. A textbook was required as an ancillary to clinical demonstrations and discussions. The almoner's work had two aspects—the administrative and the medico-social—and it was unfortunate that a recent circular of the Ministry of Health had drawn attention to the value of almoners in the E.M.S. for the assessment and collection of payments but had not mentioned their value as ancillaries to medical treatment. The almoner's department was not a dumping ground and it depended on the medical profession whether the medico-social aspects of almoner's work could be retained in the economic conditions which would doubtless result from the war.

The PRESIDENT wondered whether postgraduate education in social medicine could not be given. He thought the need was all the greater because that invaluable insight into social conditions given by obstetric work "on the district" was no longer available in some hospitals. Inquiries in the house by a trained social worker were essential in many investigations in school medical work, for example in inquiries into nutrition and tonsillectomy.

Sir WILSON JAMESON thought that perhaps something more was needed than the plan put forward by Dr. Goodman and Miss Morris. Changes in the curriculum and the establishment of a department of social medicine should be attainable objectives. The students wanted instruction in these subjects and knew they were not getting it. Perhaps they should receive it before they went into the wards and fell into the consultant's hands. It was not so much the filling of a gap in the curriculum as a new direction or twist which was required.

Dr. LEWIS GLOVER considered that selected general practitioners should teach these subjects and Dr. CLARK

drew attention to the work of Sir Robert Philip at Edinburgh in this field.

In reply, Dr. GOODMAN said he felt that both forms of attack, those suggested by Sir Wilson Jameson and by himself and Miss Morris, were needed.

PADDINGTON MEDICAL SOCIETY

AT a meeting of this society on May 21, with Dr. SAUL CROWN, the president, in the chair, the hon. secretary read a paper on

Epidemics in War-time

communicated by Dr. C. J. DONELAN, of the Ministry of Health, who was unable to attend.

War, he wrote, with its difficulties of administration and its periods of confusion, brings an increased risk of the introduction of infectious disease from outside a country. Every unusual assembly of people is necessarily exposed to the dangers of infection, and lack of food, exposure, fatigue, excitement, anxiety and other hardships reduce resistance. Sanitary problems increase as large bodies of troops, prisoners and refugees are obliged to remain in one place. Although the attention of commanders must be chiefly directed towards military operations, yet military interests compel them to attend to the prevention of disease. In most, if not all, the campaigns of history the decisive factor was the scythe of disease rather than the sword of the warrior. The real conquerors of Rome were not the Goths and Vandals but malaria and the plague, which ravaged it for many centuries. In 1345 the Tartars carried to South Russia the Black Death—probably bubonic plague—which travelled by sea to Genoa and then gradually through France and the Low Countries to England. Syphilis was spread through Europe when the dissolute followers of Charles VIII were disbanded in 1494. In 1490 there appeared at Granada a spotted disease known then as "El Tabardillo"; this was the first appearance of typhus, "the red cloak," which has ever since been one of the dreaded concomitants of armies. In 1552 Charles V was obliged because of it to raise the siege of Metz, and his failure to subdue that city saved France from destruction. The Thirty Years War spread various epidemics over Europe, and some countries lost half or three-quarters of their population. Typhus assailed Napoleon's armies again and again: the French army is said to have lost in Spain 300,000 men from disease and 100,000 from enemy action. Prisoners conveyed far into France carried the disease wherever they went. The British force which hovered indefinitely for a period at Walcheren in 1809 was decimated by malaria. The French army which retreated from Moscow was terribly afflicted by typhus, and its stragglers spread the disease all over Germany.

In the first winter of the Crimean war the British army lost through preventable disease over one-third of its strength. The Federal army in the American civil war lost 186,000 men from disease and 93,000 from wounds. The enteric infections caused most of the deaths, and at least 52 per cent. of the white and 83 per cent. of the coloured troops contracted malaria every year. In the Franco-Prussian war of 1870 the French army was inadequately vaccinated, and the troops billeted in the homes of civilians spread smallpox through the civil population. In the resulting epidemic over the whole of France the deaths reached a quarter of a million. The German army in France, which was comparatively well vaccinated, suffered only to a small extent, but the troops which remained in Germany and the civil population, which were less well vaccinated, contracted the disease from French prisoners. A more severe and extensive epidemic than any which had afflicted the country before carried away about 170,000 persons. The internment of soldiers in Belgium and Switzerland, and the communications of Austria with Germany, caused extensive epidemics in those countries also; Italian volunteers brought the infection back to Italy from France, and the deaths in England in 1870 and 1871 were ten times those of previous years. Epidemics were also started in Scandinavia and America.

The Franco-Prussian war marked approximately the conclusion of the old order of things, and from then onwards medical knowledge of the cause and prevention of disease grew apace. In the Boer war, however, infectious diseases, particularly the enteric fevers, played an important part, and in 1900 and 1901 the British army lost, out of a standing total of about a quarter of a million, 11,000 men from disease and 6000 from wounds. The war of 1914–18 really showed how much medical knowledge could do to weaken the association between war and disease. The chief measures in the vigorous campaign against intestinal infections were prophylactic inoculations, strict water control, and a vigilant search for carriers. Although the ration strength of the British Army began at 270,000 and finished at two and a half million, there were only 6907 admissions for enteric fevers and 216 deaths. Apart from a sharp epidemic in 1916 in Mesopotamia, there was remarkably little cholera in the eastern campaign. The historic epidemic of the last war was that of malaria in Macedonia in June, 1916. The army had to advance up the Struma valley, a broad plain full of mosquitoes in which every man counted his daily bites by the score. For a time the weekly evacuations ran into four figures, and the epidemic never wholly subsided. In 1918 the incidence was 370 per 1000. Malaria was carried to England and spread where anophelines were plentiful. Local outbreaks of dysentery, chiefly caused by the Shiga organism, were reported, and an appreciable increase of dysentery carriers occurred in the population.

Typhus and trench fever, both louse-borne diseases, only spread among populations afflicted by famine and misery. In the autumn of 1918 a number of cases of typhus occurred among gypsies in the south of England but none in the population among whom they moved nor in the institutions to which they were admitted. The Rumanian army and population, in which hygiene was defective, were ravaged by epidemics. Smallpox was introduced into this country by a few British soldiers but was smothered by prompt action. It may occur in persons who contract it abroad and arrive during the incubation period. There is occasionally some doubt over the official means for securing vaccination in a district in which smallpox has appeared. Lymph is supplied from the Government Lymph Establishment at Hendon both to public vaccinators and to medical officers of health. Dr. Donelan emphasised the importance of prompt notification and of tracing the movements of the contacts of any smallpox sufferer or suspect. Greater medical knowledge did much (he said) during the last war to free war from its associations with pestilence, but medical pride was promptly humbled by the great pandemic of influenza which in a few months destroyed more lives than had been lost in four years of destructive war. The lesson it taught, summarised in the official report, is that in large collections of men herded together there are opportunities for that modification of the materies morbi which make it apt to conquer the world. In the countless incubators provided by garrisons, factories, and overcrowded means of transport and places of entertainment the organism develops destructive powers which give it a decisive and overwhelming victory.

On the potentialities of the present war for the spread of disease, Dr. Donelan continued, it is possible only to speculate. Organised evacuation, as Dr. J. A. Glover showed in his presidential address to the section of epidemiology of the Royal Society of Medicine (THE LANCET, April 13, 1940, p. 693) has not increased the incidence of infectious disease, but the figures actually show a considerable improvement. Cerebrospinal fever reached an exceptionally high incidence early this year from some unknown cause.

It is necessary to steer a careful course between optimism and pessimism. The great weapons of the medical profession are unceasing vigilance, prompt action, the greatest possible medical knowledge and its speedy application. Medical practitioners must do all in their power to dispel popular ignorance and obtain for the people the best possible hygienic conditions.

The PRESIDENT remarked that Dr. Donelan's paper did not mention any history of infection by the meningococcus. He wondered whether past wars had produced any great increase in infectious diseases of the nervous system, such as encephalitis. There has been a sudden flare-up of dysentery, he said, during the last few years, and the coming summer may show unusual figures. The German government made vaccination for diphtheria compulsory, and he considered that every child should be inoculated against it. The danger is so great that no slackness must be allowed. The Italian invasion of Abyssinia showed how efficiently an army can be protected by good medical services.

Dr. N. LEVITT said that epidermophytosis caused much disablement among the Italian troops. He saw a far greater need for prompt action and vigilance than the authorities seem, in his opinion, to recognise. Typhoid has broken out, he said, in Rotterdam and Amsterdam through the infection of water-supplies due to bombing, and refugees have already entered this country from those areas. The authorities should insist on compulsory vaccination against typhoid and smallpox and the immunisation of children against diphtheria and scarlet fever. If the Ministry would provide the necessary supplies, the practitioners would doubtless give their services without charge.

Dr. ELEANOR REECE pointed to the present large proportion of unvaccinated persons and the danger of a bad epidemic of smallpox.

The meeting resolved, in thanking Dr. DONELAN for his paper, to express their opinion that there exists an urgent necessity for propaganda amongst the civil population on the need for prompt inoculation against the enteric fevers, vaccination against smallpox, and the protection of children up to twelve against diphtheria; and for the placing of material at the disposal of doctors.

BRITISH PSYCHOLOGICAL SOCIETY

AT a meeting of this society on May 22, with Dr. DENIS CARROLL in the chair, a discussion on

Anorexia Nervosa

was opened by Dr. S. W. PATTERSON. In 1873, he said, Sir William Gull gave the name to a peculiar condition mostly affecting young women, though occasionally seen in men, with no apparent lesions in the pulmonary and abdominal organs. The patients complain of no pain; they have shrunken abdomens, great emaciation and apparent weakness, and a peculiar restlessness difficult to control. All the symptoms can be explained by the anorexia, which leads to starvation, depression of all vital functions, amenorrhœa, slow pulse and slow breathing. There is no gastric disorder, and Gull therefore believed that the origin is central and not peripheral, but the patients do not show the common symptoms of hysteria. It is dangerous to let the starvation continue, and Gull quoted one case of death from starvation alone. Little has been added to Gull's classical description except the biochemical details of malnutrition, the low blood-pressure, the growth of downy hair on the limbs and the non-involvement of the breasts in the general wasting.

Total absence of appetite is the characteristic feature. Appetite is the desire for food and is a pleasant sensation, in contrast to hunger which is the need for food and unpleasant. Appetite, moreover, depends on constitution and education; civilised people are accustomed to eat without hunger—eating is a habit, a conditioned reflex. Appetite is excited by joy, by the preparation of food and by meal-times; it is inhibited by anxiety, grief, fevers and affections of the digestive tract. The adult human is omnivorous and finds a monotonous diet unappetising, but infants live on milk for months and when they come to take a mixed diet may rebel against adult food. Many children are lazy about chewing. Taste for parsnips and other strongly flavoured vegetables may develop late in life, and many children will take fats with a low melting-point, such as butter and cream, but reject those with a higher melting-point, such as meat fat. This is probably an instinctive refusal which should be respected. Loss of appetite in children of 3 or 4 years has often been associated with indigestion, constipation and overfeeding, but it may merely be that the child is unable to take adult food. The single child who feeds with his mother is apt to trade on his peculiarities, and some children who are checked and punished at meals become frightened. The old physicians used to treat the mother, giving her a careful dietary and time-table for the child, so that she felt she had to undertake a task on his behalf—not merely that she was responsible for making him difficult. Nowadays anorexia in adults is approached from various aspects—psychological, organic, endocrinological or as an example of vitamin deficiency. Gastritis, chronic constipation and "chronic appendix," whatever that may be, have been blamed. Simmonds's disease is undoubtedly due to pituitary involvement, and has nothing to do with anorexia nervosa. Lack of vitamin B affects the appetite in animals, but in anorexia nervosa the trouble may be a failure to get enough vitamins of any kind. In a series of 273 cases Dr. Patterson has found local causes of anorexia (peptic ulcer, atrophic gastritis, gastroenterostomy, alcoholic gastritis, carcinoma) in 63; reflex causes (disease of the colon, rectum or gall-bladder) in 33; toxic-infective conditions in 109; and nervous causes (psychosis, strain or anxiety) in 68. He classes those in the last group as anorexia nervosa. Treatment includes correction of the starvation state, isolation, discussion of difficulties, and adjustment of the patient and her environment. Treatment should be long and cases should be followed up. Most patients recover. In conclusion Dr. Patterson asked what is the relation of the amenorrhœa to the psychological and nutritive factors; in what proportion of cases does conduct become normal when weight increases; what is the frequency of troublesome anorexia, less severe than anorexia nervosa, apart from organic illness; and what relation has anorexia nervosa to the feeding inhibitions of infants?

Dr. W. C. M. SCOTT said that the man in the street, the mother in the home and the baby in the cradle have definite views on food, and they have arrived at their opinion without real knowledge of food and partly biassed by the way they were first fed. It is not easy to approach a patient with a feeding difficulty without experiencing some bias ourselves; we cannot remain unaffected by a patient starving in the midst of plenty, and protectively try to make the patient eat as we do. Gull described in these patients a dislike of food and an occasional voracious appetite. Such swinging of symptoms is characteristic of manic-depressive disorders. Gastro-intestinal disturbances not mentioned in the original description are manifold and various. Recent writers imply that all patients should be cured, but Ross reported 6 relapses and 1 death in 19 patients treated in ten years, and Ryle found that of 37 patients seen during

sixteen years 10 did not improve or relapsed, 4 of these dying. To give concentrated foods is to play into the hands of the patient, who already wants to live on air. The disorder has been called an addiction to meagreness; the cure may take the form of an addiction to an adequate diet, which is hardly the proper basis for feeding habits. Normal feeding should not be compulsive. Hurst holds that the patient should be told that the appetite has been lost by not eating and should be persuaded to eat. He claims to have treated 50 patients in this way during nineteen years without a single failure. Such good results suggest different standards in diagnosis. When the psychologist encounters a so-called good therapeutic result he has to ask himself whether it enables him to understand the details of the problem seemingly solved, or whether a new defence has been built up by the patient when the symptom disappears. Undoubtedly a point comes, with some patients, at which psychotherapy alone cannot cure them—they must be fed or they will die—but it was also true that a point may come when they would die if treated solely by the giving of food. Moreover, anæmia and beri-beri may complicate the picture, and these may be cured without altering the mental picture. Ryle considers that the neurosis runs true to type and should be distinguished from other neuroses. The patients are reticent and rarely see psychiatrists. A series of 117 patients seen at the Mayo Clinic in thirteen years were described as preoccupied, apathetic, reticent and negativistic, yet they aroused the sympathy of general physicians which suggested that they were of the manic-depressive type. It is difficult to imagine physicians being interested in 117 preoccupied, apathetic, reticent and negativistic patients if they were mild schizophrenics. Weizsaecker described the cases of two female patients who had occasional days of voracious eating; he studied their dreams and concluded that before eating they dreamed of their mothers, of bodily disintegration or death; whereas before starving they dreamed of their fathers, of God, knowledge and well-being. He gave no specific interpretation but suggested that the anorexia represents one of the ways in which patients may deal with conflicts about the relationship to mother and father, imprisonment and freedom, pregnancy and sterility, life and death.

Dr. Scott went on to describe three patients of his own. Two of these were women in middle life who had had to cease work owing to hypochondriacal symptoms; and both, during adolescence, had had loss of appetite and weight with cessation of menstruation. Only during treatment of the later illnesses did they admit that the adolescent anorexia had followed a sexual episode with a relation; both had believed themselves pregnant—both had starved in the hope of preventing the growth of the child. The third patient was a woman of 24 who developed the symptoms of anorexia nervosa and followed them up with depression and suicidal tendencies. It turned out that during adolescence she, too, had imagined herself pregnant following an episode with a relative, and had had anorexia and amenorrhœa for a few months; and that some of her anxiety in her later illness centred round the idea that she contained a dead baby. Ryle has said that psycho-analysis may do harm in anorexia nervosa, but gives no evidence for the statement. Psycho-analytic treatment can be carried on at the same time as medical and nursing supervision of the diet. Psycho-analysts have found that eating difficulties both in young children and adults are related to early anxiety situations of the paranoid type. Patients equate food with loved or hated objects, and, when eaten, with organs in the body, and this may give rise to fears of being poisoned or destroyed. Motives of unconscious sacrifice may also enter into feeding difficulties. Dr. Scott maintained that in the study of anorexia nervosa psychiatry has as much to contribute as clinical medicine. Physiologists should help us to understand the low temperature and blood-pressure and the slow pulse, the poor peripheral circulation, the menstrual variations, the occasional anæmia and leucopenia and the other gastrointestinal disturbances. The endocrinologists and experts on nutrition should try to explain the emaciation, the downy growth of hair, the pigmentation, and any ovarian, thyroid, adrenal and pituitary disturbance.

The CHAIRMAN said that his cases have been so negativistic that he has considered whether they were schizoid. He too has been puzzled by Ryle's dictum; he is not aware that sufficient cases have been treated by psycho-analysis to show whether this treatment is harmful or not. He has known cases to be very resistant to psychotherapy, but as far as he knew no harm has come of it. The classical method of dealing with the patients is often remarkably successful, but we need to know the state of mind of the patient at the end of treatment; if she was a hysteric to start with, was she still a hysteric at the finish? If so, this implies no criticism of the treatment; it merely helps us to understand the facts.

Dr. E. B. STRAUSS asserted that anorexia nervosa is a definite clinical entity which can be studied from the typological point of view. He restricts the concept to adolescent women of asthenic physique who show signs of physical infantilism, sometimes with an infantile type of uterus and psycho-sexual infantilism. The downy hair on the limbs can be regarded as equivalent to persistent lanugo hair. There is loss of appetite, but the patient does not complain of it. Indeed, she does not complain at all; she leads an exceedingly active life and says she feels well. The picture only becomes confused if other types of feeding difficulties are classed with it. In young males severe anorexia is often associated with schizophrenia or manic-depression; in children it is often due to hysteria, the motive being secondary gain. The patient with anorexia nervosa rarely has any strong motive of secondary gain, and so far from being a hysteric, she is only too anxious to retire into the background. The elderly woman with anorexia is psychotic or hysterical, depressed or fearful. In true cases of the condition, Dr. Strauss has almost invariably found a masculine protest coupled with the fear of assuming adult responsibilities; and there is nearly always a dominant mother figure against whom the patient feels rebellion. Physical methods of treatment are invariably successful provided the physician becomes identified in the patient's mind with *benevolent* authority. Otherwise forced feeding can prove fatal.

Dr. H. V. DICKS mentioned the pitfalls of the diagnosis, referring to one case of supposed anorexia nervosa which turned out to be acute yellow atrophy of the liver, and another which responded to treatment and then developed dementia paranoides. In one case, however, investigation showed that the anorexia was a defence against the idea of eating fæces; fæces in this case were regarded as "goodness," to be retained. When this interpretation was made clear the patient recovered.

Dr. MARGARET LOWENFELD drew attention to the relation between feeding difficulties and asthma and eczema. Adolescent patients with anorexia sometimes find it difficult to think of themselves as separate from their own bodies, and they can often express their experiences better by modelling in some play-material like Plasticine than in words. Food often becomes personified into an attacking figure which it is virtuous to resist, especially if it looks nice; in such cases it is sometimes worth while giving unattractive food.

Dr. D. W. WINNICOTT said that feeding disturbances in children are so common that one may almost say that it is the child without a feeding difficulty who is abnormal. One group stands out from the rest—that in which the child's failure to eat makes the mother ill. In these cases the patient is the mother. The child feels that by not eating he is making a psychological advance and achieving independence. It is always possible to give the cause of anorexia in infantile terms, and we should not be led into invoking such things as pregnancy phantasies even to explain amenorrhœa.

REVIEWS OF BOOKS

Clinical Practice in Infectious Diseases

By E. H. R. HARRIES, M.D. Lond., M.R.C.P., D.P.H., medical superintendent, North-Eastern Hospital, L.C.C.; and M. MITMAN, M.D. Lond., M.R.C.P., D.P.H., D.M.R.E., medical superintendent, River Hospitals, L.C.C. Edinburgh: E. and S. Livingstone. 1940. Pp. 468. 17*s.* 6*d.*

CONSIDERING the fundamental changes that have lately taken place in our approach to infectious diseases and specific methods of control, the output of authoritative textbook guidance on the subject has not been great, and the collaboration of Dr. Harries and Dr. Mitman at this time when efficient control of infectious diseases may be of vital national interest is particularly welcome. Their book has several unusual features. Almost a fifth is taken up with preliminary general considerations—immunity processes, general methods of spread and control, diagnosis and management of infectious diseases, and particularly the management of common complications such as bronchopneumonia and infections of the middle ear. This section makes for a better appreciation of the individual diseases and avoids tiresome repetition later. The rest of the book is on more conventional lines. There is, however, an orderly grouping of diseases having a closely allied ætiology or tending to affect the same systems of the body which has much to commend it, particularly from the medical student's point of view. In addition to the commoner infections, space has been allowed for rarer conditions such as epidemic louse-borne diseases, the importance of which under war conditions may be readily imagined. In the last chapter explicit and helpful advice is given on the control of infection in hospitals, particularly in children's wards—a subject on which textbook guidance is too often vague.

In general the views expressed closely reflect modern fever-hospital practice but there are exceptions. Few would disagree with the total dose of 30,000–100,000 units of antitoxin recommended for severe diphtheria, but its administration *wholly* by the intravenous route raises practical difficulties not easily overcome. Most authorities are content if a reasonable proportion of the amount is given intravenously. Again, some will contend that the admixture of antitoxin with glucose or glucose-saline before intravenous injection does not minimise the risk of unpleasant reactions; quite the reverse. But even if readers disagree with some of the advice given they will admit that the available evidence has been fairly weighed. The authors have preferred line and colour diagrams to imperfectly produced colour plates and these do illustrate their points admirably. On the other hand, some of the simpler tabular comparisons might be omitted. Occasionally there is an impression of over condensation, particularly in the sections on treatment, but nothing of proven value has been left out.

Principles and Practice of Aviation Medicine

By HARRY G. ARMSTRONG, B.S., M.D., captain, Medical Corps, United States Army; director, aero medical research laboratory, Air Corps Material Division. London: Baillière, Tindall and Cox. 1939. Pp. 496. 36*s.*

THIS book, which is the only modern comprehensive work on its subject, is written so as to give the maximum of information without waste of words. There are occasional flaws in the English but none in the presentation, which is logical and lucid. It is with a kind of retrospective apprehension that one realises that so much specialised research, culminating in a mass of fact and a maze of technical problems, has been lying scattered in the literature to be rescued just in time. In another five years it would have been almost impossible for a single writer to have collected it and to have infused it with the wealth of his own experience, for it embraces diverse fields of knowledge.

The first 160 pages deal with the selection and care of pilots and the duties of the flight-surgeon. A brief but revealing historical background is supplied, and the criteria for examination of candidates are set out with perhaps too much detail, for the most important and least ponderable are psychological. The remainder of the book is nearly all given up to the physiological difficulties encountered in actual flight and includes a number of original observations by the author. Physiologists are familiar with the fundamental problems of life at high altitudes, as investigated by Paul Bert, Haldane, Barcroft and others, but aviation presents some of its own—those of equilibration and orientation, those arising from accelerations, "aeroembolism" due to rapid ascent, and many others. The older problems centred round anoxia become incredibly complicated by the requirements of practical aeronautics. Air sickness, acute and chronic altitude sickness, and "aeroneurosis" receive full and sympathetic treatment, giving the imaginative reader a moving insight into the strain to which military and professional flyers are subject. Captain Armstrong's attitude is one of sound common sense and is clearly based on wide personal experience, both clinical and experimental, and on a familiarity with the technical requirements of aircraft. His views on the future are of great practical interest.

Hygiene of Marriage

(8th ed.) By ISABEL EMSLIE HUTTON, M.D. Edin. London: William Heinemann (Medical Books). 1940. Pp. 152. 5*s.*

THE family doctor can safely recommend this book to men or women contemplating matrimony. Though the style is a trifle stilted and the author's outlook perhaps a little old-fashioned, the information and advice she offers are sound and up to date with one rather serious exception. Dr. Hutton states repeatedly that ovulation usually takes place immediately after the cessation of the menses, so that in her opinion fertility is at its height during the post-menstrual week and the "safe period" lies between the 8th and the 26th day. This is completely at variance with modern teaching. Dr. Hutton is not concerned only with the preparation for marriage and its consummation, she also discusses menstruation, the climacterium, sterility and contraception. She is a strong advocate of family life and the rearing of children, and it is therefore a little surprising that in her otherwise excellent chapter on "childlessness" she does not mention the possibility of adoption in cases of irremediable sterility.

Green's Manual of Pathology

(16 ed.) By H. W. C. VINES, M.D. Camb., director of the Charing Cross Hospital institute of pathology. London: Baillière, Tindall and Cox. 1940. Pp. 1166. 31*s.* 6*d.*

THE increasing fatness of textbooks is said to be evidence that official teaching still prefers a mind overburdened with facts to disciplined thought, but here Dr. Vines has wisely used many of his extra pages to show the essential unity of physiology, pathology and the clinical subjects, and to point out

that disease is a continuous process. The careful description and helpful series of photomicrographs on the development of the tuberculous follicle is a good example of how this continuity can be successfully brought home to students. The division of the subject into general pathology and the special pathology of organs in relation to clinical medicine is retained but the chapters on pure bacteriology and parasitology have been replaced by brief accounts of the diseases caused by infective agents. The new descriptions of the repair of tissues and of the general characters of tumours sum up well the important facts, and the newer classification of diseases of the reticulo-endothelial system is simply and clearly described. The book contains such accurate and up-to-date detail that it is surprising to find no mention of Jacobson's work on the argentaffine cells in pernicious anæmia and to find vitamin still spelled with a terminal "e," while the heading "Carcinoma of Blood" on page 731 is an unhappy misprint. The student will find in this abundantly illustrated and eminently readable textbook all the pathological information he is likely to need.

The Virus: Life's Enemy

By KENNETH M. SMITH, F.R.S. Cambridge: University Press. 1940. Pp. 176. 7s. 6d.

THE popularisation of science is an important but exacting labour, more especially when the subject discussed is both abstruse and rapidly expanding. Dr. Smith, however, who is admirably equipped for the task, has written a book which will meet with the approval of both the layman and the specialist. The book is divided into two parts: the first deals with the nature of the virus, the second with the virus in action. In discussing the growth of the virus concept Dr. Smith quotes a letter from Jenner on the genesis of herpes simplex and its relation to other infections. Curiously enough, almost exactly similar views are expressed by Shakespeare in "Romeo and Juliet." Too much praise perhaps is given to Athanasius Kircher, who, it is now thought, was a forerunner not of van Leeuwenhoek but of Baron Munchausen. The methods of spread of animal and plant viruses and of the relationship between viruses and cells are very fully discussed, but it should be made clear that the theory that viruses are highly specialised parasites which have developed parasitism to its utmost extent was originally put forward by R. G. Green, as Laidlaw himself was the first to acknowledge. Otherwise, it may be objected that trench fever is not usually regarded as a virus infection, that no distinction is made between the work of Etienne and F. M. Burnet and that the index is inadequate. Nevertheless, a vast amount of information is accurately and pleasantly conveyed in a style singularly free from scientific jargon. No-one will quarrel with Dr. Smith's sense of frustration in that while the nations pour out their treasure to produce armaments against each other, the real enemies of mankind are still unconquered.

Pathogenic Microörganisms

(11th ed.) By W. H. PARK, M.D., late professor of bacteriology and hygiene, New York University college of medicine, and director emeritus of the bureau of laboratories of the department of health of New York City; and A. W. WILLIAMS, M.D., former assistant director of the bureau. London: Baillière, Tindall and Cox. 1939. Pp. 1056. 40s.

THIS edition was prepared for the press shortly before Dr. Park's death. It retains the general form and character of the previous edition, but has been thoroughly revised. Two new chapters have been added—one on bacterial metabolism by Dr. K. C. Blanchard and the other on bacterial variation by Dr. Philip Hadley. The book sets out to give a theoretical account of all classes of pathogenic micro-organisms, including the pathogenic yeasts, moulds, fungi and protozoa, as well as the bacteria proper, and also to provide a generous amount of technical instruction. It is inevitable therefore that it should in places be over-dogmatic and incomplete. The tabulated information introduced is sometimes rather misleading. For instance, the tables which compare anaphylaxis with allergy convey an impression that anaphylaxis is exclusively an animal phenomenon and allergy a human one, this being the chief difference between them. The account of the subject in the text is more orthodox. The sections on immunity are strictly traditional, and will appeal chiefly to students who are not primarily interested in the recent theoretical development of the subject. The book is illustrated with 247 engravings and 13 full-page plates. Each chapter has a bibliography and there is a good index.

Quarterly Journal of Medicine

The April issue contains the following papers:

NITROGEN AND CHLORIDE METABOLISM IN GASTRO-DUODENAL HÆMORRHAGE. By Douglas Black and Arthur Leese (Oxford). Detailed studies of nitrogen balance, chloride balance, and other biochemical aspects of three cases of severe gastro-duodenal hæmorrhage led to the conclusion that the increase of blood-urea in this condition is probably due in the earlier stages to increased tissue breakdown, and is contributed to later by absorption of nitrogen from blood in the intestine and by impairment of renal function. Chloride output in the urine is usually low. These findings point to the need for giving ample water and salt to such patients, as well as for feeding them in the more liberal manner now widely approved.

GALACTOSE TOLERANCE AS A TEST OF LIVER FUNCTION. By N. F. Maclagan (Westminster Hospital). Blood-galactose is estimated four times in two hours after giving 40 mg. galactose by mouth. The values in mg. per 100 c.cm., added together, are called the galactose index. In fifty normal subjects it lay between 3 and 163 (average 68). In six cases of diabetes and six of obstructive jaundice it was normal. In all of ten cases of toxic jaundice it was above 163. It was also above normal in ten out of twelve cases of severe hyperthyroidism. The test therefore promises to give a sharp differentiation between toxic and obstructive jaundice.

NEW OBSERVATIONS ON THE ÆTIOLOGY AND PROGNOSIS OF ACHRESTIC ANÆMIA. By M. C. G. Israëls and John F. Wilkinson (Manchester). The authors report six new cases of primary macrocytic anæmia, in which free hydrochloric acid was present in the gastric secretion, and the response to liver therapy was poor or variable. In biopsy specimens of sternal marrow they found megaloblastic hyperplasia closely resembling that of pernicious anæmia. The authors therefore defend their thesis that this is a distinct variety of anæmia, due to partial failure of the bone-marrow to utilise anti-pernicious-anæmia liver principle which itself is normally produced and stored in the patient's stomach and liver.

ALEUKÆMIC LEUKÆMIA. By Martin Hynes (Middlesex Hospital). Cases are described of acute and chronic leukæmia, myeloid and lymphatic, in which the white-cell counts did not exceed normal. Their diagnosis and differential diagnosis are discussed. Most reported cases of "aleukæmic myelosis" are held to have been probably examples of myelosclerosis.

A REPRINT has been published of the first edition of the "Textbook of Medical Treatment" by various authors, edited by Prof. D. M. Dunlop and Prof. L. S. P. Davidson of Edinburgh and Prof. J. W. McNee of Glasgow (Edinburgh: E. & S. Livingtone. 25s.). The whole book has been revised and the newer advances in chemotherapy are included. A section on the use of sex hormones by Dr. T. N. MacGregor has been added at the end and there is now a full account of the treatment of alcoholism and drug addiction.

THE LANCET

LONDON: SATURDAY, JUNE 1, 1940

TWO WAYS

THE world is split into two camps, though some do not yet realise it. Not merely two nations but two modes of life are in conflict: shall we simple people give our lives, our liberties, our very thoughts into the hands of a Leader, endow him with an omniscience transcending human capacity, put at his disposal all that is most loving and most ruthless in ourselves and let him choose what shall be our good things and who shall be our enemies? Or shall we follow in the ways of our forefathers, and with painful misgiving, with hope in the growing wisdom of the masses, and with tolerance for all kinds of human foible and failing, strengthen the deep-founded but ever-changing structure of our democratic state? The present moment is a nodal point; we cannot put off the decision, the stern laws of fate compel us and allow of no delay. The words that are so seldom apt in the shifting pattern of compromise in which we live are now our battle cry: "He that is not with me is against me." A battle is within earshot which may decide our personal fate and the destiny of our culture, whose result may put within our power a reign of peace or bring slavery to us and to our children, but we may even now, as always, draw strength from a better understanding of what goes on in our own mind and that of those who oppose us.

This struggle between two ways of life that express themselves as totalitarianism or democracy will not be finished, nor did it begin, in Flanders. The question "How does a nation get into the state of mind of the present Germany?" cannot be answered without considering how we western people have developed our present culture. It is not enough to say that the German enjoys the experience of submission, particularly if his ruler is playing the bully to someone else; there is in addition a pleasure in having the whole of his life organised for him down to the last detail. If all Germans are at any given moment doing the same things and thinking in the same way it gives him the illusion that everything in his own mind is being conducted in an orderly way: doubt is quenched, anxiety is diminished, he is untroubled by his inner feelings, guilt is allayed. The exact ordering of external life is a kind of occupational therapy which reduces the painful apprehensions arising from internal stress. By his deification of the leader and the state, and his contempt for all other people, the German tries a short cut to the solution of the problem of evil. Differing opinions held between fellow nationals is felt to be dangerous because mutual confidence, which springs from tolerance of difference, is lacking. But the strength which comes from the crude dichotomy of good within and evil without is brittle because it is based on a denial of the truth, though for a time it may be strong in deeds. It breaks when its action is delayed or frustrated, because the whole structure of belief is based on the omnipotence of the leader and the state. Even temporary failure is a menace to that peace of mind—that armistice of inner conflict—which denies humanity and human rights to foreigners, for delay in the attainment of success may show that fate is an avenger of wrong. It is idle to think that the enemy is exempt from guilt because he is so barbarous; on the contrary, he must continue his barbarity lest he be overtaken with painful misgiving and even remorse; these feelings which he stigmatises as decadent must be kept from his consciousness and their influence on his life denied. Our adversaries have chosen a way of resolving their own difficulties which has plunged the world into misery, and their evil designs are furthered by traitors who criminologists tell us are never people with an easy mind. In the democratic countries there is unity of purpose only in the face of great danger; at other times satisfaction is felt in the diversity of interest and aim. If nearly everyone has his own opinion we regard the fact with pleasure. "It takes all kinds to make a world" and the world so made seems to us full of richness and to be a mirror of the countless impressions and aspirations which we cherish within us. If all men thought alike we should lose the external counterpart of our varied inner moods, for it seems that we need to meet another point of view both to sharpen our wits and soften our arrogance. The diversity of man is a reassurance to us that we can hold a different view from our neighbour without hatred and can yield to him without a sense of humiliation.

Liberty can only be bought at the price of vigilance. The concentration of aggressive power in the hands of a few men, which science has made possible, favours the totalitarian countries in the first phases of warfare. A few men can spring a surprise, a multitude never can. What is remarkable is that the people in the democracies were so blind to the danger. If analogies with the working of the individual's mind are any guide to national behaviour one would think that we did not arm gun for gun and plane for plane with Germany because we did not disarm twenty years ago when that country surrendered her fleet and disbanded her army, and we did not recognise her craving for vengeance because we have not been able to remove from our minds, though we may have wiped from our memories, the starvation of that people between the armistice and the signing of an unnegotiated peace. But the savage stab at England which the enemy intends and has already begun puts past confusions and mistakes into the background. This island and our generous and easy tradition of life are objects of the enemy's desire and of his hate. We too are forced to be a military nation and to focus all power in the hands of a few men. Some view this act with foreboding,

saying that we have turned totalitarian to fight totalitarianism. This is a confusion of thought which we and the neutral countries should be clear about. To us CHURCHILL is a man not a god; we gave him great power the better to fight for the freedom of a country and a tradition that we and he love. He does not mould our way of life but we let him guide such of our actions as will serve our common ends. When power is given it is not misused; when power is seized let the world beware. Germany has devised the weapon of total war and in the process has become a destroyer of much that gives life value. Our aim will not be achieved unless we can assure to ourselves and to our children a victory in the all-in struggle for a "total peace": a way of life in which the common man can live his life fully, devoting himself to his own good purposes in the service of those he loves.

HOMŒOPATHY INVITES CRITICISM

A HOMŒOPATH, most of us would say, is a weird sort of doctor who believes that the smaller the dose in which a drug is given the more powerful is its action, so he treats his patients with drugs in extreme dilutions. He is a legally qualified practitioner, and homœopathy has flourished for over a century, which is longer than the life of most forms of mere quackery. Its adherents claim that the orthodox who oppose it are ignorant of its principles as well as of its practice, and they remind us that many notable advances in medicine have been met at first with violent and unreasoning opposition. So perhaps we should look a little more carefully and dispassionately at the homœopathic claims. The publication of a second edition of Dr. CHARLES WHEELER'S "Introduction to the Principles and Practice of Homœopathy"[1] offers a convenient opportunity, for he sets forth the principles of homœopathy with the orthodox reader specially in view.

Homœopathy, says Dr. WHEELER, "is a principle of drug therapeutics: it claims to be justifiable on general grounds, but can derive final validity only from clinical experiment." Its fundamental generalisation is that the most successful drug for a given patient will be that one which produces in normal subjects a symptom-complex closely resembling that presented by the patient. This is the famous doctrine of the *simillimum*—"likes should be treated with likes." The homœopath begins by collecting data on the effects of drugs on normal subjects, which he calls the "provings" of the drugs. This has been adequately done only for some drugs, while information about others is still incomplete. Given a knowledge of these provings the homœopath's main task is to observe his patient's symtoms, and to compare them in his mind with those associated with the several drugs of his materia medica. That is not easy, as anyone will realise who knows the variability of disease-pictures in man, and the more experienced homœopath shows his quality by a shrewder weighing or selection of symptoms and detection of parallelisms as well as by a greater knowledge of the provings. In this way the all-important choice of drug is made. Its dosage is held to be of secondary importance, for "much good homœopathic work has been done, and can be done, with tinctures and easily demonstrable quantities of drugs." Yet it is claimed as a discovery of HAHNEMANN, confirmed empirically by his followers, that minute doses of drugs gave swifter and profounder results, which endured more permanently. Hence the more experienced homœopath prefers as a rule the higher dilutions of his pharmacy, known as "potencies." These are made simply by diluting ordinary plant tinctures or solutions with alcohol and water: dilutions of 1 in 100 to 1 in 1,000,000 are regarded as "low potencies," those of 1 in 10^6 to 1 in 10^{24} are "medium," and "high potencies" range from 1 in 10^{24} up to 1 in 10^{60}. The belief in the efficacy of these infinitesimal quantities is said to be based empirically on experience; no rationalisation is attempted beyond a vague suggestion that the pharmaceutical methods in some way change the energy of the drug, and a hint that it acts after the manner of an enzyme, or through "a physical action (ethereal vibrations or whatever)." There are other considerations that influence the homœopath's choice of drug and dosage, but they are less fundamental. Once the choice is made and the drug given the patient's progress is watched. If he improves the drug is immediately withheld, and only resumed if his improvement halts. If no benefit appears the fitting of the patient's symptoms to a drug-picture is reconsidered, and trial is made of some other drug. If the drug seems to aggravate the symptoms this is likely to mean that it has been given in too concentrated a solution.

The bulk of Dr. WHEELER'S book is occupied by accounts of the provings and the uses of thirty-one drugs of the homœopathic materia medica. Sodium chloride, a substance of which the orthodox have some knowledge, may be taken as an example. To the homœopath "natrum muriaticum is one of the most profound remedies for chronic diseases and the clinical evidence of its power is extensive and persistent." In high dilution it is held to have a subtler non-osmotic influence, different from its osmotic effects in ordinary concentrations. The only statements made about its provings are these: "natrum" muriaticum produces anæmia; it produces (and cures) a definite type of constipation; young horses reared on certain salt marshes developed cataract. Otherwise no word appears, in six pages of text, on the action of sodium chloride on the normal subject, the "symptom-complex" of the substance. Yet the six pages are almost full of diverse indications for its therapeutic use, including chronic anæmia, exophthalmic goitre, migrainous headache, enuresis, hypertrophy of the heart (especially when the attacks of palpitation are aggravated by lying on the left side), malaria,

1. London: William Heinemann (Medical Books). 1940. Pp. 344. 15s.

neurasthenia and Addison's disease. There is nothing to indicate that any general principle governs these very miscellaneous recommendations.

If homœopathy purported to deal in values or processes outside the realm of science—as religion does—a scientific criticism of it would be beside the point. But Dr. WHEELER speaks in his first page of "the judgment bar of science" and obviously invites such criticism. He says that the homœopathic claims are based on "clinical experiments many times repeated"; "only experiments equally careful, equally numerous, but leading to opposite conclusions can be accepted as countervailing material." The scientist might reply that experiments less numerous but more careful and logical, in control and interpretation, might suffice to refute those claims. Two considerations, however, can deter him from undertaking to experiment. The first is that the two homœopathic principles, that of the *simillimum* and that of the efficacy of infinitesimal doses, are so incongruous with the main body of scientific principle (and remain so after 100 years) that they are unlikely to be sound. The second is that the homœopath's appeal to experience, as set forth in his own account of his own "experiments," is to the scientific mind quite unconvincing. Allow the possibility that the principles are right, surprising though that would be; the onus is then on the homœopath to record in detail the effects of his drugs on normal subjects and on patients and to demonstrate the parallelisms in which he believes. Dr. WHEELER entirely fails to do this. He pays no more than lip-service to his own fundamental principle. Until homœopathy brings evidence, as distinct from asseveration, that its remedies modify the course of disease in man medical practitioners can legitimately ignore it.

The homœopath, of course, has been trained in orthodox medicine and surgery, and practises both. His peculiar views and methods are "an addition to the physician's resources and not a substitute for any measure of proved efficacy." In the present state of knowledge, both ours and his, we may reasonably suppose either that the good effects he attributes to his drugs are part of the natural course of the patient's illness or that they are mediated by those subtler personal influences of suggestion and encouragement that accompany the tonics and placebos of orthodox medicine.

PLANTS WITHOUT SOIL

THERE is no esoteric mystery about what is variously known as hydroponics, aquaculture or water culture, but is best called soilless cultivation, in spite of the fantastic claims made for its possibilities. Nor is there anything new to plant-research workers in its principles. The soil is merely a natural vehicle which supplies and carries the materials absorbed by the roots of plants. The foremost of these materials is water; the others are various relatively simple chemical substances which to be absorbed by the plant must be dissolved in the soil water. These substances are dissociated in the water and absorbed in the form of the individual ions. The remaining requirement of the root-system is air, or more accurately oxygen, for respiration. If we can supply a plant with enough of these primary requirements at its roots without the use of soil we may expect the plant to grow as well as in its natural medium. This is what soilless cultivation aims at—the control of the supply of water, salts and air to the roots more efficiently than can be achieved in the heterogeneous system, subject to continual disturbances, which we know as soil.

There are three main systems by which we can achieve this control. The plant may be grown with its roots permanently in a watery solution of the necessary salts, but this means that we must also supply oxygen dissolved in the solution, which introduces a practical difficulty. Secondly, we may replace the soil as a vehicle by an inert material such as sand, fine gravel or even cinders and may supply the nutrient solution by merely watering it on. As the solution sinks through the "aggregate" it bathes the roots and also draws in air behind it. The excess drains away, but sufficient is left on the material for the roots to absorb their needs for some days. A great deal of valuable solution is, however, wasted in this system. The third and most economical method is to grow the plants in a coarse aggregate such as gravel contained in a water-tight trough and to supply the solution by pumping it in from a storage tank situated underneath and then to allow the surplus solution to flow back into the tank. By this method the solution is used over and over again and if chemical tests are made on it at intervals the salts absorbed by the plants can be replaced as they are used up and maintained at the correct concentration. In the United States all of these systems have been operated commercially for various crops, often with good results. Experimentation in this country has not progressed so far but at Reading University, Bakeham Farm Nurseries at Egham and elsewhere trials have been in progress for some years with several crops under the three systems. Plants can be successfully grown in any of these ways, but the third or "sub-irrigation" system seems to hold out the greatest promise for practical application in this country. There is no reason why any crop should not be grown on this system but as a paying proposition only those crops giving a high return per unit area are likely to repay the capital cost. These will be almost exclusively the plants which are normally grown in glasshouses, especially tomatoes, cucumbers, carnations, chrysanthemums and perhaps "catch-crops" like lettuces, beans and other rapidly maturing vegetables. Higher yields of crops may well be anticipated but only in so far as a greater degree of control over the plant's normal nutrition is achieved, coupled with relative freedom from soil-borne diseases. Even with these advantages the system could not pay were it not that its operations can be controlled automatically by

electricity, thus saving much in labour, and that it effects an economy in manures, sterilising and so on. Just as much or more knowledge of how to grow plants at all is however needed to grow them without soil as with it. The system undoubtedly has a future, but more experimentation is wanted before it becomes a fully-fledged partner of the age-old methods. In the meantime the more trials that can be carried out by amateurs and professionals the better.

There is not the slightest reason to suppose that the crops grown in this way will differ in nutritional value from those grown in soil. The chemical substances on which the food value of a vegetable or fruit depends are manufactured by the plant in the course of its growth and are not absorbed as such by the root; all that soilless cultivation can do is to ensure that the plants shall not be deficient in any of the elements for growth, such as nitrogen, potassium, phosphorus, calcium and the rest. But the mysterious qualities ascribed to these crops are mere moonshine invented by hopeful sellers of apparatus and chemicals.

ANNOTATIONS

SERUM IN CEREBROSPINAL FEVER

THE success of chemotherapy in meningococcal meningitis has quite suddenly relegated serum to a secondary place in treatment. Clearly chemotherapy must be employed whether serum is given or not but on another page Dr. Russell Amies pleads for a more extended trial of the combined treatment in human infections, a procedure which he regards as essentially rational. He shows that meningococcal septicæmia in mice can be treated more effectively by sulphapyridine plus serum than by either product alone, the case-fatality rate with the combined treatment being 26 per cent. as against 59 per cent. with sulphapyridine alone, 73 per cent. with serum alone, and 95 per cent. in untreated controls. It would be unjustifiable however to draw the obvious conclusion as far as human infections are concerned. Dr. Amies reminds us that the earliest use of chemotherapy in meningococcal meningitis was founded on mouse experiments but it must be said also that results far exceeded expectations. Moreover, although the accumulated data on combined treatment must by now be considerable, in no comparable series in the present epidemic has there been an improvement on the gross fatality-rate of 10 per cent. reported by Banks,[1] who used chemotherapy alone. As experience with the sulphonamide compounds crystallises emphasis is increasingly laid not only on the correct choice of preparation to meet varying circumstances but on precise dosage and early recognition of danger signals such as dehydration. Provided these details are mastered, chemotherapy alone appears to afford the patient the best chance of recovery we can offer at present. Nevertheless, serum will continue to be used, particularly in desperate cases of the fulminating type or when the patient is comatose when first seen, if for no other reason than an unwillingness to abandon a form of treatment which has proved helpful in the past. There must be no question however of reserving serum as a second line of defence to be used if the patient does not respond to chemotherapy. If any benefit is to be obtained from serum as an adjuvant it must be given immediately in a large dose (50–100 c.cm.) and preferably by the intravenous route. There is now general agreement that intrathecal administration does not offer any particular advantage but rather the reverse.

PULMONARY ARTERIAL PRESSURE

THE chief function of the pulmonary circulation undoubtedly lies in the gaseous exchange between blood and alveolar air. In his Harveian oration outlining the historical growth of this conception, R. A. Young[2] discussed some other points associated with the lesser circulation. Many of these are mechanical, and it is good mental exercise to work out the nice coördination whereby two synchronised pumps, the left and right hearts, contrive without disaster to meet the capricious demands of the peripheral circulation. Disaster, as far as the lungs are concerned, would be a brief incoördination of sufficient magnitude to denude them of blood or congest them to the point of hæmorrhage. Another point is the degree to which the pulmonary capillaries can constrict and dilate actively, for a mass movement in either direction would profoundly influence the heart and the rest of the circulation. Experiments on animals tell us that such happenings normally fall far short of the calamitous, and that in the moment of cardiac adjustment to a new circulatory condition the pulmonary reservoir may perform an important function in buffering the differential output of the two sides of the heart. Clinical observation shows, nevertheless, how the failing left heart can become increasingly dependent on increased pressure in the left auricle which can only be transmitted from the right heart via the pulmonary capillaries. The stability of the lesser circulation can be attributed in great part to its large bed and low resistance, and the pulmonary arterial pressure is as a rule placed at about a sixth that of the systemic. Brock and Spurrell[3] have for the first time measured it directly in man, confirming this order of magnitude and showing that it diminishes on inspiration and increases on expiration. It is to be hoped that they may succeed, by more sensitive recording, in registering the pulse-pressure. It is perhaps too much to hope that the limits of variation, the effects of cardiac embarrassment, the influence of high coronary flow and so forth will ever be determined on the operating-table. On the other hand it is impossible to predict what important result may not accrue from simple measurements of this kind made as opportunity serves during surgical operations.

THE DYSENTERY BACILLI

AFTER a mighty expenditure of labour Colonel Boyd[4] has brought order out of the chaos of organisms which may cause bacillary dysentery. His results are based on the isolation of a very large number of organisms in the military laboratories of India. In order to obtain criteria of pathogenicity the stools of 93,000 menials in India, making between 8000 and 9000 platings, were examined, and pathogenic dysentery bacilli were never isolated, except from men suffering from acute or chronic dysentery. This observation was confirmed by others from some 119,000 platings. The pathogenic dysentery bacilli

1. Banks, H. S. see *Lancet*, May 25, 1940, p. 966.
2. *Lancet*, Jan. 6, 1940, p. 1.
3. Brock, R. C. and Spurrell, W. R. *Guy's Hosp. Rep.* 1939, **89**, 262.
4. Boyd, J. S. K. *Trans. R. Soc. trop. Med. Hyg.* April, 1940, p. 553.

now recognised are divided into two groups according to whether they ferment mannitol. Of the non-mannitol-fermenters the most important is the *Bacterium dysenteriæ* Shiga, the only dysentery bacillus known to produce an exotoxin. *B. dysenteriæ* Schmitz (*B. ambiguus*) is distinguished from Shiga's bacillus by the fact that it produces indol from peptone and serologically a distinct antigen. Murray found it among a collection of strains obtained in the last war and since that time it has been found in asylum dysentery. The mannitol-fermenters are subdivided by their action on lactose and saccharose, for some ferment the sugars after a few days' incubation. The only known pathogenic member of the group of late lactose-saccharose fermenters is *B. dysenteriæ* Sonne, which is common throughout the world. The newly isolated organism has an antigen peculiar to itself, but it rapidly undergoes mutation. The mannitol-fermenting subgroup, which does not acidify lactose and saccharose, is known as the Flexner group, but this term is not sufficiently comprehensive. Recent experiences show that a much more extensive range of antigenic types exist, so that Andrewes and Inman divided them into five races, but the collection of strains upon which this division was based was not exhaustive; it contained, for instance, only one strain from India. Moreover, it was not recognised that strains maintained for some time in artificial culture have undergone variation. An analysis of organisms classified as Flexner bacilli isolated in military laboratories in the years 1926 to 1930 showed that more than a quarter of the Flexner-like organisms were of different antigenic composition from Andrewes's races. The proportion of inagglutinable races varied from 25·4 to 32·25 per cent. Several additional ones were identified, such as type 103, which when newly isolated is not agglutinated by serum from Andrewes's V-Z series, but after a time produces variants which breed true and form only colonies of their own type. Further, it is found that 103B, the variant, is almost identical with the Hiss and Russell Y strain. Subsequent observations have demonstrated similar variation in all the Flexner races, though not always so complete as in 103. During artificial life they show a constant tendency towards production of variants possessing decreased quantities of specific antigen and apparently increased quantities of group antigen.

Conclusions regarding the antigenic structure of the Flexner group have to be revised. Each does possess a distinctive specific or type antigen, but all share a common group antigen. Boyd's more detailed investigations have shown that the group antigen is more complex in structure than was originally supposed and contains several components. It is now proposed that membership of the Flexner group should include races which, in addition to possessing a distinct specific antigen, are also endowed with a common group antigen. Reviewed by these considerations the Flexner group is known at present to consist of six members, three of Andrewes's series and three others. Type 103 has a wide distribution, having been found in England, the Continent, the Near East, in West Africa and India. P.119 is another undoubted member. This race has not been found in England or in Europe but occurs in the Far East and has also been shown to be common in South Africa. Type 88 is of particular interest in England and differs from other members of the Flexner group in that its biochemical reactions are inconstant. In India it has been observed that about two-thirds of the strains are late fermenters of dulcite and that it is identical with the Newcastle dysentery bacillus and with the Manchester bacillus of Downie and Wade. This race has now been found in many parts of the world. As regards pathogenic action these three races, together with V, W and Z, should be classified as true dysentery bacilli. Besides these races others having the Flexner biochemical reactions but of distinct antigenic structure are occasionally found. Of these *B. alkalescens* is not associated with dysentery and is probably non-pathogenic.

Such, then, in outline, is the complex arrangement of the organisms causing bacillary dysentery. Their details are beyond the scope of the physician and may safely be left to the trained bacteriologist.

YEASTS ON THE BRAIN

INVASION of the meninges and central nervous system by a pathogenic yeast is a condition of which only 60 to 70 cases have been recorded, but observers of the disease believe that it may not be so uncommon, because of its simulation of other cerebral conditions. The usual subjective complaints of the illness, which may be protracted for months or be much more acute, are headache followed by giddiness, generalised weakness, pain in the neck, impaired or double vision and sometimes mental symptoms. The physical signs suggest cerebral abscess or tumour, or more often tuberculous meningitis, and the findings in the cerebrospinal fluid closely resemble those of the latter infection. The fluid, as described by Gray [1] in two recent cases, is clear with a small coagulum, the cells—never very numerous—are mostly monocytes, protein is increased, chlorides are strikingly low, sugar is diminished or absent, and the Lange colloidal gold curve is usually of meningitic type. The causative yeasts may be missed or mistaken for lymphocytes if the stained or unstained sediment is not examined with the oil-immersion lens. Culture, too, may be misleading, for growth on plain or blood agar is rarely visible in 24 hours, and even after 48 hours' incubation may be mistaken for *Staphylococcus albus*. Most of the recorded cases have been diagnosed post mortem from the presence either of a gelatinous meningitis usually accompanied by gelatinous cystic masses in the subjacent tissue or of embolic gelatinous cysts throughout the brain. The causal agent, variously known as *Torula histolytica, Cryptococcus hominis* or *meningitidis*, and *Saccharomyces tumefaciens*, is a true non-mycelial yeast which in cerebrospinal fluid and in affected tissues is characterised by the presence of a wide mucoid capsule, readily demonstrated in the cerebrospinal fluid by indian ink or other negative staining methods. It is believed that the usual portal of entry is the respiratory tract or paranasal sinuses, but a primary lesion in the skin has been described by several workers. Experimentally, the yeast is pathogenic for the mouse, either direct from the C.S.F. or from culture, and after intraperitoneal injection may invade the brain with the production of the typical gelatinous cysts.

INDIA AS A SOURCE OF DRUG SUPPLIES

IT is said on the good authority of Colonel Chopra [2] that three-quarters of the vegetable drugs in the British Pharmacopœia grow in India, some naturally and others by cultivation. Here, then, is a source of supply that can be drawn on if the output of mid-Europe becomes inaccessible to British importers. Not long ago, when the Japanese invasion of China suddenly deprived Europe and America of the raw material from which they manufactured ephedrine, the situation was saved by imports of ephedra herb from India. When all the ephedra needed could be

1. Gray, F. C. *S. Afr. med. J.* Feb. 24, 1940, p. 65.
2. Chopra, R. N. *Ind. med. Gaz.* April, 1940, p. 233.

obtained from China, the higher alkaloid content of the Chinese product made it unprofitable to collect, pack and export the Indian herb, which was therefore fed to the local pigs. When the law of supply and demand is working normally the rule of commerce is to buy in the cheapest market, but our main concern now must be to ensure ourselves an adequate supply of drugs, even at greater cost. Of the essential oils, India has the basic materials for the production of ajowan, caraway, chenopodium, cinnamon, coriander, cardamom, rose, sandal wood and turpentine, though of these only sandal-wood oil has so far been distilled in large quantities on scientific lines. Almost all the fixed oils used in medicine—almond, arachis, castor, hydnocarpus, linseed and sesame oils—are available in India, and arachis oil can suitably take the place of olive oil. Of the commoner alkaloids India can produce atropine and its salts, caffeine, emetine, ephedrine, morphine, codeine, quinine and strychnine, of which the last is already being largely manufactured. It needs only the stimulus given by the removal of foreign competition to make the manufacture of these drugs expand to almost any extent. Unfortunately cinchona plantations take 7 or 8 years to mature, so that it will be impossible for India to take the place of the Dutch East Indies if supplies from these should be cut off. Ipecacuanha is only grown in India in a small way, but in the Federated Malay States it grows extremely well. For most of the inorganic drugs and almost all the organic ones, as well as for the metallic compounds, India has herself been dependent on imports from Germany, Great Britain and elsewhere, so that we cannot look for help in this direction. An additional impetus has been given to the Indian drug industry by recent legislation, for the bill to reform the drug trade there [3] has now become law. The main difficulty standing in the way of her taking a leading place as a source of medicinal substances is her lack of the chemicals required in the manufacturing processes; of these sulphuric acid, the alkalis, the organic acids, and solvents other than alcohol are the most important. But in time she could make most of these for herself. As Colonel Chopra says, the need is for a central organisation which will establish drug manufacture in India on proper scientific and business lines.

CITRATED PLASMA IN SECONDARY SHOCK

REPORTS on the treatment of secondary shock with human plasma and serum are steadily increasing. One of the latest is by Strumia and his colleagues of Bryn Mawr, Pennsylvania,[4] who refer to the disadvantages in certain circumstances of blood-transfusion—the unavoidable delays owing to necessity of typing and cross-matching and so on. The quantities of fresh blood usually transfused during severe shock are probably quite inadequate to restore the normal blood-volume, and a further disadvantage of blood, fresh or stored, is that it may increase corpuscular concentration when this is already raised. It is now generally realised that the red cells of blood which has been stored in a refrigerator do not for long remain useful oxygen carriers. Hence the tendency to transfuse only the fluid part of the blood. Such is the enthusiasm in some quarters for plasma or serum (terms that some writers seem to think are interchangeable) that it is recommended for the treatment of simple hæmorrhage on the grounds that the maintenance of a normal volume of blood in circulation is of considerably greater moment than the oxygen-carrying power of the red cells. This assertion is true but only within limits, since a patient with severe anæmia may be in a very precarious condition.

Citrated human plasma is readily obtained from blood banks, and it can be stored at 4° C. for months, or with the addition of a preservative will keep well for some days even at room temperature. It is claimed that the pooled plasma from different blood-groups can be administered without preliminary typing or cross-matching and that with reasonable care in its preparation sterility tests may be omitted. One danger only has been stressed—that of heating the plasma—and Strumia gives it cold. There seems to be no objection to this course, and indeed Prof. A. M. Dikhno is reported to have given 400 transfusions at his surgical clinic at Khabarovsk using preserved blood at 4–8° C. without untoward effects. On some of the other claims, however, the evidence is scarcely strong enough for immediate acceptance and the conscientious surgeon would not care to omit, for example, testing the plasma against the recipient's corpuscles for agglutination. Citrated plasma and also serum can be reduced to the form of a dry powder and reconstituted fairly rapidly with distilled water. The advantages of the dry product in storage and transport are obvious and in addition it may be reconstituted for injection in hypertonic solution. Concentrated serum has been employed successfully in experimental shock [5] and may prove valuable in certain clinical conditions. Reports of the "toxicity" of reconstituted solutions and of serum in any form have already appeared but should be treated with reserve.

On page 1019 of this issue Mr. Ogilvie's third article on the surgery of infected wounds concludes a series of signed contributions to a subject of prime importance at the present time. It is proposed to collect and reprint these articles in a War Primer on Wound Infections. Suggestions as to how to enhance the immediate usefulness of this primer will be welcome. An early announcement will be made about the date of publication.

3. See *Lancet*, April 13, 1940, p. 702.
4. Strumia, M. M., Wagner, J. A. and Monaghan, J. F. *J. Amer. med. Assoc.* April 6, 1940, p. 1337.
5. Best, C. H. and Solandt, D. Y. *Brit. med. J.* May 18, 1940, p. 799.

Infectious Disease in England and Wales

DURING THE WEEK ENDED MAY 11, 1940

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 829; whooping-cough, 601; diphtheria, 657; enteric fever, 28; measles (excluding rubella), 6223; pneumonia (primary or influenzal), 795; puerperal pyrexia, 153; cerebrospinal fever, 315; poliomyelitis, 6; polio-encephalitis, 0; encephalitis lethargica, 8; dysentery, 33; ophthalmia neonatorum 105. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on May 10 was 827, made up of: scarlet fever, 139; diphtheria, 110; measles, 11; whooping-cough, 37; enteritis, 63; chicken-pox, 60; erysipelas, 30; mumps, 12; poliomyelitis, 1; dysentery, 7; cerebrospinal fever, 88; puerperal sepsis, 26; enteric fevers, 11; german measles, 60; other diseases (non-infectious), 61; not yet diagnosed, 111.

Deaths.—In 126 great towns, including London, there was no death from smallpox, whooping-cough or enteric fever, 1 (1) from scarlet fever, 2 (0) from measles, 28 (0) from diphtheria, 34 (11) from diarrhœa and enteritis under 2 years, and 25 (1) from influenza. The figures in parentheses are those for London itself.

Fatal cases of diphtheria were scattered over 19 great towns, Liverpool reporting 4. There were 8 deaths from diarrhœa in Birmingham.

PREVENTION AND TREATMENT OF WOUND INFECTION

VI

SURGERY OF INFECTED WOUNDS

By W. H. OGILVIE, M.Ch. Oxfd, F.R.C.S.
SURGEON TO GUY'S HOSPITAL

(Concluded)

PRACTICAL CONSIDERATIONS

In the series of which this is the last article various aspects of the problem of wound infection have been discussed, but the practical application of the scientific discoveries put before us can only be worked out in actual experience. Two important questions require amplification:

1. Can all injuries and wounds receive surgical treatment in time to prevent infection?
2. To what extent are the lessons of the Spanish war applicable to the treatment of industrial accidents and of wounds in the present conflict?

A lacerated and contaminated wound can be made clean if it is excised completely within six hours of infection. This, at any rate, was the experience in the casualty clearing stations of the B.E.F. during the quiet periods of 1917. Many soft-tissue wounds were sutured and healed by first intention; penetrating wounds of the knee-joint uncomplicated by gross bone damage recovered with full movement; gunshot fractures of the femur united in normal time without shortening; abdominal wounds showed a survival-rate of over 50 per cent.; and gas gangrene seemed a thing of the past. In March, 1918, the picture changed completely. Infection and gas gangrene were once more rampant, and the wounds recalled the dreadful months of the first winter of the war, with one difference; then we were mystified, now we could sum up the cause in the single phrase "too late."

The irrecoverable opportunity was missed for three reasons: the wounded arrived too late, their condition on arrival was too grave to permit operation, or their numbers in relation to the surgical teams available were overwhelming. During fighting such as that of the German offensive all normal arrangements for evacuation break down. The wounded may lie about for days before being picked up. Roads are impassable, ambulances have been destroyed, and transport is further impeded by reinforcements and supplies being pushed forward. Then the C.C.S. serving any area may have been destroyed, or driven to some other place. The wounded must be dispatched in the direction in which roads or trains still allow their evacuation, so that they may first reach surgical attention at a base hospital some hundred miles away, and a week after they were wounded. In any batch so arriving, a considerable number are profoundly shocked, from cold, exposure, loss of blood or toxic absorption, and quite unfit to face operation. They are sent to a resuscitation ward, and an attempt is made by warmth, fluids and blood-transfusion to improve their condition, but by the time this has been achieved, infection has usually established itself in their wounds.

The most tragic aspect of surgery under these conditions is the total inability of the teams, working day and night with the deft skill of practised experts, to cope with more than a fraction of the numbers presented to them. Many surgeons will remember the hurried visits to the resuscitation and preparation wards in the interval between two cases; the quick assessment of the rows of suffering but patient men by the light of a hurricane lamp or the first faint glow of dawn; the rough division of the wounded into the three categories of "too late," "may be ready for operation in an hour or two," and "to be done as soon as possible." The return later, after eight or ten operations done at top speed, to the same wards, to find many of the more serious casualties already dead and their place taken by fresh wounded, and, worst of all, many of those who on the last visit were marked for urgent operation now transferred to the ranks of the "too late."

EXPEDITION

Those who direct the conduct of an army must concern themselves first with making it an efficient fighting machine, and in a battle the transport and supply of the combatant units has prior claim over anything. But in the army of any civilised country the care of the wounded has a claim only modified by the need to ensure victory. All that the medical services can do is to point out that the highest rate of recovery, and of restoration to useful function afterwards, will be attained only if the wounded reach an organised surgical unit within six hours of being hit. To what extent this recommendation can be implemented it is for the administrative services to decide. Transport from the front line to the advanced surgical unit can be arranged expeditiously in periods of stationary warfare, but it must be harassed at times of activity or in a war of movement. The advanced operating unit can be moved nearer the front line, and, as far as the surgical and nursing staff are concerned, they only ask to be placed where they are most useful. But a casualty clearing station requires a lot of equipment and a certain amount of stability: it must have level, rainproof and well-lit rooms for operating, it needs a big reserve of bulky stores, and it should be near a rail head or some big road or river to evacuate its wounded. Such a unit cannot usefully be placed any nearer the front line than the extreme range of the enemy's heavy artillery, except where there is special shelter as on the Asiago plateau in Italy. The first factor—delay in transport from battlefield to hospital—is thus dependent above all on military considerations that cannot be over-ridden.

In air warfare there is no front line. Under the purely hypothetical circumstances of a skilled and humane air force attacking a defenceless country it might be assumed that bombing would be limited to objectives of military importance. But an enemy approaching at heights over 20,000 ft. and chiefly concerned with unloading his bombs and escaping as quickly as possible from a well-organised defence is as likely to hit one point as another. The assumption that air-raid casualties will be incurred chiefly in the areas of dense population, and that the main surgical services must be placed outside this danger zone, is therefore probably unsound. Bombs may fall anywhere, not only maiming people but destroying buildings and roads, and in the hours of darkness they will inevitably disorganise the centrifugal traffic in any particular sector on which the evacuation of the wounded depends. Early débridement is as essential in bomb wounds as in shell wounds, and it should be done on the spot by surgical teams prepared to move from building to building and from one sector to another as the need arises. When day comes those patients who will stand the journey can be moved to the evacuation zone, and their wounds having already been cleaned the chief dangers of infection will have been averted.

In industrial accidents the need for early excision of wounds is already realised, and is being met by that decentralisation which is so marked a feature of contemporary surgical development.

RESUSCITATION

Some delay between reception and operation is inevitable with severely wounded men. Cold, fatigue, loss of blood and shock must be fought in this war as in the last, but our weapons are more efficient. We start where we left off with the simple devices of morphia, tilted stretchers, and stoves under the blankets, but we have in the continuous intravenous drip a method that facilitates all resuscitation measures, and greatly simplifies the conduct of a large recovery ward. With continuous infusion running

we can give any fluids from saline to blood in the quantities and at the rate we desire with a minimum of supervision, and can administer sedatives, cardiac stimulants, pressor drugs or sera by the same apparatus. The use of preserved body fluids is a further advance. Stored blood has been used for some time, and the methods of collection and transport now employed are eminently practical, and highly creditable to those who planned them. At ordinary times its short life implies a certain amount of waste, and it does not appear to be quite as effective as fresh blood in replacing that lost by hæmorrhage. In heavy fighting it may prove valuable, but under such conditions it has a serious rival in preserved plasma. Three pints of blood yield only one pint of plasma, but on the other hand it can be obtained from all blood-groups except AB, that is from about 95 per cent. of the population, and it can be sterilised by filtration and stored almost indefinitely without refrigeration. In some cases of shock, where there has been little or no hæmorrhage, the hæmoglobin percentage is raised and blood-transfusion is definitely harmful, and even where much blood has been lost an immediate increase in the amount of fluid is a more urgent need than the restoration of corpuscles. Plasma should provide a circulating fluid that is not lost to the tissues, that will in fact fill the place that gum saline might have done but for the risks inherent in the use of such a foreign substance.

THE SUPPLY OF SURGICAL TEAMS

In discussing the prevention of wound infection in war-time a question that must be faced is whether more operations can be performed in the grace period of six hours. A skilful and experienced surgeon can deal with from twelve to eighteen cases in this time, but cannot increase this rate appreciably except by substituting wide drainage only for thorough débridement, a policy that in the opinion of most would be disastrous. Where a selection must be made it has been found that patients with through and through wounds from rifle or machine-gun bullets can be evacuated for later operation with far less risk than those with bomb or shell wounds.

More surgeons can be called into service, indeed the number of potential teams is almost unlimited. War surgery demands certain qualities and immediate training rather than approved qualifications and the correct background. A good peace-time surgeon may be a nuisance at a C.C.S. and a clog in its efficient machinery, while the brilliant C.C.S. surgeon often becomes a menace in civil life. The main difference is that operating by the clock is in war an index of specialised efficiency, in planned surgery evidence of arrested mental development. The good C.C.S. surgeon must be young, strong, fearless, with clever hands and as much common sense and humility as the first quality will allow. He should have served a surgical apprenticeship, and he must know his anatomy; he should therefore have worked for, if not passed, the Primary, but he need not have the Fellowship. Every large hospital could lay its hands on fifty such men, who could be trained in the simple but exacting technique of débridement and warned of the dangers of suture. Cranial, thoracic and abdominal wounds should be diverted to the experts. War anæsthesia again is no specialism. Any surgeon who is familiar with the extraordinary high standard of the nurse-technicians in the hospitals of the United States, or who had a nurse anæsthetist attached to his team in the last war, could ask for no better service than these women can give.

The provision of surgical units to meet the needs of the fighting on any particular front raises the still larger question of whether, in a totalitarian war, the requirements on all the fronts of land, sea, air and home do not demand a unified medical service. The distribution of medical men is arranged, as far as possible, to meet the greatest demand that is expected, and since the need is fluctuating and unpredictable the provision must be on a lavish and wasteful scale. A doctor in the Services spends perhaps 10 per cent. of his time working really hard and the other 90 per cent. in almost unrelieved idleness, while his colleagues in civil life are overworking all the time. One service would facilitate that free interchange that seems everywhere desirable, and would allow the provision of a pool of trained surgeons who could apply those principles by which the worst horrors of wound infection can be prevented, whenever and wherever the need should arise.

EXPERIENCE IN THE SPANISH WAR

The splendid results obtained by the Catalonian surgeons with the closed plaster treatment of wounds, results that have been placed before British surgeons by Dr. Trueta in a manual that is admirably clear and convincing, inevitably raise the question whether the same methods should be adopted for the treatment of military and industrial wounds in this country. Trueta's book has much to teach even those who disagree with its main conclusions, and his achievement in obtaining 976 satisfactory results in 1073 projectile fractures with only 6 deaths is one of which any surgeon could justly be proud.

Trueta believes that this remarkable recovery-rate, the virtual disappearance of gas gangrene, and the extraordinary comfort of patients under treatment to which many visiting surgeons have testified is due to the combination of early and complete excision, free drainage, and immobilisation in plaster-of-paris, and in his writings he appears to lay the greatest stress upon the plaster-of-paris. Whether this particular method of fixation has in fact the virtues claimed for it is the only controversial matter in the teachings of the Spanish school, for the three principles are fundamental in the treatment of infected wounds.

Of these principles early excision is by far the most important, and the Spanish surgeons had opportunities in this respect more favourable than those obtaining on the Western Front even during its quiet periods, for their patients were wounded on their doorstep, and not suffering from exposure or privation at the time. It is unnecessary to look further than this opportunity for the reason for their immunity from gas gangrene. In assessing their results as a whole it is only fair to recall that the results in the B.E.F. twenty years earlier were also good under similar circumstances. Given early excision the worst dangers of infection are past, and the subsequent treatment should be chosen to give the best results under a particular set of conditions. To drain all excised wounds—and that is in effect the recommendation of the Spanish school, for they rarely encourage primary suture—is to play for the greatest safety by choosing second-intention healing and being content with second-best results. Primary suture implies greater anxiety than drainage. It should be undertaken only under the favourable circumstances that have already been discussed and by experienced surgeons who are prepared to reopen the wound at the first sign of failure, but on the other hand it should not be summarily dismissed to suit the needs of a comfortable routine.

The difference implied in the two policies may be illustrated by the example of a patient wounded in the knee-joint and brought to the operating theatre four hours later in good condition; his synovial cavity has been penetrated to the outer side of the patella by a piece of shell which has lodged superficially in the external condyle, taking with it a piece of clothing. In such a simple wound the whole track, including foreign matter and damaged tissue, can be excised completely. If excision is followed by suture of the synovial membrane and loose approximation of the skin the wound will probably heal in ten days, movements will be back to normal in six to eight weeks, and after the war the man can play cricket for his village or his county according to his talents. If the wound is packed and immobilised in plaster it will take from two to six months to heal, and normal movements of the knee will never be regained.

Many wounds cannot be closed safely even after early débridement, but must be drained and immobilised. Plaster-of-paris forms a rigid case exactly

adapted to an individual limb and the dressings round it; it provides perfect fixation of position but not of length. A plaster case ensures complete rest in injuries of the soft tissues; it gives true immobilisation in osteomyelitis because there is no solution of skeletal continuity, and in a reduced transverse fracture because continuity has been restored; but it does not immobilise an oblique or comminuted fracture of the femur or tibia, because it does not apply traction. The less dressings and padding are used the better will be the immobilisation, but also the more imperfect the drainage and the shorter the duration of the plaster. Under war conditions a plaster case can seldom be retained longer than ten days.

We may again compare the two methods by the example of a man with a gunshot fracture of the femoral shaft whose wound has been excised and packed at a C.C.S. If he is put in a plaster spica he will travel comfortably, and at the base will need the application of a fresh spica on the tenth day, and again two or three weeks later. His wound will heal progressively and his fracture will unite in fair rather than good position. If he is put in a Thomas splint he will travel as comfortably only if his attendants are expert. At the base, with his splint suspended from an overhead frame and weight extension applied, he will heal as rapidly as if he were in plaster provided the dressings are not changed unnecessarily, but his comfort will be greater, the length and alignment of his femur will be better, and his ultimate recovery of function and movement will be more complete and will come sooner.

The one advantage of plaster over any other method of fixation, and in certain circumstances it is an overwhelming one, is that it is fool-proof. Once a wounded man has undergone efficient surgical treatment and has been put in plaster he is safe—he may be blown out of an ambulance, derailed in a train, crashed in an aeroplane or torpedoed at sea, he may be left for weeks in a cellar with only food and water, but so long as his plaster holds he will come to no harm. This assurance is of such immense value to the medical services of an army that where the conditions of transport seem likely to be harassed the plaster method seems bound to find favour; with undisturbed communications it is unlikely to replace methods that have already proved their worth.

SPECIAL ARTICLES

GENERAL MEDICAL COUNCIL

PRESIDENTIAL ADDRESS

Mr. H. L. Eason, in his first presidential address to the council on Tuesday, said that they met in the midst of a struggle, the outcome of which may affect the future of the whole civilised world. Though the routine work of the Council had not been interrupted there was no guarantee that their session would continue undisturbed by aerial attack. Before delivering this address, the President went on, I have given thought to the question whether such addresses are necessary, and whether the infliction upon the council of a formal communication is justified. In order to make myself familiar with the history, traditions, and practice of the council, I have during the last few months read through the minutes of the council, and I have been convinced that the presidential addresses, which have been given uninterruptedly since 1866, afford to the members of the council, the public, and the future historian a concise survey of the actions of the council; they also give the president an opportunity of making on behalf of the council public announcements on important matters which may affect the medical profession either in this country or the Dominions. I am therefore emboldened to continue the practice of my predecessors.

The President referred with regret to the death of Sir Gilbert Barling, representative of the University of Birmingham on the council from 1917 to 1926, and a member of the executive and examination committees from 1919 to 1926. Mr. G. H. Edington, representative of the Royal Faculty of Physicians and Surgeons of Glasgow since 1928, had resigned, and the council would miss his engaging personality, his devotion to their work, and his shrewd common sense. In his place they welcomed Dr. Andrew Allison, professor of medical jurisprudence at St. Mungo's College, Glasgow, and a member of the committee of management of the Scottish Conjoint Board. Dr. Cecil Wall had resigned in December after representing the Society of Apothecaries of London since 1932. His quiet wisdom, keen interest in medical education, and love of tradition, were of great value in the council's more intimate discussions. His successor was Dr. J. P. Hedley, consulting obstetric physician to St. Thomas's Hospital.

During the last war, the President continued, the council were from time to time seriously concerned with the adequate supply of new practitioners and the problems of their education. In this war such anxieties do not at present arise, owing to the wise decision of the Government to place in the schedule of reserved occupations all medical students who have completed two terms' study in anatomy and physiology. This decision, together with the possibility of a student obtaining postponement of his calling up for a period of not more than twelve months in all, if he can satisfy the umpire on appeal from a hardship committee that he is about to proceed to a "critical" examination, will probably ensure the supply of a normal increment of practitioners even though the war should be of some years' duration. It is a matter of satisfaction to the council to learn that the licensing bodies generally have decided that, even during the war, there shall be no lowering of the standard of education required for entrance to the profession of medicine.

The council will remember that in the last war practitioners from certain provinces in Canada were desirous of coming to the aid of this country, but were hindered by the absence of reciprocal relations with the provinces as to registration. Steps were taken to overcome these difficulties, and as a result reciprocity was established with all the provinces of Canada except British Columbia. To our regret this reciprocity was terminated some years after the war by the provinces of New Brunswick, Ontario, Quebec, and Saskatchewan. Qualified practitioners are, however, now anxious to be placed without delay in a position to render professional services to this country. The executive committee have therefore empowered me to represent to the Lord President of the Council that appropriate action should be taken to facilitate the acceptance of these contributions to the common cause.

Prof. J. S. B. Stopford was elected chairman of business for the ensuing year.

DENTAL PENAL CASES

As a result of reports from the Dental Board the Registrar was ordered to remove the following name from the Dentists Register: Alexander Samuel Fraser Duthie. He was directed to restore to the Dentists Register the names of David Minton and Joseph Reay.

MEDICINE AND THE LAW

Cash Value of Lost Lives

IN Mills *v.* Stanway Coaches Ltd. the Court of Appeal has tried once more to make a rough standardisation of the financial value of diminished expectation of human life. It seeks to discourage inflated awards. In assessing damage for loss of life, said Lord Justice Goddard, courts should think in hundreds, not in thousands.

Mrs. Mills, aged 34, was fatally injured in a motoring accident. Her husband sued as the administrator of her estate. The trial court gave him £2000. The Court of Appeal says this was excessive. It had itself awarded only £1000 for lost expectation of life in Rose v. Ford, where the dead woman was 23 years of age. The trial court gave twice as much in the case of Mrs. Mills, though she had already lived ten years longer. The appellate tribunal can hardly expect judges and juries to memorise a tariff of awards made in other cases. Nor will it interfere where the margin of difference is small. Lord Justice Slesser announced that the trial court in the Mills case would not have been overridden if it had only slightly exceeded the datum line of £1000—if, for instance, the award had been £1200 or £1300. But to double the figure prescribed in Rose v. Ford was "an entirely erroneous estimate of damage," which could not be allowed to stand. Not that £1000 is to be thought of as a fixed limit. Circumstances differ, and estimates in other cases are a guide and not a rigid figure. The sum of £1000, reached by the considered opinion of the lords justices in Rose v. Ford, is to be deemed a "reasonable guide" for the case of an adult woman. Age, it was said in a 1938 decision, is an element to be taken into account. When the victim is a child of 8, as in Trubyfield *v.* G.W.R. Co. (1937), forensic subtlety invites the court on the one hand to consider the bright prospects of health, wealth and happiness, and, on the other, to remember the possible chances of illness, accident, lunacy, a criminal career and a premature death. In the present period of anxiety and risk, indeed, counsel for the defendant might well insist that life is much less worth living to-day than a year ago. Yet it was held in Roach *v.* Yates that it was legally immaterial whether the patient did or did not wish to live or did or did not appreciate that his life was shortened. And there we must leave a problem which, as Mr. Justice Charles is in the habit of telling juries, is incapable of human solution. Courts cannot look into the future.

Another point in the Mills case was the additional award of £200 for the victim's pain and suffering. Mrs. Mills survived the accident by only four days; during most of the time she was unconscious. In these circumstances, says the Court of Appeal, she could have felt but little suffering. The damages on this head were therefore cut down to £50.

ADDENDUM TO THE B.P.

THE British Pharmacopœia Commission is to publish an addendum to the B.P. 1932 as soon as difficulties in the printing trade permit. Its main purpose is to lay down a standard for an oleum vitaminatum which may be used in place of cod-liver oil, and with the exception of a monograph on tetanus toxoid all the new monographs are related to that purpose. The vitaminised oil is "a solution of vitamins A and D containing in 1 gramme 1000 units of vitamin A activity and 100 units of antirachitic activity (vitamin D)." As long as the finished product contains the vitamins in those proportions the choice of vehicle, within certain limits, is left to manufacturers of the new oil. Thus it may be prepared by dissolving a source of vitamin A and a source of vitamin D in a suitable vegetable oil "such as arachis oil" or may consist of "a suitable fish-liver oil, or blend of fish-liver oils." Manufacturing druggists seem to favour the vegetable-oil method, but in the United States, where a good deal of study has been given to the question of cod-liver oil substitutes, fish oils of high vitamin content are gradually supplanting vegetable oil, and are in fact sanctioned by a supplement to the U.S.P. which recently became effective. Thus pilchard and menhaden oils and frozen livers of various kinds of fish supplied to the manufacturers in hermetically sealed tins are being used for producing an oil which answers the requirements of the United States Pharmacopœia. Salmon oil, too, is being used for similar purposes and it may well be that when the war is over and cod-liver oil is normally available that commodity will have to compete with fish oils which, in respect of their vitamin content, are not inferior to the oil expressed from the livers of cod-fish. In view of the scope for ingenuity which the new addendum to the B.P. allows the prescriber may soon be confronted by an embarras de choix of vitaminised oils and it will not be surprising if some prefer products which have an association with the sea and retain something of the fishy flavour to which they are accustomed. The three monographs on concentrated vitamins are the servants of the main monograph, as also is the one on purified volatile oil of bitter almond, an ingredient of the new official formulas for cod-liver oil emulsion and vitaminised oil emulsion. A standard is included for "extract of malt with vitaminised oil" which is composed of extract of malt 90 per cent. and vitaminised oil 10 per cent. The opportunity has also been taken to include a monograph on halibut-liver oil.

Five monographs of the B.P. 1932 have been amended. In three cases—camphorated oil, hydrous ointment and compound mercury ointment—the object is to authorise the use of arachis oil, cottonseed oil or sesame oil instead of olive oil in preparing them. In the case of capsicum oil the formula permits the use of a base which does not require lard. The fifth amended monograph is on tannic-acid ointment for which a new formula is presented.

The Lancet 100 Years Ago

May 30, 1840, *p.* 338

From a leading article

Vaccination may be rendered compulsory without violating any constitutional principle; it would be absurd to maintain the contrary. But a measure founded on the compulsory principle is inexpedient, and it appears to us to be unnecessary.

The children of the wealthy and middle classes are invariably vaccinated. Few remain unprotected at the end of six months, so that small-pox is generated, and finds the majority of its victims, among the poor, and pauper classes. Now, let us, for a moment, visit a poor family in which the children are unvaccinated, and a death from small-pox has occurred. In the presence of the mother, we ask, what steps should have been taken, or is it desirable to take, to remedy the neglect? Fine or imprison her, say the advocates of compulsion. But why has she neglected her duty? Question her, and any or all of the following reasons may be alleged:—She believes that cutting for the cow-pox is a bad thing altogether; that it introduces "humours" into the child's blood; that it imparts a "beast's" disease, and that it is much better to let things take their natural course. Or she wished to have it done, and liked to have Doctor Andrews, who lived in the same street, but could not afford to pay him, and did not like to trouble him, though he offered to do it for nothing. Then the place where they inoculated children gratis was at a great distance, and they took the matter from all sorts of scabby little things; besides, she did not like the doctor there, who was a great fool, or very rough, and unfeeling.

PARLIAMENT

ON THE FLOOR OF THE HOUSE

By MEDICUS, M.P.

WHEN Parliament assembled on Wednesday of last week there was the usual order paper indicating the questions to be asked on that day and the course of business available at the vote office. There were also two other bills, one the "Treachery Bill" and the second the National Service (Armed Forces) Bill necessary to regularise the position of the Local Defence Volunteers, who were called for in a broadcast by Mr. Eden, the new War Minister.

These two bills were drastic enough. That Parliament should find it necessary to pass a bill imposing the death penalty for treachery and another to regularise the position of the Defence Volunteers raised to repel invasion by the new parachute arm meant clearly that war had come on to the Home Front in all its grimness. But I had heard a hint that there might be something more and asked the vote office for "the other bill which is being presented." But of this they professed to have no knowledge and no mention of it appeared on the order paper. Nevertheless, as soon as questions—fewer than usual—were answered Mr. Attlee rose and in his new rôle of Deputy Leader of the House proposed the Emergency Powers (Defence) Bill which places the whole resources of the nation, men, women, land, factories and wealth of every kind, at the disposal of the Government. As Mr. Attlee was speaking individual members of the House went out of the chamber to the vote office in the lobby and brought back sheaves of the one-page document, which places the whole resources of the nation, men, all along the packed benches. In this way the House learned of the gravity of the occasion and beginning at 3.25 P.M. had passed the bill through all its stages by 5.23. The bill was also passed by the House of Lords.

The people of Great Britain, through their representatives in Parliament, here placed all power to mobilise the resources of the nation to fight the war to victory in the hands of the Government. Our constitution, our liberties, our wealth are at the Government's disposal, for everything must be thrown into the balance to resist the enemy and to overcome him. This makes of Parliament not a less but a much more important body than it was before, for in it now resides the only constitutional power to undo what it has done and restore what it has temporarily taken away. The gravest responsibility now rests on Parliament to safeguard the exercise of powers by the executive and safeguard the rights and liberties of British citizens.

* * *

Next day the Speaker read a letter from Sir John Anderson, the Home Secretary, announcing the arrest of a Member of Parliament under the Defence (General) Regulation of 1939 and his removal to Brixton prison. By 7.30 P.M. the Limitation of Dividends Bill and a number of other matters had been disposed of, including powers to raise money for supply in 1941 and 250 million pounds additional on a procedure carried out last year in respect of 1940. The resolution was moved by Sir Kingsley Wood, the new Chancellor of the Exchequer, and Mr. Pethick-Lawrence in commenting on the figures involved said the resolution is "of course one of tremendous significance and involves sums which are astronomical in their size and which, in the course of their issue and expenditure, will involve exceedingly large and grave problems." What is notable about these financial proposals is that they are put forward in specific form and not by proceeding through regulations under the wide powers conferred on the Government by the Emergency Act just passed.

A land-drainage resolution was moved after this and the money resolution under the Colonial Development and Welfare Bill for the remission of debts of nearly 10 million pounds and to provide other moneys.

* * *

It does not appear that Parliament will surrender its right and duty of scrutinising financial proposals big or little. The fact that there is not much discussion in the House does not mean that details are not in fact considered. But a great deal of work goes on now by committees of members and the committee plan of work may extend and increase.

What will at once affect the nation more immediately and intimately is when proposals are made for large-scale plans for maintaining standards of nutrition and fitness in the nation. Essential food-supplies should, in the opinion of many members, be made national services, and the new evacuation plans will no doubt have their own health problems.

FROM THE PRESS GALLERY

Colonial Development

IN the House of Commons on May 21 Mr. MALCOLM MACDONALD moved the second reading of the Colonial Development and Welfare Bill. He said that it was characteristic that whilst every ounce of our energy was thrown into the task of discomfiting, defeating and destroying the enemy the House of Commons nevertheless found time to offer substantial, and indeed generous, encouragement to colonial development. Let the world mark the passage of this measure as a sign of our faith in ultimate victory. In the last generation there had been a great deal of wise government of the colonies and advance had been continuous. There was, for example, the steady reinforcement of the Colonial Medical Service which had resulted in an increasingly effective attack on tropical and other diseases. But in this and other aspects of development many colonies suffered from the handicap of insufficient revenue. A majority of the colonies could not afford to finance a number of vital services, including medical and veterinary research, the building of clinics, hospitals and schools and the steady increase of health measures of all kinds. This bill proposed fresh departures from the points reached by the existing Colonial Development Act. First, the moneys to be made available for colonial development were to be multiplied more than five-fold. Instead of a fund restricted to £1,000,000 a year this bill would authorise expenditure on colonial research up to £500,000 a year, and expenditure on colonial development and welfare up to £5,000,000 a year. The provision for research was for an indefinite number of years and that in regard to development and welfare was assured for the next ten years. The sums stated were maximum figures so far as the present legislation was concerned. Secondly, by this bill they were widening the whole field of works and activity which could be assisted. Thirdly, they were removing another cramping provision which limited the contribution of money out of the Colonial Development Fund to the capital cost of works. This would remove the anomaly that, while money could be provided to meet the cost of the erection of a research station or hospital, none could be given towards the running costs of such schemes.

Major Sir JOCELYN LUCAS in welcoming the bill, said that though we had our duties to the natives it was the white settlers and administrators who had

invariably been responsible for such improvements and progress as had been made, more particularly in the conquest of tropical diseases. In this and in other respects he hoped that we would coöperate with our French allies.

Dr. HADEN GUEST said the plan presented in the bill for setting aside money for colonial development was admirable in itself, but in what way was the money to be spent? There was no comparison between what had to be done in the West Indies, an old country with a social system which never worked well and had to a large extent broken down, and what had to be done in, say, West Africa, where there was an active and vigorous native population. He had not heard Mr. MacDonald set out any plans for spending this money.

Sir FRANCIS FREMANTLE urged that native education should be directed towards the objects which appealed to these people—namely, agriculture and health. When he was a sanitary officer in Mesopotamia during the last war there were sanitary squads composed of various races which had come from India or Arabia, and he had been astonished by the powers of observation, deduction and action shown by even the more primitive people after they had been through a course of malaria prevention. Another example was the British Empire Leprosy Relief Association which had been established for about 15 years and had branches all over the Empire. The result of this scheme had been that knowledge had been obtained of the extent of leprosy throughout the world. It had been found that leprosy was two or three times as prevalent as had been supposed. Formerly the treatment was entirely insufficient. The leper was a pariah cut off from civilisation. Modern methods had shown that probably two-thirds of these cases were no longer infectious and could be returned to ordinary life. Clinics had been established and people now came forward in the early stages with splendid results. In Zululand they were struggling along with small hospitals containing about 20 beds and having financial resources of £400 a year. He hoped that grants would be made under this bill to assist small hospitals of this kind in different parts of our colonies. Zulu girls were now being trained as midwives. One little hospital was sending out something like a dozen midwives a year. A special effort should be made under this bill to provide facilities for training native people for work in health services. One of the first essentials was to train midwives whose work resulted in a tremendous saving of life, but it was necessary also to train other workers. Doctors would have to be trained when they got to the stage of establishing voluntary medical schools, but what was necessary now was the training of people for subordinate services as auxiliaries, to help as dressers, laboratory attendants, sanitary inspectors, and so forth. Research work was also important. A great deal more could be done in psychology in relation to the natives.

Mr. MACDONALD in reply said that the Government were now awaiting the submission of plans from the local governments drawn up with their local knowledge. The Advisory Committee on Development and Welfare would then begin to function. The scheme was fairly elastic. The statement he now made about the expenditure of the money provided under the bill was strictly confined to the war years. Very likely war conditions would not permit the Government to reach the maxima of £5,000,000 and £500,000 a year while the war lasted, but he certainly thought they would reach figures approximating to those in the years after the war.

"... All our drivers agree that the Red Cross only attracts the attention of German pilots. In the past 10 days Nazi airmen have been bombing or machine-gunning our ambulances, sometimes only from 50 feet. The Red Cross no longer protects our men, and we are removing it in their interests."—The committee directing the American volunteer ambulance on the French front, quoted in the *Times*, May 27, 1940.

QUESTION TIME

R.A.M.C. Officers and Private Practice

Dr. EDITH SUMMERSKILL asked the Secretary of State for War whether he was satisfied that it was in the best interests of the Army that officers of the R.A.M.C. should be permitted to attend, for fees, private patients outside the service; and on what grounds he differentiated these cases from those of members of other callings or trades wishing to supplement their Army pay.—Mr. A. EDEN replied: Officers of the R.A.M.C. are not permitted to set up in private practice in competition with civilian medical practitioners, but they are free to act in a consultative capacity or do other similar work of a casual nature which does not interfere with the performance of their military duties, and I think this is a beneficial arrangement.—Dr. SUMMERSKILL: Have you considered the difficulties created for commanding officers of units by this practice? A commanding officer was frequently asked by a man for extra leave in order to see private patients, and consequently the commanding officer had to get other men to do the work of the unit.—Mr. EDEN: This rule has been in operation since 1924, and I am told it works very well. On the face of it, it seems to be a reasonable requirement.

Sir FRANCIS FREMANTLE asked if the Minister realised that the difficulties of supplying the needs of the civilian population were very great, and that it was only right that the doctors, whether serving in the Army or civilians, should be used whenever required.—No further reply was given.

Tuberculosis in England and Wales

Mr. S. P. VIANT asked the Minister of Health whether he could supply an estimate of the number of deaths reported in England and Wales in the year 1938 as due to bovine tuberculosis.—Mr. MACDONALD replied: Of the deaths registered in England and Wales in 1938, 26,176 were classified as being due to tuberculosis. Of these, 4246 were classified as being due to non-respiratory tuberculosis; these deaths would include the majority of the bovine cases; in the absence of special investigation, it is not possible to give more definite information.

Dr. EDITH SUMMERSKILL: In view of the gravity of the answer given, can the Minister say whether he proposes to take any action to prevent the sale of tubercle-infected milk?—Mr. MACDONALD: This is an indication of the great importance of getting ahead with schemes of pasteurisation.—Dr. SUMMERSKILL: Can the Minister say whether he proposes to take any action soon in regard to that?—Mr. MACDONALD: I shall take any action which is practicable in present circumstances.

Mr. W. GALLACHER asked the Minister what was the number of beds reserved for tuberculosis and available for immediate occupation on March 31 in England and Wales, respectively; and the number of such beds expressed as the number per 100 annual tuberculosis deaths for England and Wales, respectively.—Mr. MACDONALD: The latest date for which complete returns are available is Dec. 31, 1939. On that date, the number of beds reserved for the treatment of tuberculosis in England was 24,606 of which 19,312 were occupied. The corresponding figures for Wales were 1827 and 1640. The annual death-rate returns for 1939 are not yet available, but the number of beds reserved for the treatment of tuberculosis in England expressed as the number per 100 tuberculosis deaths in 1938 is approximately 102, while for Wales it is 91.

Mr. GALLACHER: What was the number of patients on April 30 on the waiting-list for admission into institutions and sanatoria of the Welsh National Memorial Association; the time the longest case had been on the waiting-list; and the average period of waiting?—Mr. MACDONALD: The number of patients on April 30 on the waiting-list for admission into institutions and sanatoria of the association was 333. Twenty-two weeks is the longest time a case has been on the waiting-list and the average period of waiting is ten weeks.

Soldier's Death after Inoculation

Mr. W. LEACH asked the Secretary of State for War what inoculation caused the death of Private Alfred Carlisle, aged 33, of the Leicestershire Regiment, on whom an inquest was held at the Grand Hotel, South Wigston, on May 6.—

Mr. EDEN replied: Private Carlisle received his second inoculation against enteric fever on April 19. He was taken ill and died the same day. Post-mortem examination revealed that he was suffering from a variety of medical conditions, more particularly disease of the main blood-vessels of the heart. The cause of death was "acute dilation of the heart," to which the inoculation was a contributory factor. It was found at the inquest that Private Carlisle's unsatisfactory state of health could not be determined by external medical examination, and, as he made no complaint, would not be suspected.

Recruits and Mental Instability

Mr. RHYS DAVIES asked the Minister of Labour and National Service whether he had now made arrangements with the medical boards to avoid passing into His Majesty's forces persons who were physically fit but of unsound mind. —Mr. ASSHETON, parliamentary secretary to the Ministry of Labour, replied: The instructions issued to medical boards provide for inquiry to be made into a man's personal and family history of nervous and mental illness and for a specialist's opinion to be obtained in cases of doubt. The attention of medical boards has recently been drawn to the importance of their examination of this condition, and the possibility of taking further steps with a view to the identification of mentally unfit men is also being explored. The matter will no doubt receive consideration by the committee [1] under the chairmanship of Lord Horder which has been appointed to advise on medical questions arising in connexion with the examination of men by medical boards.—Mr. DAVIES: Are you aware that mental welfare associations operating under local authorities will have almost complete lists of these young men, and is it possible for the medical boards to work in coöperation with these associations?—Mr. ASSHETON: I hope very much that that can be done.

Biological Science and Camouflage

Sir JOHN GRAHAM KERR asked the Home Secretary if he was aware that the establishment of the scientific principles which determined the effectiveness of camouflage was the work of biological specialists in this subject; that one of the leading authorities in this specialised branch of science was a British subject; and if steps had been or would be taken to ensure that his full-time services should be available to the country during the present emergency. —Sir JOHN ANDERSON replied: I am aware that biological science has made an important contribution to the study of camouflage, and I have invited a British biologist to serve on the Camouflage Committee. He has accepted my invitation and will, I have no doubt, be ready to give to the matter as much of his time as may be required.

1. See *Lancet*, May 23, 1940, p. 990.

No Badge for Physical Rejects

Mr. LESLIE BOYCE asked the Secretary of State for War whether he would consider the issue of a badge to men of military age who had been rejected as unfit for service.—Mr. EDEN replied: I do not think there is any need to issue a badge to denote inability to join His Majesty's forces on account of physical unfitness or any other reason.

Evacuation of Adult Invalids

Mr. MARTIN asked the Minister of Health whether he would prepare a scheme for the evacuation of adult invalids such as those who were bedridden and therefore not able to make private arrangements for their own evacuation.—Mr. MACDONALD replied: I am afraid that it is not practicable to include within the Government's evacuation scheme arrangements for the removal of adult invalids such as those who are bedridden.

Mr. R. C. MORRISON: In view of the fact that most voluntary societies which have many of these cases brought to their notice are unable to do anything about them and to get them away, could not you do something to assist the local bodies carrying on this work? Mr. MACDONALD: If we can do anything to assist these bodies we shall be glad to do so, but the whole position must be governed by the prospect of accommodation in the reception areas.

Compensation for Air-raid Injuries

Mr. RHYS DAVIES asked the Minister of Pensions the procedure to be employed by civilians claiming state compensation in respect of injuries caused by air-raids.—Sir W. WOMERSLEY replied: Claims in respect of injuries caused by air-raids should, in the first instance, be made to the local office of the assistance board, who act for this purpose as agents for my department. The address of the board's local office may be obtained at the nearest post office.

IN ENGLAND NOW

A running commentary from our Peripatetic Correspondents

LIFE in our academic world nowadays has about it a feeling of unreality. Those lucky people who have been commandeered by the Government for special duties have, we suspect thankfully, unloaded their peace-time responsibilities on younger and more restless shoulders and have vanished behind the scenes. This is not what we under-forties envisaged at all. We took care that the Government were informed of our unique scientific value, and awaited with confidence the call to forge or unforge secret weapons. But alas! In the twinkling of an eye the captains and the kings had departed, and the forlorn remainder had been impressed with their indispensability in the cause of medical education. The facts were too obvious for dispute: any further depletion of staff and the students would have to teach themselves. Thus did the grim future unfold itself to our incredulous gaze. No thrills, no excitement, no novelty; just evacuation problems, unsuspected deluges of administrative detail, teaching and examining. The same mixture as before, ad nauseam. This is not to suggest that in normal times it is unpalatable, quite the reverse, but as the surgeon practises surgery and the physician medicine, so does the physiologist practise physiology and the anatomist anatomy. Dilution of the mixture with research increases its efficacy. I have yet to meet the physiologist who feels that in teaching alone he is doing his duty to himself or to his students. Of prospects of research we could see none, and I am told by my laboratory assistant that on the outbreak of war I lost, by slaughter, 4000 mice.

The event has proved less grievous than the anticipation, thanks to our delightful hosts who have accepted us without question and given to us every possible practical help. In fact we sometimes feel that they regard us as a welcome diversion. The University of London provides a never-failing source of wonder and entertainment. Our erstwhile chieftains occasionally emerge from the fog of war to exhibit wisdom and enhanced vitality, and to prevent our administrative inexperience from proving disastrous. One experience, more than any other, led me to accept my lot with the best possible grace. That was a month with the E.M.S. at the beginning of the war. We know, thankfully, how Hitler failed us then, and I cannot deny that the return to familiar duties was welcome, if not so exhilarating as the 200-mile dash to the hospital which I importantly made on that first fateful Sunday. Disillusion went deeper than boredom. Had casualties come on the expected scale, hard work might have disguised the fact that blood transfusion is technically simple and not a career in itself. But as it happened I had no answer to the reproof of my conscience that I had contemplated deserting a skilled occupation for one at which I was unskilled. In ten apparently short years I had become out of date, and of much less use clinically than my newly qualified colleagues. I found an age in which starvation was unknown as a treatment for hæmatemesis, and intravenous saline a panacea.

So we resign ourselves to the sheltered life, and at lunch-time usurp the functions of the Supreme War

Council. No doubt we are to be envied, and nothing surprises me more than the importance attributed to our task by others. We are not all, however, yet fully exploited. As the new routine becomes established, we are beginning to have time for research. The problems on which we are engaged may be important, and we may apply to them the energy engendered by the war. But they are not all problems of war-time significance, though they may represent the civilisation for which the war is being fought. Those responsible for seeing that war-time investigations are carried out must be aware of this; individually, our qualifications are card-indexed, and we wait in hope. At the word of command we are prepared to leave the custody of civilisation temporarily in the hands of our friends across the Atlantic and use our training for more immediate ways of preserving it.

Meanwhile, knowing that the authorities would be the last to pretend omniscience or the monopoly of ideas, I am sufficiently impressed by a circular to members of the Society for Experimental Biology to quote from it (without permission, which I hope doesn't matter). It says: "There is reason to believe that many biologists would welcome an opportunity of putting forward suggestions for types of research work which might be undertaken at the present time." Stating that the society have made arrangements to receive such suggestions, it goes on: "Specific plans which could be carried out by the individual suggesting them with his existing laboratory facilities are to be preferred, but suggestions of a more general nature might be worth while. . . . If research workers feel that their special knowledge and experience can be used it is up to them to explain the manner in which this can be done. . . ." Organisation of this kind is an excellent idea, and might be adopted by other bodies. It provides opportunity for those who would be neither sluggards nor busybodies.

We must not forget the students. They have been magnificent. Evacuation has interfered with the courses of both visiting and resident students, but they have accepted the situation and have settled down to learn by individual effort that which can no longer be spoonfed to them. They are anxious to "get on with the job" and we shall hear more of pleas for intensification of the medical course. Meanwhile, they have kept their heads as good medical students should, and have neither rushed away in a body to join the army, nor indulged in pacifist demonstrations. Our advanced honours physiology and anatomy courses have had to be discontinued, causing severe disappointment to a few. These courses must still exist elsewhere in the country, and I wonder if they have been thought of as a possible source of medically unqualified attachés to the medical staff of the Air Force. I pretend no first-hand knowledge as to whether there is any room for such individuals, or whether they could do anything which cannot equally well be done without them, but the problems of aviation seem to be highly scientific and physiological, and it appears at first sight probable that assistants skilled in physiological technique might relieve the medical officers of some examinations and other routine procedures. I mention this, because I have heard the argument raised that students at this time should not linger, but become qualified as quickly as they can. The shoe may be on the other foot. One would like to be assured that there are no duties which a man with special physiological training might not do as well as a medical officer, while postponing his own clinical training until after the war.

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There's a lot of talk about not having time to finish the game and beat the Spaniards too, but Harrow plays the M.C.C., and my friend has no wish to talk of such other events of the day as the German occupation of Abbeville. He is upholding his tradition, in the firm belief that it will be justified by another Waterloo.

Another hoary tradition of the summer season broke surface in these columns last week: the annual visit of the medical critic, in his professional capacity, to the Royal Academy. His assertion that the young female person of today has no more subcutaneous fat than the male would, I think, meet with dissent from most clinicians; it is not lack of exercise that is responsible for the peculiarities of female anatomy, surely, but just that masculine instinct that continues to paint females with adequate fat in the right places. Those popular science columnists who make heigho while the sun-that-never-sets still shines might well debate whether in the course of evolution the secondary female sex characters are determined by a male standard of beauty based on more mundane considerations or vice versa. This chicken-or-egg controversy will, I suppose, never be solved until we can visualise man as a pattern changing in the woof, as he thinks, dialectically, the weft constituted by "successive anastomoses of navel cords."

Turning from matters of fact, our critic's attitude is revealed by a sentence far more appropriate to this running commentary. "The settings of the nude," he says, "have changed from those of religion and mythology to scenes of everyday life, and thereby have *lost* all reality." (My italics.) Does it matter whether "young women really take off their pyjamas on arising from their couch before they comb their hair?" Reality concerns photographers not artists, and least of all those inhibited souls whose lovely women had to pretend to be Greek goddesses. To quote a *Lancet* annotation (1936, **2**, 1108)—a definition to end definitions—"Art production is a dialectic process in which the perceptual elements on the one hand and the subliminal stresses on the other are unified in a new and satisfying synthesis." While no-one would seriously suggest that this applies to the average academy picture, I feel that it is a pity to berate the subliminal stresses that occasionally occur. Particularly so now, when the threshold level is going up. Skirts rose in the last war to unprecedented heights: this time we may expect an even greater economy in textiles. Already that harbinger of fashion, the Stage, has come up with a bang—up against those guardians of their fellows' morals whose personal problems make them so vociferous about what is perhaps the least important of war evils. Indeed, the relaxations of standard of sexual morality which is usual during war might be regarded as the human counterpart to Nature's supposed device of increasing the male births.

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For centuries the theatre has had the fun of presenting complex states of the human mind; but most playwrights have fought shy of the psychological problems which may or may not afflict the dead. Ghosts, spirits, witches and others of that kidney are expected to behave according to the rules and to have simple, honest motives like remorse or revenge or mere spite. It was refreshing to meet the other day a neurotic ghost on the boards, whose motives, judging by his own account of them, were anything but simple. The play was "The Mad Organist" by Terence Greenidge, and it was performed at London's smallest theatre, the Bankside Little Theatre at Ealing, which is managed by the Misses Siddons-Downe. The ghost was the mad organist in person, though he was only mad nor'-nor'-west. He had returned, so he said, to persuade someone to burn his wicked manuscript—a perfectly respectable motive for any ghost—but I suspect he had really come back to talk about his symptoms. There is precedent for this, of course, for Hamlet's father enlarged on the pathology of his own demise with the scrupulous detail of an outpatient chronic, but the mad organist' from the medical, or anyhow the psychiatric, point of view, was the more interesting case of the two.

The play is largely an account of his personal conflict, and he was lucky to drop on a woman novelist of an analytical turn of mind; suppose he had chosen to haunt a busy medical practitioner during surgery hour? But he had his chance to talk and he came

clean. His conflict, of course, had begun while he was alive, and it was the old conflict of good and evil; but the impressive thing about the play was the insight with which his dissociated state was described. He had come to a country village as a dreamy young man whose deep pleasure in the honest simplicity of his own life, and of the life around him, had seemed at first unshakable; and then he had experienced that inversion of mood which leads the mentally sick person to say "Everything seems changed." In his case the Tennysonian idyll in which he had been living suddenly lost its meaning and he turned for refuge to the morbid contemplation and pursuit of evil; or perhaps he only thought he did, it would be the same thing as far as he was concerned. Anyhow he wrote a book about it, and fell in love with an appropriately villainous young woman and generally did his best to make a job of it. But the interesting part was that all the time he was carrying on his ordinary life as a pleasant village music teacher as though nothing had happened. As he put it himself, "there was sweetness and there was light, and *no one ever suspected what I was really up to.*" Another phrase had the same authentic ring about it; the view from his window had become like "a painted backcloth, one not too convincingly painted either." So what with one thing and another—his guilt about his book, his inability to decide conclusively whether good was the thing to back or evil, and the failure of his friends to spot the trouble and look after him—he made an end of himself; though even that wasn't conclusive, as he had found out to his cost. The play finishes on the same indecisive note, for he left his distorted view of life as a legacy to the woman novelist. But is it distorted? She leaves us guessing, by remarking disturbingly: "Great is the truth and it shall prevail." It looks as though there is still an unresolved conflict somewhere.

* * *

Imperturbability, as Osler pointed out, is among the most valuable of human qualities. On one of those sunny mornings when the war news was pretty grim I came across my patient Mr. Rock, the proprietor of "The Duke of Wellington." Perhaps I should not call him patient, for I have never known him ill, though he is kind enough to call me his doctor. He has seen some 20 years' service in the Royal Navy and is built rather on the lines of a medium-sized tank. When I met him he was reclining at ease on the village green, basking lizard-like in the sun, his hat pulled over one eye, his hands clasped across his great belly. "You don't seem to be worrying much," I said. "Why should I be?" he replied. "Don't you regard the situation as serious?" I asked. He shrugged his shoulders, then slowly and deprecatingly waved a ham-like hand. "Give 'em time," he said. "Only give 'em time." I reflected that Mr. Rock and his like would take a deal of Nazifying.

LETTERS TO THE EDITOR

READING MATTER FOR THE FORCES

SIR,—May I remind your readers of the needs of the Forces for books and other reading matter? The Service Libraries and Books Fund, under the lead of the Lord Mayor of London and the Lord Provost of Edinburgh, was called into being at the Mansion House at the request of Whitehall to collect books for the Forces and money for the purchase of books. Great strides have been made in this work, and the number of books collected and sent to the Navy, Army and Air Force is already approaching 1½ millions, but this is barely sufficient to keep pace with the demand from the men and women on active service.

The Postmaster-General has just announced that books and periodicals may be handed in at nearly all post offices, unaddressed and unwrapped, for transmission free of charge to the central book depôt. This makes the giving of books very simple, and any that readers can hand in will be greatly appreciated. Periodicals and illustrated papers, such as those discarded from professional waiting-rooms, are particularly valued, and a regular contribution of this kind, say once a month, even more so. The organisation also needs to be constantly purchasing some types of book to make up the particular balance of fiction and non-fiction required by the Forces. May I ask all those who will send a gift for this purpose to make donations payable to the Lord Mayor of London at the Mansion House, London, E.C.4, marking the envelope "Books"?

I am, Sir, yours faithfully,

HERBERT CREEDY,

Deputy-chairman, Service Libraries and Books Fund.

BLOOD-TRANSFUSION SERVICES

SIR,—Is it not time that some serious consideration was given to the subject of the organisation and coördination of emergency blood-transfusion services throughout the country?

Long before the outbreak of hostilities individuals both lay and medical in various parts of the country had foreseen the need for blood-transfusion services which would arise in case this country were subjected to heavy bombing from the air. Some weeks before the declaration of war widespread attention was semi-officially drawn to the subject through the B.B.C. and in other ways. At the same time numbers of persons connected with existing blood-transfusion services and in most instances attached to voluntary hospitals received intimations through local representatives of the Ministry of Health that they should do something in the matter—just what was not indicated. For the London area a comprehensive emergency blood-transfusion service was at once organised and has since been functioning in a highly efficient manner. Its organisation was carried out and it is now maintained by a personnel subsidised from the public funds. In no other part of the country has such assistance for emergency blood-transfusion services been made available. The Minister of Health on July 20 stated in the House of Commons in reply to a question by Mr. Geoffrey Mander that outside the London area recognition would only be given to certain large centres and that this would apply only to "the testing and registering" of donors. Only an almost imperceptible minimum of assistance even in this direction has so far been forthcoming.

The organisation of a blood-transfusion service demands more than the mere testing and registration of donors. It demands the services of personnel to collect the donors when required and to withdraw the blood; further, it calls for the provision of suitable receptacles and storage places for the blood so withdrawn and the means for its distribution as required. The advantages of standardisation in all these measures is obvious; no attempt at such standardisation on a national scale exists.

It is difficult to understand why the Ministry of Health while recognising the claims of the London area to a full service should withhold it from the rest of the country. Is it too much to hope that, in view of the imminent danger now threatening, the Ministry may be induced to take some steps towards the coördination and standardisation of existing blood-

transfusion services, and further, to extend to the provinces assistance comparable to that given in the London area?

I am, Sir, yours faithfully,

S. C. DYKE,

Director, Wolverhampton and District Emergency Blood-Transfusion Service.

SUPPLY AND DEMAND

SIR,—I am in full agreement with the leading article in your issue of May 25. Many of us signed a memorandum sent by the B.M.A. almost a year before the outbreak of war. In this we told the powers that be the capacity in which we were willing to serve—but we have heard nothing further. To my mind it is imperative that all doctors under the age of 40 should be conscripted forthwith. No doubt exemption would have to be granted to a number of these in order to provide for the medical needs of the civilian population; others such as surgical specialists would be drafted to casualty clearing stations. Since research is undoubtedly a luxury in war-time, all research workers under 40 years should be conscripted at once.

Many of us who saw active service in the last war and are over 50 would willingly offer our part-time services to attend to the medical needs of troops in the localities in which we live. We know the routine and this work would only involve the expenditure of two or three hours a day. By this means younger men now engaged in such work could be at once freed for service overseas.

The organisation of the profession has been undoubtedly dilatory but drastic action should at once be taken.

I am, Sir, yours faithfully,

Wimpole Street, W.1. W. ANNANDALE TROUP.

REFUGEE DOCTORS

SIR,—If the Government proceeds with its proposal to conscript doctors of military age many younger doctors will have to leave their posts and there may be some dislocation of the medical services of the country. I believe that this could be minimised by employing the services of doctors who are at the moment idle. I refer to those refugee doctors from various countries, a great number of whom, like myself, would be prepared to help in the British Army. I am Czech and I realise that in the Czech Army which is fighting with the Allies there will be a large surplus of doctors whose services could be used to the greatest advantage as medical officers in the British Army.

I am, Sir, yours faithfully,

A CZECH DOCTOR.

POSTERIOR-PITUITARY EXTRACT

SIR,—I was interested to read in THE LANCET of May 18 Dr. McLellan's account of the response of the non-gravid human uterus to posterior-pituitary extract. I would like to offer my personal experience of the action of this substance.

For about four years I received daily injections of posterior-pituitary extracts for diabetes insipidus—at first Pituitrin and later Pitressin. I can well remember the severe attacks of uterine "colic" which invariably followed a dose on the day immediately preceding a menstrual period. Pain was of such severity that it was necessary to suspend the injections at such times. However, as soon as menstruation was established this colicky pain did not occur. The preparations used throughout were Parke Davis products and doses of 10 units twice daily were generally given. I was a medical student at the time. The condition was ultimately treated by deep X-ray therapy to the pituitary gland.

I am, Sir, yours faithfully,

London, S.W.11. ELURED WILLIAMS.

OZONE TREATMENT OF WOUNDS

SIR,—In 1916 Major George Stoker, R.A.M.C., working at the Queen Alexandra Military Hospital, Millbank, obtained successful results in healing obstinate war wounds by the use of a Quain silica ozoniser. He tabulated his experience in THE LANCET (1917, **1**, 797). "The results," he wrote, "cannot be regarded as anything but satisfactory from every standpoint, be it humanitarian, scientific or economic. It is reasonable to allow one week of treatment by ozone for every month of previous duration without healing by other methods before healing can be expected." These cases consisted of chronic septic cavities and sinuses in the femur, tibia and other long bones, open wounds with sloughing surfaces, tuberculous infection of abdominal wounds, septic leg and arm amputations, trench feet, penetrating wounds in the knee-joint, suppurating glands in the neck, and penetrating wounds in the chest with empyema, abscess in the lung and so on. In May, 1917, a memorandum was issued by the D.D.M.S. London District to military hospitals offering to provide apparatus for ozone treatment, with the result that 36 war hospitals applied the apparatus. From nearly all of these reports were issued confirming Major Stoker's earlier work. Several hundred cases were successfully dealt with, in a large proportion of which other methods had failed.

In April, 1919, Captain J. R. Patterson and Captain A. W. MacBeth of the Canadian Army Medical Corps, working at the Canadian General Hospital, Orpington, reported on 16 cases of much the same type among several hundred cases treated with ozone at that hospital during the previous two years. All these yielded to treatment, and bacteriological records showed the rapid germicidal action of ozone.

The method of treatment is simple. The wound is washed with sterile water and dried with a sterile swab. The dresser then moves on to the next case and a convalescent patient wheels the ozoniser alongside the bed, connecting it with the electric current. He takes a sterile glass nozzle from the dressing carriage, adjusts it to the end of a flexible catheter which conveys the ozone from the machine, and sprays the wound area evenly with the gas. In the case of sinuses the nozzle is inserted into the wound. The length of treatment varies from two to fifteen minutes, depending on the nature and size of the wound. With two machines wounds can be ozonised almost as rapidly as one dresser can prepare them. When all the wounds have been prepared the dresser starts at the beginning again and applies a dry sterile dressing to those that have been ozonised. The edges of the wounds may be touched with liquid paraffin to prevent the dressing from sticking when it is removed.

The motive for using dry dressings is twofold. First, no antiseptic solutions are used because most of these are incompatible with ozone. Secondly, it is more comfortable to the patient; a wet dressing is soon saturated and keeps the wound soggy and favourable to bacterial growth. Dakin's solution is not incompatible with ozone, but since cases in which it was used showed no improvement over controls treated with ozone alone it was discarded as unnecessary.

Ozone seems to increase the blood-supply to the part. We have demonstrated this experimentally.

The web of a frog's foot was fastened under a microscope and the circulation in the capillaries noted. Ozone was then applied to the part and after a minute there was an obvious acceleration of capillary flow followed by a slowing. To decide that this was not due to the current of air playing on the part, we tried the experiment with an air current alone; after several minutes no change was noticed, but on the resumption of the ozonised air the change was quite noticeable.

Ozone fills a long felt want as a local stimulant to indolent tissues. By increasing the local blood-supply, especially where cicatrices are starving the area, chronic infection is overcome and the cells are sufficiently nourished to promote healthy healing. It is especially useful in cases which do not yield to ordinary methods.

Major Stoker also drew attention to the effect of the inhalation of pure ozone in cases of gassing. He wrote (THE LANCET, 1918, **1**, 550): "Ozone produced by silica tubes and properly administered is absolutely non-irritating, and seldom fails to give relief or cure, being a powerful agent in the formation of oxyhæmoglobin, increasing it when inhaled by 3½ per cent. It is a complete germicide, and renders sputum and wound discharges microscopically aseptic. . . . It is a strong heart stimulant." In gassed cases he established that ozone (1) relieved the cough, dyspnœa and pain; (2) assisted the expulsion of the glutinous mucus from the air-passages; and (3) stimulated the heart's action.

I am, Sir, yours faithfully,

J. R. QUAIN.

Chemical Club, Whitehall Court, S.W.1.

MEDICAL NEWS

University of Cambridge

Dr. J. S. Mitchell has been elected to the Elmore medical research studentship.

On May 25 the following degrees were conferred:—
M.D.—O. A. Trowell and W. T. Cooke.
M.B., B.Chir.—R. H. Taylor.

Society of Apothecaries of London

Dr. Margaret Ventèrs and Dr. Sidney Hill Waddy have satisfied the examiners for the mastery of midwifery.

British Pharmaceutical Conference

This conference will be held in London at the house of the Pharmaceutical Society, 17, Bloomsbury Square, W.C.1, instead of at Bath as had been planned. It will be confined to two days, June 11 and 12.

South African Institute for Medical Research

Dr. E. H. Cluver, secretary for public health and chief health officer for the Union of South Africa, has been appointed director of the institute in succession to the late Sir Spencer Lister. He will take up his new duties on July 1 when Dr. J. H. Harvey Pirie, the acting director, retires. Dr. George Buchanan, superintendent of the routine division of the institute, has been appointed deputy director.

Colonial Medical Service

The Secretary of State for the Colonies has appointed Sir Wilson Jameson as his medical adviser, in succession to the late Dr. A. J. R. O'Brien. The appointment is a part-time one and Sir Wilson Jameson will continue his duties as dean of the London School of Hygiene and Tropical Medicine.

Coöperation in Scottish Hospitals

Mr. Thomas Johnston, M.P., regional commissioner for civil defence in Scotland, presided over a meeting held in Edinburgh under the auspices of the Nuffield Provincial Hospitals Trust with the object of promoting the coördination of health services in Scotland. Lord Nuffield's gift will form the nucleus of a central fund for financing a scheme of regionalisation and for making grants to regional boards in aid of hospitals. There has admittedly been a shortage of accommodation for the general sick in Scotland and in the past the work done by voluntary and local-authority hospitals in their respective spheres has been hampered in many areas by the absence of general coöperation. Real progress in the development of the country's hospital services must depend upon coöperative regional schemes. Such regionalisation now in prospect under the trust will open a new era in hospital administration. The various schemes for achieving this are to be examined in detail by representatives of the Scottish branch of the British Hospitals Association and all local authorities, while the Department of Health for Scotland is to keep in touch with their deliberations.

V.D. Centres for Seamen

The list of treatment centres in the chief sea and river ports throughout the world where seamen can obtain treatment for venereal diseases has been revised and copies of the new list may be obtained from the Stationery Office (price 6*d.*).

Royal Sanitary Institute

The sessional meeting of this institute that was to have been held at Hastings on June 15 has been indefinitely postponed.

Society for the Relief of Widows and Orphans of Medical Men

The annual general meeting of the society was held on May 15 with Mr. V. Warren Low, the president, in the chair. On Dec. 31 there were 62 widows and 4 orphans in receipt of grants. During 1939 grants of £3225 from the ordinary funds and £1493 15*s.* from the Brickwell fund were given. The total membership of the society was 289. During the year 6 members were elected, 3 died and 1 resigned. The number of widows in receipt of grants this year was such that no funds were available for the customary Christmas present to be given. Particulars of the society may be had from the secretary, 11, Chandos Street, London, W.1.

Mobility of Civil Nursing Reserve

All trained nurses, assistant nurses, and nursing auxiliaries in the Reserve who have been allocated as "mobile" members for whole-time hospital work outside London, but are not yet so employed are now to be regarded as available for service, if need arises, in any casualty hospital in England and Wales. Until now, mobile members, although they have volunteered for service wherever required, have been allocated to a particular hospital in the first instance. In future they will be called up as required by the regional nursing officers of the Ministry of Health. In general they will be required to serve only in the civil defence region where they are registered, but it may be necessary to draw upon a regional "pool" of nursing personnel to meet the urgent needs of another region.

". . . The unconscious always has the great fundamental disadvantage of not being capable of scientific proof; in accordance with its definition it cannot consequently be brought out into the daylight of consciousness, and cannot be investigated by means of empirical observation, but only indirectly inferred. It has therefore become the great waste-paper basket into which everything is put that cannot be placed elsewhere, and through this conception modern psychology has suffered a confusion which has opened the floodgates to the most impossible interpretations. For a scientific investigation of the psychological the unconscious is really nothing but a way out of a dilemma."—Prof. J. A. LOESER, Animal Behaviour, London, p. 173.

OBITUARY

HERBERT JOHN PATERSON

C.B.E., M.CHIR., M.D. CAMB., F.R.C.S.

Herbert Paterson, who died in Glasgow on May 21 at the age of seventy-three, was a pioneer of medical postgraduate teaching in London. He was one of the original founders of the Fellowship of Medicine in 1919; until 1931 he was its honorary secretary, and from 1931 until his death he was the chairman of the executive committee. He was also a member of the committee responsible for establishing the British Postgraduate Medical School, and after its formation he was appointed a member of its governing body.

Elliot & Fry.

Paterson was born in Argyllshire, the son of the late Dr. H. S. Paterson, and was a foundation exhibitioner at Trinity College, Cambridge. He went on to St. Bartholomew's Hospital in 1890 with a senior entrance scholarship in natural sciences. He qualified in 1892 and the following year took his M.B. Four years later he obtained his F.R.C.S. He held house-appointments at Bart's and demonstrated anatomy in Cambridge before he was appointed assistant surgeon to the National Temperance Hospital in 1901. In 1904 he was awarded the Jacksonian prize of the Royal College of Surgeons of England for a dissertation on the diagnosis and treatment of such affections of the stomach as are amenable to direct surgical interference. Two years later he delivered a Hunterian lecture at the college, and in 1910 he obtained the degree of M.Chir. In later years his books on gastric surgery, indigestion, surgery of the stomach, and jejunal and gastrojejunal ulcer following gastrojejunostomy showed his continued interest and ever-growing experience in this specialty. He examined in surgery for the universities of Cambridge and Glasgow.

Meanwhile he was becoming more and more absorbed in the National Temperance Hospital where he became surgeon in 1913. When he retired in April 1934 he was appointed emeritus surgeon in recognition of his outstanding work. When he first joined the staff there was no outpatient department and he was partly instrumental in creating it in 1907. It was he, too, who introduced the lecture now given each year at the hospital to commemorate the work of Sir John MacAlister. For many years he held an annual gathering of his patients from all over the British Isles. Many of them were, of course, gastric cases, and the function was known as "Herbert Paterson's Gastric Tea."

During the last war physical unfitness prevented Paterson from serving in France, and he threw himself into many voluntary activities at home. He was honorary surgeon to Sister Agnes Keyser's Hospital in Grosvenor Crescent, but he was anxious to do more and conceived the idea of opening his own hospital for officers. He found a suitable house in Highgate, and the late Lord Melchett financed the venture, to which Queen Alexandra gave her name and sympathetic interest. The War Office soon realised that he was not only a fine surgeon but an excellent administrator whose judgment they could trust, and his hospital was recognised as one of the best in the country and some of the severest cases from the front were sent there. Paterson was among the first in this country to recognise the value of gas and oxygen as an anæsthetic and he was using the method at his hospital long before it was vaunted as something new by the Americans in their ambulance at the Lycée Pasteur in Paris in 1915.

When the American College of Surgeons was founded Paterson was one of three representatives of British surgery who attended the opening ceremony. He was for some time medical honorary secretary of the British Nurses Association, and he did much to see that the nursing staff in the hospitals had good food, pleasant quarters and reasonable off-duty time. He was also a member of the Council of Dr. Barnado's Homes.

A colleague writes: Herbert Paterson was a kindly little man with an old-world charm not often found in Harley Street today. One of his greatest hobbies was conjuring and he had a boyish enthusiasm for magic. He was quite an adept himself, and he enlivened the concert of many a sea voyage by his sleight-of-hand tricks. The annual dances of the Fellowship of Medicine often included a conjurer in their cabaret, as a tribute to Mr. Paterson. He was himself a staunch abstainer and never prescribed alcohol for any of his patients. He was a remarkably good speaker and had an amazing memory.

He married Tempé, daughter of the late G. H. Faber, M.P. for Boston, Lincs.

ISAAC FLACK

L.R.C.P.E., D.P.H.

Dr. Isaac Flack, mayor of Radcliffe, died at Bangor, co. Down, on May 22. Born in Galway in 1882, the son of Samuel Flack, he studied medicine there, at Belfast and at Edinburgh where he qualified in 1907. After three years spent in practice at Norwich he came to Radcliffe in 1910 as assistant to the late Dr. Scarr with whom he afterwards went into partnership. During the last war he served with the R.A.M.C., and for a time was specialist sanitary officer at Cherbourg. Soon after his return to civilian practice he began to take an interest in local public affairs. He helped to found the Radcliffe socialist party, he served on the council, and later became one of Radcliffe's first aldermen. His interest in education made his work as chairman of the education committee especially congenial and he proved himself a first-class committee man. He was elected mayor in 1938 and during the last eighteen months his professional and municipal duties had been heavy.

He married May, daughter of John Harris, who survives him with a daughter and three sons, one of whom, Dr. Harvey Flack, is now serving with the R.A.M.C.

". . . In a letter received a short time ago from a friend I read the following statement. . . . Any medical man who strays outside his speciality is apt to be regarded askance. If you are a bacteriologist and you make your lifework the thirty-two types of pneumococci you will be honoured by all your colleagues, but try to limit the spread of pneumococcal infection by clearing the slums and you will be called an advertiser, or an adventurer, or perhaps, the final insult, a Communist!"—W. R. F. COLLIS, *Irish J. med. Sci.* May 1940, p. 199.

WITH THE B.E.F.

MEDICUS, M.P., IN FRANCE

DURING the days immediately before the beginning of the German offensive of May 10 I visited the medical arrangements made for divisions, corps, lines of communication and base. The question I felt inclined to ask then was, "has there been too much mechanisation?" Lorries to transport officers and men, lorries to transport whole field ambulances, lorries to transport casualty clearing stations, hospitals, mobile motorised bath units, disinfestation units, blood-refrigeration units, and mobile bacteriological and hygiene laboratories. But with all this mechanisation a high standard of physical fitness. One division with which I spent a day had discarded motor transport for the troops for a period and had marched the men from one point to another partly as a test of fitness and partly in order to make certain that the marching could be done without detriment to divisional organisation if circumstances made it necessary. The march was one of 72 miles in three days and the number of men who fell out and had to be carried on motor vehicles was astonishingly low. The standard of fitness is high and is no doubt partly to be explained by the general rise in fitness standards since 1918 and partly by the general regime and especially the excellent food-supply. It was hardly considered the duty of a regimental or other unit M.O. in 1914–18 to concern himself with the diet of battalions or batteries or other units in the field. There was the diet-scale laid down, a good one, and all that was required was to adhere to it. In this war the diet of troops in the field is better than before and it is very much the business of the M.O. and of the administrative medical officers of a division to see that the diet standard is maintained. The calorie value of the diet would satisfy even the most exigent food-reformer.

The war of movement which has developed has answered my question about mechanisation. It was not too much but it was enough even to the extent of having organised the transport of blood for the refrigerator units by air instead of by road. This mobility was also expressed in another way in adaptability to circumstances. An advanced C.C.S. I visited was established in a fine building where, if circumstances permitted, it could expand almost at will to take on the function of a general hospital, but from which, if stability was not required, it could move as a complete C.C.S. in a very short time from the receipt of the order.

* * *

The field ambulance of today has retained all the flexibility of organisation which it had in the last war and added to it because of its mechanisation. Anything from an M.D.S. to an A.D.S. or a camp for convalescent treatment is within the ambit of the F.A. and it has added new treatments. For example, gonorrhœa is treated and cured at field ambulances by the new chemotherapeutic treatment in a very short time. Skin infections have not been serious, no doubt because of high physical standards and good diet, but also partly because of the regular bathing facilities which mobile bath units make possible. Even under the conditions of the very mobile war which has developed it should be possible to maintain these bath services.

* * *

Another aspect of the fitness question is the high degree of protection against tetanus which exists in front-line divisions. The percentage of men protected by tetanus toxoid is very high, as is also that of those protected by T.A.B. But enteric or dysenteric troubles, if not completely absent, have been almost negligible, no doubt because their prevention was not neglected by the hygiene laboratories. Other infections have also been few.

When visiting one division I found that the A.D.M.S. would be away all day consulting with his opposite number of the adjoining French division. And this consultation is a usual thing and not an occasional event and is not confined to divisional or smaller units. There are meetings of French and British consultants at G.H.Q. and views are exchanged. Further, in some cases civilian consultants of distinction are called in to counsel by the armies. The procès-verbale of the meetings between French and British consultants at G.H.Q. is issued and is a source of important information. French and British armies are part of the one big fighting machine and the medical side of the French service, while not organised on exactly the same lines as our own, functions in the same way. And the French medical institutes have been put at our disposal—particularly those of civilian France—in a way which is of great assistance. The contrast between the intimate coöperation of French and British medical services now and the less intimate coöperation there was in the last war is a concrete sign of the unity of purpose which unites us.

Births, Marriages and Deaths

BIRTHS

BEVAN.—On May 26, at Oxford, the wife of Lieutenant Roger Bevan, R.A.M.C.—a son.

DOWNIE.—On May 22, at Cambridge, the wife of Dr. A. W. Downie—a son.

GRACE.—On May 7, at London, Ontario, the wife of Prof. Archibald J. Grace, F.R.C.S.—a daughter.

LEHMANN.—On May 21, the wife of Dr. G. D. Lehmann, of Dehra Dun, U.P., India—a son.

PICTON.—On May 26, in King's College Hospital, the wife of Lieutenant A. D. Picton, R.A.M.C.—a daughter.

REEVES.—On May 9, in Alexandria, the wife of Captain G. W. D. Reeves, R.A.M.C.—a son.

SCOTT.—On May 20, the wife of Dr. Rupert Scott, Hook, Hants—a son (who lived only a short time).

MARRIAGES

GREENWOOD-PENNY—ARCHER.—On May 23, at Nether Stowey, Somerset, Sydney Augustus Greenwood-Penny, M.R.C.S., R.A.M.C., of Marazion, Cornwall, to Joan Margaret Archer.

TAYLOR—HANN.—On May 25, at Miskin Church, A. Brian Taylor, M.D., to Marjorie Hann.

WADDY—LAWRENCE.—On May 8, in Accra, Bernard Broughton Waddy, B.M., Captain, Gold Coast Regiment, to Mary Elizabeth Lawrence.

WADE—HACKING.—On May 13, at Blackburn, Henry John Wade, M.D., Surgeon Lieutenant, R.N.V.R., to Margaret Smith Hacking.

DEATHS

FLACK.—On May 22, in Bangor Hospital, Isaac Flack, L.R.C.P.E., D.P.H., of Radcliffe.

SEQUEIRA.—On May 21, at Westcliff-on-Sea, Henry James Sequeira, M.R.C.S.

YOUNG.—On May 25, at Esher, Surrey, Matthew Young, D.Sc. Edin., M.D. Glasg.

Appointments

CRUICKSHANK, L. G., L.R.C.P.E., D.P.H., resident surgical officer at the Chesterfield and North Derbyshire Royal Hospital.

HARVIE, ADAM, M.B. N.Z., F.R.C.S.E., D.T.M., resident surgeon at the Kingston County Hospital, Kingston-on-Thames.

KEANE, C. A., M.R.C.S., D.P.H., medical superintendent at the Mental Hospital, Berrywood, Northampton.

LEWIS, MAURICE, M.R.C.S., temporary assistant medical officer in the A.R.P. casualty services of Portsmouth.

YOUNG, J. A., M.B.Edin., bacteriologist to the Agricultural Research Council.

Examining Surgeons under the Factories Act, 1937: Dr. G. M. JONES (Ystalyfera, Glam.); Dr. A. W. HENDERSON (Keith, Banff).

NOTES, COMMENTS AND ABSTRACTS

SURGERY OF THE COLON

IN opening a discussion on cancer of the colon at a meeting of the section of surgery of the Royal Academy of Medicine in Ireland on Feb. 16, Mr. Seton Pringle first called attention to the importance of the presence or absence of obstruction and the site of the growth in deciding the best operative technique to be employed. In cases in which, before the onset of gross obstruction, considerable inflammatory induration of the bowel has taken place for some distance above the growth efficient drainage of the proximal bowel is, he said, essential, but he does not advise the performance of a blind cæcostomy except in most extreme cases. He does not approve of a cæcostomy for obstruction in the lower pelvic colon. Mr. Pringle then described a modification of the Paul-Mikulicz operation which he has found useful. He advocates suturing the parietal peritoneum alone to the "double-barrelled" colon as it emerges from the abdominal wall and also the use of vaseline gauze wrapped round the bowel outside the peritoneum to prevent adhesion between the emerging bowel and the abdominal wall. As a result of this procedure, about a week after operation the two openings into the bowel can be seen at the bottom of a conical granulating wound deep to all layers of the abdominal wall but still extraperitoneal. Restoration of the continuity of the bowel. is thus greatly facilitated. He also described a method of anastomosis for certain cases of lower pelvic colon growths in patients who would otherwise be condemned to the discomfort of a permanent colotomy. After mobilising and excising the growth both ends of the bowel are closed by purse-string sutures and the lower (rectal) stump is buried by a second layer. The purse-string suture controlling the upper segment is left long, and a bull-dog clip attached to the end. The rectum is then plugged with gauze soaked in flavine. A second incision is made through the anterior wall of the rectum, the gauze is picked up in a bull-dog clip, and the assistant withdraws the gauze through the anus, bringing down with it the suture and the attached upper segment of the bowel, thus invaginating the closed end of the pelvic colon into the rectum. A few sutures secure the bowel in that position. A week or so later the ligature comes away and the lumen of the bowel is restored. The preliminary colostomy can be closed later. He claimed that this method allows anastomosis to be carried out deep in the pelvis without risk of sepsis, the mucous membrane of neither colon nor rectum being handled even with a forceps and there being no fæcal flow over the line of anastomosis until healing is well advanced. In this way certain growths in the lower pelvic colon can be dealt with without sacrificing the sphincters.

NATIVES IN BRITISH NORTH BORNEO

THE two ancient races of British North Borneo (roughly speaking, farmers and hunters) are represented respectively by the Dusuns and the Muruts. Vital statistics are admittedly incomplete and inaccurate, but there seems to be no doubt that, while the Dusuns show a fairly steady excess of births over deaths, the Muruts are dwindling and in danger of dying out. An investigation was undertaken by Dr. J. O. Shircore in 1936, to discover factors responsible for depopulation and to suggest measures for combating them.[1] In our columns[2] Dr. A. J. Copeland had already drawn attention to the dangerous position of the Muruts, amongst whom, he said "malaria is highly endemic," while "the high true spleen-rates are associated with serious infection even among the youngest infants." Dr. Shircore's study too shows that malaria is one of the two greatest factors in racial decline, being hyperendemic throughout the interior.

The second serious factor is gonorrhœa, which is undoubtedly responsible for the high percentage of complete and one-child sterility which prevails. Hookworm and endemic goitre are also widespread. Malnutrition is also rife and it is strange to read that "although there are thousands of cows, buffaloes and goats, none of the milk or its products are utilised by the native." The removal of people from districts of intense infection to healthier areas, increased facilities for medical examination and treatment, and a vast extension of education, particularly in relation to hygiene, dietetics and agriculture are reforms which are both urgent and obvious.

Both Dr. Shircore and Dr. Copeland were impressed by the inadequacy of medical provision for the people of British North Borneo, and urge the necessity for a substantial increase of staff and supplies, especially of quinine and vaccines, if the native races are to be given a reasonable chance of survival and health.

1. Report on Native Health with special reference to the sociological and economic factors bearing on the depopulation problem of the interior of West Coast, North Borneo. Government Printing Office, Sandakan.
2. *Lancet*, 1935, **1**, 1233.

RUSSIA'S MILLIONS

THE "Russia Today" Press Service gives some interesting details of the population of the U.S.S.R. at the census of 1939. Since the last enumeration, made in 1926, there has been a total increase of 23·4 million or about 2 million persons per annum. The age composition has, however, changed remarkably little. In 1926, according to Pearl[1] 37·2 per cent. were in the pre-reproductive period of life, ages 0–14, 49·9 per cent. in the reproductive period, ages 15–49, and 13·1 per cent. in the post-reproductive period, 50 or over. In 1939 the corresponding percentages were 36·2, 50·8 and 13·0. High birth- and death-rates continue to prevail in spite of the increase in culture reported—in 1897 only 24 per cent. of the population aged 9 and over were classified as literate, in 1926 it was 51 per cent. and in 1939 it had risen to 81 per cent. The U.S.S.R., it may be noted, has a total population rather more than four times that of England and Wales but she has seven times as many children and only twice as many people over the age of 60. Minority problems are fashionable: the Soviet has no dearth of them. The census lists forty-nine nationalities with over 20,000 representatives apiece. Of these Germany comes twelfth with nearly a million and a half.

BILIRUBIN IN URINE

IN a letter to *Nature* for May 18 Dr. Frank Marsh points out that there is no very satisfactory chemical test for bilirubin in urine. He has now found a single manœuvre by which the van den Bergh or Fouchet tests can be applied to urine. One part of finely powdered dried normal egg albumin is added to nine parts of the urine and this is well shaken until the powder has all been taken up. The van den Bergh and Fouchet tests can then be carried out on the urine in the same way as they are on blood-serum and with results comparable in sensitivity.

BLEACH OINTMENT

THE British Standards Institution have issued a specification in the A.R.P. series for the anti-gas ointment known as bleach ointment, made by mixing stabilised bleaching powder with white mineral jelly. The specification defines not only the properties of the ointment itself but also those of the bleaching powder and the mineral jelly from which it is made. Copies of the specification may be had from the institution at 28, Victoria Street, S.W.1, price 4*d.* post free.

1. *J. Amer. stat. Ass.* 1940, **35**, 277.

LESS SUGAR FOR MEDICINES

AFTER July 1 supplies of sugar for medicines will be reduced by 10 per cent. A new order made by the Ministry of Food revokes the previous arrangement under which the Sugar Controller's allotment for 1940 was 100 per cent. of the amount used in 1939, as estimated from returns made by manufacturers and wholesale druggists, hospitals and retail pharmacists. As a consequence of this revision wholesale houses will have to ration supplies of medicines containing sugar to their customers, but if sugar is mainly reserved for children's medicines, as was suggested by the Therapeutic Requirements Subcommittee of the Medical Research Council (*Lancet*, April 6, 1940, p. 660), the reduced allocation should be more than sufficient to satisfy the needs of manufacturers and dispensers. Sugar allocations to other purposes have also been reduced, and after June 1 glucose (including liquid glucose, dextrose and dextrose monohydrate) will also be rationed.

"FURBIE"

AMONG the latest recruits to the ranks of medical autobiographers is Dr. Edward P. Furber, a Bart's man, who qualified in the 'eighties and practised first in Surrey and later in the West End. "London Doctor" (Bles. 10*s*. 6*d*.) reveals him as a cheerful and debonair person, perhaps less conspicuous for intellectual depth than for a lively interest in, and sympathy for, people of all kinds. In Surrey he found time for club cricket and for hunting—with four packs to choose from. His account of these good times at the end of the last century will cause some to sigh wistfully. He has met a variety of notable and notorious characters about most of whom he has something interesting to say. Among his theatrical friends and patients he numbered Miss Gladys Cooper and Miss Tallulah Bankhead, who explained to Mrs. Furber that she only called him "darling" when she was nervous. He was also on intimate terms with Alan Parsons and the Tree family and relates the charming "mot" of Lady Tree who, when asked within a day or two of her death why she had had her solicitor to see her, replied: "Oh, he has only been teaching me my death duties."

SYNTHETIC BRISTLES

TOOTHBRUSHES will shortly be on the market fitted with nylon fibres in place of bristles. The nylons are a range of new materials derived from coal which have hitherto been produced in America, but Imperial Chemical Industries have three factories in course of erection for their manufacture in this country. Nylon fibres can be made of any thickness from those fine enough to be spun into yarn for making stockings to stout rods. In toothbrushes it is claimed that the synthetic bristles wear better than hog's bristles and do not break off or split, that they absorb only a fifth as much water and therefore keep their stiffness when wet, and that they are resistant to the action of toothpastes and bacteria.

ALCHEMY

IT has always been difficult for the plain man to understand the tortuous phraseology and tortuous mental processes of the students of alchemy, and "Alchemy Rediscovered and Restored" by A. Cockren (Rider. 6*s*.) is not likely to render his task easier. If, as the author holds, there is a real science hidden in the researches and writings of the older alchemists, his first object should have been to make it clear why these men gave so much time and thought to the transmutation of metals, and of these metals only a selected few. It cannot be said that he has offered any rational explanation of the enthusiasm with which so many men of high attainments and devoted studies pursued the search for the Philosopher's Stone. Nor is his demonstration of the "practical" results either clear or convincing. It is incorrect to claim either a rediscovery or a restoration of alchemy until its devotees are prepared to state exactly what they are seeking and what are their methods. Till this is done, and it is certainly not done in this book, alchemy will continue to rank in the judgment of sober men with astrology as one of the nobler delusions of the mystic, and one of the favourite fields of the charlatan.

A DOCTOR IN THE SUDAN

HAVING spent the greater part of his professional life there, Dr. Allan Worsley has acquired a great knowledge of, and love for, the Sudan and its people. By the untravelled it is too readily assumed that the Sudanese and Egyptians are virtually indistinguishable. The stories and sketches incorporated under the title of "Land of the Blue Veil" (Cornish Bros. 10*s*. 6*d*.) abound in atmosphere and proclaim the charm of the Sudan and its inhabitants. Herein will be found something to please a variety of tastes and moods, from the macabre to the lightly humorous. Of the character sketches "Sabur" is perhaps the most attractive. Very moving is the story of "The Dervish Rosary" and no less fascinating in quite a different way are the folk-lore tales, especially "Black and White."

NEW PREPARATIONS

SYNTHOVO (HEXŒSTROL).—The results of clinical investigations with hexœstrol were described in a report to the Therapeutic Trials Committee of the Medical Research Council published in our columns (*Lancet*, April 6, 1940, p. 629). It is now presented by Messrs. Boots as Synthovo in tablets, each containing 1 mg. or 5 mg. of the substance, and in ampoules containing 1 mg. or 5 mg.

BROMETHOL—BOOTS is a solution of tribromethylalcohol in amylene hydrate manufactured under licence in the laboratories of Messrs. Boots. Each c.cm. contains 1 g. of tribromethylalcohol and 0·5 g. of the solvent. It is supplied in stoppered bottles, containing 25 c.cm. and 100 c.cm. of the solution, for use as a basal anæsthetic.

HEXANASTAB is the brand name of soluble hexobarbitone manufactured by Messrs. Boots. It is the sodium salt of N-methyl-C: C-cyclohexenylmethylbarbituric acid for use as an intravenous anæsthetic in a 10 per cent. freshly prepared aqueous solution. As HEXANASTAB-ORAL it is presented in four-grain tablets for oral administration. The advantages claimed for this substance are safe and quick-acting hypnosis, rapid excretion and freedom from habit-formation.

FLAVOTAN.—This is a sterilised non-greasy tannic-acid jelly containing acriflavine and amyl-meta-cresol. It is manufactured by Messrs. Boots and is supplied in collapsible tubes handy for use in the treatment of burns and scalds.

EPTOIN.—This is the brand name of an odourless, white powder with a bitter taste which is a preparation of sodium 5 : 5 diphenyl-hydantoin, a derivative of glycolyl urea, analogous in structure to the barbiturates. It is supplied by Messrs. Boots in capsules containing gr. 1½. It is said that the action of Eptoin is especially noticeable in epileptic patients who have been receiving large doses of barbiturates or bromides, for while controlling the fits it removes the depressant effect of large doses of sedatives.

SONERYL.—Pharmaceutical Specialties (May & Baker) Ltd., Dagenham, have introduced suppositories containing gr. 10 of Soneryl in addition to the gr. 3 suppositories previously made. Soneryl is also available as Soneryl Sodium in soluble form.

HEXOBARBITONE.—Burroughs Wellcome & Co. have added to their range of products Tabloid Hexobarbitone, each unit containing gr. 4 of N-methyl-cyclohexenylmethylbarbituric acid, to be administered orally to produce light hypnosis. The company are also presenting the sodium salt of this compound as Soluble Hexobarbitone in phials of 0·5 g. and 1 g., each phial being accompanied by a Hypoloid ampoule containing sufficient sterile distilled water to prepare a 10 per cent. solution of

Hypoloid soluble hexobarbitone for intravenous injection for minor surgery or for the induction of general anæsthesia in operations of not more than 20 to 30 minutes duration.

AMINOPHYLLINE.—This recent addition to the range of products of Burroughs Wellcome and Co. is a combination of theophylline with ethylenediamine. The diuretic action of theophylline is quickened by the greater solubility conferred by the ethylenediamine component, which also renders aminophylline suitable for parenteral administration. Aminophylline is available for oral administration in tabloid form, each unit containing 0·1 g. of the compound, and for parenteral administration as Hypoloid Aminophylline in ampoules containing a sterile solution in strengths of 0·5 g. in 2 c.cm. for intramuscular injection and 0·25 g. in 10 c.cm. for intravenous injection.

"HYPOLOID" MERSALYL.—This newly introduced product of Burroughs Wellcome and Co. provides a convenient means of administering by intravenous and intramuscular injection the complex mercurial compound described in the B.P. addendum 1936. The new product is a 10 per cent. solution of the sodium salt of salicyl-(γ-hydroxymercuri-β-methoxypropyl)-amide-*O*-acetic acid, with 5 per cent. theophylline added to inhibit the decomposition of the mercurial complex and increase its diuretic action. The product is presented in hypoloid ampoules of 1 c.cm. (in boxes of 10) and 2 c.cm. (in boxes of 5). It is said that the diuretic effect is enhanced if a mild acidosis is first produced by the administration of gr. 30 of ammonium chloride by mouth three times daily for two or three days prior to the injections.

DEROBIN.—Under this title Glaxo Laboratories Ltd. (Greenford) are making di-oxy-anthranol, formerly called Cignolin. This chemical compound is used in the treatment of psoriasis and many other common skin affections, including fungoid diseases.

Messrs. ALLEN & HANBURYS have sent us the latest edition of "Wise Babycraft," their book on infant feeding and management. Its four sections are on the expectant mother; the infant; the weanling and toddler; and minor ailments. The mother will find in its pages advice which is no less valuable because it is not impartial. Copies may be had on application.

AN EARLY FOOD REFORMER

ACCORDING to an anonymous writer in the "Lives of British Physicians," published in 1857, William Lambe was "eccentric in his manners and a rigid vegetarian." But as Mr. Saxe Wyndham shows in a brief memoir (London Vegetarian Society. Pp. 35. 6*d*.) he had much more to recommend him to the notice both of his contemporaries and of our generation. He was a pioneer in the doctrine that many diseases are the result of errors in diet and even more to impurities in drinking-water. He himself drank only distilled water and also banished from his table all nitrogenous material, even using milk and butter as sparingly as he could. Again, he was one of the first to recognise the merits of the waters of Leamington Spa, and to his efforts and the clinical reputation of Dr. Jephson was due the astonishing rise to popularity of that resort. In a few years it was changed from a small village to a fashionable and populous town. In addition—and probably this is the chief feature of Mr. Wyndham's pamphlet—Lambe was the friend of Shelley for many years and it was Lambe's fiat which sent Keats from the mortal rigours of an English winter only to die in Italy. Mr. Wyndham has added a good deal to our knowledge of these interesting relationships, and has followed the various families with which Lambe and his children were connected—Newtons, de Boinvilles, Aymards and Forsters—few of whom remained faithful for long to the vegetarian creed of the "Patriarch," as he became known in his intimate circle. Lambe himself was a rigid adherent to his tenets for almost half a century, but he did not apparently enforce his rules on his patients, to many of whom his services were rendered without a fee. At the Royal College of Physicians he was loved and honoured. "Farewell," said Francis Hawkins in a Harveian oration, "farewell, gentle spirit: for none more sincere or more innocent ever joined the Great Majority."

Medical Diary

Week beginning June 3

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1.

TUESDAY—5.30 P.M., general meeting of fellows.
Orthopædics—4.30 P.M., cases will be shown.
Surgery—6 P.M., annual general meeting.
WEDNESDAY
History of Medicine—5 P.M., Dr. H. P. Bayon: (1) The Masters of Salerno and the Origin of the Medical Profession in Western Europe. (2) The Medical and Alkemikal Writings attributed to Queen Cleopatra.
FRIDAY
Clinical—2.15 P.M., annual general meeting.
Medicine—3.30 P.M., annual general meeting.

ROYAL INSTITUTION, 21, Albemarle Street, W.1.

TUESDAY—5.15 P.M., Dr. J. C. Spence: Feeding of Children.

HARVEIAN SOCIETY OF LONDON

WEDNESDAY—3 P.M. (26, Portland Place, W.1), Dr. Arthur Morris: Hospital Administration. (Harveian lecture.)

BIOCHEMICAL SOCIETY

SATURDAY—2.30 P.M. (department of medical chemistry, University of Edinburgh), short communications and demonstrations.

EUGENICS SOCIETY

MONDAY—4.30 P.M. (rooms of the Linnean Society, Burlington House, Piccadilly, W.1), Sir Bruce Bruce-Porter: The Importance of the Child.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W.12.

MONDAY—10 A.M., opening of special course on fractures.
TUESDAY—2.30 P.M., Sir Walter Langdon-Brown: ward clinic.
WEDNESDAY—11.30 A.M., Clinico-pathological conference—medical. 2 P.M., Dr. Janet Vaughan: Pregnancy Diagnosis Tests. 3 P.M., clinico-pathological conference—surgical. 4.30 P.M., Prof. G. R. Cameron: Pathology of the Liver.
THURSDAY—2 P.M., Dr. Duncan White: radiological conference.
FRIDAY—2 P.M., clinico-pathological conference—gynæcological. 2.30 P.M., Mr. V. B. Green-Armytage: sterility clinic.
DAILY.—10 A.M.-4 P.M., medical clinics; surgical clinics and operations; obstetrical and gynæcological clincs and operations; 1.30-2 P.M., post-mortem demonstration.

FELLOWSHIP OF MEDICINE AND POSTGRADUATE MEDICAL ASSOCIATION, 1, Wimpole Street, W.1.

London Chest Hospital, Victoria Park, E.2. MON. AND FRI., 6 P.M., M.R.C.P. course in heart and lung diseases.—West End Hospital for Nervous Diseases, Gloucester Gate, N.W.1. MON. to FRI., M.R.C.P. afternoon course in neurology.—Brompton Hospital, S.W.3. WED. and THURS., M.R.C.P. course in chest diseases.

". . . One occasionally hears the statement that the trend of intellectual leadership is westward across the Atlantic. In proof of the assertion specific fields are mentioned, such as neurosurgery, astronomy, dentistry and perhaps orthopedics, in which America has won pre-eminent standing. But this argument overlooks the many fields in which leadership, certainly until the war began, was still in Europe and the many others in which genius and stimulation are as potent on one side of the ocean as on the other. In physiology, for example, it would be difficult to determine whether the leadership lies in Europe or in the United States. The same is true of anatomy and pathology. In fields like pharmacology, tropical medicine, ophthalmology, legal medicine, social medicine and dermatology—to mention only a few—leadership is unquestionably still in Europe, or was in 1939. In mathematics, the English are indisputably pre-eminent in analytic number theory; the Russians are making important contributions in topology and probability, the French in algebra. America cannot match the group of European scientists in the important fields of enzyme chemistry and the organic chemistry of natural products. Nowhere else in the world can one duplicate or even approach the coordinated and cooperating Scandinavian group which is focusing so many precise techniques of chemistry and physics on problems of biology."—RAYMOND B. FOSDICK in his review of the work of the Rockefeller Foundation for 1939.

ADDRESSES AND ORIGINAL ARTICLES

PULMONARY TUBERCULOSIS
DIAGNOSIS AND SOME ASPECTS OF TREATMENT *

BY F. G. CHANDLER, M.A., M.D. Camb., F.R.C.P.
PHYSICIAN TO ST. BARTHOLOMEW'S HOSPITAL, LONDON; SENIOR PHYSICIAN TO THE LONDON CHEST HOSPITAL

WE are apt at times to congratulate ourselves on the decline in the incidence of tuberculosis; but still our sanatoria are overcrowded, the waiting-lists in many places are dangerously long, phthisis takes its dreadful toll in all classes, and it is but small satisfaction to those afflicted and to those who watch their sufferings, their hope deferred, their enforced inactivity perhaps for years, and the long and tedious treatment, and to us who know not only these but also the uncertain issue, to be told that tuberculosis is on the decline. On the great question of prevention, with its difficult social, legislative, and economic problems, and on the important subject of aftercare I do not propose to touch; the following remarks will be mostly restricted to certain aspects of diagnosis that, to my mind, appear still to need emphasis, and reiterated emphasis, and to the discussion of some methods of treatment.

What we can do at the present time to minimise the incidence of pulmonary tuberculosis is to endeavour to educate the public to desire and to insist on a pure milk-supply and to think bacteriologically, thus preventing the spread of bacilli. This involves care of cough, sputum, handkerchiefs, pillow slips, sheets and eating utensils. Not only the community but also many members of our profession have yet to realise the necessity for bacteriological investigation whenever there is persistent cough or phlegm. Pulmonary tuberculosis still masquerades sometimes as chronic bronchitis. The diagnosis is often not made early enough and is too often missed. Whatever may be said about nutrition, acquired immunity, and heredity, one fact stands out unchallenged—that is, that no-one, however ill nourished, or whatever the hereditary tendency, can contract the disease if he or she never comes into contact with the tubercle bacillus. Since this is difficult and expensive to achieve, though not impossible, attempts to produce immunity on a large scale have been made. Some have advocated small quantities of milk infected by bovine tubercle bacilli, others the ingestion of an attenuated culture of live human bacilli; but there are many who, rightly or wrongly, shrink from such methods, finding it difficult to believe that they are without risk. The proof of their efficacy, too, is not easy to establish.

DIAGNOSIS

The early diagnosis will be made by a careful consideration of the symptoms, by certain simple clinical methods, such as weight record, a temperature record taken especially at the usual time of maximal use—namely, 6.30 P.M.—by bacteriological tests and by radiography.

Symptoms.—Certain symptoms in conjunction may be almost pathognomonic; for example, cough, sputum, hæmoptysis, loss of weight, pain in the chest, and perhaps night sweats, but all of these may exist in other conditions. The symptoms, such as cough, sputum, or pain, may be localising in that they are referable to the chest but do not obviously suggest tuberculosis; or the symptoms may be neither pathognomonic nor localising in the slightest degree but simply those of vague ill health—namely, malaise, tiredness, loss of weight, indigestion, lack of appetite, disturbance of menstruation, anæmia, tachycardia, fainting, or fever. If a careful routine examination reveals nothing definite, tuberculosis should suggest itself as a possibility, and a full investigation should be made. "Weariness without cause indicates disease," and "Phthisis comes on mostly from eighteen to thirty-five years of age," wrote Hippocrates. The symptoms which should arouse suspicion but are often ignored or misinterpreted are cough, expectoration, slight hæmoptysis, and pleuritic pain. The cough is called "smoker's cough"; expectoration is ascribed to chronic bronchitis; slight hæmoptysis is explained away and not investigated and is said to come from the teeth, gums, nose, pharynx, or larynx; pleurisy is called idiopathic or sometimes rheumatism or intercostal neuralgia.

Physical signs.—Far too much reliance is still placed on physical signs in the diagnosis of pulmonary tuberculosis. In many affections of the chest signs are invaluable, but in pulmonary tuberculosis they cannot reveal an early lesion or a lesion separated from the chest wall by healthy lung tissue; nor can they tell us with any certainty the extent or distribution of the disease. A large cavity may exist with no demonstrable signs. Further, the physical signs of pulmonary tuberculosis can be imitated in every particular by other conditions. There is not a single pathognomonic sign of tuberculosis. This does not mean that the great value of physical signs is denied; they may lead to the diagnosis of tuberculosis, but only by correlation with the symptoms, history, and bacteriological findings.

Bacteriology.—Of all methods of diagnosis the bacteriological investigation is the most important; it is the one proof positive of the disease. The sputum must be tested even up to twelve times or more if necessary, though it is rare not to find the bacillus in the first few examinations in tuberculosis. If there appears to be no sputum, or if the patient cannot produce it, he must be encouraged with an expectorant. Another method is to place a laryngeal mirror at the back of the throat to excite a cough, and to examine the mucus or mucopus that appears on the mirror. If this gives a negative result, the fæces should be examined by the Antiformin method. Many women and children swallow all their expectoration, and bacilli may be found easily and in large numbers in the fæces in many cases. This has been tested numberless times at the London Chest Hospital and found to be of the greatest practical value; it is a far simpler procedure than the more advertised method of the stomach wash-out and is a more delicate test. In cases of doubt resort may be made to guineapig inoculation or to culture on Löwenstein's, Petragnani's, or other media. If tubercle bacilli are not found after careful search, the condition is almost certainly not tuberculous.

Radiography.—It is impossible to exaggerate the value of radiography. I would almost go so far as to say that often no final or useful opinion can be given without it. It is not so long ago that it was realised at chest hospitals that every case, without exception, had to be radiographed as a routine; otherwise many mistakes and omissions in diagnosis were made. The chest is so easily examined by X rays that advantage should more often be taken of this method. The relative importance of the various methods of diagnosis of diseases of the chest are, first, the symptoms and the history; secondly, microscopy of the sputum; thirdly, radiography; fourthly, exploratory puncture; and, lastly, the physical signs. These facts, it seems, are not yet sufficiently widely recognised in our profession. There still exists, in some places, the idea that with enough clinical skill radiography is not needed. I am convinced, however,

* The Mitchell lecture delivered before the Royal College of Physicians of London on Feb. 7, 1940.

that every expert in diseases of the chest throughout the world will agree with what I have said. If we do not use radiography often, we shall not only make errors but also miss a host of interesting conditions and fail to add our quota to the important research work that is taking place.

Some cases of phthisis are discovered by the cardiologist while screening the heart, the patient having been sent to him because of breathlessness or of tachycardia. Others are discovered by the radiologist after a barium meal or barium swallow, the patient having been sent to him because of indigestion and loss of weight. All manner of investigations are done except radiography. Why is this? The chief reason is that its value is not yet fully realised. But this is not the only reason. There still exists the physician who will disapprove of these remarks. He will say that it is dangerous teaching for the student, who must be taught to develop his senses. He may even regard it as a reflection on his skill; a similar attitude was adopted by many physicians towards the stethoscope in the early part of the nineteenth century. The number of die-hards, however, rapidly grows less; for, sooner or later, a chest reported normal by the self-confident physician will be shown by the X rays to be the seat of gross disease. Samuel Gee, over thirty years ago, as early as the 1907 edition of his classical "Auscultation and Percussion," writes in the preface:—

"No doubt the time has come when skiagraphy by X-rays should be reckoned among the methods of physical examination of the chest, yet inasmuch as few medical men possess the necessary apparatus, the topic has been excluded from the present book."

Today few practitioners are far removed from an X-ray plant, even in remote parts of the Empire. Samuel Gee would not fail to make use of this great advance, were he living now.

One still hears, only too often, expressions of surprise that the radiogram shows such extensive invasion of the lung when abnormal physical signs were practically absent. Not only does the radiogram show the type, distribution, and extent of the tuberculosis, but also it will demonstrate a tuberculous lesion in a very early stage. By it the progress of the case and the response of the lesion to treatment can be watched. Again, it may be the first proof of miliary dissemination. Of all methods for early diagnosis radiography gives place to one only, and that is the bacteriological investigation.

There is, however, another side to this picture. Though we owe so much to the skilled and critical radiologist, there is a type who diagnoses pulmonary tuberculosis when it does not exist; who professes to tell whether the disease is active or not; who speaks of peribronchial and hilar tuberculosis. To add still further to the confusion comes the inexperienced tomographist, who detects cavities in healthy cured patients and sometimes does not hesitate to tell them so. I think that there is no single radiographic appearance of tuberculosis that cannot be simulated by some other condition, even to the clear-cut rounded cavity with a fluid level. Therefore the shadow pattern must be interpreted in correlation with the clinical and especially the bacteriological findings. For example, carcinoma of the upper lobe with incipient atelectasis can simulate almost exactly a tuberculous infiltration with a small interlobar effusion in symptoms, signs, and radiographic appearances. It is the absence of tubercle bacilli that will suggest the correct diagnosis.

TREATMENT

In these days of special and spectacular treatments we may forget the healing power of Nature. Early lesions, widespread infiltration, and even large cavities may be completely cured by rest, good air, and a suitable diet.

Rest.—Of all treatments rest is the most important. It is the basis for the treatment of most types of tuberculosis and is the principle underlying the various surgical and semi-surgical interventions. It is not easy to explain why bodily rest should act so powerfully on an organ that is not itself at rest. The lung is moving less, it is true; but it is, nevertheless, moving. One reason perhaps is that by rest the bodily defences are conserved and augmented. Again, partial "atelectasis," by which is wrongly meant local collapse or deflation, can develop in the lungs of a patient lying for long periods. It is possible that this takes place selectively in the affected parts. This might be thought an unhealthy state of things and one conducive to the spread of the disease, but artificial pneumothorax shows that this is not so. The tubercle bacillus does not seem able to thrive in an airless or relatively airless portion of lung. Herein tuberculosis differs from most other diseases. Breathing exercises are good in empyema, bronchiectasis, unresolved pneumonia, bronchitis, and emphysema, but not in tuberculosis, and this is what is so infinitely difficult to make the patient understand. Rest must be *absolute* while there is any fever or any acuteness in the symptoms or any extension of the lesion. The patient should rest in the most comfortable position and neither feed nor wash himself. When the temperature has been normal for two or three weeks, movement can very gradually be promoted.

One day a physician from one of our dominions, visiting my wards, was asked what he would do with a young woman who had extensive bilateral infiltration of the lungs, and he replied: "I would put her in a plaster bed for a year." The principle of this is absolutely right for certain cases. An actual plaster bed, however, is a severe regime, and the patient will, if properly instructed, often make his own plaster bed by his will and determination.

The first activity allowed is the self-administration of food, then washing. Later the patient sits up for longer periods, then gets out of bed for a short time. Then walking is gradually allowed and the distances are extended, but this should be a very slow process. There is a tendency at many sanatoria to hurry the patient on too fast, partly for economy's sake and partly because of the shortage of nurses. I know the theory of the value of auto-inoculation induced by exercise, but increasing experience has taught me the greater value of rest. Rest in bed, preferably in the open air, for six to twelve months or more may be needed, and the progress should be checked by sputum examinations, temperature record, serial radiograms, and sedimentation-rate tests. These dreadful months of inactivity must be relieved and lightened by pleasant surroundings, hobbies, and occupational therapy. Moreover, we must see to it that the body does not become pale and flabby and the muscles wasted and lacking in tone. This may be prevented by exposing most of the body to air and sunshine after Rollier's method. It is this great pioneer's pride to show the muscles of a man, who has been lying in bed for a year or eighteen months, as firm and hard as an athlete's. There is no doubt that air and sun promote a healthy circulation and maintain muscle tone. There is a fear of sun and air to the naked body in pulmonary tuberculosis. This is unfounded. Just as a tuberculous knee-joint would flare up under too strong an application of sun, so may the chest; but sun, used in the way that Rollier uses it, is of the greatest benefit. If reactions are feared, the chest can be excluded from irradiation. Of all treatment I believe rest to be the most important. A patient will do better resting in bed in a hospital in the east end of London, than exercising in the air of Arizona or the high Alps.

Air and climate.—What the fundamentals of this are we do not know. That air should be fresh and free from dust, fog, chemicals, and infecting organisms is obvious; but, when it comes to the question of mountain or valley air, seaside or country, the subject becomes infinitely more difficult. Those who see the results of good treatment in high altitudes are naturally inclined to attribute too much to the climate and to consider sea air even dangerous, but this position is not easy to maintain. Some of our most

successful sanatoria are on the sea coast. I doubt if the place is of such great importance. As many special procedures are employed in the high Alps as elsewhere. It is the mode of life that matters.

Diet.—Here again, unfortunately, we are ignorant of the fundamentals. Merely to put on excessive fat is of doubtful value, though to gain weight is one of the indications of progress. The diet must be rich in vitamins. The proved value of cod-liver oil and malt is probably due to their content of vitamins A, B, and D, but it is probable that vitamin C is equally important. Natural vitamins should be used as far as possible, though there is no harm in supplementing with synthetic vitamins for a time. The diet should also have a rich mineral content. It is probably not so much a question of bulk as of quality. Raw eggs, butter, milk, and cod-liver oil and malt seem to merit the reputation they enjoy in the treatment of tuberculosis.

Medicinal treatment.—One of the remedies that has persisted since the days of Dioscorides in the reign of Nero is tar. At one time every patient was given creosote as a routine in some hospitals. None of us, I think, was certain of its value, if any, and today the tendency is to use calcium instead. A plausible case can be made out for the absorbable forms of calcium, which may be given as calcium sodium lactate gr. 20 three times a day, with vitamin D or as calcium gluconate by mouth or injection. I cannot give any scientific justification for this remedy, but I have observed many times that the patient will begin to put on weight only after taking calcium. Fraser (1927) is sceptical of its value in the chronic infections and is of the opinion that the work of Grove and Vines needs further corroboration.

Gold.—I find it difficult to speak of this remedy, for I am uncertain in my own mind. It certainly does not produce the sterilisatio magna in man or animals that was claimed in the early days of its reintroduction by Möllgard. It is toxic, it can produce severe reactions and complications, and yet in some cases it appears to do good. It seems to promote some sort of tissue reaction. More than this cannot be said. One uses it as one clutches at a straw. One prescribes it in some cases when an artificial pneumothorax is impossible, or when there is an acute extension to the opposite side. I may be wrong, but, though I have used it from the moment of its introduction, starting off with enthusiasm, and though I have seen what appeared to be remarkable and unimpeachable examples of its efficacy, I use it little now. I have seen some of my first wonderful cases relapse and die. I cannot help wondering whether it was not the added rest more than the gold that caused the disappearance of bacilli and the improvement of the clinical condition. Many examples of the supposed indisputable action of gold could be matched in the earlier descriptions of treatment by creosote, by Yeo's mask, or by nascent iodine.

Moreover, there is another remarkable and to me unexplainable phenomenon—the initial success of a new method. Two outstanding examples are Coley's fluid and Blair Bell's lead. As I look through my well-thumbed copy of Secher's (1926) large monograph on the treatment of tuberculosis with Sanocrysin I feel today that there is very little in it of real value and much that is utterly wrong. Nevertheless, gold excited the interest of many experts in tuberculosis, and it is still used extensively. When all is said, we must admit that gold is no specific. When the true specific chemotherapy is discovered, we shall be able to prove its value in a few weeks, and the knowledge will be flashed from one end of the earth to the other; and we may be allowed the hope that, in the not far distant future, the Mitchell lecturer will have the enviable task of announcing the chemical conquest of tuberculosis. When this comes, this lecture, together with whole libraries of literature on the subject, can be relegated to the bonfire or the museum.

Tuberculin.—There is little doubt that when a truth is announced it is capable of proof by workers in every part of the world and will be accepted by them. If tuberculin was of value in treatment, its position should have been established long before now. Far from its being established, we find opposing schools of thought on the subject. There are those who regard it as useless, those who regard it as a panacea, and those who use it as a placebo either for their patients or for themselves; some use it as a non-specific protein for mild shock therapy, and others use it in self-limiting and benign types of tuberculosis. It may be said, without fear of contradiction, that the greatest authorities have little faith in its value. I have succeeded several times in desensitising patients completely to tuberculin, with no effect whatever on the clinical course of the disease. I have tried different brands, as they have arisen, with the same result, and it is a strange and interesting commentary on the subject that these new brands should for ever be forthcoming, for each new production tacitly condemns the older as unsatisfactory or useless. One still thinks with surprise of the episode of the Dreyer diaplyte tuberculin, with its faulty premises and premature publicity.

The writings on the subject of tuberculin are innumerable. Opinions and results, as regards its place in treatment, prevention, and diagnosis, are conflicting. Do not these facts suggest that there is a misunderstanding of a phenomenon; that observations are twisted and turned to make them fit a theory? Whenever I think of tuberculin, there comes to my mind the phlogiston theory of combustion:—

> "Chemists have turned phlogiston into a vague principle which consequently adapts itself to all the explanations for which it may be required. Sometimes this principle has weight and sometimes it has not; sometimes it is free fire and sometimes it is fire combined with the earthy element; sometimes it passes through the pores of vessels, sometimes these are impervious to it; it explains both causticity and non-causticity, transparency and opacity, colours and their absence. It is veritable Proteus, changing in form at each instant."

Thus wrote Lavoisier. He tore the hypothesis to shreds and discovered oxygen. Perhaps a similar fate may overtake the tuberculin theories. Of one thing I feel convinced, that the allergic reaction has nothing whatever to do with immunity.

(To be concluded)

ANEURYSM OF THORACIC AORTA
TREATED BY WIRING WITH COLT'S APPARATUS

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THE poor prognosis of thoracic aneurysm has led to many attempts at inducing coagulation within the sac mechanically, chiefly by the insertion of wire. The introduction of many yards of iron or silver wire, followed in some cases by passage of an electric current, has seldom, however, brought about improvement but, on the contrary, often proved hazardous or fatal. The main causes of failure have been the length of the operation; the severity of the hæmorrhage; the lack of control over the path of the wire, coils of which have entered the cavity of the heart or the main branches of the aorta; and sepsis. Colt designed his apparatus to overcome each of these obstacles; and cases have since been reported of successful cure of the aneurysm thereby. Since most of the cures due to wiring relate to the abdominal aorta, a successful result in a thoracic aneurysm is worthy of record.

APPARATUS AND TECHNIQUE

The part of Colt's wiring apparatus that is introduced into the aneurysm consists of a dull gilt wire

wisp, which can be folded up inside a cylindrical cartridge, while retaining sufficient spring to open, when liberated, like an umbrella across the aneurysmal sac. Two sizes of wisp are available: one packing to 2½ in. long and containing 75 in. of wire, the other to 3½ in. long and containing 105 in. of wire. For each size there is a corresponding container, with a special trocar, cannula, and piston for introduction of the wire umbrella. The whole apparatus is sterilised by separate boiling of its constituent parts. The cartridge of appropriate size is then loaded with the wisp so that its wires do not cross one another and will therefore open smoothly without becoming entangled.

Under local anæsthesia the trocar and cannula are introduced slowly into the most prominent part of the aneurysm. On withdrawal of the trocar a brisk spurt of blood will indicate successful entry into the cavity of the sac, an essential point of technique. The loaded cartridge is then attached to the cannula so that the free ends of the wires will be the first to enter the sac; the piston is inserted; and the wire wisp is pushed gently through the cannula until it lies free within the aneurysm. No force must be used, and the position of the end of the cannula should, if necessary, be adjusted so that the wisp can be pushed home without resistance. The cannula is then quickly withdrawn, the puncture sealed with collodion, and a dressing applied. It has been well established, as claimed by Colt, that the presence of the dull gilt wire wisp, properly introduced, is sufficient to initiate within a short time clotting in a saccular aneurysm, even though the patient is syphilitic; and that the wire does not become broken or eroded but remains in position without causing trouble, even after many years. No advantage is gained by the passage of electrical currents after insertion of the wire, but the patient should be kept strictly at rest and given adequate antisyphilitic treatment. General measures to assist coagulation are also appropriate immediately after wiring.

CASE-RECORD

A male, aged 51, first seen on July 7, 1936, as an outpatient at the Southend General Hospital, had had a severe aching pain for the past month in the right pectoral region, radiating at times to the back and inner aspect of the right arm. Dyspnœa on effort had also been noticed, with considerable loss of weight, but cough and sputum were absent. The past medical history was negative, apart from a war injury in 1918 causing loss of the right arm below the shoulder. No venereal infection was admitted.

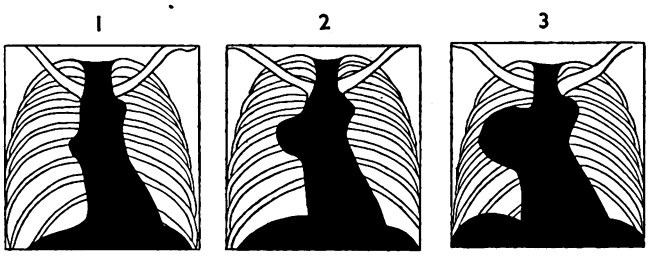

FIG. 1—Aneurysm of thoracic aorta in July, 1936.
FIG. 2—Same aneurysm as in fig. 1 on Oct. 13, 1936.
FIG. 3—Same aneurysm ten days after insertion of wire.

The patient was poorly nourished. Much dental sepsis was present. Clinical examination of the heart showed nothing abnormal except an accentuation of the second sound at the aortic area. No abnormal pulsation was seen, and pressure phenomena were absent. The blood-pressure was 124/68 mm. Hg. A few râles were heard over both apices and at the right base. Examination of the abdomen, nervous system, and urine showed no abnormality.

Radiography of the chest revealed a small dense rounded shadow at the right hilum (fig. 1), which on screening was seen to pulsate and to resemble an early aneurysm of the ascending aorta. The lung fields were clear. An electrocardiogram was normal. Blood Wassermann and Kahn reactions were strongly positive. A localised saccular aneurysm arising from the ascending aorta was diagnosed.

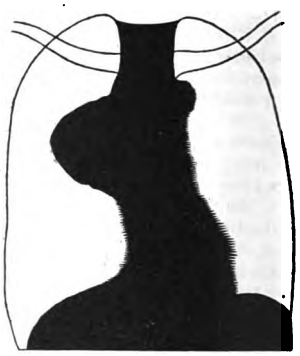

FIG. 4—Sketch of kymogram, taken on Sept. 16, 1938, showing absence of expansile pulsation in the sac of the same aneurysm as in figs. 1–3.

The patient was kept strictly at rest in bed for a month, and a mixture containing liquor hydrargyri perchloridi 1 drachm, and potassium iodide gr. 30 was given by mouth. Pain was considerably relieved at first, but three weeks after admission it was noted that, notwithstanding the improvement in symptoms, slight expansile pulsation could be felt in the second right interspace. After a month in hospital the patient was transferred home to continue rest in bed and to complete a course of intramuscular injections of bismuth.

When he was next seen, on Sept. 8, 1936, no improvement was found, the slightest exertion bringing a severe stabbing pain to the right of the sternum and back. At rest there was a constant dull ache in the same area, disturbing sleep and requiring an opiate. The patient was readmitted to hospital on Oct. 9, 1936, by which time a bulge had appeared on the chest wall, with obvious expansile pulsation and concomitant signs of aneurysm, shown by a systolic heave and diastolic shock, with a widespread impairment of percussion note. The aortic valves, however, remained competent, with blood-pressure 130/76 mm. Hg. Peripheral œdema and pulmonary signs were absent, and no blood was expectorated.

Thereafter the bulging upon the front of the chest grew rapidly more prominent. X-ray screening and films on the 13th (fig. 2) showed that within two months the aneurysm had more than doubled its size and had reached and involved the anterior chest wall, although the overlying skin remained healthy. The patient was now conscious of deep pulsation within the chest. In view of the constant pain and the progressive yielding of the sac, the outlook appeared poor unless something further could be done. Arsenical treatment was considered, but deemed unwise in view of a possible Herxheimer reaction with rupture of the aneurysm. The case seemed, however, to conform to the criteria of suitability for wiring, and with the patient's willing agreement this course was decided on.

On Nov. 3, 1936, the wiring was carried out with Colt's apparatus as already described, the smaller trocar and cannula being used. A preliminary sedative of Omnopon and hyoscine was given and local anæsthesia alone employed. The introduction was made without difficulty, the patient experiencing a sense of heavy pressure but no pain. After withdrawal of the cannula gentle pressure was applied over the site of insertion, which was protected by a gauze pad kept in place with Elastoplast. There was no external bleeding.

Directly after the operation the pulse was poor, but it rapidly improved in quality during the day and thereafter maintained its good volume, no distress being evident. Morphia gr. ¼ was given and repeated the same evening. To assist coagulation, hæmoplastin 4 c.cm. was given intramuscularly and 10 c.cm. of a 10 per cent. solution of calcium gluconate intravenously, both being repeated daily for the next twelve days. The patient was kept strictly recumbent, all straining being avoided and fluids reduced to a minimum.

On the day after the wiring the general condition was satisfactory, with no evidence of bleeding or external

change in the condition of the aneurysm. Little disturbance of the heart's action was apparent except for an increase of rate to 100–110 a minute. At the apex the heart sounds appeared unchanged, but over the aneurysm a coarse grating sound was heard during systole, probably produced by friction of adjacent fibrils of the wire wisp. The second sound at the aortic area preserved its clear ringing tone. No symptoms were complained of apart from a bruised feeling at the site of the wiring and thirst attributed to restriction of fluid intake.

On the third day after operation, however, the bulge of the chest wall appeared to have become more prominent, with widening of the area of pulsation and accompanying tenderness. Although there was no discoloration of the skin and general signs of hæmorrhage were absent, it was thought that local oozing of blood might have taken place round the sac through the point of puncture, with consequent danger of rupture. Within a few days, however, the swelling and the pulsation were much less. On the tenth day, when the supporting bandage was removed, the skin was found to be normal. The patient felt well and was free from symptoms, with a pulse-rate of 80–90 and a normal blood-count. A radiogram at this stage showed a slight haze round the sac, whose margins were less clearly defined (fig. 3). Subsequent progress of the patient was uneventful, with notable relief from the pain. As the aneurysm became smaller and less pulsatile, it became progressively harder. The patient was allowed to leave hospital seven weeks after insertion of the wire and remained in bed at home for a further month.

He has since remained under observation, with periodic X-ray control. In view of the apparent arrest of the aneurysm a gradual increase in his activities was allowed. Six weeks after leaving hospital he could walk for 10–15 min. without pain or dyspnœa, while the general condition had shown a steady improvement, with gain in weight and recovery of strength. The swelling upon the chest wall was then slight, hard, and insensitive, and showed no expansile pulsation on clinical or X-ray examination. Over it the heart sounds were audible and normal, and nothing was found wrong with the heart. Radiography showed a dense rounded shadow, whose margins were no longer blurred but sharply defined, with the wire umbrella lying open and unchanged in position. Serial radiograms taken at intervals of about three months over a period of more than three years have not shown any change in the size or outline of the sac or of its contained wire wisp. Apparently the sac is filled with densely organised clot and the disease has been arrested. A kymogram (fig. 4), taken by Dr. Franklin Wood at the London Chest Hospital on Sept. 16, 1938, confirms the absence of expansile pulsation in the sac.

From the clinical aspect the progress of the patient has similarly been uneventful, except for a flare-up of gingivitis and stomatitis due to antisyphilitic treatment, necessitating an extraction of teeth in September, 1937. No disturbance of the chest condition followed, and the gums healed normally. Over the greater part of the time mercury and potassium iodide have been given by mouth, with short courses of bismuth given intramuscularly. The blood Wassermann and Kahn reactions, strongly positive at the start of treatment, have both remained negative since March, 1939. In December, 1939, the patient appeared fit and could walk several miles without discomfort or dyspnœa and carry out the normal activities of life.

DISCUSSION

It may fairly be claimed from the patient's progress that the introduction of the gold wire brought about clotting within the sac of the aneurysm and thereby arrested the disease. In assessing results of treatment the normal duration of life with aortic aneurysm apart from interference has to be borne in mind. This was the subject of a detailed investigation by Colt (1927), his series of 707 cases including 182 males with aneurysm of the ascending aorta, and the average age of onset being fifty. Of this group about a quarter had died within five months from the date of the diagnosis, a further quarter within fifteen months, and a like proportion within two years, the average duration of life after diagnosis being therefore considerably less than this period. In the present instance the wiring has given the patient over three years of good health, with relief from the severe pain and other serious symptoms of his illness, and a reasonable prospect of continued fitness, if not of permanent cure.

A review of published records of abdominal and thoracic cases shows that greater prospect of success with Colt's apparatus is offered by aneurysms of the abdominal aorta, in which surgical access and exposure are easier. The average duration of life in this group was increased and included such long-standing survivals as eighteen years (Wheeler 1933) and ten and a half years (Lawson 1913). In the thoracic aneurysms the results showed greater variation and the proportion of early failures was higher from such causes as gradual leakage into the mediastinum or the pleura. Some of the thoracic cases were, however, in an advanced stage, offering little prospect of cure at the time of wiring, for which they would not now be considered suitable.

From a study of these cases Colt gave the following indications for wiring:—

(1) The aneurysm must be definitely saccular and not merely part of a diffuse dilatation of the aorta.

(2) The patient's age, general state, and cardiovascular condition, apart from the aneurysm, should offer a reasonable prospect of good health, if he should survive the operation.

(3) Failure of the aneurysm to respond to preliminary rest and antisyphilitic treatment over a period of two to three months, with a rapid and progressive increase in size of the sac, is an indication for wiring if otherwise suitable.

(4) The aneurysm should have reached and involved the chest wall and so be accessible under local anæsthesia. The strain of open exposure under a general anæsthetic is thus obviated. Wiring, however, should not be delayed until the chest wall has become weakened and the skin eroded.

The most favourable thoracic type for wiring was that arising from the ascending arch, aneurysms of the transverse and descending aorta being seldom

FIG. 5—Radiogram of sac of aneurysm, showing wire wisp in position.

suitable. The case described in this article conforms in general to the indications given above.

SUMMARY

A case is described of saccular aneurysm of the ascending aorta successfully treated by wiring with Colt's apparatus. Observation over more than three years since the operation has shown no further change in the size and condition of the sac, which appears to be thrombosed and inactive, and the patient has remained free from symptoms and able to lead an active life. A brief review is given of other recorded cases and of the indications for this form of treatment.

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SULPHATHIAZOLE IN BUBONIC PLAGUE

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THE highly standardised method developed by one of us (S. S. S.) for biological assay of anti-plague vaccines (Sokhey and Maurice 1935) and sera (Sokhey 1939a) has enabled us to assess fairly accurately the therapeutic value of several drugs, including some of the more important sulphanilamide derivatives, in bubonic plague. None of the compounds tested by us proved to be entirely satisfactory. Last year we organised at the Haffkine Institute, with the help of the Lady Tata Memorial Trust, the synthesis of new compounds, particularly heterocyclic derivatives of sulphanilamide. Of the thirty-five compounds prepared (Ganpathi 1940a and b, Ganpathi and Nandi 1940) we have tested only six so far. One of these, sulphathiazole, the synthesis of which has been reported by Fosbinder and Walter (1939) and by Lott and Bergeium (1939), is very effective in plague. We here give the results obtained with this drug and with sulphapyridine (M. & B. 693), the only other drug found to have some action in plague (Schutze 1939). A few experiments showing the effect of anti-plague serum prepared at the institute are also included for comparison.

METHOD OF TESTING

The method of testing was so devised that the laboratory-induced infection should simulate natural infection as closely as possible, and all the steps of the experiments were accurately standardised, so that results of experiments carried out at different times should be directly comparable. Essential details of the method are as follows:

Test animal.—The Haffkine Institute inbred white mouse was used for these experiments. This strain is uniformly and constantly susceptible to infection with plague (Sokhey 1939c). The mice used were two and a half to four months old and weighed 21–30 g. (Any other strain of mice equally susceptible to plague infection would do. The strain of mice should be such that 6–12 organisms of a suitable strain of *Pasteurella pestis*, as described below, when injected subcutaneously should produce a mortality of not less than 90 per cent.; and, when ten times this infective dose—i.e., about 60–120 organisms—is given, a uniform mortality of 100 per cent., with an average duration of life of about five to seven days, should result.)

Test infective dose.—This was 0·2 c.cm. of a 10^{-6} dilution (in broth) of a 48-hour broth growth (incubated at 27°–29° C.) of a suitable strain of *P. pestis* per mouse. It was always given subcutaneously in the right flank of the animal. Such a dose contains about 60–120 organisms (Sokhey 1939b). Our experience is that agar cultures obtained directly from the blood in fatal human cases are highly virulent, and their virulence can be maintained undiminished for at least three years by storing them at about 4° C. (Sokhey 1939d). Strains for our work were selected by using the test infective dose described above.

Mode of administration of the drug.—The drug under test was made into an emulsion with tragacanth so that 0·5 c.cm. of the emulsion contained the required dose. This quantity of the emulsion was introduced with a pipette into the stomach of the mouse. The drug was usually administered twice a day, at 9 A.M. and 9 P.M.; in a few experiments it was given only once a day, and in some others three times a day, at 7 A.M., 3 P.M., and 11 P.M. For our experiments we have employed dosages from 10 mg. a day for ten days to 40 mg. twice a day for ten days.

Time of starting the administration of the drug.—Experiments have been reported in which the administration of the drug was started at the same time as the infection was given (Schutze 1939). Such experiments are of limited value, as the results given below will show. In cases of human plague the most important factor which decides the issue is the development of septicæmia. In mice, under the experimental conditions described in this paper, septicæmia develops forty-eight to seventy-two hours after the induction of infection by the subcutaneous route. We therefore started the administration of the drug at four different stages of the infection: (1) at the same time as the infection was given, (2) twenty-four hours after infection, (3) forty-eight hours after infection, and (4) seventy-two hours after infection.

Number of animals used for each experiment.—For each test 20 animals were used; the selected dose of the drug under test was given to 10 mice, and the remaining 10 mice were kept as controls. During the experiments the mice were kept in batches of 5 in the special cage designed for experimental work in tropical countries (Sokhey 1939c). The cages were housed in an air-conditioned room with a temperature of 75°–78° F.

Duration of the experiments.—The mice were observed for at least thirty-one days. They were examined once a day, and deaths were noted. Those dying within this period were dissected and examined for evidence of plague by microscopical examination of organ smears, and failing that by cultural methods. Whenever possible the animals which survived were killed after the end of the period of observation and similarly examined.

RESULTS

The results are given in tables I–IV according to the four different stages of infection at which the administration of the drugs was begun. Plague organisms were never found in the organ smears and blood-cultures of the animals dying during the period of administration of the drugs, but they were found in animals dying after the administration of the drug had been stopped, the only exception being in the experiments in which sulphapyridine was given in very small dosage—i.e., 10 mg. once a day for ten days. In this case some animals which died during the period of administration of the drug showed the presence of plague organisms.

COMMENTS

During our recent studies in the field we have noticed that the most important single factor which decides the issue in human plague is the development of septicæmia. If the lymph-glands prevent the spread of infection to the blood-stream and the infection remains localised spontaneous recovery invariably results. The percentage of such cases in different outbreaks is 20–50 per cent. On the other hand, if the organisms pass the lymph-glands and a septicæmia results death invariably follows unless an effective agent can be given to control the infection. Even if an effective agent is available it must be given before extensive destruction of the tissues of the organs has resulted. In the mouse 100 per cent. of the animals infected with our standard test infective

TABLE I—ADMINISTRATION OF DRUG BEGUN AT TIME OF INFECTION

Expt. no.	Drug	No. of organisms given as test infective dose	Mice used	Deaths during period of administration of drug (1st to 10th day)	Deaths after drug was stopped (11th to 31st day)	Controls: Mice used	Controls: Deaths
Dose—10 mg. twice a day for 10 days							
1	Sulphathiazole	80	10	0	1 (19·0)*	10	10 (5·7)
2	Sulphathiazole	66	10	0	3 (20·6)	10	10 (5·6)
1	Sulphapyridine	79	10	0	3 (16·3)	10	10 (6·8)
2	Sulphapyridine	63	10	0	3 (22·0)	10	10 (5·3)
3	Sulphapyridine	66	10	1 (8·0)	4 (17·0)	10	10 (5·6)
Dose—20 mg. twice a day for 10 days							
1	Sulphathiazole	146	10	0	1 (21·0)	10	10 (5·7)
Dose—10 mg. once a day for 10 days							
1	Sulphapyridine	69	10	9 (7·4)	1 (11·0)	10	10 (5·6)

* Drug in this experiment was given for 20 days—i.e., 10 mg. twice a day for 20 days. The figures given in parentheses are the average number of days elapsing between infection and death.

TABLE II—24 HOURS AFTER INFECTION

Expt. no.	Drug	No. of organisms given as test infective dose	Mice used	Deaths during period of administration of drug (1st to 10th day)	Deaths after drug was stopped (11th to 31st day)	Controls: Mice used	Controls: Deaths
Dose—10 mg. twice a day for 10 days							
1	Sulphathiazole	80	9	0	2 (15·5)	10	10 (5·7)
2	Sulphathiazole	66	10	1 (8·0)	1 (11·0)	10	10 (5·6)
1	Sulphapyridine	79	10	0	2 (22·0)	10	10 (6·8)
2	Sulphapyridine	63	10	0	0	10	10 (5·3)
3	Sulphapyridine	66		0	3 (19·3)	10	10 (5·6)
Dose—20 mg. twice a day for 10 days							
1	Sulphathiazole	146	10	0	0	10	10 (5·7)
Dose—10 mg. once a day for 10 days							
1	Sulphapyridine	69	10	8 (6·3)	2 (12·0)	10	10 (5·6)

TABLE III—48 HOURS AFTER INFECTION

Expt. no.	Drug	No. of organisms given as test infective dose	Mice used	Deaths during period of administration of drug (1st to 10th day)	Deaths after drug was stopped (11th to 31st day)	Controls: Mice used	Controls: Deaths
Dose—20 mg. twice a day for 10 days							
1	Sulphathiazole	80	10	0	1 (12·0)	10	10 (5·7)
2	Sulphathiazole	66	10	3 (6·6)	0	10	10 (5·6)
1	Sulphapyridine	132	10	6 (4·8)	4 (18·5)	10	10 (4·9)
2	Sulphapyridine	66	10	5 (6·4)	1 (12·0)	10	10 (5·6)
Dose—40 mg. twice a day for 10 days							
1	Sulphathiazole	56	10	1 (6·0)	0	10	10 (6·7)
1	Sulphapyridine	66	10	6 (5·8)	3 (22·3)	10	10 (5·2)
Dose—20 mg. thrice a day for 10 days							
1	Sulphathiazole	56	10	1 (6·0)	0	10	10 (6·7)

TABLE IV—72 HOURS AFTER INFECTION

Expt. no.	Drug	No. of organisms given as test infective dose	Mice used	Deaths during period of administration of drug (1st to 10th day)	Deaths after drug was stopped (11th to 31st day)	Controls: Mice used	Controls: Deaths
Dose—20 mg. twice a day for 10 days							
1	Sulphathiazole	146	10	3 (6·6)	0	10	10 (5·7)
2	Sulphathiazole	66	10	4 (7·0)	0	10	10 (5·6)
1	Sulphapyridine	132	10	8 (5·6)	2 (19·0)	10	10 (4·9)
2	Sulphapyridine	66	10	8 (5·6)	1 (13·0)	10	10 (5·6)
Dose—40 mg. twice a day for 10 days							
1	Sulphathiazole	56	10	2 (7·3)	0	10	10 (6·7)
1	Sulphapyridine	66	10	8 (5·9)	1 (30·0)	10	10 (5·2)
Dose—20 mg. thrice a day for 10 days							
1	Sulphathiazole	56	10	3 (7·3)	0	10	10 (6·7)
Dose—0·1 c.cm. a day for 4 days; first dose given intravenously and subsequent ones subcutaneously							
1	Haffkine Inst. anti-plague serum	141	10	0	2 (26·0)	5	5 (5·2)
2	Haffkine Inst. anti-plague serum	30	10	0	2 (17·5)	10	10 (6·3)
3	Haffkine Inst. anti-plague serum	108	10†	0	1 (18·0)	10	10 (5·7)

† One mouse died before serum could be given.

dose develop septicæmia regularly, and this septicæmia develops forty-eight to seventy-two hours after the induction of infection. Seventy-two hours after the giving of infection 100 per cent. of the mice have septicæmia, yet only in a very few animals is the injury to organs so extensive as to make recovery impossible.

From this standpoint the results obtained by starting the administration of the drugs at four different stages of the infection can be better evaluated if they are viewed as forming only two groups. Septicæmia does not set in until forty-eight hours after the induction of infection; therefore the cases in which administration of the drug was started at the same time as infection (table I) and twenty-four hours after the giving of infection (table II) really form one group. There is no significant difference in the intensity of infection at these two stages, while they have in common the important factor of the absence of septicæmia at the start of the treatment. Similarly the results obtained by starting the administration of the drugs forty-eight hours (table III) and seventy-two hours (table IV) after the induction of infection form a common group in which septicæmia was already present at the start of the treatment. For reasons given above the results of the second group are more significant for assessing the value of the drugs under test.

When the administration of the drug was begun before septicæmia had set in, as small a dose of sulphathiazole as 10 mg. twice a day for ten days saved nearly 80 per cent. of the infected animals, and even better results were obtained by doubling this dose. Sulphapyridine produced about the same action as sulphathiazole in these early stages of infection with doses of the same order. In the second group however—i.e., when the administration of the drugs was started after septicæmia had set in—the remarkable action of sulphathiazole in curing plague becomes more evident. A dose of 20 mg. twice a day for ten days cured approximately 80 per cent. of infected animals when the drug was given forty-eight hours after infection and 65 per cent. when given seventy-two hours after infection. Doubling this dose produced even better results, the survivals becoming 90 and 80 per cent. respectively. These results are as good as those obtained with the Haffkine Institute anti-plague serum (table IV). It is in this significant group that sulphathiazole shows much more definite curative action than sulphapyridine. With the largest dose employed (40 mg. twice a day for ten days), when treatment was started forty-eight hours after infection, sulphathiazole cured 90 per cent. of infected animals, whereas sulphapyridine cured only 10 per cent., and similar results were obtained when treatment was started seventy-two hours after infection.

The rate of absorption and excretion of a drug influences its action to a considerable extent, and comparison of two drugs by giving similar doses is fallacious if their rates of absorption and excretion are not similar. Sulphathiazole has been reported to be absorbed and excreted much more rapidly than sulphapyridine. In our comparison of the effect of the two drugs we have, therefore, given large doses to produce the maximal possible effect. Tables III and IV show that the effect of sulphapyridine in doses of 20 mg. twice a day for ten days was the same as that of 40 mg. twice a day for ten days; and no advantage was gained by doubling the dose. Doubling the dose of sulphathiazole slightly improved the percentage of cures. It is evident that in both cases any doses higher than 40 mg. twice a day would not have materially affected the results.

These animal experiments show sulphathiazole to have a remarkable curative action in plague and to be superior to sulphapyridine in this respect. Since plague is much more severe in the mouse than in man—in man the case-mortality is never 100 per cent.—it is hoped that sulphathiazole will prove even more effective in human infection, and we hope to try it out in the field soon.

SUMMARY

(1) Sulphathiazole in doses of 10 mg. twice a day for ten days cures 80 per cent. of plague-infected mice when administered at the time of infection or twenty-four hours after. Still better results are obtained if the dose is increased.

(2) If treatment is begun forty-eight or seventy-two hours after infection, a dose of 40 mg. twice a day for ten days cures 80–90 per cent. of infected mice.

(3) Under experimental conditions sulphathiazole is much superior to sulphapyridine in plague and is as good as an effective anti-plague serum.

Our thanks are due to Messrs. May and Baker for a generous supply of sulphapyridine (M. & B. 693).

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TIME-RELATIONS OF HEPARIN ACTION ON BLOOD-CLOTTING AND PLATELET AGGLUTINATION

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Howell and Holt (1918) demonstrated that heparin, administered intravenously or added to blood outside the body, delayed the clotting of the blood. As Howell predicted, it was found that highly purified heparin stopped the agglutination of blood-platelets, thus preventing the formation of a thrombus. This is true whether the stimulus to thrombus formation is present in the animal's blood-vessels (Murray et al. 1936) or in a glass or Cellophane tube through which the blood is allowed to flow (Best et al. 1938). That blood-clotting and thrombosis may, under certain conditions, be separate processes can be deduced from the facts that platelet-free blood may clot, and that platelet thrombi, containing no detectable amounts of fibrin, may form. In 1904 Loeb studied the action of the anticoagulant hirudin, which prevented the agglutination of platelets. He showed that the effect on platelets developed more slowly than that on clotting. In the present work we have studied the time-relations of heparin action on blood-clotting and platelet agglutination.

METHOD

Clotting times were measured on 1 c.cm. samples of blood withdrawn from a vein into a hypodermic syringe as little negative pressure as possible being used. The blood was then allowed to flow slowly down the wall of a small test-tube. All equipment coming in contact with the blood was carefully cleaned and dried before use. Samples were taken from an exposed femoral vein, each new site of puncture being distal to the previous one. The state of the blood was observed at short intervals by gently tilting the tubes.

Platelet agglutination in dog's blood was studied in a glass cell (Best et al. 1938) which connected the carotid artery with the jugular vein (fig. 1). The top plate of this cell had a transverse scratch on its inner surface, and platelets tended to clump first on the downstream side of this scratch. Although the initial deposition of platelets was on the scratch, this was quickly followed by the clumping of other platelets on those already immobilised; the process observed was thus, for the most part, a true agglutination. Two cells were used in most of the experiments cited. A microscope (× 50) was focused on the scratch in each cell, which was illuminated by transmitted light. The appearance of clumps, or the growth of clumps already present on the scratch, indicated active platelet agglutination. The absence of clumps or the progressive reduction in size of clumps present indicated that little or no platelet agglutination was taking place. In practice these conditions were easily recognised.

Dogs under Nembutal anæsthesia were used. Highly purified heparin (Connaught Laboratories, Toronto) was administered intravenously in an aqueous solution containing 100 units per c.cm. The protamine used was in an aqueous solution containing 1 mg. of protamine per 0·04 c.cm., and this amount inactivates (Chargaff and Olson 1938) 33 units (0·33 mg.) of heparin.

TABLE I—DELAY IN EFFECT OF HEPARIN ON THROMBUS FORMATION

Heparin administered (units per kg. of body-weight)	Maximal clotting-time	Thrombus formation following administrations of heparin
50	Over 6 hours	Continuous
100	,,	,,
150	,,	,,
200	,,	,,
300	,,	May be continuous or may cease approximately 1 hr. after heparin given
350	,,	Ceases approximately 50 min. after heparin given
450	,,	Ceases approximately 20 min. after heparin given

RESULTS AND DISCUSSION

The present experiments may be divided into two groups. In the first a single dose of heparin was

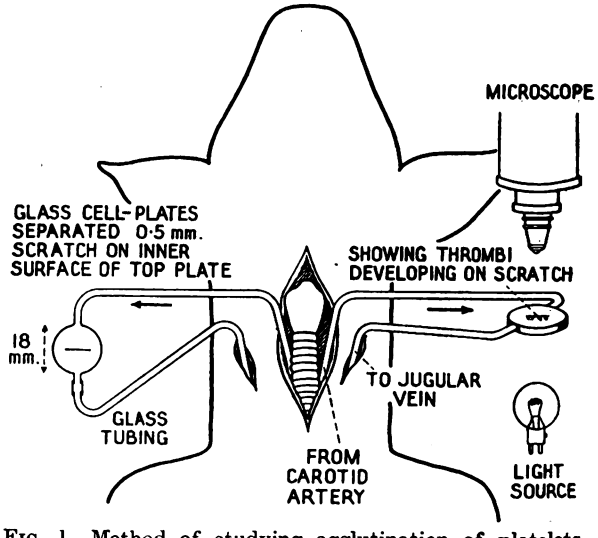

FIG. 1—Method of studying agglutination of platelets.

given and clotting-time and thrombus formation observed. In the second a large dose was administered and, approximately 35 min. later, blood flow through the cells was started and the heparin neutralised by the required amount of protamine. Clotting-times were taken approximately every 10 min. at the beginning and towards the end of each experiment. The cells were watched for thrombus formation. After the flow through the glass cell is started, there is always a latent period (average 6 min.) before thrombi are observed. The agreement between the results obtained with the two cells was remarkable. After a large dose of heparin the reappearance of thrombi might be delayed for 5–6 hours, yet the time of reappearance in the two cells differed only by a few minutes. This finding strongly suggests that the scratch on the inner surface of the cell constituted maximal stimulus for platelet agglutination.

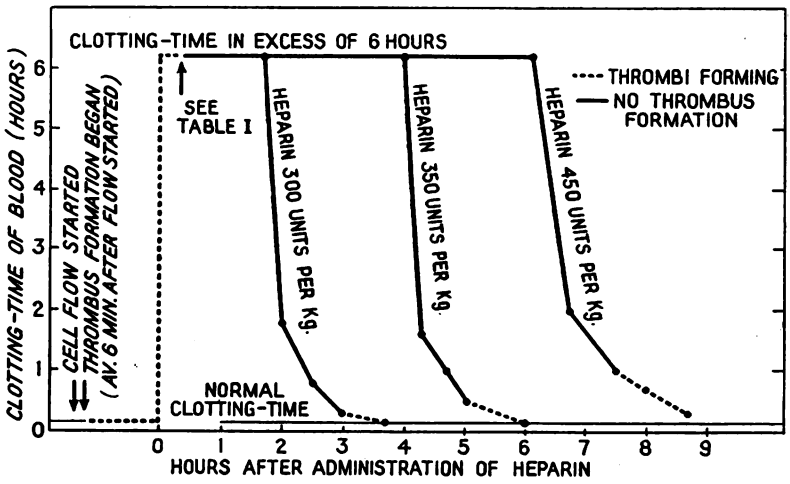

FIG. 2—Effect of heparin on platelet agglutination (thrombus formation) and clotting-time of blood in the dog.

Fig. 2 shows the result of the first group of experiments. Each curve showing the return of clotting-time and platelet agglutination was obtained in one animal. As pointed out by Jaques (1939), there is great variation in the response of different dogs to heparin. In the same animal, however, from the effect of the first injection the results of the subsequent administration can be fairly accurately predicted. After a dose of heparin in excess of 300 units per kg. of body-weight the clotting-time of the blood very quickly reached a high value (over 6 hours), whereas platelet agglutination continued for 15–50 min. As shown in table I, smaller doses, while increasing the clotting-time of the blood, did not stop platelet agglutination. With the large doses of heparin the clotting-time of the blood, after 3–6 hours had elapsed, returned to under 1 hour before platelet agglutination started again. In our experiments the larger the dose of heparin, the longer the interval before thrombi reappeared, but the longer the clotting-time at the moment of reappearance. In considering these results it is essential to remember that the method used for detecting platelet agglutination gives an immediate answer, whereas the measurement of clotting-time necessarily yields a delayed result. It is sometimes forgotten that a clotting-time of 6 hours can only be determined by observing a sample of blood for 6 hours. The clotting-time depends on the conditions under which the blood is kept. The physical and chemical processes which lengthen the clotting-time are not necessarily fully developed when the blood sample is taken. We measure the anticoagulant action of heparin by observing the length of time during which the blood remains fluid. We have no means, as yet, of determining the margin of this control, although it may prove to be of practical importance.

Table II shows the outline and the results of the second type of experimental procedure. As indicated, the administration of a quantity of protamine sufficient to neutralise the large initial dose of heparin brings the clotting-time, almost at once, to normal or subnormal levels. The reappearance of thrombi was observed during the injection of the protamine. Thus, whereas the inhibitory action of heparin on platelet agglutination takes some time to develop, this effect disappears as soon as the heparin is removed. Administration of protamine after heparin to the animals which had a long normal clotting-time immediately lowered this value below the original level. Several groups of workers have now shown that heparin may appear in the blood-stream under certain conditions. Our findings may be interpreted as supporting the view that heparin may sometimes be present in the blood of normal dogs under nembutal

TABLE II—OUTLINE AND RESULTS OF HEPARIN-PROTAMINE EXPERIMENTS

Elapsed time for each phase of procedure	1 min. or less	1 min. or less	1 min. or less	5 min.	1 min. or less	Approx. 30 min.	1 min. or less	10 min.	3–5 min.	5 min.	1 min. or less
Procedure	Blood sample for clotting-time (CT) measurement taken (sample 1)	→	Heparin (450 u./kg.) administered	→	Blood sample for CT taken (sample 2)	→	Cell flow started	→	Protamine given to neutralise heparin (1 mg./33 u.)	→	Blood sample for CT taken (sample 3)
Exp. No.	Clotting-time of sample 1 (min.)	..	..	..	Clotting-time of sample 2	..	..	Thrombus formation		..	Clotting-time of sample 3 (min.)
1	14	..	..	..	Over 6 hr.	..	..	None	Starts during protamine injection	..	7
2	6	..	..	..		..	..			..	6
3	7	..	..	..		..	..			..	5
4	9	..	..	..		..	..			..	6
5	7	..	..	..		..	..			..	6
6	8	..	..	..		..	..			..	6
7	9	..	..	..		..	..			..	8
8	5	..	..	..		..	..			..	5
9	33	..	..	..		..	..			..	8

anæsthesia. An alternative explanation is that the injection of heparin, like that of hirudin (Országh and Alföldy 1940), leads to the production of some substance which accelerates blood coagulation. In many experiments, however, in which heparin has been administered, and natural removal permitted, no return below the normal clotting-time has been observed.

CONCLUSIONS

From the foregoing it becomes apparent that, from the practical standpoint, heparin develops its characteristic effect on clotting-time with little delay. With carefully graded dosages of heparin it is possible to observe a definite delay in the action on clotting-time (Quick 1936; Jaques 1939). The inhibition of platelet agglutination, as judged by our criteria, may not become obvious until 15–50 min. after the injection. In the presence of what appears to be a maximal stimulus a dose of heparin in excess of 300 units per kg. of body-weight is necessary to prevent agglutination. Smaller doses, which raise the clotting-time to over 6 hours, do not prevent platelet agglutination; this has been observed previously in the rabbit (Best et al. 1938). It has been shown that thrombosis in veins (Murray et al. 1936), arteries (Solandt and Best 1938), and on cardiac endothelium (Solandt, Nassim, and Best 1939) can be completely prevented by doses of heparin which are much smaller than the above. This indicates that extensive damage to these parts did not produce a maximal stimulus to platelet agglutination. In view of the absence of effect on agglutination of doses of heparin which produce a clotting-time of over 6 hours, it is noteworthy that, after a large dose has been administered, platelet agglutination will not start again until the clotting-time of the blood has returned to less than 1 hour. In spite of this the sudden removal of the heparin by protamine led to the immediate onset of platelet agglutination. These findings suggest that, in the presence of even a little heparin, an effect on agglutination previously produced by a higher concentration may persist.

SUMMARY

A single dose of heparin sufficient to raise the clotting-time of the blood of the anæsthetised dog to over 6 hours did not prevent the agglutination of platelets in the presence of what appeared to be a maximal stimulus.

With larger doses of heparin the effect of platelet agglutination, unlike that on the clotting-time, took 15–50 min. to develop under the conditions of our experiments. This point should be remembered in experimental or clinical studies with heparin.

Evidence is presented which suggests that even the most extensive injury to arteries or veins never results in a maximal stimulus to platelet agglutination. The dose of heparin necessary to prevent the formation of platelet thrombi in an injured blood-vessel is, for this reason, much smaller than that required to prevent the process in a glass cell.

The findings suggest that, in the presence of even a little heparin, an effect on agglutination previously produced by a higher concentration may persist.

It is a pleasure to record our appreciation of the technical assistance given by Mr. C. R. Cowan.

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PATHOLOGICAL FRACTURE OF MANDIBLE

NON-UNION TREATED WITH PEDICLED BONE GRAFT

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A SEAMAN, aged 52, was admitted to the Seamen's Hospital on Jan. 1, 1935. He had then been ill for some seven months with osteomyelitis of the lower jaw following extraction of teeth in the left premolar and molar regions. An abscess had formed which had been opened at another hospital. Before his admission under my care seven sequestra had been discharged. On admission there was considerable swelling of the left side of the face and of the soft tissues overlying the lower jaw on the left side, and an external sinus was discharging pus. Inside the mouth pus was observed to well up freely from the area involved. Radiography showed a fracture in the region of the angle of the mandible on the left side (fig. 1). On the 16th loose sequestra were removed. On Feb. 13 more sequestra were removed, the distance between the separated ends of the mandible then being ¾ in. On the 26th two small sequestra were exfoliated, and at this time splints were cemented in position by Mr. Bramley Ball, honorary dental surgeon to the hospital. It was recognised that a condition of non-union had been established, and that some form of grafting operation would have to be undertaken. In view of the suppuration, it was decided to wait a considerable time to allow latent sepsis to subside; consequently operation was postponed until January, 1936. The condition immediately after operation is illustrated in fig. 2. Subsequent progress was uneventful, and the patient was discharged on May 21, 1936.

FIG. 1—Radiogram showing a pathological fracture at the angle of the mandible.

OPERATION

A detailed and illustrated description of the operation performed was given in my Hunterian lecture (1918). Briefly, the procedure is to bridge the gap

(*Continued from previous column*)

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Országh, O. and Alföldy, J. (1940) *Lancet*, Jan. 6, p. 28.
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between the fragments with a portion of bone removed from the lower border of the jaw in front of the site of non-union. The size and shape of the bone thus transferred can be judged from the radiogram (fig. 2), which shows the condition immediately after operation. The essential feature wherein this method differs from the introduction of a completely detached graft usually taken from another bone, such as ilium, rib, or tibia, is that the blood-supply of the bone transferred is maintained by the preservation of the attachment to it of the platysma and deep fascia and by the utilisation of these structures as a pedicle so fashioned as to permit the change in position to be effected with perfect ease and without tension on the nutrient tissues. This method of dealing with non-union by using a pedicled bone graft is recognised as an accepted procedure, and a more or less detailed description will be found in books dealing with the treatment of maxillofacial injuries.

RESULTS

The numerous cases arising from injury during the last war and operated on by me and my American collaborators, both in this country and in America, showed a high percentage of absolute successes. I was able to exhibit three such cases to the odontological section of the Royal Society of Medicine some twenty years after operation (Cole 1938). The test of time has dispelled the gloomy forebodings of professional criticism.

In a recent book on plastic surgery by Barsky (1938) it is alleged that "there is a possibility of functional disability caused by the restriction of the movements of the tongue and muscles of the floor of the mouth." In his description of the operation the pedicle is said to consist "of the platysma muscle below and the muscular attachments of the floor of the mouth internally." If this internal attachment existed, resulting dysfunction would at least be credible, but technically and anatomically it does not. In the numerous cases dealt with functional disability of any kind has not been met with. In the present case a period of 3½ years has elapsed since the operation; the radiographic appearances are shown in fig. 3. No flattening at the site of removal of the bone from the mandible could be observed in the facial contour, and protrusion of the tongue was free and unfettered. Further, to clinch the question of functional ability, the patient has followed his calling as a sailor and has eaten the food provided on board ship with ease and comfort locally and without digestive disturbance.

Although it is true that non-union may result from loss of bone no matter how occasioned, it is equally true that it is a rare consequence of sequestration resulting from an osteomyelitis set up by infection alone. I have previously discussed (Cole 1926) the sequelæ of infection in the mandible and emphasised the importance of splinting in acute cases where

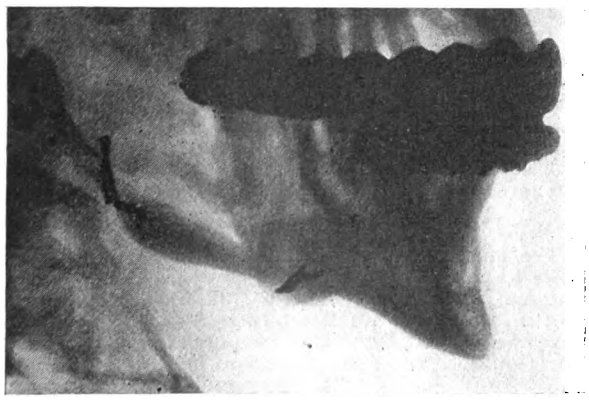

FIG. 2—Radiogram showing the graft immediately after the operation.

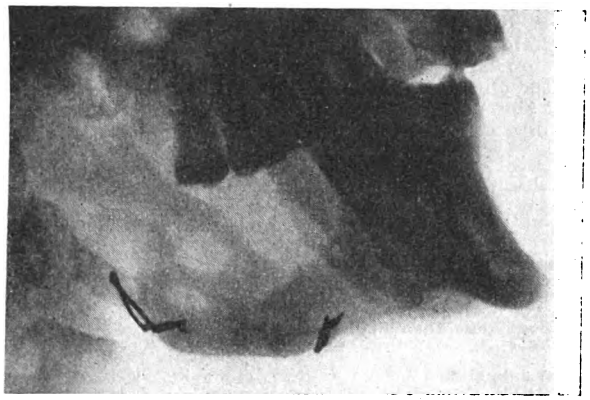

FIG. 3—Radiogram showing the graft 3½ years later.

spontaneous fracture may be expected. Illness arising from such an infection lasted in this case for nearly two years, during which time the patient was unable to follow his occupation, was subjected to several operations, and suffered considerable inconvenience and pain. Once fracture has taken place the resulting mobility will not only tend to prolong and extend the infective process but also may prevent the maintenance or renewal of continuity by regenerated bone. No claim to novelty is made for the treatment adopted. The result is recorded to show how, once initiated, union is strengthened and consolidated; thus to vindicate the pedicled bone graft as a sound and reliable procedure; and to challenge with facts the hypothetical disadvantages alleged to attend its employment.

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MISSED ABORTION AND MISSED LABOUR

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IN 1935 Robinson et al. reported a new method for evacuating the uterus in missed abortion and in missed labour by increasing the sensitivity of the uterus with œstrogens. Further experience of this treatment has since been obtained, and it is now possible to report the details of 55 consecutive cases, including the 12 previously described.

Intra-uterine death of the fœtus is usually followed by expulsive uterine contractions within a comparatively short time. Sometimes, however, the fœtus, though dead, is retained in utero for weeks or years. The condition is then termed missed abortion or missed labour according to the period of pregnancy at which the fœtus dies. In these cases there must be some failure in the mechanism which ordinarily initiates the expulsive uterine contractions, and study of them may throw light on the cause of the onset of normal labour—a phenomenon still incompletely explained. Frank et al. (1933) were the first to show that intra-uterine death of the fœtus is accompanied by a fall in the amount of "free" œstrogens in the blood-stream. They suggest that, if less than one mouse unit of œstrogen is demonstrable in 40 c.cm. of blood of a pregnant woman, the finding is diagnostic of intra-uterine death of the fœtus. This work was confirmed in the laboratory of the department of

obstetrics and gynæcology in the university of Liverpool by Polonsky (1936) and myself, using the technique of Frank et al. (1933). The test was carried out on 82 patients, in most instances at the request of the clinician, who suspected the death of the fœtus. All the patients were subsequently traced, and the results are shown in table I. These findings show

TABLE I—BLOOD-ŒSTROGEN TESTS

Blood œstrogen	Fœtus alive	Fœtus dead	Incorrect results
Free œstrogen in 40 c.cm. of blood	46	3	3
No free œstrogen in 40 c.cm. of blood (less than one mouse unit)	3	29	3
Test animal died	—	1	—

that, when used to diagnose fœtal death, the test, in our hands, is accompanied by appreciable error. Nevertheless, they serve to demonstrate that the amount of œstrogens in the blood is usually reduced when the fœtus dies but remains in utero.

The question arises whether this change is associated directly with the death of the fœtus or is the result of failure of placental function. The answer to this question is supplied by investigation of the œstrogen content of the blood in cases of hydatidiform mole, when the fœtus is dead but chorionic activity persists. This investigation was carried out in 3 cases, and large amounts of "free" œstrogen in the blood were easily demonstrable in all. This means that the change in the œstrogen content of the blood depends on an alteration in placental function rather than on the death of the fœtus. This is in keeping with the accepted view that it is the placenta which is responsible for the production of œstrogen, and indeed progesterone, during the greater part of pregnancy. In view of the activating effect of œstrogens on uterine muscle, it is possible that the unusually small amounts of this hormone in circulation largely explain the quiescence of the uterus in missed abortion. On the other hand, this quantitative hormonal change may be merely coincidental and the inevitable result of death of the placenta. Whatever the explanation may be, the results described here show that, if the deficiency of œstrogens is rectified by prolonged administration of any type of œstrogenic substance, the uterus becomes sufficiently active to expel its contents.

METHOD

In treating missed abortion or missed labour, the object is to increase the sensitivity and activity of the uterine muscle. To this end œstrogens are administered at short intervals for several days. As a result the uterus becomes so sensitive that expulsive uterine contractions may begin without any further medication. If not, however, the uterus, already prepared by œstrogens, will react readily to oxytocic agents, such as quinine and posterior-pituitary extract, whereas it rarely reacts to these substances without previous sensitisation. The technique was varied from time to time, and different œstrogens were employed. In the earlier cases œstrone or œstrone benzoate was used, and at that time standardisation of the preparations was unsatisfactory. In table II an endeavour has been made to convert the mouse and international units of earlier preparations to the modern milligramme unit, and the dose stated is probably only approximately correct. In tables III and IV, however, the dosage of œstradiol benzoate and stilbœstrol is according to the manufacturer's specifications. After trial of various techniques of treatment, the following is employed at present. Œstradiol benzoate is given intramuscularly in a dose of 2 mg. every eight hours for seven or eight days. If abortion has not taken place by the fifth day, quinine hydrochloride gr. 10 is given each hour for three doses and followed by four injections of 0·5 c.cm. of posterior-pituitary extract at intervals of an hour. This treatment is repeated on the eighth day if the products of conception still remain in the uterus. When stilbœstrol is used instead of œstradiol benzoate, 2 mg. is given by mouth thrice daily, or 1 mg. four-hourly, for seven or eight days. The quinine and pituitary extract are also given when required on the fifth and eighth days.

RESULTS

A total of 55 patients were treated: 14 with œstrone or œstrone benzoate, 30 with œstradiol benzoate, and 11 with stilbœstrol. In 48 cases the uterus was evacuated weeks or even months after the death of the fœtus. There was some doubt about one of these cases for the cervix was dilated and the lower segment packed twenty-four hours before œstrogen was given. There were, however, no signs of abortion before the administration of the hormone, and the uterus was not evacuated until five days after the operation. In a few other cases the possibility of spontaneous onset of labour cannot be excluded, for expulsive uterine contractions began so quickly after relatively few doses of œstrogen that it is doubtful whether the two events should be regarded as cause and effect. In 29 of the successful cases nothing but œstrogen was administered, but in the remainder oxytocic drugs were given on the fifth to the eighth days of treatment. However, these drugs rarely, by themselves, cause abortion or labour in these cases, and it seems permissible to conclude that the œstrogenic hormone, by sensitising the uterus to respond to oxytocic agents, was the main cause of evacuation of the uterus. Hormone induction failed in 7 cases, but failures have become fewer as experience of the method has been acquired. Thus, there was only one failure in the last 27 cases. Of the 7 failures 5 patients experienced "pains" and uterine hæmorrhage (previously absent) as a result of treatment, but evidently uterine sensitivity was not sufficiently increased to complete the abortion. In a sixth case subsequent attempts to induce abortion with an intra-uterine bag also failed, and vaginal hysterotomy was finally necessary; the uterus in this case must have been unduly inactive. In the seventh unsuccessful case a lack of œstrogens in the blood could not be demonstrated before treatment was begun.

Further inquiry into these results reveals that the ease with which hormone induction may be brought about varies directly with the duration of pregnancy before the death of the fœtus—i.e., the size of the uterus—and inversely with the length of time during which the products of conception have been dead. A fœtus of considerable size which has died recently is more easily evacuated. Thus, in 29 patients the uterus was of the size of a twenty-eight weeks pregnancy or over. Induction of labour was successful in 28 of these, and in only 9 were accessory uterine stimulants necessary. In 26 cases the uterus was less than twenty-eight weeks in size; induction was successful in 20 of these, œstrogens alone, without oxytocic drugs, being used in 9.

All of the œstrogenic substances used appear equally efficacious, although relatively larger amounts of œstrone and œstrone benzoate are required. All the later cases were treated with stilbœstrol given by mouth. This synthetic œstrogen gives equally good results, and so far there have been no failures with it in 11 cases. It has the distinct advantage that it avoids the necessity for repeated intramuscular injections.

DISCUSSION

The advantages of a medical method of treating missed abortion and missed labour are considerable. Surgical interference, in the presence of an inert uterus and macerated products of conception, is always attended by risk of hæmorrhage, injury, and infection. In the cases described here every patient successfully treated with œstrogenic hormone had an uneventful apyrexial convalescence, and extrusion of the uterine contents was usually rapid, complete, and unaccompanied by abnormal hæmorrhage. In one

case the delivery of the placenta was delayed for a few hours, but there was no bleeding, and it was subsequently expressed with ease. One other patient is recorded as having had slight postpartum hæmorrhage, which was also easily controlled by fundal massage and with ergot. In the remainder abortion or labour was characterised by the absence of any delay or difficulty.

It has been realised for some years that it is rarely, if ever, possible to promote abortion in women with œstrogens if the fœtus is alive and well established. It is, therefore, difficult to avoid speculation about why the death of its contents alters the response of the uterus to œstrogenic hormone. During normal pregnancy there is a balance between inhibiting and activating hormones—progesterone and œstrogens—progesterone being dominant in its effect on uterine muscle. This balance is qualitative rather than quantitative, and it is difficult, if not impossible, to override the effect of progesterone by the administration of even the largest amounts of œstrogens. It may well be that any œstrogens given are inactivated

TABLE II—ŒSTRONE AND ŒSTRONE BENZOATE

Age	Parity	Duration of pregnancy (weeks)	Approx. time since death of fœtus	Total amount of hormone given (mg.)	Duration of hormone treatment	Additional treatment	Time of abortion (hours)*	Result	Comments
34	2	35	20 weeks	490	7 days	Quin. & pit. 4th day and 8th day	198	Success	—
38	7	32	18 ,,	10	3 ,,	..	192	,,	—
26	2	26	15 ,,	303	6 ,,	Quin. & pit. 4th day, pit. 7th day	172	,,	Negative blood œstrogen test.
25	?	28	15 ,,	320	5 ,,	Pit. 4th day, quin. & pit. 7th day	..	Failure	Pain and bleeding at 100 hours, negative blood œstrogen test.
39	4	28	12 ,,	10	3 ,,	..	72	Success	Dilatation of cervix, quinine on 2 previous occasions had failed.
22	4	32	10 ,,	420	7 ,,	Quin. & pit. 7th day	180	,,	—
23	0	35	9 ,,	160	3 ,,	..	66	,,	Negative blood œstrogen test.
32	0	33	8 ,,	140	4 ,,	..	80	,,	—
31	2	28	6 ,,	12	3 ,,	Quin. & pit. 4th day	100	,,	Malaria treated with quinine killed fœtus
?	2	33	5 ,,	10	1 dose only	..	3	,,	Negative blood œstrogen test.
20	0	31	3 ,,	4	2 days	Ol. ric. 5th day	138	,,	Twins, eclampsia, negative blood œstrogen test.
29	2	34	2 ,,	340	6 ,,	..	168	,,	Mitral stenosis, negative blood œstrogen test.
20	0	32	2 ,,	300	5 ,,	Pit. 5th day	144	,,	—
23	?	35	4 days	200	5 ,,	Pit. 3rd day, ol. ric. 4th day	100	,,	—

* Time counted from first dose of œstrogens.

TABLE III—ŒSTRADIOL BENZOATE

25	0	32	18 weeks	18	3 days	Quin. & pit. 1st day and 3rd day	80	? Success	Dilatation of cervix and pack 24 hours before œstrin
31	0	30	16 ,,	96	8 ,,	Quin. & pit. 6th day, ergometrine	200	Success	Anencephalus, meningocele, negative blood œstrogen test
?	0	36	12 ,,	76	7 ,,	Pit. with each injection	144	,,	—
36	4	24	12 ,,	92	8 ,,	Quin. & pit. 5th day	..	Failure	Show and pain at 100 hours
28	2	28	12 ,,	104	9 ,,	Quin. & pit. 5th day	..	,,	Show and pain.
25	0	40	12 ,,	42	4 ,,	Quin. & pit.	72	Success	—
35	4	21	11 ,,	64	10 ,,	Quin. & pit. 5th day and 7th day	..	Failure	Positive blood œstrogen test.
23	?	20	10 ,,	174	10 ,,	Pit.	..	,,	Taylor's bag also failed.
41	6	36	10 ,,	20	3 ,,	..	50	Success	Toxæmia
?	1 ab	25	7 ,,	20	3 ,,	Quin. & pit. 4th day	..	Failure	Bleeding at 100 hours.
40	9	32	6 ,,	12	1 day	..	15	Success	Slight postpartum hæmorrhage.
30	1	34	6 ,,	48	4 days	..	90	,,	Negative blood œstrogen test
28	1	34	6 ,,	80	7 ,,	Ol. ric., quin. 8th day	220	,,	Toxæmia, negative blood œstrogen test
35	2	34	5 ,,	52	5 ,,	..	96	,,	Toxæmia, negative blood œstrogen test
34	0	40	5 ,,	46	7 ,,	Quin. & pit. 7th day	168	,,	—
29	?	24	4 ,,	20	2 ,,	..	36	,,	Negative blood œstrogen test.
32	0	42	4 ,,	4	one injection	..	Immediate	,,	Toxæmia
37	5	32	3 ,,	40	2 days	..	40	,,	—
36	0	38	2 ,,	12	2 ,,	..	36	,,	Toxæmia
35	0	34	2 ,,	80	7 ,,	Quin. 6th day	148	,,	Toxæmia, positive blood œstrogen test
40	8	?40	2 ,,	6	2 ,,	..	36	,,	General ill health
23	0	35	1 week	24	2 ,,	..	48	,,	Toxæmia
24	0	38	1 ,,	10	1 day	..	4	,,	—
32	0	38	1 ,,	16	1 ,,	..	5	,,	Toxæmia
27	1	38	1 ,,	80	7 days	Quin. 6th day	148	,,	Previous quin. induction killed fœtus
33	2	34	1 ,,	24	2 ,,	..	36	,,	—
37	0	33	1 ,,	6	1 day	..	24	,,	Toxæmia
35	3	?39	3-4 days	64	6 days	Quin. & pit.	120	,,	Diabetes, negative blood œstrogen test
?	1	39	3-4 ,,	4	1 day	..	10	,,	Placenta prævia
40	6	33	3-4 ,,	84	7 days	Quin. & pit. 5th day	336	Failure	Toxæmia and valvular disease of the heart; pains on 7th day but passed off; onset of labour too late to be regarded as successfully induced

* Time counted from first dose of œstrogens.

TABLE IV—STILBŒSTROL

38	12	34	14 weeks	105	7 days	Quin. & pit. 5th day	144	Success	—
26	1	23	13 ,,	18	6 ,,	Quin. & pit. 5th day	144	,,	—
34	4	27	12 ,,	8	2 ,,	..	50	,,	Cervical polyp.
26	4	29	11 ,,	105	7 ,,	Quin. & pit. 5th day	144	,,	—
32	1	32	6 ,,	45	5 ,,	Quin. 4th day	120	,,	—
24	0	37	2 ,,	90	6 ,,	Quin. & pit. 5th day	144	,,	—
33	2	37	1 ,,	24	2 ,,	..	48	,,	Diabetes
42	0	41	1 ,,	55	..	..	54	,,	Placenta retained for a few hours, no bleeding
24	0	36	1 ,,	30	2 days	..	36	,,	Toxæmia
40	6	30	?	40	1 day	..	10	,,	—
24	0	40	3-4 days	80	6 days	..	144	,,	Hydrocephalus

* Time counted from first dose of œstrogens.

in the blood-stream by some mechanism operating during pregnancy. Nevertheless, when the products of conception die, the placenta ceases to produce not only œstrogens but also progesterone. This conjecture is substantiated by the recent work of Browne et al. (1939), who found a gross fall in the output of pregnandiol in missed abortion. The uterus then is released from the all-powerful influence of progesterone and can react to œstrogens by expelling the dead products of conception. Hormone induction of abortion or labour when the fœtus is dead is therefore possible in a large percentage of cases; the technique is easy and the subsequent evacuation of the uterus unattended by complications. The results justify the adoption of this method as the standard treatment in these cases.

SUMMARY

(1) Intra-uterine death of the products of conception is followed by a decrease in the amount of œstrogens in the blood-stream. Administration of œstrogens to patients with missed abortion and missed labour so increases the sensitivity of the uterus that its evacuation is usually promoted.

(2) The method of induction described here was successful in 48 out of 55 consecutive cases. Expulsion of the products of conception was free from complications such as uterine hæmorrhage and infection.

(3) The rationale of the use of œstrogens in these cases is discussed. The routine adoption of this medicinal method of induction should make surgical intervention, with its attendant risks, rarely necessary.

The following proprietary œstrogenic preparations were used: Œstroform, Œstroform B. (British Drug Houses), Progynon B. (Scherings), Dimenformone (Organon), Stilbœstrol (British Drug Houses), Syntestrin (Gedeon Richter). I am indebted to these firms for their various products, which were supplied free or at reduced cost. Most of the patients were treated in the Liverpool Maternity and Women's Hospitals, and I am grateful to colleagues on the staffs of these hospitals for permission to direct the treatment and to record the results.

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RADIUM AND RADON

BIOLOGICAL REACTIONS COMPARED

BY S. RUSS AND G. M. SCOTT

(*From the Barnato Joel Laboratories at the Middlesex Hospital, London*)

THOSE who have consistently used radium in treatment are apt to question how far it is possible to substitute radon for radium, in view of the significant change in strength of radon with the length of treatment. This question became important last September, when radium all over the country was put into safe custody; radon quickly became available, but no doubt some have refrained from using it because of uncertainty about how far it can take the place of radium.

In 1932 we investigated the action of radium on the ovary of the rabbit,[1] and it now seemed worth while to repeat the experiments with radon. These experiments could be duplicated only in the sense that equal physical doses of radiation could be given. This can be done in one of two ways: either the initial quantity of radon can be increased, according to the equation

$$Q_o(1-e^{-\lambda t}) = \lambda Qt,$$

where Q is the number of milligrammes of radium, Q_o the number of millicuries of radon, and $\lambda = 0{\cdot}18$ day^{-1}, the length of treatment (t) being kept the same; or the time of treatment may be extended to T, the quantity Q being kept the same, according to the equation

$$Q(1-e^{-\lambda T}) = \lambda Qt.$$

We chose prolonging the time of treatment to compensate for the decline in the strength of the radon rather than increasing the initial strength of the source.

The initial strength of the radon source was 6 millicuries, and it was left in situ for 11·1 days, the corresponding interval with 6 mg. of radium element being 4·8 days. So the question narrows down to whether there is any significant change in the reactions of the ovary of the rabbit when irradiated with radium and with radon, the initial sources being of the same strength but the time of exposure lengthened from 4·8 to 11·1 days. (The Paris technique for the treatment of cervical cancer with radium extends over 5 days.) Complete details of the technique adopted need hardly be given here; it is enough to say that radon in platinum tubes was stitched on either side of a rabbit's ovary and removed after 11·1 days. The rabbit was allowed to live for another six weeks; it was then killed, and the ovaries were removed for examination. In two rabbits the radiation was screened by 0·6 mm. of platinum; in a third the screenage was 0·3 mm. of platinum.

The sections prepared showed that extensive damage had been done to the irradiated ovaries. In the rabbits in which 0·6 mm. platinum screens were used, the extent and degree of this damage could not be distinguished from that produced by the same dose of radium with the same screen. When the screen was 0·3 mm., the resulting damage appeared to be rather greater than that caused by radium under the same conditions; it is likely that this difference in the effects produced by radon and by radium is due to the extra degree of screening brought about by the radium itself inside the platinum container. A radium salt within a platinum tube is a little more screened than a radon source inside a similar tube.

SUMMARY

Experiments previously carried out on the action of radium on the rabbit's ovary were repeated with radon. On the whole the effects produced were remarkably similar.

1. Russ, S. and Scott, G. M. *Brit. J. Radiol.* 1932, **5**, 814.

The Lancet 100 Years Ago

June 6, 1840, *p.* 371.

From the evidence of Sir Richard Dobson *before a Royal Commission:*

Do you think it would be of great advantage to the service, if, instead of calling those gentlemen physicians, they were called surgeons of the fleet?—Most unquestionably, because, after a battle, those gentlemen who are physicians of the fleet will not use any instrument, and never do. As the thing is at present, a physician to the fleet has his right hand tied behind his back, it being incompatible with his title to operate. . . . Without meaning the slightest disrespect to any man on the list of physicians, I can say that if there be any blockheads amongst the surgeons of the navy there is not one who is so great a blockhead as to think himself not perfectly well qualified for the duties of a physician; but when physicians would have the operations of an hospital to perform they would rather feel their disqualification. I am of opinion that a hospital surgeon ought to be higher paid than a physician, inasmuch as his duties are more laborious, and neither less difficult nor requiring inferior qualifications. At all events, if a surgeon blunder, it is seen; a physician may prescribe wrong, but there is no testimony of it.

In consequence of the evidence of Sir R. DOBSON, and of other witnesses, the commission have recommended "that the rank of physician should be abolished in the naval service."

REVIEWS OF BOOKS

On Oxidation, Fermentation, Vitamins, Health and Disease

By ALBERT v. SZENT-GYÖRGYI, M.D., Ph.D., Prix Nobel, professor of medical and organic chemistry, University of Szeged. London: Baillière, Tindall and Cox. 1939. Pp. 109. 11s.

THESE five Abraham Flexner lectures will make absorbing reading for the research worker, the medical man, the student or the intelligent layman. Much of the charm of the spoken word is maintained and the pages are enlivened by the author's whimsical humour. Professor Szent-Györgyi is a man of vision; not befogged by a mass of intricate details, he can see through and beyond them to fundamental concepts and can glimpse something of the true pattern of that state we call "life." For this reason the first and last lectures are the most stimulating and enjoyable. In the first we are led easily and gently but competently to the underlying principles of biological oxidation. The life of the cell (and thus of the whole body) is not a question of oxygen but of hydrogen. "Life knows but one fuel, H, which is the great fuel of life." How this is so, the story of the transfer of hydrogen from substance to substance, and the meaning of this in terms of energy, are explained with admirable lucidity. The final lecture on vitamins, health and disease is an example both of the simplicity and the daringness of your man of vision and contains much wisdom. The most difficult lecture is the second, on the respiration of muscle. Here the author, starting at the end of the story (oxygen) works backwards, seeking to follow the steps taken by hydrogen in its amazing journeyings. A great deal of this concerns work by the author himself and his colleagues; evidence is accumulating that the sequence worked out by them probably pictures the actual facts. A simple additional diagram might have helped.

The section most open to criticism is probably that on the oxidation and resynthesis of lactic acid. Here we are not told that in mammalian muscle no evidence has yet been obtained that lactic acid is resynthesised to glycogen except via the liver (Cori cycle). For this and other reasons it is difficult at present to accept the attractive suggestion that a third of each molecule of lactic acid is oxidised (rather than a third of the number of molecules) and the rest converted to a biose which can be polymerised to a hexose. The lecture on vegetable oxidation systems, with the frequent references in other parts of the book to the underlying unity of plant and animal life, is particularly welcome. This should be a sufficient reply to those students who resent being taught any facts of plant physiology on the score that they are a waste of time.

It is a pity that the book is so expensive, for it should be widely read. Those who do read it will undoubtedly enjoy it.

Poisons: Their Isolation and Identification

By FRANK BAMFORD, B.Sc., late director of the Medico-Legal Laboratory, Cairo. London: J. and A. Churchill. 1940. Pp. 344. 18s.

THERE is an evident need for a short book by a practical toxicologist to bridge the gap between the appendices of textbooks of forensic medicine and the comprehensive Autenrieth's "Detection of Poisons." This is what Bamford has set out to supply and he has contrived to catalogue the laboratory tests for the identification of poisons in a way that makes arresting reading. The approach is strictly practical, the text being packed with valuable tips and asides, and a sound balance is struck between theory and bench work. The book is comprehensive enough for all ordinary purposes, and includes a small masterpiece on the isolation and identification of the alkaloids. Sections on toxalbumins, poisonous plants, the sulphonamides and fur dyes are added, together with a chapter on the drugs of addiction. Here and in other chapters one finds evidence of the limitations of practice in Cairo—Bamford confesses to never having seen a fatal case of aspirin poisoning. He is wise enough, however, to describe in detail many recently described tests he thinks worth trying with their references at the foot of the page. Every analyst has his own fancies in analytical method, and it would be unfair to criticise Bamford's likings, for he provides plenty of alternatives. What is most remarkable is the absence of errors in a book so packed with figures.

This is an attractive laboratory manual whose pages will be well thumbed by many a chemist as well as the professional forensic analyst.

Physiological Basis of Medical Practice

(2nd ed.) By C. H. BEST, M.D., D.Sc. Lond., F.R.S., professor and head of the department of physiology in the University of Toronto; and N. B. TAYLOR, M.D., F.R.S., professor of physiology in the university. London: Baillière, Tindall and Cox. 1939. Pp. 1872. 55s.

THIS book requires no introduction. The most striking change in the second edition is the inclusion of an entirely new section on the special senses. This makes the whole a more complete textbook of physiology but the reader gets the impression that the authors have not brought quite the same enthusiasm to bear on this section as on the original parts of the book. The chapters on the eye contain the information of an orthodox textbook of physiology and retain an undue number of the so-called "laws"—theories and formulæ which have a very limited application even in the laboratory. The section on the ear contains a good account of cochlear potentials and an impartial presentation of the evidence for the telephone and resonance theories. Taste and smell receive adequate attention. The whole section is written in lucid style but some of the terminology—e.g., extensity, dendate, entoptic—is a little strange to readers in this country. The original sections have been revised without any disturbance of their arrangement and most of the alterations are limited to sentences or short paragraphs, with the result that the number of pages is almost unchanged.

Compendium of Regional Diagnosis in Lesions of the Brain and Spinal Cord

(11th ed.) By ROBERT BING, professor of neurology, University of Basel, Switzerland. London: Henry Kimpton. 1940. Pp. 292. 25s.

Professor Bing's *Kompendium* is well known in its original form in this country, but this translation by Professor Haymaker will greatly extend its public. Although it is not a book of exact neuroanatomy or detailed neurophysiology the localisation of lesions in the nervous system is approached through the medium of anatomy and physiology. The application of these exact sciences to clinical neurology calls for selection and interpretation which lay the author open to the censure of the purist. But the book is not intended for the critical expert; it is written to introduce clinical neurology to the student, who in the past has been deterred by the German text. Professor Hay-

maker has made a free translation and by altering the structure of some parts of the book has made it extremely readable; even such difficult sections as that on the aphasias are lucid. Only the section on radiography seems inadequate and ill-balanced. The lay-out, clearly-marked diagrams and the absence of references make for simplicity, and the use of tabulation and varying size of type makes selection easy.

Statistical Methods for Medical and Biological Students

By GUNNAR DAHLBERG, M.D., LL.D., professor at the University of Uppsala; head of the Swedish State Institute for Human Genetics and Race Biology. London: George Allen and Unwin. 1940. Pp. 232. 10*s.* 6*d.*

MOST authors of textbooks or papers dealing with statistical methods in medicine open with the expression of a belief that the average medical worker has little knowledge, and less love, of mathematics, and affirm that if he will go with them he shall not be disturbed. The premise is certainly reasonable; the promise, with rare exceptions, is not kept. It is all a question of degree. What seems so easy and non-mathematical to the expert is nothing of the sort to many a poor ignorant reader. Professor Dahlberg is no exception. The algebra he finds it necessary to introduce is not difficult but the symbolism is there and makes it look as if it were—and often that is quite enough for those who are shy of such signs. The introduction, too, without explanation of such terms as exponential function and parameter is not encouraging to the beginner. In describing the line of thought behind statistical methods Dr. Dahlberg is on happier, but rather dull, ground; possibly his book has lost in the translating. In general this "attempt at a compromise between the demands of the mathematical statistician and the mathematical limitations of the medical and biological student" has not been very successful. The more advanced medical student is already well provided and would gain little more here, the average doctor would certainly find it difficult and probably uninspiring.

Cardiovascular-renal Disease

A Clinicopathologic Correlation Study Emphasising the Importance of Ophthalmoscopy. By LAWRENCE W. SMITH, M.D., professor of pathology; EDWARD WEISS, M.D., professor of clinical medicine; WALTER I. LILLIE, M.D., professor of ophthalmology; FRANK W. KONZELMANN, M.D., professor of clinical pathology; and EDWIN S. GAULT, M.D., associate professor of pathology; all of Temple University school of medicine. London: D. Appleton-Century Company. 1940. Pp. 227. 20*s.*

THIS most readable monograph, based on the material awarded the Frank Billings gold medal at the Scientific Exhibition of the American Medical Association in 1938, is a laudable attempt to clarify the present state of our knowledge about cardiovascular-renal disease. Dealing in turn with essential hypertension, senile atherosclerosis, nephritis and nephrosis (this last heading, rather curiously, including the toxæmias of pregnancy and pyelonephritis), it gives a clear outline of present views on pathogenesis and clinical and pathological features, each condition being illustrated by one or two well-documented case-reports. Particular attention is paid throughout to the ophthalmological findings. The process of simplification has led to certain as yet unjustified assumptions. There is a tendency to ascribe more importance to the renal factor in essential hypertension than seems to be warranted, while the status of malignant hypertension as outlined by the authors is far from satisfactory, and even such an authoritative monograph as this cannot be quite up to date; for instance, on the question of the relationship of the suprarenals to the hypertension of experimental renal ischæmia.

Food Control: its Public Health Aspects

By JAMES HOUSTON SCHRADER, Ph.D., formerly director, bureau of chemistry and food, Baltimore Health Department; instructor in biochemistry, Johns Hopkins University. London: Chapman and Hall. 1939. Pp. 513. 24*s.*

THE aim of this book is to give the reader a broad comprehension of why food control is necessary, what industrial practices are concerned in such control and how control measures are applied. On the whole it has succeeded, but the subject is so wide that no one section can be comprehensive in full detail. The various foods are considered separately, and so are the different types of preservation, such as canning, refrigeration and drying. Each subject is discussed on a definite plan—technology, relation to public health, including nutritional value, dietary importance, bacteriology, sources of infection and epidemiology, and measures of control. The control measures are confined to those adopted and legal in the United States, so also are the various bacteriological methods and standards. The literature quoted is largely confined to work done in that country and a good deal of valuable work done in Great Britain and on the Continent is ignored. For example, no mention is made of the long investigations carried out year by year by the English Food Investigation Board.

The book is up to date and on the whole accurate, but it may be said that the definition of food-poisoning given would exclude outbreaks due to living salmonella organisms; botulism and diphtheria are never carried by water, not "rarely" as stated; to use as small an amount as 1 millilitre of pasteurised milk in expressing the *B. coli* content is rather absurd, and the maximum limit for tin in foods is not 2 grains per pound in England, since there is no limit fixed. Nevertheless, for those who need a wide survey of food control and its dangers the book can be strongly recommended. It is well printed and written in a clear and unambiguous way.

Cancer in Childhood

Edited by HAROLD W. DARGEON, M.D., F.A.A.P., instructor in pediatrics, College of Physicians and Surgeons, Columbia University. London: Henry Kimpton. 1940. Pp. 114. 15*s.*

THIS depressing book, compiled by Dr. Dargeon with the help of ten colleagues, deals with malignant disease in the young but also touches on certain benign tumours and mentions the leukæmias and certain types of nævus. Most of the articles have already been published in the *Journal of Pediatrics,* and Dr. James Ewing contributes a valuable critical review as an introduction. It comes as a shock to learn that in 1936 malignant disease caused more deaths in New York city in children than whooping-cough and nearly as many as scarlet fever. Some of the contributions are inferior in quality. What is the evidence for this statement, for example? "Although malignant tumours of the penis do not occur in children, precancerous changes undoubtedly take place before the age of 10 years in a certain proportion of boys who have tight prepuces." From this it is argued that "complete protection" can only be provided by early circumcision.

For reference purposes this symposium probably fills a gap and we learn that a legacy will make it possible to distribute free copies to certain libraries.

THE LANCET

LONDON: SATURDAY, JUNE 8, 1940

THE INJURED WORKMAN

In the case of Donoghue *v.* Stevenson (1932) Lord ATKIN said, "I do not think so ill of our jurisprudence as to suppose that its principles are so remote from the needs of a civilised society as to deny a legal remedy where there is so obviously a social wrong." The social conscience is becoming increasingly sensitive to the spectacle of an industrial worker disabled by accident at his work; we can no longer treat such incidents as the private concern of the workman and his employer. For some time past the legislatures of civilised states have attempted to devise means whereby the injured worker can secure relief, but there is still an infinite variety in the kind of relief offered and the means of obtaining it. In this country Parliament began to intervene in 1882, and in 1897 the first Workmen's Compensation Act was put on the statute book. Many amending acts have since been passed, and there have been Government inquiries, notably that conducted by HOLMAN GREGORY with its comprehensive report of 1920 in which it was recommended that insurance against employers' liability should be compulsory, that the administration of the various acts should be vested in a commissioner with local representatives, that the employer should be made liable for the costs of treatment, that inquiry should be made into arrangements for training partially disabled men for suitable work, and that registrars of county courts should be given authority to advise injured workmen about their rights. None of these proposals has been adopted, except to a limited extent and in the face of bitter opposition. Now at last we have a Royal Commission sitting, with wide terms of reference, to advise on the arrangements for dealing with industrial accidents, including industrial disease; the hearing of evidence began in February, 1939, and although the sittings of the commission were suspended at the outbreak of the present war, they were later resumed. Government departments have provided valuable data; representatives of employers, workmen, insurance companies, and public-utility bodies have given their views; the experience of France, Germany, and the United States has been put in: the Royal College of Surgeons of England has a member of its council on the commission; the Royal College of Physicians of London has tendered evidence prepared by a committee of experts; others have spoken on behalf of hospitals and medical societies having special contacts with problems of industrial medicine.

It is possible to trace certain trends of thought in the published evidence which already covers over a thousand foolscap pages. The injured workman cannot be left to get what he can out of his employer; his restoration in mind, body and estate concerns the community at large and is as much a social service as is health insurance, unemployment assistance, or any other scheme for the relief of destitution and loss of earning capacity. There is obviously a strong demand for more state control, for an increase in the rates of benefit, and for protection of the workman against the insolvency of his employer. Equally obvious is the dissatisfaction with the present system of allowing disputes on medical questions to be settled by a single medical referee from whose decision there is no appeal, or by taking such cases to court. Approval has been given to the simple informal procedure of the Unemployment Assistance Board in adjusting claims. The College of Physicians has reasonably pleaded that purely medical issues should be settled by medical machinery. Each county court should have its medical board presided over by a part-time local consultant well versed in local industrial conditions. The board would receive medical reports, examine the workman and submit its opinion in writing to the judge. There would then be no devastating conflict of medical opinion in open court and no lengthy litigation to keep the workman's mind on edge. And the physicians' evidence dealt too with the all-important question of rehabilitation. No-one is content with the present facilities for treatment; one side of the question has been well ventilated in a recent report on the handling of fractures. There are, it is true, rehabilitation centres in certain districts but any statesmanlike scheme to restore the workman to full working capacity implies coöperation everywhere between the factory, the panel practitioner, the hospital and the rehabilitation centre. After many injuries the general condition of the patient deteriorates while he is in hospital; without special treatment in the form of suitable medical exercises or of light work under supervision he will not regain his normal working capacity. A wide scheme of social service is essential to guide the workman and assist in the coördination of his treatment.

Payment of a lump sum by way of compensation for an injury has come in for criticism; although such payments are popular with employer, workmen and insurance companies, experience has shown that they seldom confer any lasting benefit on the recipient and are often quite inadequate to meet the needs of a man who is permanently disabled. Trade-unions are emphatic that compensation should be a charge on the employer alone and that the workman in particular should not be asked to contribute; against this view is the full weight of national health insurance, in which the funds are provided by small weekly payments from employer, workman and state. In their evidence WILSON and LEVY, extending their published study of 1939, showed that the incidence of industrial accidents varies only within narrow limits from year to year and may fairly be classed as a risk

suitable to be covered by a fixed rate of insurance. Time presses and the situation seemed so urgent in one direction that the Government brought in a bill to grant supplementary allowances for meeting cases of hardship; but although the scales were drawn up after discussion with representatives of industry the bill had a stormy reception in the House of Commons. One crumb of comfort is the likelihood that the pecuniary rate of compensation will soon be raised by one third. Another is that the Royal Commission, which had again postponed its labours, is to resume its sessions on June 20, and it is right that no effort should be spared to eliminate that most tragic of all kinds of waste—the relegation to the scrap-heap of a man who has fallen victim to the ever-increasing peril of the industrial machine but who can be restored, not by litigation but by perseverance, to his place in the body politic. The last few weeks have seen many a short cut to efficiency in national affairs. Industrial rehabilitation would be a not unworthy task for a Minister of State with plenary powers.

THE SURGICAL LESSONS OF HEAVY FIGHTING

THE basic principles of war surgery are simple, but their application must depend on circumstances. Excision, drainage and immobilisation are the basis of all wound treatment, but excision is properly limited to wounds seen before infection is established, and is highly dangerous once the inflammatory reaction of the tissues has been set in train. The application of these principles will vary in detail with the number and condition of the wounded, the nature of the battlefield, the adequacy of transport, and the experience and equipment of the medical services. During the quiet intervals of stationary warfare the majority of wounds will be excised while they are still uninfected. A proportion of these will be sewn up and kept at the casualty clearing station till they are healed. The after-treatment, particularly with regard to whether splinting is adopted or not and the method employed, will be adapted to the needs of the case with the aim of attaining the best restoration of function at the earliest time. In heavy fighting with movement, particularly when all communications are harassed by enemy activity and strained to their limits, the wounded will arrive in large numbers, dirty, tired, hungry and thirsty, often several days after they were hit. The aim of surgery then is to treat the maximum number of men with the one object of saving life and limb, and ensuring their safe transport afterwards with the minimum of attention. Under such conditions the method of wide drainage and fixation in plaster-of-paris is supreme. "The one advantage of plaster over any other method of fixation, and in certain circumstances it is an overwhelming one, is that it is fool-proof. Once a wounded man has undergone efficient surgical treatment and has been put in plaster, he is safe—he may be blown out of an ambulance, derailed in a train, crashed in an aeroplane or torpedoed at sea, he may be left for weeks in a cellar . . . but so long as his plaster holds he will come to no harm. This assurance is of such immense value to the medical services of an army that where the conditions of transport seem likely to be harassed the plaster method seems bound to find favour. . . ." These sentences from Mr. OGILVIE's concluding article of our symposium on wound infection were in type before the B.E.F. began its withdrawal. In the last few weeks the medical services in Flanders have struggled to do their work under incredible difficulties. Under these conditions the closed plaster method which served the French in beleaguered Paris in 1870 and again during the defence of Verdun in 1916, and which saved countless lives in the army of Republican Spain, has come into its own. In heavy fighting the method has many advantages. It greatly simplifies the supply and distribution of splints, for a stock of plaster bandages does the work of apparatus of many types, each of which must be kept in several sizes. The weight of such a stock may be greater than that of the splints it replaces, but its bulk is less. A well-made plaster case ensures absolute immobility under all conditions, and does not require a skilled personnel to do so, for there is no adjustment of straps or extension cords, no slinging of the splint or choice of special positions. Further, it implies a sealed dressing that cannot be changed without removing the plaster, and thus protects a man who has escaped the primary dangers of anaerobic infection from the risks of a secondary streptococcal contamination. It is applicable to all wounds that have been adequately excised, and is contra-indicated only when damaged tissue that may undergo necrosis remains in the wound, or where there is any vascular damage.

The wounded have now reached England in sufficient numbers to warrant certain conclusions on the general questions raised in the symposium. It is evident that the warning expressed about the dangers of primary suture was not inopportune. The men who were treated by débridement, packing and immobilisation have stood the journey well and landed in excellent condition, in sharp contrast to the few that were sutured and have arrived with grave infections demanding instant surgery. It is necessary to emphasise this danger, for under the conditions of urgent evacuation many casualties must receive their first surgical treatment in hospitals where there is no surgeon with experience of the last war or first-hand knowledge of the ghastly potentialities of infection that lurk in every shell wound. Primary suture of an excised war wound is always an experiment, one only to be undertaken by those with an extensive experience of débridement, and then only in selected cases that can be kept under observation till they are healed. It should never be attempted in cases that must be evacuated, and at times of stress such as the present it is almost criminal. It must also be repeated that in infected wounds any surgical interference beyond the minimum necessary to establish free

drainage and remove absolutely dead tissue and accessible foreign bodies is fraught with the gravest danger of disseminating an infection hitherto localised. It seems clear that the condition of the men who have received no surgical treatment and have reached England anything from two to six days after being wounded is better than could have been anticipated, and far better than that of men evacuated under similar circumstances during the great German attack over the same country in March, 1918. Some have severe infection and even gas gangrene, but many wounds of the knee-joint, gunshot fractures of the femur and lacerations of the buttock, treated by no more than field dressings and splints, have arrived in excellent condition with no more than minor infection. The conclusion seems inescapable that the course of sulphanilamide they have all received in France is responsible for this gratifying and unexpected result. The advantage of plaster-of-paris for immobilising wounds under conditions where transport may be rough and hazardous, where skilled attention and even food may be lacking for long periods, has been demonstrated beyond question. The contrast between the comfort and freedom from pain and the condition of the wound in those who were put in plaster on the other side of the Channel and those who travelled in gutter or skeletal splints has been most striking. Further, many of those who were in pain and had a raised temperature on arrival have become comfortable and apyrexial within 48 hours of a plaster being applied, even though nothing more has been done to their wounds than to change the dressings.

The fighting of May, 1940, then, has taught the medical services lessons that will greatly benefit our wounded in the future: that wounds without laceration will often arrive in good condition at a hospital many miles away if they are dressed, given sulphanilamide and immobilised, while even severe wounds that are excised, packed with vaseline gauze and fixed in a well-made plaster case can if necessary be sent long distances by improvised transport in safety and comfort.

MICE AND MEN

SINCE the time when BEHRING prepared diphtheria antitoxin and EHRLICH salvarsan it has become a recognised practice to assess the therapeutic value of any new remedy on suitable animals before using it in man. And this practice has been justified a thousandfold, not only as a trial of therapeutic efficiency but also in discovering the pharmacology and toxicity of the test substance. Another argument, which appeals particularly to the statistician, is that planned experiments with a sufficient number of test-objects to give a mathematically reliable answer can be carried out on animals in a way which would be impossible or too time-consuming with human material. Breeding at an enormous rate, occupying relatively little space, consuming minimum quantities of food, able to be manipulated with relatively little risk to the experimentor of a lacerating or penetrating wound from claw or tooth, mice are ideal laboratory animals which can be handled in numbers large enough to satisfy even the most exacting statistician. For chemotherapeutic assessment the mouse, being susceptible to hæmolytic streptococci, has proved the efficiency of prontosil, sulphanilamide and sulphapyridine and has differentiated the last from the other two compounds by demonstrating its potency against the pneumococcus. More difficult than these assessments was the preliminary work with the meningococcus, yet here again the sensibly planned animal work has been triumphantly confirmed in man and by analogy extended to the treatment of human infection by the closely related gonococcus. Nevertheless, since it is rarely possible to fulfil the rigid postulates of KOCH and reproduce an exact human disease in a lower animal by inoculation of a specific organism, the difficulties and dangers of applying results from mice to men must never be minimised. In particular, caution is required where the human pathogen has only a low virulence for the experimental animal so that enormous doses are required to kill it, or where the pathology of the animal infection bears no resemblance to the human disease. As an instance, the bacteria which cause the enteric fevers are mostly poorly virulent for the mouse and do not reproduce an experimental infection at all resembling typhoid fever; yet the treatment of the human disease with the sulphonamides has been advocated on the basis of results obtained by animal experiment. In less degree, criticism might be made of the clinical application of results obtained from the intraperitoneal infection of mice with the staphylococcus and the gas-gangrene group of organisms.

Difficulties also arise in assessing the toxicity of a drug from animal experiment. To take again the sulphonamide group as an example, lower animals tolerate these drugs well. The curative dose for mice infected with *Streptococcus pyogenes* or the pneumococcus would be the equivalent of 150 g. daily for a man. And though in man a dose of as little as 3 g. daily may produce definite toxic effects these mostly show themselves in the blood, and there have been no reports of the degenerative changes in the central nervous system which HAWKING [1] demonstrated when massive doses are given to lower animals. Because of the value of sulphanilamide in puerperal sepsis there has always been a temptation to use the drug prophylactically for every woman in labour. COLEBROOK [2] as long ago as 1937 gave it as his considered opinion that such wholesale prophylaxis was undesirable though it was justifiable to use the drug whenever there was sound reason to anticipate puerperal sepsis, for example, in any case delivered with much instrumental interference or in bad surroundings. Similarly, it can and should be used in the treatment of pyelitis of pregnancy.

1. Hawking, F. *Lancet*, 1937, **2**, 1019.
2. Colebrook, L., *Ibid* p. 286.

Because this is so firmly accepted, one could forecast with confidence the effect on a pregnant woman and the fœtus of the relatively large doses which SPEERT[3] administered to pregnant rats throughout the whole period of gestation. No human mother could expect to survive such a course. When rats were fed throughout gestation with sulphanilamide in amounts sufficient to give blood-concentrations of 24 to 36 mg. per 100 c.cm. deleterious effects—intra-uterine and postnatal mortality, decreased litter size and birth weight, and selective stunting of growth—were produced in the offspring. These conditions have no counterpart in the treatment of human infection during or at the end of pregnancy, so that there seems no justification for the author's conclusion, repeated editorially by the *Journal of the American Medical Association*,[4] that until the effects of sulphanilamide on the human fœtus are better known the drug should be administered with extreme caution during pregnancy. Common sense as well as caution is required in the interpretation of animal experiment and its application to man.

3. Speert, H. *Bull. Johns Hopk. Hosp.* March, 1940, p. 139.

4. March 30, 1940, p. 1271.

ANNOTATIONS

BOMB CONCUSSION AND THE EAR

MANY of the casualties now reaching this country are suffering from rupture of the ear drums, and this condition is likely to be common as a result of intensive bombing on the scale experienced in Flanders. In civilian practice a ruptured tympanic membrane is not as a rule accompanied or followed by infection of the middle ear, but the risk of infection is much greater under war conditions where dirt and fatigue play important rôles. Infection apart, large tears may not heal completely and a permanent perforation is undoubtedly a disability which may be troublesome at any time, as well as a cause of deafness. Concussion also affects the inner ear, especially the cochlea. It is most often conveyed by the external auditory meatus and transmitted through the tympanic membrane and tympanum. Quite severe inner-ear disturbances can occur without apparent injury to the drum and are probably produced by violence carried to the oval window by the ossicular chain. The deafness following such injury is usually only temporary, lasting a few hours or days, but it may be permanent. Audiometric investigations show it to be of the nerve or high-bone type with a sudden drop in the curve at about a frequency of 2048 d.v. (the c^4 fork). A considerable personal factor is present: some people seem to be unaffected by prolonged heavy gunfire while others are permanently deafened by a single detonation. In addition to these organic lesions psychoneurotic and even psychotic symptoms are not infrequent sequelæ.

Protection against aural concussion would therefore prevent much suffering and disablement. Some form of occlusion of the external meatus has been practised for many years. A letter in THE LANCET of Aug. 11, 1866, contained the information that in France cotton-wool plugs were used at rifle practice. This example has been intermittently followed to the present day, and certain refinements have been introduced. In 1918 Guild[1] maintained that cotton-wool impregnated with vaseline is the most effective protective device. Other materials have their advantages and disadvantages. Plasticine tends to break away and leave debris in the meatus. Rubber and vulcanite plugs shaped like halma men are made in different sizes, but the former are sometimes difficult to remove and the latter cannot always be made to fit tortuous and narrow channels. Other obvious means of protection are metal flaps attached to the steel helmet or a modified "scrum-cap" incorporating a metal shield. All these methods of what might be called total protection have the disadvantage of cutting off the protected person from aural communication. No doubt this could be overcome by a system of signals, and indeed the objection may not be of much military importance if the explosions are occurring at frequent intervals. There is no obvious reason why the civil population should not use such a device, and it would do something to counteract the sirens and whistles said to be used by German dive-bombers. In the last war certain naval units were issued with vulcanite plugs through the middle of which a hole about an eighth of an inch in diameter was bored. The protection against concussion was considered to be adequate, and considerable hearing was still possible. However, these plugs expose the inner ear to continuous loud noise and thus may possibly lead to deafness. The blast from a near-by explosion is probably partly conveyed through the bones of the skull and against this it is difficult to conceive an appropriate method of protection.

1. Guild, S. R. *Anat. Rec.* 1918, **15**, 36.

THE LATENT PERIOD IN CARCINOGENESIS

ACCORDING to experimental data the shortest known interval between the first application of a carcinogenic chemical to the skin of mice and the appearance of a tumour is 31 days; the longest is a matter of years. The latent interval may include a considerable lapse of time between the last application of the chemical or physical agent and the appearance of the tumour —in man as much as 30 years. The whole period is often referred to as the precancerous stage. While this description is true of a minute fraction, perhaps only one cell, in the treated area, it cannot with certainty be said to apply to every part reached by the carcinogenic chemical. As a rule one or at most a few tumours grow in the treated region, which is itself vastly bigger than the actual site of origin of the tumour. The greater part may never progress to cancer except through extension from one focus. The position of a future tumour is unpredictable, which suggests that at some stage of the process a hitherto undetected factor intervenes either to add to or take away something. It would be logical to maintain that until the site of a tumour becomes predictable it is futile to try to discover the morphological or physiological changes which precede it. Nevertheless this aspect of experimental cancer has proved an irresistible lure to many morphologists. From none of the descriptions of late results of tarring or painting of pure substances has there emerged any peculiarity either local or general of cell or tissue response in the latent period. Such changes as occur—for example, in the skin, hyperplasia and hypertrophy—are not specific. They follow the action of many other agents. With the exception of some observations by Page[1] on nuclear swelling, the earliest response to

1. Page, R. C. *Arch. Path.* 1938, **26**, 800.

the first application of these substances appears to have escaped attention. Pullinger [2] now claims that several highly active chemical carcinogens provoke a reaction within a week which is characteristic and possibly specific. A severe injury in the form of hydropic degeneration is accompanied by progressive swelling of cytoplasm and nuclei to a size remarkable for cells of the squamous epithelium of mice. Recovery and subsequent differentiation of the injured cells is the rule, premature death the exception. Related non-carcinogenic hydrocarbons injure the epithelium slightly but do not produce the characteristic reaction. The relationship of this reaction to cancer formation depends on the observations that the response is spread over the whole treated surface, and Mider and Morton [3] have shown that carcinoma may result from a single application to the skin of methylcholanthrene. We may have in this response the first or an early essential step in the whole long story. Unfortunately those substances which cause tumours to appear more slowly do not give rise to the whole of the characteristic reaction. That it appears at some time during the course of repeated applications has not yet been excluded.

TRANSVERSE ABDOMINAL INCISIONS

THE first requirement of an incision in abdominal surgery is that it should give a free exposure of the field of operation, and this is of especial importance in war surgery. Speed and gentleness, the criteria of good operating, cannot be achieved if the surgeon is working in a confined space. But the anatomy and physiology of the abdomen must be respected if no permanent damage is to be done to it. For general purposes the mid-line and paramedian incisions are deservedly popular, particularly the latter, but there are two objections to them. They depend on deep muscular relaxation if the lateral parts of the abdomen are to be reached: and the tendinous and fascial sheets are divided at right angles to the direction of maximum strain so that there is a strong tendency for disruption of the wound during healing. Why not open the abdomen through a transverse incision? The idea is not new but has never become popular. A recent account by Hunter [4] of a series of cases in which transverse incisions were used for pelvic operations raises the question whether this approach might not be used for general abdominal surgery and particularly for war wounds. The rectus muscles were not cut across but were merely retracted in most of Hunter's cases and these are of small interest to the surgeon because such an incision cannot give a sufficiently free exposure for an exploratory laparotomy. In 27 cases, however, the recti were divided. The exposure was excellent and the ultimate result apparently very satisfactory, although incisional hernia seems not to have been avoided completely. Hunter says that it is unnecessary to sew the rectus to its sheath before cutting it since there is very little retraction, and when closing the wound it is sufficient to suture the sheath alone in order to obtain satisfactory union of the muscle. Such an incision has great advantages. It is made along the lines of stress in the abdominal fasciæ and because the rectus is divided the wound falls open easily. It can be extended into the loin on each side by cutting the oblique muscles parallel with the nerves, and the fixed parts of the colon would thus be freely exposed, a point of importance in war surgery. The main disadvantage of this incision is that it is slow to make because of the free hæmorrhage from the cut muscles.

2. Pullinger, B. D. *J. Path. Bact.* May, 1940, p. 463.
3. Mider, G. B. and Morton, J. J. *Amer. J. Path.* 1939, **15**, 299.
4. Hunter, E. W. *Amer. J. Obstet. Gynec.* April, 1940, p. 593.

THE B.L.B. APPARATUS

Boothby, Lovelace and Uihlein of Rochester [1] have introduced a modification of the B.L.B. apparatus for the administration of oxygen which they claim has advantages over the original model, especially in aviation. In this the metal valve is replaced by a sponge-rubber disk in a suitable receptacle moulded directly into the rubber mask, thus avoiding the use of the metal connecting tube of the older apparatus. The disadvantages of the metal valve are said to have been overcome by the new arrangement, which possesses the merits of simplicity, lightness and low cost. The defects of the metal valve are very real, but although the rubber-sponge disk avoids these the disk itself may not be a perfect substitute since it tends to collect water from the expired air and after a time the exit of air from the apparatus may be impeded. The sponge may also trap organisms and be troublesome to disinfect. According to Boothby and his colleagues "a flow of oxygen of approximately 2, 2·5 and 3 litres per minute will maintain, on the average, the alveolar oxygen at close to 50 per cent. for small, medium-sized and large men, respectively," and "a flow of approximately 5·5, 6·5 and 7·5 litres per minute is sufficient to maintain the alveolar oxygen at about 92 per cent." These figures are similar to those obtained with the older model but many more observations will have to be carried out to determine whether the correspondence between the two forms is so exact.

DEVELOPMENTS IN THE TREATMENT OF LEPROSY

IN his address to the meeting of the British Empire Leprosy Relief Association on May 6, Dr. Ernest Muir,[2] the medical secretary of the association, referred in a sentence to results obtained at the leprosy institution at Chiengmai, N. Siam, from experiments on leprosy along entirely new lines. More details are now available about this work which although still in the early experimental stage seems full of promise. One part of the work consisted in the injection of diphtheria antitoxin into patients during an exacerbation of the disease. This had the effect not only of immediately clearing up the reaction but also of causing what seemed to be a permanent improvement of the leprous condition. A natural sequel to this finding was the injection of patients with diphtheria formol-toxoid, and again encouraging results are reported. Dr. Collier, of the Amerıean Presbyterian Mission at Chiengmai, concluded after a survey of 400 treated cases that in general the activity of the disease was brought to a halt almost immediately and healing began. If the disease was already regressing a few doses of toxoid seem to accelerate healing; if it were actively progressing larger doses and a longer period of treatment were required, but in almost every case there was a response, though he admits it may only be temporary. Dr. Maufred Obendorffer has been able to produce leprosy in monkeys by injecting them first with sapotoxins from colocasia plants, and then with leprous material; injection of either sapotoxin or leproma alone had no effect. The difficulty of infecting laboratory animals with human leprosy has always been a great stumbling-block to the study of the disease and its treatment, and in this connexion it will be remembered that Prof. S. Adler of Jerusalem lately reported the infection of Syrian hamsters with human

1. Boothby, W. M., Lovelace, W. R. and Uihlein, A. *Proc. Mayo Clin.* March 27, 1940, p. 194.
2. See *Lancet*, May 11, 1940, p. 880.

material. It is important in animal experiments to distinguish mere survival of the organism at the site of inoculation from the spread of infection to other tissues. In the Siam work it is claimed that a true leprous infection has been produced in monkeys, and we may therefore look forward to more extensive and controlled work on the treatment of the experimental disease with diphtheria toxoid and antitoxin. The relationship of the mycobacteria to the corynebacteria suggests that this line of treatment is not wholly empirical.

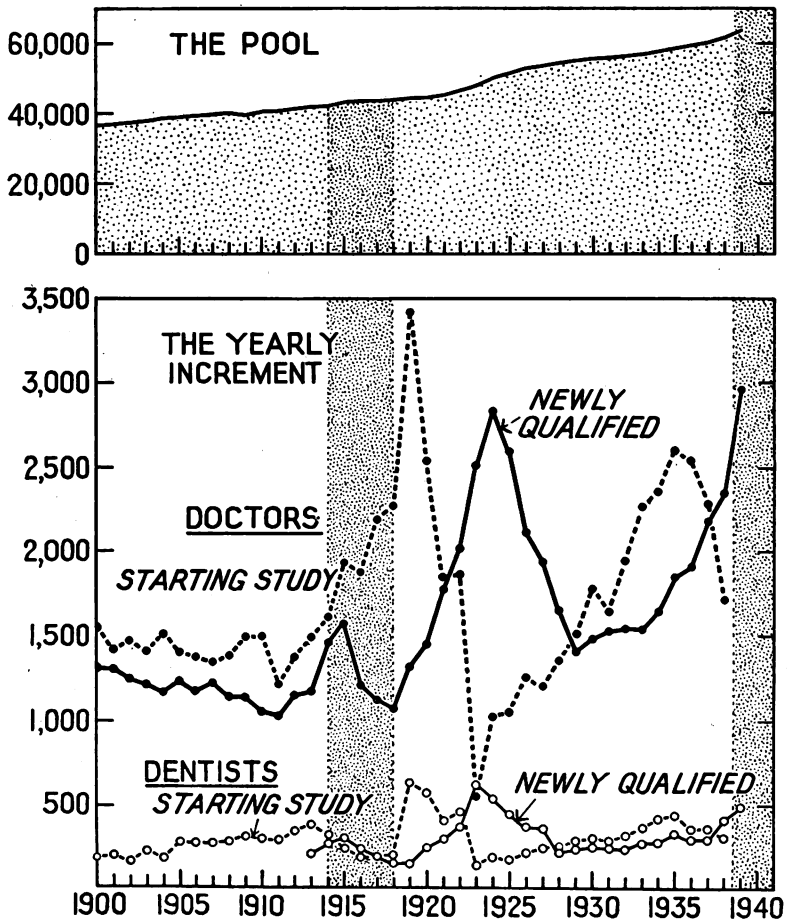
THE MEDICAL POOL

THE basic facts in the supply of medical personnel are given in the registers issued yearly by the General Medical Council. The Medical and Dentists Registers [1] for 1940 tell a story that cannot be gainsaid of the recruitment of doctors and dentists for the nation. For many years we have published a graph of the annual increment, both of those starting on their studies and those newly qualified to practise. This graph has been brought up to date and we have added a graph of the growing size of the medical pool, plotted from the total number of names on the medical register on the first day of each year.

The Medical Register 1940 contains 63,410 names, 2000 more than any previous year, and adequate, one must hope, for the calls made upon medicine from any source. The number of names added by registration during the year 1939 is 2968, a figure quite without precedent and higher than the peak year of 1924; but this will be the summit, especially as there is good reason to believe that many who were expecting to qualify leisurely in 1940 made an attempt to do so in 1939—an attempt which was patriotic even if not always successful. Of the 2968 names 1437 were registered in England, 692 in Scotland and 356 in Ireland, while 296 were added to the Colonial and 187 to the Foreign list. The 1940 register, no doubt for reasons of economy, has left out the usual section of medical acts and regulations; for this reason the 1939 register should not be lightly thrown away.

The Dentists Register 1940 contains 15,200 names, nearly 500 more than last year and almost that number more than ever before. This increase is subject to a deduction of names removed from the register for failure to pay the annual retention fee, of which the usual statistics were not available, owing to war conditions, when the register went to press. Only 170 names were removed during 1939 on other grounds (all except two on evidence of death), and 210 names were restored. There was, however, a gratifying expansion of the ranks of the profession during the year, for 418 persons were registered as graduates or licentiates, a number which has not been equalled since 1925. Apart from the revision of names, the only important alteration in the register is the reminder under "Registration Fees" of the reduction in the normal retention fee to £2 during the war, and of the exemption from payment of the fee accorded to practitioners engaged in war service. This volume also omits the text of the Dentists Acts and the regulations of the Dental Board. Perhaps the omission of the local list at the end will be felt more keenly, but such a list must needs be misleading at the present time.

1. Published for the General Medical Council by Constable and Co. Price 21s. and 12s. respectively.



ADVISORY COMMITTEE ON FOOD POLICY

THE Select Committee on National Expenditure, whose report was discussed in these columns on May 25 (p. 971), recommended the setting up of an authoritative body of scientists and practical men to work out a war-time food policy for the country which would aim at providing an adequate diet at the least possible cost in shipping and foreign currency. The advisory body has now been appointed as follows: Sir William Bragg, P.R.S. (chairman); Sir Alan Anderson, M.P. (deputy-chairman); Prof. A. W. Ashby, professor of agricultural economics, Aberystwyth; Prof. E. P. Cathcart, F.R.S., regius professor of physiology, Glasgow; Mr. Henry Clay, economic adviser to the Bank of England; Prof. F. L. Engledow, professor of agriculture, Cambridge; Mr. W. Gavin, agricultural adviser to the Ministry of Agriculture; Sir Edward Mellanby, F.R.S., secretary of the Medical Research Council; Sir John Orr, F.R.S., director of the Rowett Research Institute, Aberdeen; Prof. J. A. Scott Watson, professor of rural economy, Oxford; Prof. D. M. S. Watson, F.R.S. (secretary), professor of zoology and comparative anatomy, University College, London.

SPECIAL ARTICLES

GENERAL MEDICAL COUNCIL

SUMMER SESSION, MAY 28–29, 1940

(*Concluded from p.* 1021)

THE council considered several cases in which judgment had been postponed from previous sessions, and did not erase any name from the register. The name of Henry Nunan Collier, erased at the May session, 1938, was restored to the register.

Charges against Medical Practitioners

DRUNKENNESS AND MOTORING OFFENCES

Two practitioners appeared before the council in consequence of conviction for offences involving drunkenness, and the council directed that the name of one of them should be erased from the register. The other name was not erased.

John William Paterson Collier, registered as of Viewfield, Rigside, Douglas Water, Lanark, M.B. Edin. 1922, had been summoned to appear before the council on the charge:—

That you were convicted of the following offences: (1) On Nov. 14, 1934, at the sheriff court of Hamilton, of driving a motor-car while under the influence of drink and were fined £20; (2) On Sept. 18, 1936, at the sheriff court of Lanark, of driving and being in charge of a motor-car while under the influence of drink to such an extent as to be incapable of having proper control of the motor-car, and were fined £20 or sixty days' imprisonment; (3) On May 28, 1937, at the sheriff court of Edinburgh, of driving a motor-car while under the influence of drink to such an extent as to be incapable of having proper control of motor-car, and were fined £20; and (4) On April 21, 1939, at the sheriff court of Lanark: (*a*) Of driving a motor-car without due care and attention and without reasonable consideration for other persons using the road, and causing the vehicle to collide with and damage a motor omnibus then stationary on the road; (*b*) Of driving the motor-car while under the influence of drink to such an extent as to be incapable of having proper control of the motor-car, and were fined £2 or ten days' imprisonment in respect of the first charge, and £10 or thirty days' imprisonment in respect of the second charge, the sentences to run concurrently, and your driving licence was suspended for six months.

Dr. Collier expressed his regret. He admitted that he had recently been discharged from the Army on account of an adverse report from his colonel, who said he "drank too much." The registrar was directed to erase his name.

CONVICTED OF FELONY

Benjamin David Ling, registered as of 3, Buckingham Drive, Carmyle, Glasgow, E.2, M.B. Glasg. 1937, was summoned to appear before the council on the following charge:—

That you were at the Assizes for the county of Warwick held at Birmingham commencing on Nov. 30, 1939, convicted (1) Of the following felony, namely, that between Dec. 1, 1938, and Feb. 14, 1939, you unlawfully used an instrument or some other unknown means with intent to procure the miscarriage of Elizabeth Potter Alexander; (2) Of the following misdemeanour, namely, that between the same dates you conspired with Doris Ettie Jackson and with other persons unknown unlawfully to use an instrument or other unknown means with intent to procure the miscarriage of Elizabeth Potter Alexander; and were sentenced to twelve calendar months' imprisonment on each count, the sentences to run concurrently.

Dr. Ling appeared but was not represented. He said he had been friendly with Miss Alexander for seven years. He had performed the abortion to avert a scandal, and had become engaged to her and had married her before his conviction. He was of military age and anxious to serve his country as a doctor. The council directed the registrar to erase his name.

CONCEALMENT OF BIRTH

Arthur James Daly, registered as of Flat 2, Warwick House, 433, Mansfield Road, Nottingham, M.R.C.S. 1925, was summoned to appear before the council on the following charge:—

That you were at the Notts Assizes commencing on Feb. 26, 1940, convicted of endeavouring to conceal the birth of a child by secretly disposing of its dead body, and were sentenced to three days' imprisonment.

Dr. Daly appeared, accompanied by Mr. A. A. Pereira, counsel, instructed by Messrs. Le Brasseur and Oakley. The council's solicitor explained that the child was that of a single woman and of Dr. Daly. They had agreed to have the child adopted. He attended her at the birth, which took place somewhat before he expected at her parent's house. He stated at the trial that when he delivered the child he placed it on its side on a pad of cotton-wool which he had placed on the bed, and swabbed out its throat and nose with bits of cotton-wool. While doing so he became aware that the mother was about to have a hæmorrhage and had to attend to her. When she was safe, he found that the child showed no signs of life, and applied artificial respiration without success. He wrapped the body in cotton-wool and carried it about with him in his bag for a few days. He then took it to a caravan which he had hired before the birth, and left the body there in a box, where it was discovered by the farmer on whose farm the caravan stood. Dr. Daly was charged with murder and acquitted but found guilty of concealment of birth, to which charge he had pleaded guilty. The judge took into consideration his long imprisonment awaiting trial. In answer to Mr. Pereira, Dr. Daly said that he had become acquainted with the woman socially and had had sexual intercourse with her before he had ever treated her professionally. Mr. Pereira urged on the council that the doctor's error did not go against him in his professional capacity to an extent which would justify the erasure of his name from the register, and the council decided not to direct its erasure.

CANVASSING AND ADVERTISEMENT

Horatio Matthews, registered as of 30, Harley Street, London, W.1, M.D. Glasg. 1910, was summoned to appear before the council on the following charge:—

That being a registered medical practitioner you canvassed and advertised in or about the months of February and April, 1940, for the purpose of obtaining patients and promoting your own professional advantage in respect of your practice as a registered medical practitioner carried on by you at 30, Harley Street, London, W.1 (1) By circulating to various commercial concerns your visiting cards having your professional address thereon, together with a notice having on one side the words: *For Your Notice-board*, and on the other side the following words: *Ophthalmic Notice.* "During the present emergency, arrangements for the examination of eyesight of any of the staff or their families who may wish it, may be made, either at Harley Street, or at certain alternative rooms outside, for the reduced fee of one guinea through the Secretary, Staff Association of this Establishment"; and in particular: (*a*) On or about Feb. 2, 1920, to Low Temperature Carbonisation Ltd., of 28, Grosvenor Place, London, S.W.1; and (*b*) On or about Feb. 8, 1940, to the secretary of The London Assurance, of 1, King William Street, London, E.C.4. (2) By writing to the secretary of The London Assurance on April 20, 1940, proposing that such company should make it part of their policy to keep a register from time to time of the state of sight of their insured members in anticipation of certain possible claims mentioned in such letter, and further proposing that you should be asked to do this for the company. And that in relation to the facts so alleged you have been guilty of infamous conduct in a professional respect.

The complainants were Messrs. Low Temperature Carbonisation Ltd. and The London Assurance.

Dr. Matthews appeared but was not legally represented. The council's solicitor called officials of the two complaining companies, who said they had been rung up by someone calling himself Dr. Matthews and suggesting that they should take part in an arrangement by which the members of their staffs would have their eyes examined. Without invitation of any kind, the cards and notices complained of, and a mass of literature relating to a scheme for medical examination of their employees, had been sent to them. Dr. Matthews, addressing the council at considerable length, said that he had sent the literature to these and other firms in pursuance of the determined policy of an association which he had founded in the conviction that the present national ophthalmic services were misconceived and working on wrong lines. He had never seen a patient as a result of these activities and had not undertaken them for his own gain or advancement, but because he was a capable organiser and an enthusiast for the policy. If a patient applied, he would send him to one of the thirty odd colleagues who were members of the association. He was aware that he was following a dangerous course, and had in fact pursued it with the object of bringing the scheme to the notice of the council as the only possible way of obtaining professional recognition of it. The president announced that the council had found the charges proved; they took a grave view of the methods adopted by Dr. Matthews of prosecuting whatever scheme he had been interested in, and suspended judgment for a year subject to the usual provisos of good behaviour attested by professional brethren of the respondent.

The Pharmacopœia

The chairman of the pharmacopœia committee, Prof. David Campbell, said that the number of copies of the British Pharmacopœia, 1932, which had been sold up to date was 48,511, and of the 1936 Addendum 11,813. The work had extended during the past six months in three main directions. For the next edition of the Pharmacopœia 604 monographs had been completed, and when more favourable circumstances arose a new edition might be published. In the meantime it had been found necessary to prepare another addendum: this was complete and in the press. Work was in progress on a third addendum in which it was proposed to include monographs dealing with certain substances not formerly made in this country but now produced by British manufacturers, in some instances under licence granted by the Comptroller of Patents. The names under which the substances would be designated had been published, and monographs on ten of them had been prepared. He appealed to all members of the profession to use as far as possible these substances as suggested by the Pharmacopœia, and support the valuable efforts of the manufacturers. For some of these preparations biological tests were required, and the Pharmacopœia Commission had been fortunate in securing the assistance and goodwill of Sir Henry Dale, F.R.S., director of the National Institute of Medical Research, who would keep in that institute the standards of these preparations. The Pharmacopœia has thus been greatly strengthened by the inclusion of tests and assays which could not otherwise have been defined.

Satisfactory Financial Position

Dr. J. W. Bone, chairman of the finance committee, said that the council had saved £960 through the short sittings at its recent sessions; in spite of an expenditure of £200 on air-raid precautions it now had a surplus of £7409 for the year. Its assets were now £137,000.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

BLOOD-TRANSFUSION SERVICE

A NEW drive has started to increase the number of voluntary blood-donors. In Edinburgh and district 3000 donors are already enrolled but a further 3000 are being asked for. Ever since the transfusion service was organised on a war-time basis last September the bank in Edinburgh has been kept stocked and supplies continually used for civil purposes. Blood was drawn from the bank for the treatment of a sailor wounded in the Firth of Forth raid in October. There is a full organisation in being for the immediate distribution of banked blood to the surrounding area and for the immediate replenishment of the bank. Members of the service are on duty continuously and parties are sent out to draw blood in surrounding towns in order that the organisation in each of the subcentres may be kept in action. During the present campaign posters, newspaper articles and photographs are employed to attract and increase public attention and to remove any fears of possible dangers or inconvenience. The centres of the service in Glasgow, Dundee, Aberdeen and Inverness, as well as in the Orkney and Shetland Islands, are also actively recruiting new donors as well as maintaining blood-banks and full services. It is only fair that the public should realise that the transfusion services, in Scotland at any rate, are in an advanced state of preparedness, for a contrary impression could quite easily be taken from Dr. Dyke's letter which appeared in THE LANCET of last week (p. 1027).

STUDENTS AND THE WAR EFFORT

There has been considerable agitation among Edinburgh medical students for an intensification and shortening of the medical curriculum. At a meeting held in the university union the following motion was unanimously passed: "that in view of the present war situation this House is of the opinion that, in the case of medical students, university vacations should be drastically curtailed forthwith." Many students expressed their unwillingness to waste three months in a long vacation while others were working overtime in industry or enduring hardship in the services. It was suggested that a fourth term should be instituted, and indeed the first-year students expressed a desire to work continuously in order that they might qualify in three and a half instead of five years. It is understood that the university authorities are unwilling to conduct a full teaching term during the summer vacation or shorten the curriculum but it is likely that some arrangements will be made to enable students of the clinical years to spend at least part of the long vacation in general and special hospital work. It seems much more likely that the first-year and second-year students will be recruited into agriculture and forestry for the vacation.

EDINBURGH'S HEALTH IN WAR-TIME

Dr. W. G. Clark, medical officer of health for Edinburgh, stated recently that there had been an increase in ill health and disease in Edinburgh since the war broke out. During last winter and spring a great increase had occurred in the incidence of cerebro-spinal fever, but it was not the troops who had been particularly affected, as in the last war, but the civilians. In the first four months of 1938 there were eight cases in Edinburgh; in the same period in 1939 there were eleven; but in the first four months of this year there had been 193 cases. Although the provision

of A.R.P. beds had reduced the number of civilian beds in the city's hospitals this shortage had been more apparent than real since, with few exceptions, the reserved beds had been fully occupied.

NEW X-RAY TUBE IN EDINBURGH

Five years ago the Edinburgh Royal Infirmary installed two 250,000 volt X-ray tubes for the treatment of malignant disease. Ever since then they have been working at their fullest capacity, but even so it has not been possible to overtake all the necessary work. Approximately 850 patients have been treated a year and some 17,000 separate treatments have been given. Now, through the generosity of the trustees of the Melville bequest, it has been possible to purchase a third tube, taking advantage of a considerably reduced price offered by Metropolitan Vickers Electrical Co. It is hoped that the new tube will be in operation in a short time. The gift of the Melville trustees will not only enable the managers to purchase the apparatus itself but also to carry out the necessary reconstruction for its housing and erection. During the last five years the staff of the radiological department have been fully occupied with deep X-ray therapy and have achieved highly satisfactory results. The necessary elaborate record-keeping and "follow-up" of patients have been well carried out by a special staff.

COMPOUND AND INFECTED FRACTURES

In an address to the West London Medico-Chirurgical Society on May 22 Mr. R. Watson Jones said that in the past too much attention had been paid in the treatment of compound fractures to the invading organisms and not enough to the tissues themselves. The first-aid treatment had been the application of iodine or other antiseptics for destroying the organisms, and many had the erroneous idea that in this way they were sterilising the wound. First-aid treatment might indeed include the application of iodine, but it must secure, what was of much more importance, the continued and complete immobilisation of the tissues. The immediate treatment should by all means include the removal of foreign bodies and of the main mass of infected tissue, but it could never be hoped by any operation to render the wound sterile. It was much more important to remove devitalised tissues in which organisms could develop. The object was not to kill every germ but to encourage the natural defences of the body. It had been proved that in a large proportion of compound fractures the gas-gangrene bacillus was present in some part of the wound, but only in a small proportion of these cases did gas-gangrene infection develop. Many people who were careless in their toilet must day by day be implanting gas-gangrene organisms in their nails or in cracks in their skin, and yet the infection did not develop because there was no tissue in which it could grow.

The first stage in the treatment of compound fractures, Mr. Watson Jones went on, was the treatment of shock. Urgent as operation might be, if it was performed immediately, before the patient had had an opportunity of recovering from his shock, he might die. The main element in the treatment of shock was immobility of the limb and also warmth. Two or three months ago Mr. Watson Jones himself sustained injuries in a motor-car accident, and he knew for the first time what shock really meant and what cold really meant. He had never supposed that it was possible to be so cold and still to live. As soon as the patient's condition would permit operative excision of the wound must be performed. In civil life they had become accustomed to the distinction between the small punctured wound of the fracture compound from within and the large ulcerated wound of the fracture compound from without. In war-time that distinction was dangerous, for a small punctured wound might conceal extensive soft-tissue injuries beneath. Every wound produced by shrapnel, bomb or falling masonry must be excised and fully explored. He urged that no single layer should be sutured, except perhaps the skin. No catgut should be buried. They had all accepted the principle that no foreign body should be buried in a compound fracture which had been excised. It was dangerous to put in screws and plates and wire because these produce a serous reaction which encourages the development of organisms. But it had not generally been recognised that catgut was a foreign body, and would be surrounded by a sero-fibrous exudate which might well turn the scales between infection and straightforward healing. Opinions were divided whether the skin should be sutured. In civilian practice as a rule wounds could be safely sutured if the case was seen within six or eight hours and the suturing could be done without tension; but any surgeon who was not accustomed to the treatment of compound fractures and who now was faced with these problems should during the first two or three months refrain from suturing the skin in any case. There was no safer treatment of any compound fracture than really sound excision of the wound, which was then lightly packed with gauze and covered with a plaster.

Public Health

Health Policy for County Councils

In a small brochure[1] addressed particularly to his own council in Caernarvon, Dr. Griffith Evans has appealed to county councils to ensure so far as lies in their power that the people get "fresh, natural, whole food," and he suggests that this may be achieved among other ways by establishing market gardens in association with sewage-disposal schemes. His booklet contains one chapter on the aftercare of tuberculosis and five on dietetic aspects of county health functions. Dr. Evans suggests that the tuberculosis scheme has partly failed because, though treatment is thought to be worthy of state support, aftercare is looked on as a frill and is left to private charity and voluntary committees. Dr. Evans strongly favours the village settlement, and is anxious for the establishment of one in Wales.

Infectious Disease in England and Wales

DURING THE WEEK ENDED MAY 18, 1940

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 875; whooping-cough, 508; diphtheria, 676; enteric fever, 46; measles (excluding rubella), 6549; pneumonia (primary or influenzal), 719; puerperal pyrexia, 160; cerebrospinal fever, 334; poliomyelitis, 3; polio-encephalitis, 1; encephalitis lethargica, 5; dysentery, 38; ophthalmia neonatorum, 83. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on May 17 was 784, made up of: scarlet fever, 120; diphtheria, 98; measles, 16; whooping-cough, 28; enteritis, 67; chicken-pox, 47;

1. Notes on Health Policy for County Councils. Newton, Mon: Welsh Outlook Press. 1940. Pp. 37. 1s.

erysipelas, 36; mumps, 10; poliomyelitis, 1; dysentery, 3; cerebrospinal fever, 91; puerperal sepsis, 33; enteric fevers, 4; german measles, 56; other diseases (non-infectious), 70; not yet diagnosed, 104.

Deaths.—In 126 great towns, including London, there was no death from smallpox or scarlet fever, 1 (0) from enteric fever, 2 (0) from whooping-cough, 5 (0) from measles, 15 (0) from diphtheria, 29 (6) from diarrhœa and enteritis under 2 years, and 25 (3) from influenza. The figures in parentheses are those for London itself.

Birkenhead reported the fatal case of enteric fever, Birmingham and Coventry each had 3 deaths from diarrhœa, Bristol and Coventry each 3 deaths from influenza.

IN ENGLAND NOW

A running commentary from our Peripatetic Correspondents

For some time before the invasion of Holland and Belgium the Ministry of Health had made plans for the reception, medical examination, feeding and lodging of the refugees who might be expected. When "the balloon went up" I was at a certain "port on the South-East coast" and gave what help I could to the local authority on whom the task actually devolved. A crowded fortnight followed. For three or four days nothing happened and we had time to organise a combined scheme with the immigration officials, security police, ambulance services, hospitals, public assistance, Red Cross and W.V.S., which stood the test of use. Then they began to come. First three trawlers from Rotterdam, stinking to high heaven of rotten fish and crowded with Jewish refugees who had paid a fantastic passage money. Among them were, surprisingly, eight escaped Polish prisoners—"des solides gars," in green German prisoners' overalls. Then, at dusk, a large packet-boat with nearly two thousand Belgians, needing more than twelve hours continuous work before the last had trickled through the various controls; twelve hours of question—"Vous êtes en bonne santé?" "Pas de contact avec les maladies infectieuses?" Twelve hours of gazing into faces, of lifting hats, of inspecting hands and wrists, twelve hours of labelling with the appropriate coloured labels. The experience showed that to do everything on the boat took too long and from then on the refugees were landed at once, passed through the customs, then medical inspection, then a walk to a roller-skating rink where tea, bread and cheese were provided, on to an ex-ballroom for immigration and security controls and so back to the waiting trains. For the old and exhausted a short cut was arranged and each boat was visited by a medical officer to see to the immediate hospitalisation of the acutely sick or wounded. On one boat we found a complete orthopædic hospital of nearly 150 cripples, mostly children in plaster, with attendant nuns and nurses, which had tried to follow its medical director into France and had arrived in England instead. Thanks to a corps of A.R.P. stretcher-bearers and a hospital train the whole lot was on its way to a British orthopædic hospital in a very short time. I shall not easily forget the sister superior, rocking on her feet with weariness, surveying the disorder and messes of the third-class saloon as the last child was carried out and suddenly billowing forward like a three-master under full sail to retrieve under one arm a pair of crutches, and under the other a white woollen rabbit with pink ears.

Other impressions are of the delight of the port sanitary inspector—the only veteran who had done the same work before—at being recognised by a Belgian woman whom he had rescued as a girl from an overturned fishing boat in the inner harbour in 1914; of a "flight" of French fishing boats of various sizes, who had asked our hospitality for the night, setting out jauntily at dawn like a family of wild duck for the long sail down the Channel, washing hanging from the rigging and the children's faces scrubbed, in spite of a night in the open alongside the quay and the horrors that had gone before; of the Red Cross commandant's reply on the telephone at 4 A.M. when she was asked without warning to supply tea for up to 1500 wounded on a hospital ship arriving in a quarter of an hour—"Will do what we can" and not another word—they did it, and the ship never arrived; of the gloomy huddle of Fifth Column suspects under guard; and above all of the courage and smiling patience with which all greeted what must have seemed to them the endless formalities of their arrival.

Apart from the few wounded and injured, the sick were a very mixed bag. A baby with measles and a child with tinea were the only infectious and contagious diseases detected. Only two hysterias, an acute delusional insanity and an attempted suicide—all as it happened in British subjects—an acute tonsillitis, a cardiac failure and a cerebral hæmorrhage occurring after the boat had berthed—these were some of the cases that come to mind. The proportion needing immediate admission to hospital was only 0·2 per cent. The most useful things in the first-aid bag I had prepared were a bag of boiled sweets for the children and seasick, aspirin, bromide and grey powder. The morphia, shell dressings and half an inner cycle-tyre tube for a tourniquet were fortunately not required, but over all was the haunting thought of what would happen if one of the frequent air-raid warnings should result in bombs.

Now the picture changed. The flood became a trickle, then ceased. The immigration officers, security police and ourselves gave way to R.T.O.'s, staff officers and R.A.M.C. and then the flood began again, but this time in khaki. "Just like '14," said our Admirable Crichton of a sanitary inspector.

* * *

Man cannot live by news alone, but today he very nearly does. And the more voracious we are for it the scarcer it becomes. Now the paper shortage has made it impossible for the shortsighted, at any rate, to glean anything from a 'bus. The screaming placards confine themselves to uninteresting permanent statements such as ALL THE LATEST WAR NEWS, or READ THE WAR NEWS IN THE DAILY DASH, while the sensations of the hour are inconspicuously chalked up in unpractised capitals on blackboards. Will there soon be a Will Hay at every street corner? And will Lords R—— and B—— compete for the ex-pavement artist with the most effective flourish?

* * *

There came the other day into the casualty department a case of foreign body in the œsophagus. The patient had been eating a mutton-chop to his midday dinner when he felt something stick in his throat, and then had a pain which he referred to the lower edge of the thyroid cartilage. The casualty officer examined him with a laryngoscope and finding nothing took him over to the X-ray department where he gave him a "barium swallow" and thought there was some "hold-up." He brought him back and sent for the admitting-officer. The admitting-officer came and examined him with the laryngoscope and found nothing abnormal; so he took him again to the X-ray department. He thought that the barium divided into two at the site of the pain, so he took him back to the casualty department and admitted him. Then he rang up his chief, and told him all the investigations that had been made. His chief wanted to know whether his tongue was furred and what his expression was when swallowing, and the house-surgeon went to the ward to make these observations. But the patient said he was too tired to drink, and there was so much barium on the tongue that it could not be seen whether it was furred or not. So the surgeon decided to do

nothing for the night. Next day the dresser wrote a report in which he filled in all the particulars including the patient's age and address in the spaces provided, and entered all the investigations that had been performed so that no-one ever looked at them again. The registrar congratulated him on the excellency of his report. That evening a junior pro wrote home and this was her letter:

My darling old Mumsie,

I had a thrilling time yesterday but rather sad. They sent me to the casualty department, and there came in a dear old man, aged 81, who looked just like grandpa. He had pink cheeks and blue eyes, with a bald head and a little ring of white curly hair round it. I simply loved him, his hands were all twisted and gnarled, and he had walked all the way to the hospital. It had taken him 25 minutes. I do not believe that grandpa could have walked all that time. He was very tired so I sat him down in a chair and gave him some water to drink and he got better. He said it hurt him to swallow but I don't think it did very much because he did not make faces as he swallowed. Then the doctor on duty came along and took him into another room where it was all dark except for one bright light. He put a thing on his head and sat opposite the old man and caught hold of his tongue and put a little mirror in his mouth and said he could not see anything and he must have him X-rayed. So he took him along and sister sent me with him in case anything happened. It is quite a long way to the X-ray place; about as far as it is down the garden to grandpa's seat that he calls "his utmost limit," where he sits in the sun when it is warm. But there wasn't any sun in this room which was all dark and felt cold and clammy. The old man had to take his clothes off—and stand in a tiny space while they made sparks behind him which they caught on a piece of yellow glass they call a screen. Then they made him hold a mug of white paste in his hand and put some in his mouth and swallow; and sometimes he swallowed at the right moment and sometimes he did not, so that altogether he had to do it quite a lot of times; and oh! it was so exciting to watch the paste shoot past his throat and down in front of his spine; and I saw his heart beating so that mine almost stopped. And then I thought of the poor old man; because I am sure grandpa would never have put up with it. He would have cursed and sworn, and thrown the mug on the floor long before the end of it. And in the end the doctor said; "we must send for the admitting-officer; take him back to the casualty department, please, nurse." So we went back with him leaning on my arm just as grandpa does when he comes back from the "utmost limit"; and I sat him down in a chair and gave him a cup of tea, but it hurt him more than it did before as I could see from his face. Luckily the admitting-officer was a long time coming so the old man had had a bit of rest; because he took him into the dark room again and examined him with the little mirror. He said, "I cannot see anything abnormal, I must see him under the X-rays." So off we went again to the X-ray department, but he leant very heavily on my arm this time. Then we went all through it again, but I was not a bit excited because I knew my old man was getting very very tired, and they did it again and again because the casualty officer said he thought there was a "hold-up," but the admitting-officer said no, he thought there was a duplication of the stream, and they each tried to make the other see what they saw, until the admitting-officer said, "Well I must go and do a white-cell count. We shall have to admit him." And then he looked at his watch and said "Oh damn! I'm late, will you do it for me?" and the other said, "Take him back to the casualty-room please nurse." Then I had to tell the operating-theatre to get the endoscopy instruments ready as someone would be coming down to remove the mutton bone. These are long metal tubes with an electric light at the end that they push down nearly into your stomach. But they did not do it. I heard the admitting-officer talk about it when I took in the doctor's cup of tea. He was saying "No! the old man won't come down, says we've pulled him about enough for one evening."

In my time off today I went up to see my old man. He shook me by the hand and asked whether he could go home. He was better and said he had enjoyed the fish and tatters they gave him for dinner and that it did not hurt so much. I asked the staff nurse why they had done all that last night and she said, "They had to investigate him, nurse, to make an accurate diagnosis," but I do not think they know now whether the mutton bone is there or not. They still think "an œsophagoscope will finally be necessary to determine its presence or not." But I know he is getting better because I can see it in his face. Well, that is all for the present, I will tell you about my old man when I come home on Sunday.

Every your loving daughter,

FELICITY.

Since her mother showed me the letter I have been wondering which was the better report of the two.

TAKING NOTES

OF the making of notes there is no end, and of their varieties it is the same. There are the notes which tell the condition of a part and those which indicate the fleeting thoughts within the mind. There are the notes which hew the structure into form, and those which point the wisps of straw that tell the way the wind is blowing. In all clinical medicine there are two modes of approach—that which sorts out the possibilities by essential lines of cleavage, and that which settles down to narrow probabilities—and the notes that suit the one are not suited to the other. The busy doctor, going his round, may see twenty cases in a day of which one may be a grave one. He jots down notes in his car of the shortest kind, to indicate this gravity and to register the rest. The physician in his consulting-room may see six patients in a day and none of them be serious, yet his notes run to many pages, for the cases have been sorted out by others and he must be certain of his points. The most mechanistic lesion may need the most subtle noting, while the neuropsychological case needs the crudest. There was the lady who had had twelve operations on the nose by different surgeons, all of whom had missed the fact that her husband brought his mistresses into her drawing-room and compelled her to receive them. Notes on the shape of the turbinals would not help in this case; but in a case of aphonia seemingly hysterical those on the structure of the nose may matter much. Then there are negative notes—how valuable these may be, but how we may overdo them—and it is nearly always the negative note we have not made which is the one we need. One point in a negative note that is essential is the date, perhaps the hour. To know a palsy of the face was not there at some unstated time in the patient's life means nothing. To know it was not there at 9 P.M. on Tuesday, May 28, 1940, may be essential.

The good note-taker is not necessarily a good doctor, though he may be able to estimate all the symptoms that may occur in any disease in percentages. He may well be a successful physician, for he can tell the patient's doctor all about her, while the bad note-taker may magnetise his patient into self-confidence and so back into health but will fail because he cannot write anything to the doctor. It is seldom that anybody's notes are of any value to anybody else who has to treat a patient, but there are two exceptions—negative facts in the subtle medical cases and positive ones in the crudely surgical. But they must be facts, and that calls for accuracy of observation.

Prof. C. F. M. Saint's little book called "Surgical Note-Taking" (H. K. Lewis, 3s.) deals with the latter type and leads us to make one critical remark. He writes from South Africa, and it is the practice there to denote the race by the patient's colour; but he is not consistent, for some of the notes start, "the patient, a coloured female, age 46," and others, "a male aged 56," from which one would infer that the latter belonged to the white races. This apparently is not so. But dressers and clerks will pick up some useful tips from him, and the more closely he approaches the crudely surgical the better he is as a guide.

LETTERS TO THE EDITOR

POSTERIOR-PITUITARY EXTRACT

SIR,—Dr. Archibald McLellan's interesting paper on the response of the non-gravid uterus to posterior-pituitary extracts in THE LANCET of May 18 (p. 919) raises several matters of clinical importance. As he kindly refers to earlier observations on the subject by myself, I should like to add to his remarks. Using an intrauterine bag technique, I showed (*Edin. med. J.* August, 1934, proceedings, p. 93) that vasopressin, and not oxytocin, was the factor responsible for causing contraction of the non-pregnant organ when these extracts were administered intramuscularly in customary dosage. Dr. McLellan has carried the work an important stage further by his quantitative studies. Through the kindness of Mr. Stanley White of Messrs. Parke Davis I also was supplied with specially purified "pitocin" and "vasopressin." My results were so surprising that I at first believed that the bottles had been wrongly labelled. A re-assay of the remainder of the contents confirmed the correctness of the stated concentrations of the two fractions; and subsequent work with other samples produced like results.

My findings at that time also led me to state that the non-pregnant uterus would contract (although in varying degrees and in varying manner, such as the slow spasm now mentioned by Dr. McLellan) at any stage of the menstrual cycle. I thus put myself at variance with Knaus and other workers who were at that time proposing to make an absence of uterine response a clinical test for determining the time of ovulation in the human subject. Strong criticism of my methods was made by Reynolds, and later answered by myself (*Lancet*, 1935, **1**, 53). More recently, E. M. Robertson (*Edin. med. J.* 1937, **44**, 20) and others have corroborated and augmented my findings. Although McLellan does not broach this subject, it is noteworthy that his charts and tables show that he also has found that the non-pregnant uterus will respond to posterior-pituitary extract at a time which presumably corresponds to the luteal phase of the menstrual cycle. Nevertheless, differences can be detected in the behaviour of the uterus according to the stage of the cycle. In the pre-ovulation stage the contractions as recorded by the intrauterine bag are frequent, irregular and of small excursion, whereas after the mid-point of the cycle they become increasingly "flat" and are interrupted by powerful contractions lasting for upwards of 60 seconds or more. The first type of contraction I have been in the habit of calling the A-type waves, and the second the B-type waves. During menstruation the B-type contractions are powerful, regular and very frequent.

Dr. McLellan draws attention to the importance of determining the response of the uterus to the posterior-pituitary fractions at various times throughout the course of gestation. For some years I have collected such information, making use of the opportunity offered when a therapeutic abortion becomes necessary. Thus far the observations are necessarily few in number, and do not warrant making a definite statement. It may be said, however, that Robson's observations (quoted by McLellan) on the behaviour of excised human uterine muscle are likely to be true also for the behaviour of the intact organ. At all events, the human uterus is remarkably resistant to both posterior-pituitary fractions in the early weeks of gestation, although curiously, if actual abortion is taking place, the uterus, which but a few hours before had been extremely refractory, will now respond promptly to injections of posterior-pituitary extracts. In the present state of knowledge there is good reason to insist that when posterior-pituitary extract is used to control hæmorrhage in cases of inevitable or incomplete abortion the plain extract should be given and not the purified oxytocic principle.

I am, Sir, yours faithfully,

Radcliffe Infirmary, Oxford. CHASSAR MOIR.

TREATMENT OF CEREBROSPINAL FEVER

SIR,—The report of the proceedings of the section of therapeutics of the Royal Society of Medicine in your issue of May 25 was most instructive. It would be interesting to hear more fully Dr. Banks's reasons for stating that sulphapyridine by mouth is the drug of first choice as against sulphanilamide. Is dosage the only factor? The first and final aim of chemotherapy would seem to be to raise the concentration of the drug in the body fluids rapidly to its effective level and keep it at that level for a sufficient length of time. A natural corollary is that the dosage interval is as important as the dosage.

Of the first 50 cases treated at the Isolation Hospital 4 died. All were treated with sulphapyridine four-hourly until the drug was stopped. In addition, fully half of the cases had meningococcal antitoxin intravenously in 10 per cent. dextrose by the continuous drip method. One of the cases so treated died, a man who was in the third week of his disease when admitted.

No-one will dispute Dr. Banks's most sensible and practical statement that treatment must be undertaken in skilled and experienced hands and isolation is of secondary importance. Nevertheless, cerebrospinal fever is an epidemic infectious disease and this fact should not be forgotten. The inference need not, I think, be further stated.

We are, Sir, yours faithfully,

T. LLOYD HUGHES,

Bebington, Wirral, Cheshire. H. F. HARWOOD.

SUGAR IN THE TREATMENT OF ULCERS

SIR,—Neither your Budapest correspondent in THE LANCET of May 4 (p. 826) nor Dr. Meyer in his letter of May 25 (p. 986) stresses the value of glucose in the treatment of bed sores. Glucose applications are particularly valuable in dealing with deep ulcers in patients who have anæsthetic areas from spinal lesions, as the other methods available for treating these are not very effective. In a patient recently under observation with neuromyelitis optica a deep ulcer developed while the patient was still anæsthetic. Packing the ulcer three times a day with powdered glucose led to a dramatic response, so that this enormous ulcer had almost completely healed before the anæsthesia had completely disappeared.

I am, Sir, yours faithfully,

Norwich. STEPHEN T. FALLA.

BLOOD-TRANSFUSION SERVICES

SIR,—No-one connected with any blood-transfusion scheme outside the Metropolis could but endorse fully Dr. Dyke's observations in his letter in your issue of June 1. Long before the war many of us formed a transfusion service capable of meeting the needs of large numbers of casualties and last September put this service on a war footing despite the vague and lukewarm encouragement of the Ministry of Health.

Personally we have grouped over 1000 donors from the town and nearly 500 from neighbouring urban and rural areas including not a few from the Services. Equipment for dealing rapidly with many donors has been assembled. A team of voluntary workers has on our own initiative been enlisted and trained, but even now we cannot be granted cars for transporting donors, and not even a petrol allowance is obtainable for this purpose. Most of us are only too glad to perform useful national work voluntarily, but we might expect coöperation if not financial assistance from official bodies. It seems unreasonable that London should be the sole recipient of official favour, and that the transfusion needs of the rest of the kingdom should be ignored. This appears to be the general position throughout the provinces, where it seems likely that heavy calls will be made on these services. If these are met successfully it will be because of the unsupported efforts of transfusion officers who have not allowed official apathy to stultify their efforts.—I am, Sir, yours faithfully,

E. BIDDLE,

Transfusion Officer, East Suffolk and Ipswich Hospital.

PURPURA HÆMORRHAGICA TREATED WITH VITAMIN P

SIR,—Dr. Gorrie's interesting article in your issue of June 1, in which the value of vitamin P is implied, calls for comment. In a recent editorial on vitamin P in the *Journal of the American Medical Association* (Jan. 6, 1940, p. 43) it was stated that Szent-Györgyi obtained negative results when he repeated his earlier experiments on the basis of which the existence of vitamin P was first claimed. In Dr. Gorrie's case the hæmaturia ceased almost completely after giving vitamin P, yet in contrast Gimsing (quoted in *Brit. med. J.* 1939, **1**, Key to medical literature, p. 108) found vitamin P disappointing in 7 cases of hæmorrhagic nephritis. Unlike Jersild, my own results with vitamin P in purpura have hitherto been negative.

I am, Sir, yours faithfully,

St. Stephen's Hospital, S.W.10. ELI DAVIS.

FOOD PRESERVATION

SIR,—In the early weeks of the war the Government relaxed the statutory rules regarding preservatives in food to the extent of permitting the use of sodium nitrite and potassium nitrite in bacon, ham and pickled meats. This was a token of the severity of the regulations which have been in force since 1927. Sausage, fresh and dried fruit, jam, marmalade and cornflour almost exhaust the list of the solid foods in which the use of preservatives is allowed by the regulations of 1927, and in some cases the addition of sulphur dioxide allowed is so small as to be practically useless. An example is seen in jam, for although the use of 40 parts per million of sulphur dioxide is permitted, jam makers in general make their jams without it.

Besides sulphur dioxide, the other preservative permitted under the 1927 rules is benzoic acid and this may be used, in minute specified quantities, in certain non-alcoholic wines, sweetened mineral waters, brewed ginger beer, coffee extract and pickles and sauces made from fruit and vegetables. Thus the foreign substances permitted are limited to sulphur dioxide and benzoic acid.

In some countries the use of measurable traces of boric acid, borax and salicylic acid is sanctioned and the question arises whether, in view of the extreme necessity to prevent food wastage, it would not be in the national interest to amend the regulations so as to allow the use of these substances—regarded by the governments of some countries as virtually innocuous in the weak dilutions which answer this purpose—in certain foodstuffs while the emergency lasts. I am advised that it is hardly feasible for any of these substances to be employed for the purpose of concealing incipient decomposition or to disguise staleness and putrefaction, which prior to 1927 was the purpose to which formaldehyde was sometimes put. The reintroduction of formaldehyde is not suggested, but I submit that an extension of the applications of sulphur dioxide and benzoic acid and the restoration of salicylic acid, boric acid and borax might be considered as a temporary expedient.

The installation in this country of refrigerators in houses, and especially in luxury flats, has made considerable headway in recent years, but the majority of dwellings have no refrigerating system. Spells of hot weather may be close upon us and food wastage is no longer an affair of the individual conscience but an offence against the whole community. Not a scrap of food should be allowed to become putrid or a pint of milk sour, and that is why I venture to suggest that some reasonable latitude should now be authorised to help us to conserve all the food we buy. Since the use of preservatives in cream was entirely prohibited large volumes of this valuable food have been wasted, and it is asserted that much tainted cream has been consumed, to the discomfort of its consumers. Which is the more harmful, cream that has lost its freshness, or cream kept fresh with the aid of innocuous preservatives?

A related matter is the milk problem. Is it not better to heat milk and ensure its freshness for an extra day rather than pour it down the sink? It is agreed, I believe, that heat even when carefully applied, as in the process of pasteurisation, may impair the antiscorbutic vitamin in milk, but the deficiency of vitamin C can readily be corrected with lettuce or fruit; and after all one has little thought for vitamin C when boiling the milk for the breakfast coffee or making a rice pudding. Being not unfamiliar with the historical place THE LANCET takes in the reform of our food laws I feel as anybody but a Daniel must feel on the threshold of a lion's den. But please understand that the suggestion is merely that for the period of emergency only the regulations as to the use of preservatives in food should be remodelled under expert supervision.

I am, Sir, yours faithfully,

Whitehall Place, S.W. 1. F. C. GOODALL.

SUPPLY AND DEMAND

SIR,—The leading article in your issue of May 25 raises questions of paramount importance not only to the profession but to the state. As you insist, this is a "total" war. There is a limited number of doctors to supply the needs of the forces and the civil population. The violence of the war is rapidly increasing, and casualties must increase also; this means more doctors for the forces. Ere long the country will have to face the certainty of a scarcity of doctors—even now there is a scarcity of specialists in certain branches of surgery—e.g., thoracic, neurological, and orthopædic. To make the most of our limited resources there must be some kind of conscription of the whole profession—labour is conscripted; why should we be exempt? That there is need of a comparatively small nucleus of trained administrators in each of the services, military and civil, there is no doubt. The rest of us should form a pool on which all the services can draw. There should be a "medical" uniform

common to all services. The members of the pool should be transferable from one service to another, from one part of the country to another, and from one country to another as need arises. There should also be a new census of the profession, whether serving at the moment or not, so that any special qualifications possessed by a man could be used to the best advantage, which is, unfortunately, not the case today.

That some such scheme will come into being is certain—force of circumstance alone will bring it to pass. It will be far better for the profession and the state alike if we demand it. Only there must be no delay. After the war we can thing again.

I am, Sir, yours faithfully,

London, W.1. PHYSICIAN.

SIR,—The medical examination held for prospective R.A.M.C. officers is not very severe or searching but it is nevertheless incongruous that approximately the same standard of physical fitness is expected from middle-aged practitioners as from young and recently qualified men. Surely this service should adopt the common-sense method used by the rest of the army and grade doctors in medical categories, apportioning to each man work that he is best capable of, thereby making the most use of all available material. This method would not only avoid injustice, such as elderly men having more strenuous work than younger and fitter men, which I assume must now be a matter of chance, but would enable the army to make use of volunteers now rejected for relatively trivial reasons. It does not seem to me, from recent personal experience, that the army authorities yet realise that every doctor will not be called upon to do the physical work of a combatant officer, or that every available doctor will soon be needed. It may be interesting to reflect that the late Lord Nelson or General Carton de Wiart, however good and efficient doctors they might be, would be instantly rejected for *any* service by a present army medical board.

I am, Sir, yours faithfully,

UNDER THIRTY.

OBITUARY

MATTHEW YOUNG

M.D. GLASG., D.SC. EDIN., D.P.H.

Dr. Young was one of those self-effacing altruists who go through life trying to hide their light under a bushel. Fortunately in this he was largely unsuccessful. Everyone with whom he worked appreciated the sterling qualities of the man: his industry and thoroughness, the width and depth of his knowledge, his keen scientific insight, his honesty and courage which were always infused with kindness. Everyone trusted him as a friend and as a scientist, for no worker more readily placed his gifts at the disposal of others. Young's own splendid record of published work—in anatomy, anthropology and biometry—was only equalled by what he did, quietly and unobtrusively, on behalf of his colleagues and friends, and he was able to raise the standard of medical research in this country by insisting on the proper biometrical treatment and interpretation of numerical data. He came of good Ayrshire farming stock, and was educated at Kilmarnock Academy and Glasgow University, where he graduated M.B. with honours in 1907. After a year in general practice at Thirsk he returned to Glasgow as junior and later senior demonstrator in anatomy at the university. In 1915 his M.D. thesis on the Scottish skull won for him the Bellahouston and Struthers gold medals. In the same year he joined the staff of the Medical Research Council and until 1922 he was engaged, under the direction of John Brownlee, in supervising the tracing and statistical analysis of the case-records of all the officers and men who had been admitted to casualty-clearing stations or hospitals during the last war. This enormous task provided invaluable data as to the results of different forms of treatment, and made it possible for surgeons working near the front line to be kept informed of the histories of cases in which they were specially interested. The records, which included more than 22 million index cards and a quarter of a million detailed case-sheets, were later transferred to the Ministry of Pensions. In 1922 he was appointed to the permanent staff of the council for work under Brownlee in the statistical department which then formed part of the National Institute for Medical Research. After Brownlee's death in 1927 he was transferred to the council's external staff and attached to the institute of anatomy at University College, London, where he was able to resume those anatomical and anthropological studies which the accident of war had interrupted. He was an honorary lecturer there and he spent many an hour in teaching, for pleasure, senior students of physical anthropology as well as lending a hand on busy days among the juniors in the dissecting-room. Since the outbreak of the present war he had been working in Professor Greenwood's department at the London School of Hygiene. He had been in indifferent health for some two years and in January he went down with an attack of pleurisy. Since then he had been confined to bed and his general state slowly but inexorably deteriorated.

Young's more important publications, alone or in association with other workers, deal with such various subjects as the incidence of cancer in relation to occupation and locality, the nature of status lymphaticus, the growth of the face and jaws in children, the statistics of appendicitis, and the relation of iodine deficiency to thyroid disease. He was a member of the Medical Research Council's committees on dental disease and on statistics, and he was personally responsible for the biometrical and statistical analysis of the data, collected at Birmingham by the former committee, on the relationship of dietary deficiency to dental caries in children. In the spheres of pure anatomy and anthropology, he published a number of interesting studies of the skulls of ancient man.

Sir Edward Mellanby writes: Young was a man of wide scientific knowledge and his researches and publications cover so extensive a field that it is difficult even to summarise them concisely. Although he did valuable work in medical statistics, he never wished to be regarded purely as a statistician; his own, sufficiently comprehensive, description of his subjects of work was "medical problems of an anatomical and anthropological nature." Apart from his wide knowledge and great ability, Dr. Young had two outstanding qualities which made him the perfect collaborator. The first was his desire to help all investigators and his willingness to participate in many divergent studies, and the

second his reliability. These qualities were of exceptional value to medical science, and the large number of calls for his help made upon him by the Medical Research Council can be judged by the numerous instances in which he has published accounts of extensive inquiries in association with others. His death is a severe loss to the council.

Dr. Young leaves a widow and a young son and daughter.

JOSEPH WILLIAM LEECH

KT., M.S. DURH., F.R.C.S.E., M.P.

Sir Joseph Leech, who died suddenly in his 75th year on May 30 had taken an active part in the professional, municipal and parliamentary life of Newcastle-on-Tyne. His own life was full of hard work, interest and goodwill, and deserved success, with a sudden passing just as he would have wished.

A native of Cumberland, he migrated to Newcastle early in life, received his medical education there at the University of Durham college of medicine, graduating M.B. in 1887. He later proceeded to the degrees of M.D. and M.S. and in 1900 obtained the diploma of F.R.C.S.E. There must be few parallels with the sequel, for Leech became a successful surgeon despite the fact that he never held a resident hospital appointment: he was a self-taught surgeon albeit a really good one.

After a short period of general practice he decided to specialise and was successively assistant surgeon, surgeon and consulting surgeon to the Royal Victoria Infirmary, Newcastle-on-Tyne; senior surgeon and consulting surgeon to the Newcastle Throat and Ear Hospital. He served throughout the last war as major R.A.M.C. (T.F.) in the 1st Northern General Hospital.

Leech was a man of engaging personality and ferocious energy who put his utmost into anything he undertook. As lecturer and examiner in clinical surgery at the college of medicine he always had a large following of students, and those who benefited will ever have a kindly memory of his forceful methods of instruction. He drove a sound knowledge of surgery into his students by constant reiteration, and as a man of the world he also taught them the successful handling of patients.

In 1926 when he retired from the active staff of the Royal Victoria Infirmary he also began the second part of his career by becoming a member of the Newcastle city council. He was sheriff in 1930–31 and lord mayor in 1932-33: in both of these positions he was an outstanding success for he more than upheld the dignity of the office. He was a good speaker and was always well groomed, while his white hair and white moustache gave him an appearance of some distinction. Parliamentary life attracted him and since 1931 he sat as unionist M.P. for the west Newcastle constituency. He was the first member of Parliament to be, at the same time, lord mayor since 1790. During his busy life he found time to qualify as a barrister and was a member of the Middle Temple. In 1934 the university of Durham conferred on him the honorary degree of D.Ch. In 1938 he was knighted in recognition of his public services. In Newcastle itself he had many contacts and a colleague writes: "Many will remember Leech as honorary secretary of the now amalgamated Newcastle Clinical Society. He had novel methods for the staging of its annual dinner, and all knew his subterfuge when stalking a 'victim' of first pulling out from one waistcoat pocket a cigarette for acceptance, followed by the appearance of a dinner ticket from another waistcoat pocket: but the number of tickets sold was always large and the dinner, under his sway, an invariable success." He was also ex-president of Durham Medical Graduates' Association and a senior fellow of the Association of Surgeons of Great Britain and Ireland.

Sir Joseph married Elfreda Louisa, daughter of the late Walter-de-Lancey Willson, of Kirklinton Park, Carlisle, and she survives him. There were three sons, one who predeceased him was a flight-lieutenant in the R.A.F., and of the others, one is a major in the Northumberland Fusiliers, while another is in business in the Far East.

Of his Parliamentary life a fellow-member writes: Sir Joseph's interests were mainly centred in the affairs of the city of Newcastle and he was a member of the group of North-Eastern M.P.s who kept all political and social matters in that region under their eye. To his whips he was a diligent and very keen member, always willing to help and willing always if called upon to travel from the north to take part in a division. His chief personal characteristics were kindness and humanity. Behind him he leaves the memory of a great gentleman.

RUBENS WADE

M.R.C.S.

Dr. Wade, who died on May 30 at the age of 60, was well known as an anæsthetist. For several years his work had been interrupted more than once by failing health, but on each occasion he seemed to make a good recovery and went back to his duties with renewed energy. But soon after the war began, and before he could get into the swing of the new conditions, he was again struck down.

Born at Applethwaite, the son of Thomas Wade the artist, he was educated at Sedbergh and Christ's College, Cambridge, taking his clinical course at St. Bartholomew's Hospital from which he qualified in 1906. His inclination was towards general practice in the country, but a defect of hearing led him to choose the career of an anæsthetist. During the last war he was attached to the military hospital at Sidcup, acting as anæsthetist to the facial surgery unit there. After demobilisation he joined the honorary staff of St. Bartholomew's and the Royal Northern hospitals. Although holding such important posts Wade was less known than he should have been to anæsthetists in general. This was due partly to his quiet and unobtrusive nature but more especially to his defective hearing which made it quite useless for him to attend anæsthetists' gatherings. A colleague writes: "The only time that I ever remember seeing him at a meeting of the anæsthetics section of the R.S.M. illustrated well his innate courtesy and kindly feeling for his friends. I was reading a paper and afterwards asked him whether he had been able to hear me. He replied, 'Not a word. I did not expect to, but I thought it only right to come and support

a friend and colleague.' It was this same deafness, I believe, which many years ago led him to give up other branches of medicine and take up anæsthesia. In this particular line he would say, with a twinkle in his eyes, hardness of hearing was not always a disadvantage, especially with a difficult or irritable surgeon!"

Except for one or two papers on anæsthesia in plastic and facial surgery he wrote little. He was devoted to the interest and safety of his patients among whom he was a great favourite for they quickly realised that he would spare no effort for their comfort and wellbeing. There was no humbug about him and his sterling honesty was never better illustrated than when on one occasion a tragedy befell. Although it was really no fault of his, he insisted on assuming the entire responsibility and allowing no share of blame to fall on others.

In 1912 he married Phyllis Mary Landon, who died a few months ago. They had one son.

Sir Harold Gillies writes: In the passing of Ben Wade those who had the privilege of working with him have lost a real friend endowed with a kindly personality that endeared him to all. Neither the long-continued consumption of anæsthetic fumes nor his increasing deafness in any way impaired his good temper. Inefficiency, however, he would not tolerate in others or himself. The rapid strides that anæsthesia made during the latter part of the last war were largely due to his untiring and intelligently directed efforts to provide a safe and satisfactory anæsthesia for severe facial wounds. In 1916 the first improvement suggested by Colonel J. F. W. Silk, then consultant anæsthetist to the army, was adopted of operating on these jaw cases in the sitting position, when a very light mixture of chloroform and oxygen was administered through the nose or mouth. Wade (as well as the surgeons) adapted himself to this strange method. Another improvement was the introduction of the Kahn's tube and the nasal intrapharyngeal methods. Later the positive pressure intratracheal was adopted, and later still the two-tube intratracheal method—the forerunner of that used at the present day. In all these methods Wade was absolutely sound and reliable and he definitely upheld the school of anæsthetists that have added so much to the reputation of this country by choosing the type of anæsthesia best adapted for the particular patient and the particular operation. Judgment was added to technical skill. At St. Bartholomew's, in particular, his delightful presence will be sorely missed.

CLARENCE EDWARD WIGAN

M.B. ABERD.

Dr. Clarence Wigan, who died at Rock, Cornwall, on April 5, was born at Portishead in 1864. After leaving Bristol Grammar School he studied to be an electrical engineer, but later decided to follow his father's profession, entering Charing Cross Hospital as a student, and taking his M.B. at Aberdeen University in 1891. He began practice in Clevedon, Somerset, and was the first man in the west country to make use of the Röntgen rays. Following his original bent in physics, he began to work out electrical treatment on practical lines in contrast to the somewhat empirical methods used at that time. After two years he moved to London where he developed his technique in electrotherapy, especially in the combined use of faradic and galvanic currents. In the selection of conditions suited to this latter treatment he was anticipating the response nowadays to diathermy and the sinusoidal current. During the last 18 months his work had been interrupted by illness, though he had been able to return at intervals to attend to those who demanded his care.

Mr. F. J. STEWARD, consulting surgeon to Guy's Hospital, died at Kingswood on May 31.

We also regret to announce the death in Flanders during May of Major LAURENCE O'SHAUGHNESSY.

Medical Diary

Week beginning June 10

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1.

TUESDAY

Therapeutics and Pharmacology—2.30 P.M., Mr. A. J. Ewins, D.Sc., Dr. E. C. Butler, Dr. H. M. McCrea, and Dr. G. Melton: Clinical Experiences with Sulphathiazole in Therapy of Staphylococcal Infections.

Psychiatry—4.30 P.M., Dr. E. N. Butler: Observation Units. Dr. J. S. I. Skottowe, Mr. R. H. Curtis and Dr. Letitia Fairfield will also speak.

FRIDAY

Ophthalmology—5 P.M., annual general meeting. Mr. J. P. Maxwell: Cataract in Osteomalacia.

MEDICAL SOCIETY OF INDIVIDUAL PSYCHOLOGY.

THURSDAY—2.30 P.M. (11, Chandos Street, W.1.), Dr. J. A. Hadfield: Sexual Fetichism—Its Psychopathology and Treatment.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W.12.

MONDAY—10 A.M., opening of special course on chest surgery.

TUESDAY—2.30 P.M., Sir Walter Langdon-Brown: ward clinic.

WEDNESDAY—11.30 A.M., clinico-pathological conference (medical). 2 P.M., Dr. Janet Vaughan: pregnancy diagnosis tests. 3 P.M., clinico-pathological conference (surgical). 4.30 P.M., Prof. G. R. Cameron: Pathology of the Liver.

THURSDAY—2 P.M., Dr. Duncan White: radiological conference.

FRIDAY—2 P.M., clinico-pathological conference (gynæcological). 2.30 P.M., Mr. V. B. Green-Armytage: sterility clinic.

DAILY—10 A.M.–4 P.M., medical clinics; surgical clinics and operations; obstetrical and gynæcological clinics and operations. 1.30–2.30 P.M., post-mortem demonstration.

FELLOWSHIP OF MEDICINE AND POSTGRADUATE MEDICAL ASSOCIATION, 1, Wimpole Street, W.1.

London Chest Hospital, Victoria Park, E.2. WED. and FRI., 6 P.M., M.R.C.P. course in heart and lung diseases. West End Hospital for Nervous Diseases, Gloucester Gate, N.W.1. MON. to FRI., afternoon, M.R.C.P. course in neurology.

Appointments

BLAIR, R. H., M.B. Lpool, hon. physician to the Redruth Hospital.

BUNTING, M. ELIZABETH, M.B. Lond., D.A., anæsthetist at the Royal Hospital, Sheffield.

CORNER, LANCE S., M.B. Sydney, registrar at the Central London Throat, Nose and Ear Hospital.

EDWARDS, PHYLLIS, M.B. Lond., resident medical officer at Redhill County Hospital, Edgware.

EVANS, HORACE, M.D. Lond., F.R.C.P., hon. physician to the Royal Bucks Hospital, Aylesbury.

HALE, L. W., M.D. Lond., M.R.C.P., hon. physician to the Redruth Hospital.

LLOYD, F. H., M.D. Florence, M.R.C.P. Lond., resident assistant medical officer at the West Middlesex County Hospital, Isleworth.

POWYS, MARJORIE, M.B. Lond., D.R.C.O.G., resident assistant medical officer at the Middlesex County Maternity Hospital, Bushey Heath.

SULLIVAN, E. M., M.B. N.U.I., assistant resident medical officer at Erdington House, Birmingham.

WALMSLEY, G. H. C., M.B.Manc., D.P.H., tuberculosis officer and assistant medical officer for Brighton.

WILLIAMS, R. S. HUNT, M.B. Camb., F.R.C.S.E., registrar in the ear, nose and throat department of the Queen Elizabeth Hospital, Birmingham.

London County Council Mental Health Service.—The following appointments are announced:

HILL, J. D. N., M.B. Lond., M.R.C.P., D.P.M., temporary specialist at Sutton Emergency Hospital;

JOSEPH, H. S., M.B. Lond., D.P.M., temporary medical officer at Sutton Emergency Hospital;

REES, W. L. L., M.B. Wales, temporary medical officer at Mill Hill Emergency Hospital;

THORLEY, A. S., M.D. Lond., D.P.M., temporary medical officer at Sutton Emergency Hospital.

Examining surgeons under the Factories Act, 1937: Dr. W. G. Owen (Penygroes, Caernarvonshire); Dr. A. B. Stich (Brenchley, Kent); Dr. H. L. Sells (Market Bosworth No. 1 district, Leicestershire).

PARLIAMENT

ON THE FLOOR OF THE HOUSE

By MEDICUS, M.P.

BETWEEN Tuesday of last week when the Prime Minister made his statement "that the King of the Belgians yesterday sent a plenipotentiary to the German Command asking for a suspension of arms on the Belgian front" and Tuesday of this week lies a world of thoughts, actions and intense feeling. Then we were warned to be prepared to hear "hard and heavy tidings"; now we have heard tidings not of the greater disaster which appeared impending, but of a miracle of deliverance. In the course of that deliverance, however, we have lost transport vehicles, armoured vehicles and a thousand guns. To make up that loss will cause a delay in supply and it is a colossal loss. Channel ports lost, important industrial areas, mines and factories in the hands of Germany, the Belgian Army of nearly half a million men—"the best army Belgium ever had"—in enemy hands.

A secret session is to be held, probably on next Tuesday, when the House will discuss the now paramount question of Home Defence; for the danger of invasion, often threatened, must be treated as a reality and all our power used to prevent it. The Fifth Column, not aliens alone, is to be stamped out.

* * *

Mr. Churchill stated our losses in killed, wounded and missing at 30,000 men and to many members this seemed a figure lower than had been expected. Even this figure may be reduced as some of those listed as missing may reappear. But whatever betides, "on our sea power, and on our air power we shall ride out the storm." When Mr. Churchill paid his tribute to the splendid youth of the Air Force whose exploits surpass those of the Crusades or the Age of Chivalry his voice trembled for a moment and for an instant he hesitated. The story was grim but even if these islands were invaded, as the Prime Minister did not believe, even then the war would be continued under the sheltering power of the Navy from the Empire overseas. It is a world war in the literal sense in which we are engaged, a war in which there can be no neutrals, for neutrality has no meaning except opportunity for the aggressor.

* * *

A stern cheer of approval greeted the Prime Minister as he sat down and this was followed by a confused incident in which Mr. Lees-Smith rose to make "a few appropriate remarks," but the House would not listen and by direction of the Speaker Mr. Lees-Smith sat down. The importance of this incident is that Mr. Lees-Smith has been elected chairman of the Labour Party committee and has been occupying the seat on the front Opposition bench traditionally reserved for the leader of H.M.'s Opposition. But there is no opposition in the literal sense of the term, and whether any opposition arises remains to be seen. His Majesty's loyal Opposition is in fact so much a part of our constitution that the machinery of the House of Commons moves creakily without it. Last week Mr. Herbert Williams, a Conservative formerly holding ministerial office, was able to secure a supply day when supported by some Conservative back-bench members. This last Tuesday Mr. Maxton challenged Mr. Lees-Smith's right to speak after the Prime Minister's statement and members from all parts of the House, if not vocal, were audible. Captain Bellenger, a Labour M.P. in uniform just returned from the B.E.F., claimed his right to speak if a debate was to be held and there were other less articulate interjections. Although the House had a whole list of bills to deal with on Tuesday last the business was all disposed of before 6 P.M. and younger men in Parliament were making arrangements to change from civilian dress to army uniform. Mr. Oliver Stanley, the former Minister of War, has joined up and is now a lieutenant. Others will be doing the same.

* * *

But the work of Parliament goes on. A grave difficulty has arisen with regard to an excess supply of cocoa in West Africa over and above what the present markets can absorb or shipping space transport. It has therefore been proposed to destroy by burning or dumping into the sea £300,000 worth of cocoa which has already been paid for out of money provided by the British taxpayer. By the irony of politics the announcement of this fell to the lot of a Labour parliamentary secretary whose party has often furiously denounced food and crop destruction—coffee in Brazil and cotton in the U.S.A., for instance—as a sign of the decrepitude of capitalism. A number of members are determined if they can to find a way out of this difficulty even if it means giving the cocoa away.

Matters of this kind, questions of public health and the nutrition of the nation, the guarding of freedom of speech and criticism, and, above all, questions of the supply of war-materials—guns, munitions, aeroplanes—all these matters will come before Parliament. The administrative side of Parliament may be reduced to the essential elements of necessary stages of legislation, but the critical and revising function of Parliament is likely to reassert itself and to be of great value to the national effort we are making and which we must make as free men.

QUESTION TIME

Inoculation of Civil Population

Mr. H. J. PARKER asked the Minister of Health whether steps would be taken to inoculate the civilian population beginning with civil defence and other key-workers, against typhoid and tetanus, in case of the danger of epidemics following serious air-raids.—Mr. A. MACDONALD replied: I do not think that any such general inoculation of the civilian population is practicable or indeed advisable. Inoculation may, however, in particular circumstances and for some diseases be of value, and facilities are available for anti-typhoid and anti-tetanus inoculation where required.

Bombing of British Hospital Ships

Captain L. F. PLUGGE asked the Prime Minister whether, in view of the bombing of British hospital ships he would consider effective reprisals in some form or another against action of this kind.—Mr. C. ATTLEE, Lord Privy Seal, in reply said: The bombing of hospital ships and the machine-gunning of ambulances in France might be taken, in conjunction with the deliberate attacks by German aircraft on refugees on the roads of Belgium and France, as typical of the methods of terrorism being pursued by the German government. H.M. Government held themselves free to take such action as they might consider appropriate, but it was not their intention to exact retribution from the wounded or from women and children.

Women Specialists in Medical Services

Dr. E. SUMMERSKILL asked the Secretary of State for War whether he had now decided to include women

specialists in the medical services for the care and treatment of women auxiliaries.—Mr. R. K. LAW, Financial Secretary to the War Office, replied: It is not considered necessary to appoint women specialists in the medical service of the Army for the specific duty of treating women auxiliaries, in addition to the specialists already available. Women doctors employed in the Army are eligible for specialist appointments. Dr. SUMMERSKILL: Why is there this discrimination against women? Mr. LAW: I do not think there is any discrimination against women as such. It is the purpose of the authorities to get the best available medical attendance for members of the forces, irrespective of sex.—Dr. SUMMERSKILL: Is there in the Army any prejudice against women? Mr. LAW: I am sure there is no such prejudice.

Medical Practitioners and Military Service

Mr. T. E. GROVES asked the Parliamentary Secretary to the Ministry of Labour and National Service having regard to the procedure prescribed by the Minister of Health relative to the liability of medical practitioners for service with His Majesty's forces in the circular letter to insurance committees, dated May 11, 1940, in which no reference was made to a doctor's right of appeal on the ground of hardship, he could give an assurance that such right of appeal existed, and that no appeal would be rejected solely on the ground that the Central Medical War Committee had recommended the call-up of the appellant.—Mr. R. ASSHETON replied: Medical practitioners who are called up under the National Service (Armed Forces) Act have the same right as other persons so called up to apply for postponement on the ground of exceptional hardship. The function of the Central Medical War Committee is to advise as to the extent of civilian needs for medical practitioners, and there is no reason to suppose that the statutory authorities will reject applications for postponement because the Central Medical War Committee has recommended that the services of the applicant need not be retained for civilian needs.

Visits of R.A.M.C. Officers Overseas

Mr. GROVES asked the War Minister whether he would consider, in the interests of efficiency of the medical services, making it possible for medical men with the forces who had little or no experience of military medical work either to make visits to the forces overseas in order to learn at first-hand precisely the conditions prevailing or to receive courses of instruction from medical men with overseas military experience.—Mr. A. EDEN replied: It is a principle in the medical services of the Army that all medical officers receive the maximal amount of military medical instruction compatible with the rate of supply of these officers from civil sources and the military demands for their services with military units A number of medical officers from home commands have visited overseas units in order to see the conditions in which these units are working.

Alien Doctors

Mr. T. E. GROVES asked the Home Secretary whether he would favourably consider imposing a condition in respect of those alien doctors of enemy nationality, including refugees, who had been and might be permitted to practise in Great Britain, that, when within the age-groups of British subjects compulsorily called up for service, the continuance of their permit was contingent upon their undertaking some form of national service and upon their not practising to the prejudice of the absentee British doctors.—Sir JOHN ANDERSON replied: I have no doubt that the majority, if not all, of the foreign doctors would be willing to undertake some form of national service in their own profession, but my information is that the medical profession would not look with favour upon this proposal. In pursuance of the Emergency Powers (Defence) Act, 1940, these foreign doctors like other people may be required to place their services at the disposal of His Majesty, and there will be power to utilise their services in any way which may be found appropriate in the national interest.

Sir ERNEST GRAHAM-LITTLE asked the Home Secretary what was the composition of the Home Office advisory medical committee dealing with the admission to Great Britain of foreign medical practitioners; who was the secretary of this committee; what was the total number of foreign medical practitioners entering this country since the German invasion of Austria in March, 1938, who had been placed on the medical register and allowed to remain in this country without such registration, respectively; how many of these were of German, Austrian or Czechoslovakian nationality, respectively; and whether any precautions were adopted, or were now in operation, to prevent enemy agents from being included in these admissions and allowed to remain at liberty.—Sir JOHN ANDERSON replied: After the invasion of Austria and Czecho-Slovakia my predecessor, after consultation with the medical profession, decided that fifty Austrian and fifty Czech refugee doctors might be allowed, provided they obtained a British medical qualification, to practise in this country. Of these hundred persons only four, all of whom are Austrians, have as yet obtained a British medical qualification. The bona fides of all the doctors so admitted to this country was carefully tested before they were allowed to come here, and since the outbreak of war each case has been examined by one of the tribunals appointed for the purpose. The committee which advised the Home Office in the selection of these doctors consisted of the following persons: Sir Robert Hutchison (chairman), Sir Cuthbert Wallace, Sir William Willcox, Dr. J. C. Anderson, Sir Girling Ball, Dr. P. M. d'Arcy Hart, Prof. Samson Wright, Mrs. M. Ormerod, and Mrs. Y. Kapp (secretary).

Fees for Air-raid Casualties

Mr. GROVES asked the Minister of Health whether he was aware that at its last meeting the local medical and panel committees for the county of Kent unanimously approved a resolution declaring that a sufficient domiciliary medical service could not possibly be given to persons injured in air-raids for the sum of 16*s.* a year; and whether action would be taken to meet this point.—Mr. MACDONALD replied: This resolution has not been reported to me, but in any case I see no reason for departing from the scheme which was accepted on behalf of the profession as a whole.

Dental Mechanics

Mr. W. A. BURKE asked the Parliamentary Secretary to the Ministry of Labour and National Service if the committee of inquiry into the conditions of labour of dental mechanics had yet issued a report.—Mr. ASSHETON replied: I am informed that the report of the committee set up by the professional associations regarding dental mechanics is almost completed.

Evacuation of Old People

Mr. ROBERT MORRISON asked the Minister of Health if he would arrange an evacuation plan for old people.—Mr. MACDONALD replied: Plans for the evacuation of school-children are already taxing accommodation in the reception areas very severely, and I am afraid that it is not practicable to include within the Government's evacuation scheme special arrangements for the removal of large numbers of old people.

Blood-transfusion Services

Mr. ROSTRON DUCKWORTH asked the Minister whether sufficient supplies of blood for transfusion had now been guaranteed; and, if not, whether he could make a detailed statement on the subject to ensure adequate public response.—Mr. MACDONALD replied: Special measures have been taken in the London area and a number of large provincial centres to obtain a sufficient supply of blood for transfusion, and I have no reason to think that the general position is unsatisfactory.

Cash-and-Carry System for Milk

Dr. E. SUMMERSKILL asked the Minister of Agriculture whether he intended to make cheap milk available by eliminating the high cost of distribution and introducing the cash-and-carry system advocated by authorities on dietetics.—Mr. R. BOOTHBY, Parliamentary Secretary to the Ministry of Food, replied: The Minister has been discussing these questions with the milk distributors and a statement of Government policy will be made shortly.

Nutritive Value of Bread

Major W. H. CARVER asked Mr. Boothby whether he was satisfied with the present position with regard to the nutritive value of bread generally sold to the public in this country; whether he had yet been able to consider the recommendation sent to him by a group of members of the House of Commons interested in the scientific aspect of this matter; and whether he proposed to take any steps in the matter having regard to the desirability of enabling the public to obtain the maximum nourishment from bread. Mr. BOOTHBY replied: The whole question of the nutritive value of bread is now under consideration and I am not at present in a position to make any statement.

Sir FRANCIS FREMANTLE: Has this question not been settled twenty years ago?—Mr. BOOTHBY: Not so far as I am aware.

Treatment of Tuberculosis in Scotland

Mr. W. GALLACHER asked the Secretary of State for Scotland what was the number of beds reserved for tuberculosis in Scottish hospitals and sanatoria, and available for immediate occupation; also the number of such beds expressed in a percentage of annual tuberculous deaths for Scotland.—Mr. ERNEST BROWN replied: The desired figures are 4,300 beds and 122 per cent.

MEDICAL NEWS

University of Cambridge

Prof. F. J. Browne has been appointed a substitute examiner in midwifery for part I of the final M.B. examination in June in place of Mr. Frank Cook who is unable to act.

Changes in the regulations for the diploma in medical radiology and electrology made in 1937 shortened the course for this diploma from 9 to 6 months. It was found that this shortened course gave insufficient time for teaching physics for part I and diagnostic clinical radiology for part II. It has therefore been decided to return to the normal course. It had also been agreed to discontinue the diploma in 1941, but the Director-General of Army Medical Services has pointed out that this would seriously affect the training of radiologists for the R.A.M.C. The examination will therefore continue to be held till the university determines otherwise.

Society of Apothecaries of London

At recent examinations the following were successful:

Surgery.—C. Cotterill, N. P. Desai, B. Gallivan, A. G. Hick, and F. G. Pattrick.

Medicine.—C. Cotterill, D. S. Edwards, G. G. France, A. G. Hick, K. W. N. Palmer, and W. E. Whaite.

Forensic Medicine.—C. Cotterill, D. S. Edwards, G. G. France, A. G. Hick and K. W. N. Palmer.

Midwifery.—C. Cotterill, R. G. Feast, A. G. Hick, and C. H. Wood.

The following candidates, having completed the final examination, are granted the diploma of the society entitling them to practise medicine, surgery and midwifery: C. Cotterill, Sheff.; N. P. Desai, Bombay and W. Lond.; D. S. Edwards, Middlesex; R. G. Feast, Birm. and Roy. Coll. Edin.; G. G. France, Camb. and Guy's; and A. G. Hick, Leeds.

University of Liverpool

At recent examinations the following were successful:

D.T.M.—C. W. Hossack, I. Kitchlew, and T-L. Tan.

D.T.H.—M. P. Browne, E. S. Dismorr, Frances Dooley, J. M. French, D. B. George, M. H. Hafezi, Rebecca Koshi, I. H. Marrable, J. D. Munroe, I. Soorani, and H. Stott.

Royal Faculty of Physicians and Surgeons of Glasgow

At a meeting of the faculty on June 3, with Mr. Roy F. Young, visitor, in the chair, Dr. R. W. Crocket (Penshurst, Kent) and Dr. A. L. Goodall (Glasgow) were admitted to the fellowship. Mr. A. D. McIntyre, L.D.S., was admitted a higher dental diplomate of the faculty.

British Orthopædic Association

At the annual meeting of the association on May 3, over which Prof. T. P. McMurray presided, several short papers were read during the morning. Mr. W. R. D. Mitchell (Liverpool), from his results in 169 patients with tuberculous arthritis of the ankle and tarsus, recommended prolonged and conservative treatment in children, but amputation without delay in adults, for he said that in them tuberculous lesions were apt to appear in other parts of the body after conservative treatment of the original focus. Mr. Robert Stirling (Edinburgh) had obtained good results in 16 patients with spastic paralysis from extirpation of the pronator quadratus muscle followed by intensive re-education of the biceps and supinator muscles. Mr. H. A. Brittain (Norwich) outlined the advantages of ischio-femoral extra-articular arthrodesis of the hip as opposed to ilio-femoral, especially in the late treatment of tuberculous disease. Mr. Norman Capener (Exeter), in a review of spondylolisthesis, discussed the importance of a proper appreciation of stresses and strains in orthopædic conditions. At all ages he advised conservative treatment of spondylolisthesis, except when increasing displacement was present in adolescence, and when pain persisted. In both these exceptions a posterior spinal fusion should be performed. He condemned the anterior transperitoneal fusion as unnecessary and dangerous. Mr. F. W. Holdsworth (Sheffield) emphasised that in dislocation of the carpal semilunar manipulative reduction of a recent injury could most easily be achieved by traction in palmar flexion since this position opened up most widely the space between the os magnum and the radius. In injuries neglected for longer than 14 days excision of the semilunar provided better results than operative replacement. Mr. V. H. Ellis (London) discussed the reaction of bone to the pressure of fluctuant tumours. He said it was generally agreed that osteoclasts are the only cause of bone absorption, which is the normal response of bone to continuous pressure, but there are differences between the results of pressure by hard and by fluctuant tumours—e.g., aneurysm, abscess, bursæ. In these, although absorption takes place, there is always a line of resistance formed by osteoblastic activity.

In the afternoon members of the association attended a clinical demonstration at the Royal National Orthopædic Hospital. At the dinner held the same evening the guests of honour were Sir William Macarthur, director-general of the Army Medical Services, and Colonel J. A. MacFarlane, of the Canadian Army Medical Service.

Naval Honour

The officers' decoration of the Royal Naval Volunteer Reserve has been awarded to Surgeon Commander E. E. D. Gray.

Massage Corps

In 1937 the Chartered Society of Massage and Medical Gymnastics decided to organise a massage corps, and an explanatory leaflet and enrolment form was sent to every member of the society. Some 6000 members have since enrolled in the mobile section for service at home or abroad, in the immobile section for service in their own town or city, or in a special section for those already attached to hospitals or units which will require their services in time of war. An organiser has been appointed to each of the Ministry of Health's regions for hospital services. Members have been graded according to their experience and qualifications, taking into account special experience in such subjects as plaster work and orthopædic work. Refresher courses have also been held. The Ministry of Health has accepted the corps as the enrolling body for massage personnel, and at the suggestion of the Ministry a supplementary list has been set up for the enrolment of qualified masseurs who are not members of the society.

CORRIGENDUM.—In the leading article on vitamins D_2 and D_3 in our issue of May 25 a sentence in the second paragraph on page 970 should read: "The value for vitamin D_2 is by definition 40,000 I.U. per milligramme . . ."

NOTES, COMMENTS AND ABSTRACTS

THE TRIANGULAR BANDAGE

FOR several reasons the art of bandaging has largely disappeared from the medical profession. The greater use of plasters has lessened the need for the firm, even pressure of a bandage, and the student now has little time for the intricate twists and turns that gladdened his predecessors. A few nurses can still bandage well, but the finer points of bandaging are now only appreciated by the amateurs in the first-aid organisations, and here a line of cleavage has developed. The medical and nursing professions use the roller bandage, the first-aiders the triangular. What are the reasons for this? Probably it is a question of supply, for good roller bandages are expensive. They are hard to wash, take a long time to dry, are difficult to re-roll and have seriously deteriorated when all this has been done. Triangular bandages may, in the first instance, cost more, but they are readily washable and dry rapidly, and can easily be ironed out and used again and again. But there is another difference between the two schools of thought. Students and junior pros may imagine they can put on a roller bandage by the light of nature; no-one can imagine this with the triangular. Each manœuvre has to be learnt by heart and continually rehearsed. This is exactly the sort of training needed for someone who is going to prepare much and practise seldom. It would therefore be inadvisable for the first-aid associations to change from the triangular bandage to the roller. Should every medical student be trained in its use before he qualifies? Most assuredly not. He already has to learn more than the human brain can bear, and few medical men and women take up the specialty of first-aid under ordinary circumstances. At the present time, however, that number is much increased, and many doctors who have never used a triangular bandage have got to learn its use in order to teach it to others. "Triangular Bandaging without Words" (John Bale, 1s.) will help; it is cheap, will go in the pocket, and does not spoon-feed because it consists of diagrams only, leaving the student to think out the details himself.

INFANT FEEDING

Dr. Lalit K. Mitra has packed into a small space a great deal of information concerning "Modern Technique in Infant Feeding" (Calcutta, 1939, pp. 133). If at times brevity makes him appear somewhat dogmatic he always shows plenty of good sense. He deals first with the management of breast-feeding, goes on to describe artificial feeding with fresh milk mixtures, analyses proprietary foods and discusses their particular uses and merits. Mixed feeding, feeding after weaning and the feeding of premature and ailing infants are also considered.

J. PATH. BACT.

THE May issue completes the 50th volume of our valued contemporary and even in this stern time a jubilee should not pass without a note of friendly recognition.

NEW PREPARATIONS

TUBERCLE ENDOTOXOID (B.D.H.) is a preparation of the tubercle bacillus from which the toxicity has been eliminated. It is issued by British Drug Houses Ltd. (London, N.1) in rubber-capped vials of 1 c.cm. and 3 c.cm. The results of clinical trials with it were reported in *Tubercle*, 1939, **20**, 397.

CARBACHOL (A. & H.) is carbaminoylcholine chloride, an ester of acetylcholine issued originally under the trade name Doryl. It exerts a therapeutic action similar to that of acetylcholine but more powerful and more prolonged. It is active when given by the mouth or by injection. Messrs. Allen & Hanburys have issued it in tablets containing 0·002 g. and in ampoules containing 0·000 25 g.

SULPHATHIAZOLE IN GONORRHŒA

GOOD results are reported by J. Gaté and P. Cuilleret (*J. Méd. Lyon*, May 20, 1940, p. 187) in the treatment of acute gonorrhœa in the male with sulphathiazole and with sulphamethylthiazole. Up to December, 1939, they had treated 68 patients with sulphathiazole. A total amount of 9 g. was given in doses spread over twenty-four hours, and a single day's treatment rapidly cleared the gonococci from the urethra without any local measures. All the patients were cured, as established by a careful follow-up, with provocative tests. Tolerance to sulphathiazole was very much better than to sulphapyridine. Cyanosis was seen in only one case. Sulphamethylthiazole was used in 41 cases; the drug was given by mouth in doses of 1 g. at intervals of two or three hours until 9 g. had been administered in twenty-four hours. After this course each patient rested for another twenty-four hours, and then provocative tests almost always showed a complete disappearance of gonococci from the urethra. All these patients were treated in hospital, so that proper supervision could be exercised. Scalding became less after eight hours' treatment—i.e., after 3 g. of sulphamethylthiazole had been absorbed—and usually disappeared finally after twelve hours' therapy. The urethral discharge began to be less purulent about the twelfth hour and clear towards the twentieth from the start of treatment. Tolerance to sulphamethylthiazole was excellent, and none of the known complications of sulphonamide therapy was observed.

Births, Marriages and Deaths

BIRTHS

ANDERSON.—On May 29, at Hove, the wife of Dr. J. M. Anderson—a daughter.

BICKERTON.—On June 1, at Gerrard's Cross, the wife of Wing Commander J. Myles Bickerton, F.R.C.S., R.A.F.V.R.—a daughter.

BODEN.—On May 31, the wife of Major Geoffrey Boden, R.A.M.C.—a daughter.

BREWER.—On May 28, at Luton, Elizabeth (née Nickell-Lean), the wife of Dr. H. F. Brewer—a son.

DEAN.—On May 27, in Edinburgh, the wife of Flight-Lieutenant W. J. Lyon Dean, M.B.—a daughter.

PARSONS-SMITH.—On May 27, in London, the wife of Dr. Gerald Parsons-Smith—a daughter.

MARRIAGES

BARTON—BARTON.—On May 28, at Kingston-on-Thames, James Kingston Barton, M.R.C.P., to Elizabeth Ellen Barton.

MUNDY—EDSALL.—On June 1, at Kensington, Norman Mundy, Surgeon Lieutenant, R.N.V.R., to Gwendoline Edsall, of Wimbledon.

RABAN—SCOTT.—On June 1, at Hatfield, John Pridmore Raban, Major R.A.M.C., of Harpenden, to Evelyn Margaret Scott, of Woodley, Berks.

WATSON—GILCHRIST.—On June 1, in Glasgow, George Ian Watson, M.D., to Caroline Murray Gilchrist.

YATES—DUPLOCK.—On June 1, at Dronfield, Arthur Gurney Yates, M.D., of Sheffield, to Doris Hope Duplock, of Dronfield.

DEATHS

CLOSE.—On May 29, at Wimbledon, Colonel Joseph Kinnear Close, M.D. R.U.I., Colonel I.M.S. (retd.).

HURTER.—On June 3, in Liverpool, Herbert Richard Hurter, M.D., hon. LL.D. Lpool.

LEECH.—On May 30, at Alnmouth, Northumberland, Sir Joseph William Leech, M.P., M.S. Durh., F.R.C.S.

O'SHAUGHNESSY.—In May, in Flanders, Laurence O'Shaughnessy, M.D. Durh., F.R.C.S., Major, R.A.M.C.

ROWE.—On May 28, at North Stifford, Essex, John Joseph Stephen Rowe, L.M.S.S.A., late of the Seamen's Hospital, Tilbury, aged 76.

STEWARD.—On May 31, at Kingswood, Francis James Steward, M.S. Lond., F.R.C.S.

VAN BUREN.—On May 29, at Plymouth, Asa Claude Alexis Van Buren, M.D. Lond.

WADE.—On May 30, in a London nursing-home, Rubens Wade, M.R.C.S., senior anæsthetist to St. Bartholomew's and the Royal Northern Hospitals.

ADDRESSES AND ORIGINAL ARTICLES

PULMONARY TUBERCULOSIS
DIAGNOSIS AND SOME ASPECTS OF TREATMENT

BY F. G. CHANDLER, M.A., M.D. Camb., F.R.C.P.
PHYSICIAN TO ST. BARTHOLOMEW'S HOSPITAL, LONDON; SENIOR PHYSICIAN TO THE LONDON CHEST HOSPITAL

(*Concluded from p.* 1037)

IF the lesion, in spite of the measures already outlined, does not heal; if it increases; if cavitation develops or hæmoptysis is uncontrolled; if financial, social or political considerations make early mobilisation essential; if there is a conjunction of diseases, such as diabetes and tuberculosis: then other methods of treatment must be considered. These methods may be embraced in the unhappy term "collapse therapy." In spite of its obvious absurdity, it has become established by usage, and it is not easy to substitute another single word to convey the same conception. Gravesen has suggested "relaxation therapy," and this expresses much better what we set out to achieve. Yet, when the lung is completely closed and rendered functionless by a well-planned thoracoplasty, the term "relaxation" is a euphemism. However, on the whole "relaxation therapy" is perhaps to be preferred to "collapse therapy."

ARTIFICIAL PNEUMOTHORAX

The simplest form of relaxation therapy is artificial pneumothorax, one of the most ingenious and dramatically successful methods of treatment ever devised, though from other points of view one of the most unsurgical and "groping in the dark" procedures imaginable, in that one is searching for a potential space that may not exist. If one fails to find it, it is difficult to know for certain if there is no space or if one has failed technically. Moreover, the termination of the treatment is a matter of guesswork, and we are forced to play for safety. Nevertheless, it is the treatment of choice and the most gentle surgical method that can be employed.

I was greatly shaken by the experience of a distinguished expert, who, after making several attempts without finding a pleural space, finally cut down on to the parietal pleura after the original Brauer method, when he found a free pleural space and obtained a good pneumothorax with only one very wide adhesion, which he was subsequently able to divide. I think, however, that this is very rare. I make it my invariable practice, if I am unable to find a pleural space, to get a colleague to try later.

The action of an artificial pneumothorax in some ways is obvious, in others not. In favourable cases it will close cavities, stop hæmorrhage and probably prevent dissemination of the disease through the bronchi, the lymphatics and the blood-stream. But there is more in it than this. Large caseating or acute bronchopneumonic areas will heal rapidly and completely. It is probable that the condition of the lung as a culture medium is fundamentally altered, and that, in a "collapsed" or airless state, it is mechanically and nutritionally unfavourable to the growth of the tubercle bacillus. Coryllos (1933) says that the tubercle bacillus is a strict aerobe, requiring large amounts of oxygen for continuation of life and growth:

"It has been estimated that an equivalent weight of cultures of human tubercle bacilli consumes about three times more oxygen than the muscles of a dog at rest."

The effect of artificial pneumothorax in stopping hæmoptysis, fever, cough, sputum and night sweats is sometimes almost instantaneous. It shortens the wearisome period of enforced inactivity; it allows in some cases a very early mobilisation; it permits sea, sun and air baths. It is so well known and so universally employed that further comment is needless.

PLEURAL ADHESIONS

From now onwards I shall be talking almost entirely about adhesions. I shall have to restrict myself to them. This perhaps is not disproportionate; for, the moment we depart from purely medical treatment, the problem of adhesions begins almost to dominate the subject. Time will not permit me to survey such important procedures as thoracoplasty or operations on the phrenic nerves, which are well established, and the value of which is critically and admirably assessed by Alexander (1937); nor can I discuss two less well-established but valuable procedures—oleothorax and external drainage of large cavities.

Sometimes adhesion between the two layers of the pleura is complete or almost so, making artificial pneumothorax impossible. Sometimes the lung is adherent over a wide area. More often the adherent areas are localised, and both layers of the pleura become drawn out, with the consequent formation of string, cord, wide band or columnar adhesions of various dimensions and complexity. Such adhesions develop in probably over 80 per cent. of cases treated by artificial pneumothorax, rendering treatment ineffective in at least half of them. These adhesions, developing, as they tend to do, over the affected part of the lung, may prevent relaxation just where it is most wanted and prevent firm healing and the closure of cavities; or, if the cavity is closed, there is a danger of its reopening when the pneumothorax is terminated.

In many cases the adhesions may be divided or enucleated from the chest wall with the thoracoscope, originated by Jacobaeus. This has been called internal pneumolysis, meaning "lung freeing." Which method is used—division a few millimetres or centimetres from the chest wall or enucleation from the chest wall itself—will depend entirely on the type of the adhesion. Some use electrocautery, others diathermy coagulation followed by electrocautery. Treatment by the diathermy current alone has been almost abandoned.

This intervention is being increasingly used. A vast array of cases could be cited where a completely ineffective pneumothorax has been converted into an effective one; where large cavities held open by adhesions have closed completely and remained permanently healed. There are many patients who, before the division of the adhesions, had no hope of recovery, but after it, have recovered, have lost all symptoms, have become free from tubercle bacilli, and have been, so far as can be judged, permanently cured. Many cases have been watched more than ten years. Though the work has grown enormously in the last five or six years, it is probably still only in its infancy. The procedure has greatly increased the scope of treatment by artificial pneumothorax, and has prevented the necessity for much major surgery of the chest. By the use of procaine, the operation can be rendered completely painless.

As with any operation inside the chest, it cannot be said to be without risk. The operation demands the most careful technique, great patience and cautious judgment. Given these, the risks are few. Nevertheless, though few, they unfortunately include a complication which is one of the most serious and disheartening with which we have to deal in artificial pneumothorax—namely, the mixed empyema due to tubercle bacilli and pyogenic organisms. The adhesions may contain lung tissue, blood-vessels or tubercles, and perhaps infected lymphatics. The chief dangers therefore are hæmorrhage and empyema, the latter caused by cauterising through tubercles or by damage to the lung. Hæmorrhage

can be prevented by the use of the coagulating diathermy current before cauterising. This, however, adds to the complexity and expense of the apparatus required and may not be available in outlying centres; many expert workers use the cautery alone. With this technique, when bleeding does happen, coagulation is effected by cautery at dull-red heat. Some workers allow hæmorrhage to occur and stop it afterwards. To my mind, however, there is no question of the value of working in an absolutely dry and bloodless field, and there are times when diathermy alone can stop a brisk hæmorrhage.

Empyemas.—A pure tuberculous empyema is probably caused by cutting through tubercles on the pleura or in the adhesion. This cannot altogether be prevented, for the tubercles are not always visible, or, if they are visible, it may be thought right to risk cauterising through them. Fortunately, this is the more favourable type of empyema and may often be left entirely alone or treated conservatively. This statement may appear unwarranted to many workers, but I am accumulating evidence which I hope to publish later.

It is another story altogether with the mixed empyema due to tubercle bacilli and pyogenic organisms, which is almost invariably caused by inadvertently cauterising the lung, by sloughing afterwards, by rupture of a thin-walled cavity, or by the tearing of the lung by a remaining cord adhesion which should have been divided. This mixed-infection pyopneumothorax is, as I have already said, one of the most difficult problems we have to face in thoracic work. It is to avoid this serious complication that Maurer (1930) has emphasised the enucleation method. It is certainly better to enucleate an adhesion when there is no real necessity than to run the slightest risk of injuring the lung. Fortunately, the incidence of these complications can be kept down to very small figures. Thus, to take two series of cases that have been subjected to the most critical and minute analysis:—

Brock (1938a) reports 360 consecutive cauterisation operations, with 5 cases of tuberculous empyema and 5 cases of mixed empyema.

In my clinic, working in conjunction with Drs. E. H. Hudson and J. Smart, in a series of 539 consecutive cauterisation operations, I have noted 7 tuberculous empyemas, 8 mixed empyemas, and 1 empyema caused by *Staphylococcus albus*. Some of these, however, developed several months after operation. In this series hæmothorax has occurred once only, though bleeding, easily controlled by diathermy, has occurred on several occasions, chiefly in the early cases of the series.

Open operation for division of adhesions.—In dealing with adhesions it might seem more in accordance with surgical principles to open the chest, to separate the adhesions from the chest wall under ordinary vision, and to tie or to coagulate any bleeding-point. Curiously enough, though this has been attempted several times, it has proved a failure over and over again owing to the supervention of empyema. Why this should be so it is difficult to say. It is probably due to cutting into lung tissue owing to the fact that the adhesion has not been strictly enucleated when it should have been, or that a wide enough disk of parietal pleura has not been separated. Internal pneumolysis by thoracoscopic methods has proved infinitely safer. When, however, the adhesions are not amenable to thoracoscopic division, or when the attempt would be dangerous, the problem can be tackled by extrapleural pneumolysis.

Extrapleural pneumolysis.—A portion of rib is resected at some convenient point and the parietal pleura carefully stripped and pushed from the chest wall from without inwards, as in the extrapleural pneumothorax described below. If the adhesions are localised, this will leave a disk of parietal pleura, to the centre of which the adhesions are attached. This disk can then be cut through peripherally, well away from the attached lung, and the lung, with the adhesions and disk of attached parietal pleura, allowed to fall down into the pleural cavity. This method, moreover, is applicable not only when the adhesions are circumscribed to a definite area but also when the whole of the upper lobe is attached to the chest wall (figs. 3, 4 and 5). Within its proper indications it is of the greatest value. I have called this extrapleural pneumolysis. The affected portion of lung has not merely been pushed inwards but has also been freed from the chest wall. Unfortunately, there is a great confusion in the terminology. The word pneumolysis, or pneumonolysis, means lung freeing, and the word apicolysis should mean freeing of the apex. Apicolysis, however, has been used to include extrapleural stripping, the extrafascial strip of the Semb type, and plastic operations; and the word pneumonolysis is used by Alexander (1937) to mean the separation of the lung and pleura from the chest wall and the filling of the space thus created with paraffin, pedicled pectoral muscles, breast, masses of fat, gauze, rubber sheeting, inflatable rubber bag or other substance. This is called plombage in some countries. It is better that the term extrapleural pneumolysis should not embrace plastic operations or plombage.

Time does not permit further reference to plombage. The subject is full of interest and promise, and the method, if successful, would save the patient the frequent and prolonged treatments needed in pneumothorax therapy; but, in spite of repeated attempts to perfect the method, it has never really established itself. Paraffin wax is the substance most commonly used. This may shift its position, irritate the surrounding tissues, or become extruded through a sinus. Tuffier made the first experiment in 1893. In 1910 he used fat as a filling substance. Be it noted that in his first attempt he employed no packing substance. Later he tried air, but without success.

Extrapleural pneumothorax.—If the lung is completely adherent; if it is adherent over a wide area; if the adhesions are widespread and not amenable to treatment by the procedures described—then extrapleural pneumothorax should be considered. In such cases, in the past, thoracoplasty has been advocated. Much as we admire the skill and ingenuity of the surgeons who have been the pioneers and improvers of the technique of thoracoplasty, we cannot but regard it as a terrific and mutilating operation, one that offends the æsthetic sense and the craftsmanship of the surgeon. It may need several stages, and, worst of all, we cannot be certain of the issue. It may not achieve our aim, or there may develop an extension to the other side. Moreover, many patients are unsuitable for this operation because of their condition, their age, or the involvement of both lungs. It will be realised that I am emphasising the objections. I would not have it thought that I intend an attack on thoracoplasty. There are many who owe their lives to this procedure. Nevertheless, physicians and surgeons alike have wished for some more gentle and less mutilating method. Great hopes, therefore, were placed in the recent revival of the extrapleural pneumothorax. This procedure involves a relatively small external incision, the resection of a portion of one rib—say the third, fourth or fifth rib posteriorly—and the careful and infinitely gentle stripping of the parietal pleura from the endothoracic fascia of the chest wall by the finger, a blunt instrument or gauze. By this means the whole of the upper lobe, or more if necessary, can be separated from the chest wall, and the resulting space filled with air, as in an ordinary pneumothorax. It may seem extraordinary that the air will remain in this position and not escape into the tissues, but such is the case.

There are two types of this operation: type I, where there is no pleural space and no artificial pneumothorax (fig. 1); and type II, where there is a partial artificial pneumothorax and the rest of the lung is adherent to the chest (fig. 3). In type I the extrapleural pneumothorax (fig. 2) is maintained by refills of air, as in an ordinary pneumothorax. In type II there are two possibilities: either the extra-

and intrapleural pneumothorax can be kept going as separate things (fig. 4); or the shelf of pleura that separates them can be divided, which, after Tudor Edward's demonstration of its feasibility, has become the more common, if not the invariable, practice. This throws the two air spaces into one, making a single pneumothorax of the whole thing (fig. 5), which has the double advantage of giving far better collapse and of making only one air space to be refilled with air subsequently. There is a further advantage, in that it avoids the danger of the uncontrolled stripping of the pleura to be mentioned later. When the shelf between the intra- and extrapleural pneumothorax is divided, the procedure had perhaps best be called extrapleural pneumolysis.

Though an extremely delicate operation and one necessitating great technical skill and judgment, and

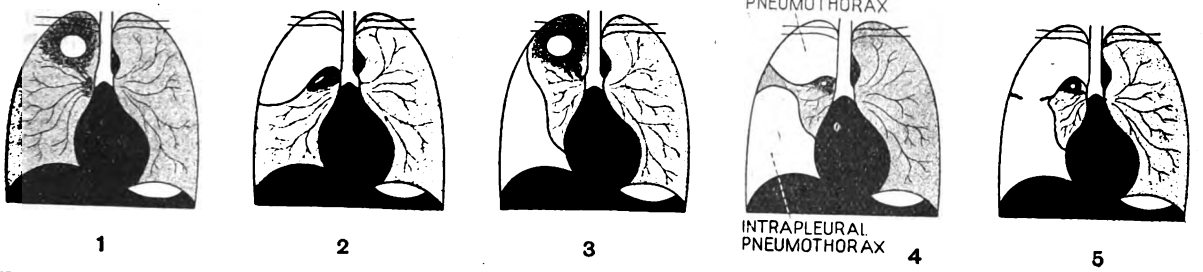


FIG. 1—Right lung adherent to chest wall, making induction of artificial pneumothorax impossible.

FIG. 2—Right upper lobe freed from chest wall extrapleurally, making extrapleural pneumothorax.

FIG. 3—Right upper lobe adherent to chest wall, with artificial pneumothorax below.

FIG. 4—Extrapleural pneumothorax above and intrapleural pneumothorax below, separated by a shelf of pleura.

FIG. 5—Extrapleural pneumothorax above and intrapleural pneumothorax below have been made into a single cavity by division of the intervening shelf of pleura—now better called extrapleural pneumolysis.

though fraught with many dangers if the greatest care is not taken, extrapleural pneumolysis disturbs the patient little. There is no mutilation, and subsequent re-expansion of the lung can take place. The dangers of this measure, as with thoracoscopic internal pneumolysis, are hæmorrhage, damage to the lung and sepsis. There is also another danger in type I of this operation—namely, that bleeding or exudation of fluid into the extrapleural space may, by raising the pressure, cause further stripping of the parietal pleura from the chest wall. This would be of no serious consequence unless the lung or a blood-vessel were ruptured. Since such stripping is uncontrolled, the danger of such a rupture is obviously present. For this reason some surgeons insert a small drainage-tube. Such was the practice, for example, of Graf of Dresden, who, working since 1934, is largely responsible for the renewed interest in and enthusiasm for this method. There are objections to drainage, however, and probably the safest thing is to read the pressures often and to correct any unduly high positive pressure and to remove fluid.

Apparently, with our present knowledge, it is impossible to prevent a fluid exudate from appearing from time to time after any procedure on or near the pleura. The pleura is a mysterious membrane. At one time it can be cauterised and coagulated by diathermy extensively for an hour and a half and not a drop of fluid will be excreted. Another time the mere passage of an instrument through the pleura will provoke a sharp reaction and a large effusion. If serous fluid appears in an extrapleural pneumothorax, it must be replaced with air. If it is threatening to obliterate the space, this is an indication for the use of pure olive oil. Time does not permit further reference to this valuable but partly discredited method, which I have fully described elsewhere (Chandler 1938), except to emphasise that pure olive oil alone should be used without any addition of Gomenol, which serves no useful purpose but merely acts as an irritant, and that olive oil is preferable to paraffin oil. So far as I know, olive oil remains unchanged. I have seen it, after eight years, as clear as when it was introduced into the pleural cavity.

At the present time there is a wavering of opinion concerning the value of the extrapleural pneumothorax. Perhaps unsuitable cases have been chosen or certain technical difficulties have not been appreciated. Too many complications have developed, and there is a danger that this most attractive method may fall into discredit. It will be most regrettable if this comparatively gentle method has to be abandoned. The chief complications, in my experience, are infection of the space or its obliteration by blood. Both should be preventable. I should like to have quoted the views of various surgeons and to have given some detailed figures, but time does not permit. Nineteen cases came under my care in 1937 and 1938, and the results were satisfactory. There was no mortality, but the incidence of complications was rather high. In another series of twenty-two in 1939, however, the results were most gratifying—eighteen did well and lost their tubercle bacilli up to January, 1940, and had no serious complications. Again there was no mortality. These figures are most satisfactory, but it is too early to assess the ultimate value of the procedure in these particular cases. Further analysis shows that extrapleural pneumolysis is more satisfactory than a pure extrapleural pneumothorax. If, therefore, a partial inaffective pneumothorax exists this should not be terminated before sending the case for an opinion as to further operative procedures.

ENVOI

To conclude, in my view the things of fundamental importance in diagnosis are the symptoms, bacteriological examination of the sputum or of the fæces and radiography of the chest, and in treatment the most important factor is rest. The ideal of surgery should be to produce relaxation with the minimum of mutilation and disturbance of function, to limit this disturbance so far as possible and to aim at subsequent restoration of function. To this end the freeing or lysis operations, when they can be done, are theoretically better than the plastic.

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SERUM PHOSPHATASE IN CASES OF BONE TUMOUR

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AN increased amount of serum phosphatase has been recognised since the work of Kay (1930) as an accompaniment of many generalised diseases of bone, but the estimation of it has never become popular in localised diseases, such as osteogenic sarcoma, in spite of the fact that significant variations are often found in such conditions.

Previous work on the subject has appeared almost entirely in American journals. Simmons and Franseen (1935) and Franseen, Simmons, and MacLean (1939) described its use in a large series of cases of various types of bone tumour and were impressed with its clinical value in differentiating tumours and in detecting the onset of metastases. Although raised values were not entirely confined to any one type of tumour, the highest figures were seen in osteogenic sarcoma, and a rough parallelism was traced between the amount of ossification (judged either by radiography or by the morbid anatomy of specimens removed at operation) and the level of the serum phosphatase. Unexpectedly high figures were often found to be due to the development of metastases. Similar opinions have been expressed by Gutman, Tyson, and Gutman (1936), Woodard, Twombly, and Coley (1936), Woodard and Higinbotham (1937), and Roe and Whitmore (1938). The conclusion of greatest theoretical interest which arises from these papers appears to be this relationship between the serum phosphatase and the formation of new bone, suggesting that the osteoblasts are probably concerned with the secretion of the enzyme. We may anticipate our own conclusion by expressing agreement with this principle, the application of which appeared to afford a satisfactory explanation of our results.

RESULTS

The results presented here were obtained by performing serial estimations of serum phosphatase by the method of King and Armstrong (1934) on 28 cases of bone tumour. The normal range for this method is 3–13 units. Most of the patients were undergoing treatment by radium bomb and X-ray therapy at the Westminster Hospital Annexe.

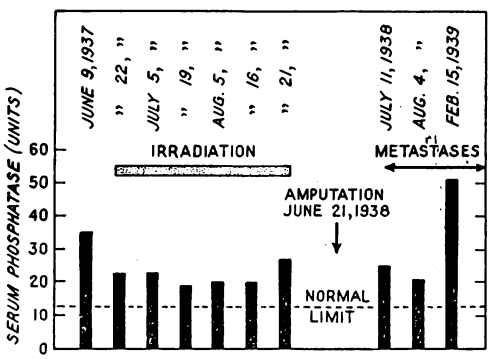

FIG. 1—Serum phosphatase in osteogenic sarcoma of tibia (case 5).

Osteogenic sarcoma.—The accompanying table shows that raised values were found in 11 out of 12 cases of osteogenic sarcoma. The highest reading (260 units) is believed to be the highest value for serum phosphatase yet published; it was in a patient with a large sarcoma of the humerus and much formation of new bone. Throughout this series the level of the serum phosphatase was roughly related to the amount of new bone formed, as judged by the radiogram. The only patient (No. 12 in the table) with a normal value had a purely osteolytic tumour of the scapula.

Osteoclastoma.—Raised values were found in 3 out of the 5 cases. The two patients who gave normal values had been given radiotherapy before the blood was taken; hence the values may not have been maximal at the time of estimation. In this group the relation of the phosphatase level to the degree of calcification shown in the radiogram was less close.

Ewing's tumour.—All 3 cases showed values near the upper normal limit, which is in accordance with the ineffective nature of the repair in this condition.

Metastases in bone.—Raised values were found in 6 of the 8 cases. The two normal readings were from cases of carcinoma of breast and submaxillary gland tumour, and in both of them the metastases appeared in the radiogram to be purely osteolytic.

Effects of radiotherapy.—Fig. 1 shows the typical effects of radiotherapy on osteogenic sarcoma. A fall in serum phosphatase was produced, but normal limits were not regained, suggesting either that the malignant osteoblasts had not all been destroyed, or that metastases had developed. After amputation of the leg for radium burn the serum phosphatase remained high, and a further radiogram of the chest revealed metastases, of which there was at this time no clinical evidence. Fig. 2 shows a similar case of osteogenic sarcoma in which normal values were regained for a time; a rise then took place which was associated with further extension in the tumour no longer adequately controlled by radiation. Fig. 3 shows a case of osteoclastoma in which the initial normal values rose above normal during the course of treatment, which was clinically satisfactory. We interpret this as indicating repair by normal osteoblasts after the osteoclastic tumour cells had been destroyed. A detailed account of this case has been given by Nissen (1939).

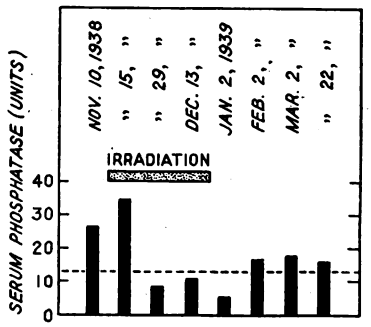

FIG. 2—Serum phosphatase in osteogenic sarcoma of femur (case 6).

Detection of metastases.—An attempt was made to determine the usefulness of the test in detecting the presence of clinically latent secondary deposits in bone. For this purpose 17 cases of carcinoma of the breast and 2 of prostatic carcinoma were selected at random from the wards. The breast cases showed readings ranging from 3 to 11 units and the prostate cases readings of 18 and 89 units. On the strength of the high reading in one prostate case a radiogram was taken, which revealed in the pelvic bones multiple metastases which had not been suspected.

DISCUSSION

The results as a whole appear to fit in well with the hypothesis that the increased amount of serum phosphatase in cases of bone tumour reflects the level of osteoblastic activity. This general statement assumes the exclusion of hepatic dysfunction and of the rise of phosphatase which takes place in toxic or obstructive jaundice or occasionally with multiple hepatic metastases. It follows that the significance of the results is quite different in osteogenic sarcoma, where the rise is probably due to secretion of the enzyme by the malignant osteoblasts, and in all other tumours, where any rise is presumably due to repair or

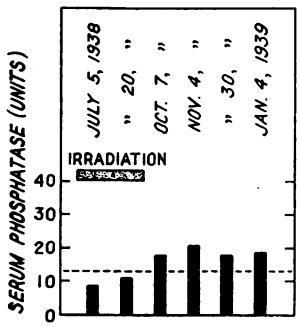

FIG. 3—Serum phosphatase in osteoclastoma of ischium (case 15).

attempted repair by normal osteoblasts. The question arises whether the estimations have any clinical value in cases of bone tumour, and our conclusions may be stated as follows:—

(1) In osteogenic sarcoma the test is of value in following the course of treatment and in detecting the onset of metastases. It appears from our cases that any persistent rise of phosphatase which cannot be correlated with the local appearances probably indicates metastases.

(2) In osteoclastoma and in Ewing's tumour the estimation merely reflects the attempts at repair, which are known to be present, and is not of any particular value.

(3) In secondary deposits in bone it is obviously useful to be able to detect clinically latent metastases, and our short series of cases suggests that this can be done in prostatic carcinoma. In this condition the estimation of serum phosphatase therefore appears to be a useful routine test, which might well be done before any radical operation is attempted. We may notice here a paper by Gutman and Gutman (1938), who describe an increase in both the acid and the alkaline phosphatase[1] in the blood in cases of "metastasising prostatic carcinoma." It appears from their paper that neither of these two phosphatases was increased unless definite bony metastases were present.

SERUM PHOSPHATASE IN CASES OF BONE TUMOUR

Case	Sex	Age	Diagnosis	Basis of diagnosis	Serum phosphatase† (highest)
			Osteogenic sarcoma of—		Units
1	F	15	humerus	Clinical	260
2	,,	18	femur	,,	87
3	M	16	,,	,,	87
4	F	64	ilium	,,	54
5	M	14	tibia	,,	51
6	,,	17	femur	,,	35
7	F	27	frontal bone	Autopsy	24
8	M	18	ilium	Clinical	20
9	,,	14	femur	,,	19
10	,,	19	tibia	Biopsy	16
11	F	41	humerus	,,	14
12	,,	73	scapula	Clinical	12
			Osteoclastoma of—		
13	M	8	mandible	Biopsy	53
14	,,	8	humerus	Clinical	27
15	F	36	ischium	Biopsy	21
16	,,	46	sacrum	,,	7
17	,,	44	ilium	Clinical	6
			Ewing's tumour of—		
18	M	14	tibia	Autopsy	19
19	F	14	orbit	Biopsy	10
20	M	20	jaw	Autopsy	13
21	M	67	Carcinoma of prostate*	Clinical	89
22	F	56	,, ,, breast*	,,	58
23	,,	29	,, ,, parotid*	,,	26
24	M	63	Hypernephroma*	,,	20
25	F	62	Carcinoma of vulva*	,,	20
26	M	62	,, ,, tonsil*	,,	20
27	,,	44	Submaxillary tumour*	,,	8
28	F	66	Carcinoma of breast*	,,	7

* Metastases in bone. † Normal 3–13 units.

SUMMARY

(1) The serum phosphatase in 28 cases of bone tumour is recorded.

(2) The results support the hypothesis that the level of the enzyme in the blood-serum reflects the degree of osteoblastic activity in the bones, assuming that the possibility of gross hepatic damage has been excluded.

(3) The estimation appears to be of some value in following the treatment of osteogenic sarcoma and in detecting the onset of metastases in this condition.

(4) The test can sometimes detect the presence in bone of latent metastases from other organs—e.g., prostatic carcinoma—and the test is suggested as a useful routine in this condition.

We thank the British Empire Cancer Campaign for financial assistance to one of us (N. F. M.) and Dr. R. J. V. Pulvertaft for the histological data and much helpful advice.

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1. The phosphatase with which this paper is concerned is the alkaline phosphatase.

LEUCOPENIA AND MUCOSAL LESIONS FOLLOWING SULPHAPYRIDINE THERAPY

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ASSISTANT PHYSICIAN TO THE MAREEBA BABIES' HOSPITAL

A WOMAN aged 47, who was born in London and had lived there most of her life, arrived in South Australia on a holiday two months before her present illness. She was first seen by one of us (C. F.) on Sept. 26, 1939. Her temperature was 104° F., respiration-rate 26, and pulse-rate 100. The systolic blood-pressure was 220 and the diastolic 120 mm. Hg. The usual signs of bronchopneumonia were present. Nothing else abnormal was found. She had had an attack of tonsillitis before leaving England and insomnia since then. She was well-nourished and described herself as a vegetarian, though milk and eggs were included in her diet. The accompanying figure shows the course of the disease. Two days after the onset of bronchopneumonia treatment with M. & B. 693 was begun, 11 g. being given in four days. The temperature became normal, and the drug was discontinued. Three days later the patient complained of pain in the right loin, and the temperature began to rise. Pyuria was found, and a second course of 11 g. of the drug in five days was given.

The day after the treatment ended the patient complained of a stinging sensation in the nose, itching of the eyes, and some catarrhal symptoms. It was thought that she might be sensitive to unaccustomed pollens, and flowers were removed from the room. Next day she developed conjunctivitis, a wheezing sound on inspiration, a slight sore-throat, and a morbilliform rash, which was most noticeable on the forearms, though it was present on the legs and to a lesser degree on the trunk and face. It spread rapidly and in forty-eight hours looked blotchy and purpuric, and the face became slightly cyanotic. The throat at this time, Oct. 13, two days after the appearance of the rash, became covered with a white membrane, which, within twenty-four hours, lined the whole mouth. The lips became cracked, and blood oozed from the mucous surfaces. A culture grown from a mouth-and-throat swab showed no pathogenic organisms, and a blood-culture was sterile. There was a leucocytosis of 13,000, with no reduction in the granulocytes, and the hæmoglobin was 90 per cent. (Sahli). On Oct. 15 the leucocytes fell to 5000 per

c.mm. and two days later to 3500. On this day the percentage of granulocytes was 77, lymphocytes 17, and monocytes 6. Sodium pentnucleotide 150 c.cm. and a blood-transfusion were given during this time of increasing leucopenia.

During the first fortnight of toxic symptoms—i.e., from Oct. 12, the seventeenth day of her illness—the state of the patient was deplorable. The eye symptoms (see below) became much worse. The edges of the lids were constantly glued together by exudate, and the patient was haunted by the fear of blindness. Swallowing became very difficult, and she could only take fluids. Cough was distressing and came on in paroxysms accompanied by stridor and expectoration of membranous shreds. The vagina and vulva were covered with exudate and white plaques which, on separating, left raw, ulcerated and bleeding surfaces. Micturition became painful, and the skin rash was irritable. On Oct. 26 improvement in the clinical condition was evident. Though the temperature was still high, the leucocytes were approximately 10,000 per c.mm. and the granulocytes 67 per cent. The mucosæ had begun to look more healthy. The cough was not so troublesome and expectoration was less. Swallowing was less painful and semi-solids could be taken. Exfoliation of the skin had begun. On the 27th she developed a pulmonary infarct, with signs at the base of her left lung. In spite of this, local and general improvement continued until Nov. 4, the fortieth day of illness and a month since the onset of toxic symptoms. On this day she developed a second pulmonary infarct, with severe pain in her left side and a large area of dullness at the base of the left lung. The pain was severe for four days, but in spite of this her general condition rapidly improved. The eyes showed conjunctival adhesions, the skin was still desquamating, the mucosæ of the mouth and throat were slightly reddened and glazed. The cough had disappeared. The patient left hospital on Nov. 16, the fifty-second day of her illness, feeling comparatively well and complaining only of photophobia.

The following account of the eyes was kindly written by Dr. Brian Moore :—

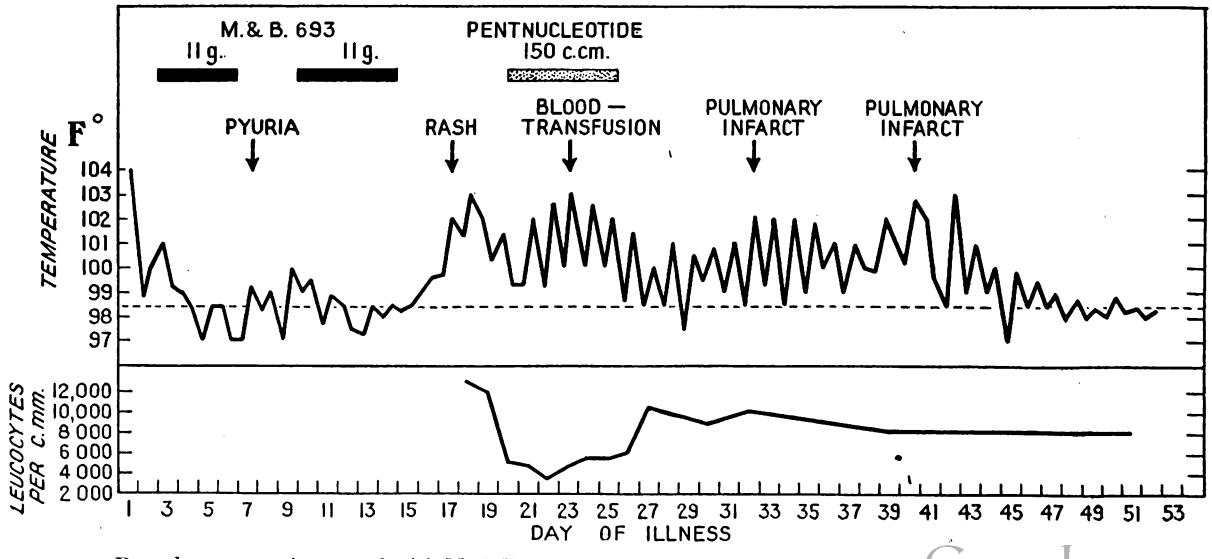
I first saw this case on Oct. 12, 1939, at Dr. Finlayson's request. The eye condition on this occasion gave no clue as to what was to come. There was a mild conjunctivitis, with no evidence of iritis or a corneal lesion. I saw the patient again five days later, when the eyes had become much worse, presenting a most extraordinary picture. The eyelids were sealed together along their entire margins by a membrane. An attempt to separate the lids stretched this membrane, which appeared translucent but showed no signs of breaking. It ended externally in an abrupt shelf about 1 mm. thick at the mucocutaneous line. I could free this gently with forceps and strip it off. The consistence was such that it separated almost in one piece, with practically no bleeding. When the eyes could be opened after this operation, the cornea was found to be intact. The bulbar conjunctiva was slightly injected, the palpebral more so. The conjunctival surface appeared generally sticky, but there was no real discharge. The margins were kept lubricated and were separated daily.

The lids became very tender, and, though the patient coöperated in every way, she resented handling and feared for her sight. During the next week bands of adhesions formed between the bulbar and palpebral conjunctivæ. Arising deep in the fornix they occasionally extended forwards almost to the lid margin. Some of these adhesions were so dense that they had to be divided with scissors. This proved a satisfactory method of treatment, for they did not recur. During this period small pustules, surrounded by some inflammation, appeared on the lids and added to the general discomfort. On Oct. 26, a fortnight from the onset of the eye symptoms, a further complication took place: an ulcer appeared on the right cornea just below the centre. Atropine was used, and the ulcer healed quickly.

As the patient's general condition improved, the "membrane" became easier to deal with and eventually ceased re-forming. For about ten days one had constantly to remove plaques which would otherwise have coalesced and gummed the lids together again. During this time an intense photophobia was present and persisted to some extent throughout the illness. At the end of three weeks the eyes, apart from a tendency to stickiness, were practically normal, although two conjunctival bands in each eye were made visible by pulling the lower lids strongly away from the eye. They showed as thin perpendicular folds.

I saw her again on Feb. 29, 1940, about four and a half months after her original illness. Her eyes were comfortable except for a tendency to stickiness. I found the thin conjunctival bands much as before. They had not increased in size and caused no limitation of movement of the eyes or loss of mobility of the lids.

I have never encountered the condition before or seen it reported. At one time during the attack there was an extraordinary resemblance to a case of pemphigus of the conjunctiva. One felt doubtful at times whether the persistent battle to free the lids of the membranous exudate was judicious. It was extremely tedious for the patient, who had so many other disabilities. However, in view of the result,



Bronchopneumonia treated with M. & B. 693 and complicated by leucopenia and mucosal lesions.

I think it must have been justified. One would infer from the behaviour of the conjunctiva that symblepheron of considerable magnitude would have ensued without persistent treatment.

Our thanks are due to Dr. C. T. Champion de Crespigny for his advice as a consultant and to Sir Stanton Hicks for his help in augmenting the supply of sodium pentnucleotide.

ERYTHROBLASTÆMIA

AND ITS VALUE IN THE DIAGNOSIS OF NEOPLASTIC INFILTRATION OF BONE-MARROW

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ERYTHROBLASTÆMIA is present when ordinary blood-counts show nucleated red cells in the circulating blood. I say ordinary blood-counts because occasionally, by extraordinarily long searching, probably especially after unaccustomed severe muscular exercise, one or two nucleated red cells may be found in the circulating blood of normal adults. Erythroblastæmia includes all primary or secondary leuco-erythroblastic anæmia—i.e., all cases in which the blood-picture shows anæmia and immature red cells (erythroblasts) and immature white cells (myelocytes). Erythroblastæmia may also occur without leuco-erythroblastic anæmia.

ÆTIOLOGY

The blood of newborn, especially of premature, infants usually contains a moderate number of nucleated red cells during the first week of extra-uterine life. Many nucleated red cells are likely to be present in the blood of newborn infants with inherited syphilis—a manifestation of the infantile hæmopoietic reaction towards the infection. Various other infections and toxic conditions in children are associated with reactive or regenerative erythroblastæmia. Among these one must especially remember Von Jaksch's anæmia (pseudoleukæmia or infantile type of splenic anæmia). Erythroblastæmia is a feature of fœtal erythroblastosis (including icterus gravis neonatorum and congenital universal anasarca) and Cooley's erythroblastic anæmia, a rare familial developmental abnormality mainly observed in families of Italian or Mediterranean origin settled in America.

Nucleated red cells may sometimes, but not always, be found in the blood when there is excessive erythropoiesis, whether primary—i.e., of unknown or of uncertain causation—or secondary—i.e., reactive, to compensate either for insufficient oxygenation of the red blood-cells or for some known kind of anæmia. The excessive erythropoiesis is primary or of unknown causation in erythræmia or primary polycythæmia, mostly with definite splenomegaly, of the Vaquez-Osler type and in acute erythræmic myelosis of infants, the extremely rare and fatal condition described by Guglielmo, which by description seems as if it might be a very acute erythroblastæmic variety of myeloid leukæmia in infants. In reactive compensatory polycythæmia due to insufficient oxygenation of the red blood-cells erythroblastæmia is rarely found. Such polycythæmia includes the polycythæmia of high altitudes; the compensatory polycythæmia in some congenital cardiac malformations and occasionally in acquired chronic valvular disease; and the polycythæmia connected with various types of pulmonary obstruction to the circulation of blood through the lungs. Anæmia leading to regenerative compensatory erythropoiesis sometimes associated with erythroblastæmia includes anæmia due to hæmorrhage and pernicious (Addisonian) anæmia and other types of infective, toxic, or metabolic anæmia.

There is no erythroblastæmia in non-regenerative (aplastic) anæmias, but in some cases of "clinical" aplastic anæmia the fact that there are no nucleated red cells or other signs of active compensatory hæmopoiesis in the circulating blood does not prove that erythropoiesis is not going on in the bone-marrow; it proves only that red cells are not entering the circulating blood from the bone-marrow. The diagnosis in such cases nowadays may be greatly aided by sternal puncture.

Among the rarer anæmias of uncertain origin in which occasionally during the rapid regenerative period there may be erythroblastæmia is the acute hæmolytic anæmia of Lederer. Nucleated red cells, notably megaloblasts, may constitute a striking feature of the blood during regenerative "blood-crises" in true pernicious (Addisonian) anæmia. The severe exacerbations in familial hæmolytic (acholuric) jaundice and even in the much rarer puzzling cases of supposed acquired hæmolytic jaundice may be accompanied by erythroblastæmia.

Erythroblastæmia or, as Janet Vaughan and others call it, leuco-erythroblastic anæmia often accompanies secondary neoplastic infiltration of the bone-marrow. It is hard to be sure whether this erythroblastæmia is part of an attempted erythropoiesis to compensate for destruction of the bone-marrow by the new growth, or whether it is to be regarded (at least in part) as due to some other kind of excitation of the erythroblastic elements in the bone-marrow by direct contact with the infiltrating neoplastic cells. These two causes probably work together in various proportions in different cases. Billings and Capps (1903) mentioned a case of neoplastic infiltration of the bone-marrow in which the blood-count showed over 90,000 nucleated red cells per c.mm. of blood; but the number may be much higher. The neoplastic infiltration is nearly always secondary to carcinoma. I do not think that any erythroblastæmia has been found in most cases of primary tumours of the bones (sarcomata) or of the bone-marrow, but nucleated red cells have been mentioned in blood-counts in myelomatosis (multiple myeloma).

It is not clear why in some cases of secondary neoplastic infiltration of the bone-marrow new bone is formed instead of bone being absorbed. Such osteoplastic results are relatively rare; the patients are mostly men with prostatic carcinoma, and the prostate need not be enlarged. Apparently in such cases the prostatic carcinoma pours into the blood-stream millions of carcinoma cells, which are held up mostly in the bones and bone-marrow, the innumerable metastases each consisting generally of only a few cells. Obviously the cancer cells must also be carried in large numbers to other tissues, where apparently they atrophy. Perhaps this may explain some of the rheumatic-like pains and general malaise of which the patients complain besides their more definite bone pains.

An example of the predilection of metastases for certain sites is the well-known predilection of metastases from suprarenal neuroblastoma in children (the Robert Hutchison type) for the orbits and skull. The experimental work of Takahashi (1915–16) and others, who injected intravenously carcinomatous or sarcomatous material, showed that a large proportion of the injected neoplastic cells disappeared after undergoing vacuolation, surrounded by leucocytes. Although the capillaries of the lungs formed a fairly efficient filter, some tumour cells passed through the lungs and produced metastatic tumours in various parts of the body, showing a predilection for certain sites.

The osteoplastic change increases not only the weight but also the thickness of the affected bones (prepared as museum specimens). I have called such bones the "secondary marble bones" (Weber 1935) in contrast with the rare developmental (mostly congenital) "primary marble bones" of Albers-Schönberg. In a case of the kind that I described in 1929 the osteoplastic change in the bones (specimens of which are in the museum of the Royal College of

Surgeons) was typical; but, the prostate not being enlarged, the diagnosis was not made at first, even after necropsy. In this patient's circulating blood the counts showed 622–121,856 nucleated red cells per c.mm. The spleen was somewhat enlarged and not soft, weighing 350 g. It is probably generally enlarged in such cases, but whether there is ever a myeloid (hæmopoietic) change in the spleen, as there is apparently in some of the cases of the Albers-Schönberg type, I do not know. In such cases the total leucocyte count is increased; in the above-mentioned case it was 15,200–51,200 per c.mm. According to Naegeli (1923), the changes due to neoplastic invasion of the bone-marrow include great increase in the leucocyte count, often with the presence of immature cells; and persistent presence of nucleated red cells, the normoblasts being more numerous than the macroblasts, which always show much polychromasia. As regards differential diagnosis by the blood-picture from pernicious anæmia, it must be remembered that the colour-index may sometimes be up to at least 1 in neoplastic cases.

In some cases of primary developmental "marble bones" (Albers-Schönberg type) there is a leuco-erythroblastic anæmia, but it does not seem to be proved that this and the accompanying splenomegaly are evidence of a hæmopoiesis to compensate for the diminution in the total amount of bone-marrow. A rare leuco-erythroblastic anæmia, associated with splenomegaly and often with a sclerosis of the bone-marrow, has been discussed by McMichael and McNee (1936) and others and called by Hickling (1937) "chronic non-leucæmic myelosis." The difficulty in understanding the pathology of these cases is increased by the fact that cases of true leukæmia have been observed in which a sclerosis of the bone-marrow was found at necropsy. Erythroblastæmia may be found in all kinds of leukæmia, both in myelosis, including erythroleukæmic cases, and in lymphadenosis and even in aleukæmic and leucopenic forms. In myelosis and erythroleukæmic cases the erythroblastæmia may be regarded as part of the primary disorder of hæmopoiesis, but in lymphadenosis (lymphatic leukæmia) the terminal erythroblastæmia may perhaps be due to a compensatory activity in the remaining erythropoietic marrow when much has been destroyed by the lymphoid infiltration.

NEOPLASTIC INFILTRATION OF BONE-MARROW

Erythroblastæmia is of value in the diagnosis of cases in which radiograms show a symmetrical uniform osteosclerosis in the pelvis. In such cases the question may arise whether the sclerosis, in spite of its being diffuse and uniform without any obvious localised foci, is due to secondary neoplastic infiltration or is an example of what by some has been called osteitis condensans ilii. Garré's "sclerosing osteitis" seems to be a chronic low-grade infection of the lymphatics of the bones and persists in spite of deep X-ray treatment. In Bársony and Polgár's cases (1928) of osteitis condensans ilii the sclerosis was not always strictly confined to the ilium; in their type of case the course seems to be benign and, apart from sacral and radiating pains, clinical signs (except radiological) are absent. Rendich and Shapiro (1936) think that nothing certain is known about the true nature of this condition, known to radiologists as osteitis condensans ilii. Shafer (1938) suggests that there are many causes, including the action of fluorides, phosphorus in small doses (large doses have the reverse effect), and lead.

CASE-RECORD

A man, aged 53, was readmitted to hospital on May 30, 1939, after having had, in February, 1937, a resection of the pyloric region of the stomach for carcinoma, the diagnosis being confirmed by microscopy. On readmission in 1939 he complained of pains like sciatica on the left side, together with other pains, of about two months' duration. In the hospital he rapidly lost ground, and lower back pains were severe.

The radiograms of the skeleton showed a sclerosis of the pelvis such as I have already described. A great authority on abnormal conditions of bones, who kindly examined the radiograms, thought that the density was too uniform for neoplastic metastases. Moreover, diffuse uniform secondary infiltration of bones from gastric carcinoma must be rare. A blood-count on June 18, 1939, gave the following results:—

Red cells	2,800,000	Polymorphs	84%
White cells	19,000	Lymphocytes	9%
Hæmoglobin	44%	Monocytes	5%
Colour-index	0·8	Eosinophils	1%
		Myelocytes	1%

Some basopilic punctation of erythrocytes was noted, and there were many megalocytes and decided polychromasia. Four nucleated red cells (normoblasts) were seen in counting 100 leucocytes—i.e., there were 760 nucleated red cells per c.mm. This leuco-erythroblastic anæmia suggested that the radiographic appearance of the pelvis was due to metastatic carcinomatous infiltration, which was indeed found at necropsy a week later.

No recurrent carcinoma was found in the stomach, but there were macroscopic metastases in the liver and various abdominal lymph-glands. There was sclerosis in both iliac bones, one rib, and some vertebral bodies, and in the left ilium there was a soft metastatic deposit, which microscopy proved to be carcinomatous. Microscopy of a metastasis in the liver showed adenocarcinoma, and there could be no doubt that the whole condition was secondary to the original gastric carcinoma.

For help in the examination of this case I thank my then house-physician, Dr. H. Huber.

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DECURVON: A PECTIN-INSULIN WITH PROTRACTED ACTION

BY B. BRAHN, Ph.D. Tübingen

(*From the Veterinary Faculty of the State University at Utrecht*)

AT the beginning of 1936 I set about discovering an insulin with protracted action and no depôt effect. I sought especially to avoid a depôt effect because in some cases the insulin is absorbed irregularly or stored longer than was intended. In such cases the sudden absorption of too much insulin at a time has sometimes led to hypoglycæmia (Kepler 1938). Secondly, it seemed of great importance to exclude all albumin-containing substances from a preparation that patients have to take for years. Thirdly, I wished to avoid the addition of zinc, because it is difficult to estimate whether zinc, though taken in ever so small quantities, may not in the course of years lead to undesirable by-effects. As a matter of fact, symptoms have often been observed recently which may be caused by the zinc of protamine-zinc-insulin (Bollman cited by Kepler 1938).

Since the discovery of insulin, many attempts have been made to obtain a protracted action of the insulin by adding substances to it that form a colloidal viscous solution. These experiments, which had more or less been abandoned, partly because the effect was not sufficiently pronounced, and partly because of certain disadvantages peculiar to the substances used, have once more been taken up. I have confirmed that agar-agar, gum arabic, and gelatin

Average values of blood-sugar in rabbits after subcutaneous injections of insulin and other substances

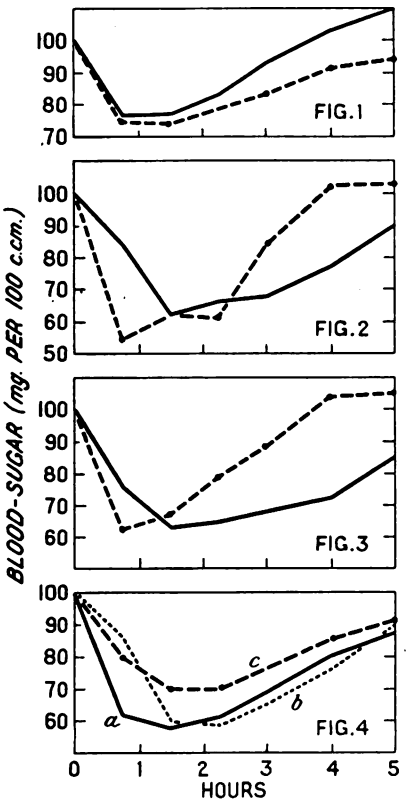

FIG. 1 — Continuous line, insulin 0·6 U. in 0·55 per cent. agar-agar; interrupted line, insulin 0·6 U. (control).

FIG. 2 — Continuous line, insulin 0·6 U. in 16 per cent. gum arabic neutralised with a decinormal solution of sodium hydroxide; interrupted line, insulin 0·6 U. (control).

FIG. 3 — Continuous line, insulin 0·6 U. in 10 per cent. gelatin; interrupted line, insulin 0·6 U. (control).

FIG. 4 — Insulin 0·6 U. in different strengths of pectin (pH about 3): (*a*) pectin 2·5 per cent.; (*b*) pectin 3·5 per cent.; (*c*) pectin 5 per cent.

are not suitable as an addition to insulin; nor did experiments with a modified concentration and a different pH improve the results (figs. 1 and 2). The administration of gelatin-insulin, which was highly effective in experiments on animals (fig. 3), proved impracticable in man, the injections being painful and the jelly having to be melted before every injection. However, among the soluble colloidal substances one proved suitable for addition to insulin: a highly purified pectin, consisting principally of ester of galacturonic acid. That injections of pectin are entirely innocuous and painless has been proved in thousands of cases treated with the styptic Sangostop. Experiments with various concentrations and with different pH showed that the best results could be obtained with solutions of 4–5 per cent. of pectin with a pH of 4·0–4·4. I have called these solutions Decurvon.

EXPERIMENTS WITH DECURVON

About 200 experiments were made on rabbits (cross-tests of two days) and 15 with healthy fasting human beings.

Rabbits.—The rabbits were kept on a diet of oats, hay, and water and fasted for twenty-four hours before the experiment. The blood-sugar was determined by the Hagedorn-Jensen method at intervals of three-quarters of an hour at first and later at intervals of two hours, when it was found that the decrease of blood-sugar brought about by decurvon sets in immediately after the injection, as it does when ordinary insulin is injected. The preliminary experiments (fig. 5) show clearly that the action of insulin does not increase proportionately with the increasing viscosity—i.e., the concentration of pectin. Of the acid solutions of pectin the one with 3·5 per cent. of pectin shows the greatest improvement compared with the action of ordinary insulin, whereas a 5 per cent. solution of pectin gives the poorest result. Fig. 5 shows the average blood-sugar values of 22 animals, each of which had been injected with 1 unit of decurvon. Four hours after the injection of decurvon the blood-sugar value is still 19 per cent. below the blood-sugar level obtained after injection of ordinary insulin; after six hours the difference is still 12 per cent., and eight hours after the injection of decurvon the blood-sugar level has not yet reached its original level.

Man.—The effect on healthy fasting human beings is not completely parallel to the results obtained in the experiments on rabbits. In man absorption also sets in immediately, but it takes place at a much reduced pace (fig. 6). Whereas after injection of ordinary insulin the blood-sugar level has certainly reached its lowest point in an hour, after the injection of decurvon the blood-sugar curve drops for at least three hours and has not yet resumed its final upward trend after six to seven hours. No conclusion could therefore be drawn from experiments on animals about the duration of the decrease in blood-sugar in man; it could only be assumed that the effect would not last twenty-four hours, an assumption which has since been verified by clinical experiments showing that the action of decurvon on diabetics lasts twelve hours or so, according to the dose. This also proves that cumulative action and consequent hypoglycæmia are out of the question.

EXPERIMENTS WITH ZINC-PECTIN-INSULIN

Scott and Fisher (1935) having established the influence of zinc on protamine-insulin, the next step was to investigate zinc-pectin-insulin. Although, in view of Scott and Fisher's experience, we thought that the action of the zinc might be due to its power to

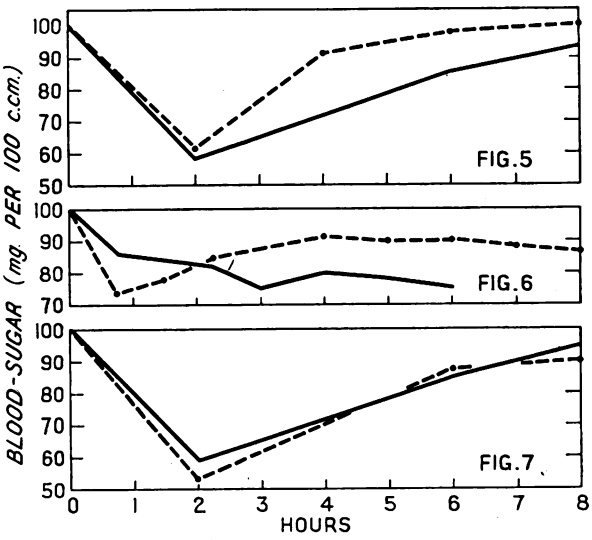

FIG. 5—Average values of blood-sugar in 22 experiments on rabbits treated by subcutaneous injection: continuous line, decurvon 1 U. (containing about 4·5 per cent. of pectin, pH about 4·4); interrupted line, insulin 1 U. (control).

FIG. 6—Average values of blood-sugar in several experiments on man: continuous line, decurvon 10 U.; interrupted line, insulin 8 U. (control).

FIG. 7—Average values of blood-sugar in 16 experiments on rabbits treated by subcutaneous injection: continuous line, decurvon 1 U.; interrupted line, zinc-decurvon 1 U.

precipitate albumin, by which the absorption of the protamine-insulin mixture is delayed, we nevertheless made the necessary experiments and found that the addition of 1 mg. of zinc sulphate to each 1000 U. of decurvon did not alter the blood-sugar curve from that produced by decurvon alone (fig. 7). We also gave intravenous injections of zinc-pectin-insulin to rabbits and found that the blood-sugar decreased as quickly and to as low a level as with ordinary insulin. The prolongation of the action was such as to be of little value. Theoretically, however, it was interesting to see that to all appearances—in contrast with all depôt insulins, such as lecithin-insulin (Hagedorn et al. 1936)—the blood-sugar curve differs, inasmuch as its lowest part does not form a sharp angle, but the lowest value remains at the same level for about half an hour (fig. 8). Those experimental intravenous injections were only possible because, in contrast with all depôt insulins, decurvon contains the insulin in soluble form, owing to its low pH. This also accounts for the fact, already mentioned above, that from the moment of its injection the insulin is at the disposal of the body, ready for absorption, whereas the insulin that is contained in the depôt insulins that have a rather high pH has first to be dissolved by the tissue fluids to be brought into an absorbable form. Therefore there is no need to combine decurvon with ordinary insulin, as is often recommended—for protamine-insulin and protamine-zinc-insulin when a patient, notwithstanding a reduced supply of carbohydrates, needs more insulin in the morning than is released from the depôt insulin. Owing to its composition decurvon can be given intravenously in diabetic coma just as well as ordinary insulin.

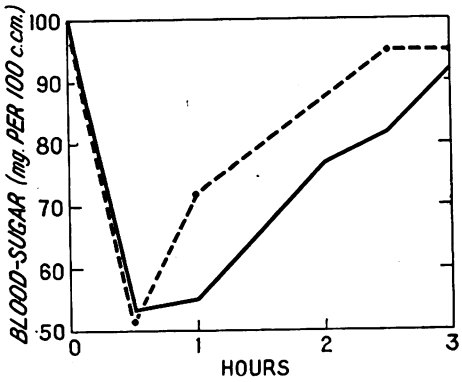

FIG. 8—Average values of blood-sugar in several experiments on rabbits treated by intravenous injection: continuous line, decurvon 0·8 U.; interrupted line, insulin 0·8 U. (control).

SUMMARY

Experiments with decurvon are reported on. Decurvon is a pectin-insulin, containing neither albumin nor zinc, in which the insulin—in contrast with depôt insulin—is dissolved. Absorption of the insulin sets in immediately after the injection and is regular and prolonged. In rabbits four hours after the injection of 1 U. of decurvon the blood-sugar level is still 19 per cent. lower than it is after injection of 1 U. of ordinary insulin. In healthy fasting man the blood-sugar decreases for at least three hours after the injection of 10 U. of decurvon and does not begin to rise until after six hours. In contrast with depôt insulin decurvon can also be injected intravenously.

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NUTRITIONAL DEFICIENCY OF VITAMIN K IN MAN*

BY HAROLD SCARBOROUGH, M.B. Edin.

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SINCE the original observations of Dam and Glavind (1938) several workers have established that the amount of prothrombin in the plasma may be diminished in patients with obstructive jaundice, and that this deficiency is corrected by the administration of vitamin K with bile salts (Butt, Snell, and Osterberg 1938, Brinkhous, Smith, and Warner 1938, Illingworth 1939). Decreased plasma-prothrombin levels which are restored by the administration of vitamin K have been found in hæmorrhagic disease of newborn infants by Waddell and Guerry (1939) and by Dam, Tage-Hansen, and Plum (1939). As a result of this and other work it is now accepted that the prothrombin levels may be diminished in patients with jaundice, and that this decrease is an expression of a deficiency of vitamin K.

These observations raise the question whether a spontaneous deficiency of vitamin K may arise in man as the result of a diet deficient in this material. Dam and his co-workers (1929, 1934, 1935), Almquist and Stokstad (1935), and others have established the existence of a hæmorrhagic disease in chickens associated with, and apparently due to, a diminution of plasma prothrombin as the result of a deficient diet and cured by the addition thereto of vitamin K. A low level of plasma prothrombin has been reported by Roderick (1931) and by Quick et al. (1935) and by Quick (1937) in association with the hæmorrhagic tendency which develops in cattle fed on spoiled sweet-clover hay, but this is apparently not controlled by the administration of vitamin K. Murphy (1939) claims to have produced by dietary means in mice a condition characterised by prolonged bleeding-time and due to a deficiency of vitamin K. The first and only report of a deficiency of vitamin K in man as the result of a deficient diet was made by Kark and Lozner (1939), who found diminished levels of plasma prothrombin in 4 cases of clinical hypovitaminoses (3 cases of scurvy and 1 of pellagra). A preparation of vitamin K (Klotogen) given by mouth without bile salts restored the normal level of plasma prothrombin in all cases. The results of a more extensive investigation into the levels of plasma prothrombin in clinical hypovitaminoses are reported here and attention is drawn to an important point in the technique of the determination of the prothrombin time.

METHODS OF INVESTIGATION

All of the 18 cases investigated presented clear clinical evidence of deficiency of one or more vitamins. Further evidence in support of the diagnosis of such a deficiency was obtained by a study of the previous diets of the patients and by laboratory tests. None of the patients was jaundiced, and none showed clinical evidence of hepatic disease.

Vitamin-A deficiency was demonstrated by Dr. C. P. Stewart by a dark-adaptation method.

Vitamin-B_1 deficiency was determined by estimation of the vitamin in the blood by a modification of the Schopfer-Meiklejohn method similar to that

* This work formed part of a study of nutritional deficiency diseases carried out during the tenure of a Beit Memorial Research Fellowship in 1939.

TABLE I—PROTHROMBIN INDEX IN CLINICAL DEFICIENCY OF VITAMINS

Case	Sex	Age	Clinical deficiency	Duration of deficient diet	Alcoholic history	W.R.	Vitamin A (dark-adaptation)	Vitamin B_1 (μg. per 100 ml. of blood)	Vitamin C (saturation test)	Vitamin K (prothrombin index)	Vitamin P (capillary resistance)
									g.	per. cent.	
1	M	62	Scurvy	9 months	No	+++	Deficient	2·0	>5·0	98	Not low
2	F	37	,,	2 years	,,	-ve	—	3·5	>5·0	100	Low
3	M	58	,,	3 ,,	,,	,,	Deficient	0–1·0	>5·0	100	,,
4	M	65	,,	3 ,,	,,	,,	—	? Trace	8·0	100	,,
5	M	54	,,	1 year	Yes	,,	Deficient	4–5	10·0	100	,,
6	M	61	,,	5–6 years	No	,,	,,	5–6	>5·0	95	,,
7	M	55	,,	2 ,,	,,	,,	—	5–6	7·0	98	Not low
8	M	64	,,	3 ,,	,,	,,	Deficient	1·0	11·5	100	Low
9	M	69	,,	6 months	Yes	,,	—	—	8·5	100	,,
10	M	71	,,	3 years	No	,,	—	—	>4·0	109	—
11	M	70	,,	6 months	,,	,,	—	—	—	102	Not low
12	F	54	,,	1 year	,,	,,	—	Trace	>5·0	95	Low
13	M	56	Beriberi heart (Soma Weiss)	4 weeks	Yes	,,	Deficient	Trace	>4·5	100	Low
14	F	43	Severe neuritis and beriberi heart	6 months	,,	,,	—	None detected	—	94	,,
15	M	45	Beriberi heart	9 ,,	No	,,	—	2·5	3·0	100	,,
16	M	47	,, ,,	Intermittent 2–3 years	Yes	,,	—	< 2·0	—	102	,,
17	M	26	Pellagra and scurvy	6 months	No	-ve	—	Trace	>10	92	Low
18	M	62	Pellagra	9 ,,	,,	+++	—	4·0	2·0	100	,,

recently described by Sinclair (1939). The figures given in the table are, however, "apparent values" (Sinclair 1939) and are expressed as μg. of vitamin B_1 (including cocarboxylase) per 100 ml. of blood. A value of 7 or less is taken as abnormally low.

Vitamin-C deficiency was determined by an ascorbic-acid saturation test. Under the conditions of this test a subject on a diet adequate in ascorbic acid becomes saturated (as defined by Johnson and Zilva) with a dose of 0·5 g. or less of ascorbic acid. In table I the total amount of ascorbic acid required to produce saturation is given as a measure of the degree of deficiency of ascorbic acid.

Vitamin-P deficiency was determined by measurement of the capillary resistance (Scarborough 1939). It is not yet definitely established, however, that a low capillary resistance is to be interpreted as evidence of a deficiency of vitamin P.

Vitamin-K deficiency was assessed in terms of the prothrombin time determined according to the original method of Quick et al. (1935). The results are expressed as prothrombin indices in the manner described by Illingworth (1939). In the terms of this nomenclature the control time is expressed as a percentage of the unknown. For example, if the control tube clots in 25 sec. and the unknown in 50 sec., the prothrombin index is 50 per cent.; if the unknown clots in 75 sec., the index is 33 per cent.; and so on. At least one control and in many cases two or even three were set up for each determination. With multiple controls the prothrombin index was expressed as a percentage of the mean of the controls, which never differed by more than 2 per cent.

INTERPRETATION OF RESULTS

The results of this investigation are presented in table I. The period for which there was a history of dietary deficiency is indicated in column five. Since Kark and Lozner (1939) have raised the question of the possibility of a positive Wassermann reaction being associated with an increased prothrombin time, the result of this reaction has in all cases been shown.

It is evident from table I that all the 18 cases examined were deficient in one or more vitamins. In spite of this the lowest prothrombin index in the series is 92 per cent. From this it is justifiable to conclude that a deficiency of vitamin K does not arise in man in association with a deficiency of other vitamins. For comparison with the values given in table I the results published by Kark and Lozner have been calculated in terms of the prothrombin index and are given in table II.

It may be concluded from table II that a mild (?) deficiency of vitamin K is found in patients with deficiency diseases of nutritional origin. In two of the patients a second determination, made three days after the first, showed a significant increase in the prothrombin index. The particular value of the contribution of Kark and Lozner, however, is that they have shown that it is only when determinations are made on a series of dilutions of the unknown plasma with prothrombin-free normal plasma prepared according to the method of Lozner, Kark, and Taylor (1939) that pronounced differences in the levels of plasma prothrombin can be observed. Their results with the dilution technique appear to show that "there may be a dietary deficiency of vitamin K in man."

TABLE II—PROTHROMBIN INDEX IN CASES REPORTED BY KARK AND LOZNER

Case	Clinical deficiency	Prothrombin index	
		May 23	May 26
		per cent.	per cent.
1	Scurvy	78	83
2	,,	66	83
3	,,	70	97
4	Pellagra and subclinical scurvy	78	77

CONCLUSIONS

The answer to the question, whether a spontaneous deficiency of vitamin K, as determined by a decreased plasma-prothrombin level, may arise in man in the absence of jaundice and as the result of a dietary deficiency of vitamin K, appears to depend on the method used for determining the prothrombin time. If the plasma prothrombin be determined by the method in general use (Quick et al. 1935), the answer is "no" (18 times out of 18). If the deficiency be assessed by the dilution method described by Kark and Lozner, the answer is "yes" (4

times out of 4). Consequently, in view of the large and steadily increasing amount of work on vitamin K it is important that the methods of determining plasma prothrombin be reconsidered. Since there was a deficiency of several vitamins in all 22 cases investigated (4 by Kark and Lozner and 18 by me), it is probable that the method of Kark and Lozner is superior to that in general use.

The author is indebted to Miss E. B. Mackay for help in determining some of the prothrombin times.

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INFECTIVE MONONUCLEOSIS AND THE PAUL-BUNNELL TEST

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In 1932 Paul and Bunnell showed that the blood of patients with glandular fever contained antibodies for the red blood-cells of sheep. Their observation has since been confirmed beyond all dispute; so the negative reaction of a patient's serum to the Paul-Bunnell test is practically considered to be adequate evidence for rejecting the diagnosis of infective mononucleosis (Bernstein 1940). In this connexion the following case is of interest.

CASE-RECORD

A man, aged 24, was admitted to University College Hospital on Dec. 5, 1938. He had begun to feel ill the previous evening and had had a disturbed night, waking several times drenched with sweat. On the morning of admission the throat became sore, and a moderately severe frontal headache developed.

On admission his temperature was 100° F. and pulse-rate 90. The throat was slightly reddened, but there was no ulceration, membrane, or tonsillitis. Strings of discrete glands about the size of peas, of rubbery consistence, and somewhat tender were felt in both posterior triangles of the neck, in both axillæ, and in the left groin. The submental and left epitrochlear glands were similarly enlarged. The tonsillar glands were more enlarged and very tender. The spleen was not felt. No other abnormal physical signs.

Blood-count on admission: red cells 5,800,000, Hb. 106 per cent., white cells 1800 (monocytes 26 per cent., polymorphs 44 per cent., lymphocytes 26 per cent., eosinophils 3 per cent., mast cells 1 per cent.). Because of the leucopenia the count of white cells was twice repeated and gave figures of 1300 and 1800. Although the differential count showed a relative mononucleosis, the absolute figure for mononuclear cells was within normal limits. Many of the mononuclear cells were however of the Rieder type. Two days later the white count was 1300 (monocytes 13 per cent., polymorphs 63 per cent., lymphocytes 22 per cent., and eosinophils 2 per cent.) and the Paul-Bunnell test negative. Serum agglutination for brucellosis was also negative; the blood proved sterile after ten days' incubation, and neither hæmolytic streptococci nor diphtheria bacilli were grown from the throat swab. A radiogram of the chest showed enlarged mediastinal glands, a finding of importance in view of the fact that a previous radiogram of the chest taken during health did not show this glandular enlargement.

During the five days following admission the temperature fell to normal by lysis and remained normal until the 18th. The pulse-rate reflected the temperature. The glands, however, remained enlarged, and, despite the fall of temperature, the patient did not feel well. On the 14th the white-cell count was 9400 (monocytes 3 per cent., polymorphs 69 per cent., lymphocytes 27 per cent., mast cells 1 per cent.). Starting about the 19th, the temperature began to rise slightly each evening to about 99·2° F., reaching on Jan. 1 and 2 100·5° F. The white-cell count on Dec. 22 was 6000 (monocytes 3 per cent., polymorphs 68 per cent., lymphocytes 26 per cent., eosinophils 1 per cent., mast cells 2 per cent.) but on Jan. 2 it was 9800 (monocytes 13 per cent., polymorphs 72 per cent. lymphocytes 14 per cent., eosinophils 1 per cent.). The Paul-Bunnell test was again negative on Jan. 5. The temperature then subsided to normal for about a week, the patient still feeling ill. Then began a slow "staircase" rise, reaching its height on the 22nd, with a morning temperature of 100° F. and an evening temperature of 101·4° F. Thereafter the temperature fell by lysis, reaching normal by Feb. 3. On Jan. 20 the tip of the spleen was first felt. On the 25th the white-cell count was 8400 (monocytes 12·5 per cent., polymorphs, 56·5 per cent., lymphocytes, 30 per cent., mast cells 1 per cent). The temperature had no sooner reached normal than it began to rise again, reaching its height on Feb. 13 and returning to normal on the 24th. White-cell counts on the 9th and 23rd were 4700 and 4900, monocytes being 14 per cent. and 13 per cent. respectively. On the 23rd the Paul-Bunnell test was positive in dilutions up to 1/128.

After the 24th the temperature remained normal, and the change in the patient's condition was definite. In the previous periods of normal temperature the patient had continued to feel ill and look listless; now he insisted that he felt well and was agog to leave hospital. He was discharged on March 5 and has had no further symptoms. On discharge the glandular enlargement was still present, the Paul-Bunnell test was positive in dilutions of 1/128, and the blood-count was: red cells 6,000,000, Hb. 110 per cent., leucocytes 9000 (monocytes 17 per cent., polymorphs 49 per cent., lymphocytes 30 per cent., eosinophils 3 per cent., mast cells 1 per cent.).

The combination of the clinical signs, the blood-counts, and the positive Paul-Bunnell test during the last period of pyrexia leaves little doubt that the patient then had infective mononucleosis. The same clinical findings, similar blood-counts, and the continuity of the periodic pyrexia also leave little doubt that the patient had one and the same morbid process throughout his three months' illness. The interesting point of this case is the Paul-Bunnel test. For ten weeks, during which the patient felt ill and had the clinical signs of "glandular fever," an abnormal mononucleosis, and three successive waves of pyrexia, the Paul-Bunnell reaction remained negative. Then, during a fourth wave of pyrexia, the Paul-Bunnell reaction became positive, and, despite the persistence of the glandular enlargement and the mononucleosis, the patient knew that he had recovered; the temperature then finally subsided and remained normal.

CONCLUSIONS

Two points emerge from these facts. In the early stages of infective mononucleosis the Paul-Bunnell reaction may be negative. The appearance of a positive Paul-Bunnell reaction may be followed immediately by recovery from the illness. These points suggest that the appearance of the positive reaction may indicate the development of immunity to the unknown agent responsible for the disease.

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CINEBRONCHOGRAPHY

(CINEMATOGRAPHY THROUGH THE BRONCHOSCOPE)

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ALTHOUGH several methods of making direct and indirect motion pictures of the human larynx have been described, there does not appear to be any record of direct cinematography of the trachea and larger bronchi. The apparatus and technique described below have been used successfully for the production of films depicting in motion the normal appearance and movements of the larynx, trachea, and larger bronchi, together with some of their commoner abnormalities as seen through the bronchoscope.

APPARATUS

The initial difficulties were the assembly of a suitable lens, the construction of a bronchoscope with an adequate respiratory space, and the provision of sufficient light for photography.

The lens assembly (fig. 1) consists of a lens with a focal length of 10·5 cm. mounted in a cell giving an effective diameter of about 7·0 mm. The lens cell is set at the distal end of a tube which has an external diameter of 10·0 mm. and a length of 12·1 cm. The lens tube has an adaptor at its proximal end which fits into a socket on the camera. The lens is cemented; hence the tube cannot be sterilised by heat or spirit, and some chemical antiseptic must be used for this purpose. The camera-socket is attached in place of the f 1·9 Cine Kodak lens by the standard spring mechanism, and it is used to couple the camera to the lens tube.

The bronchoscope (fig. 2) is 40·0 cm. long, its internal diameter 10·0 mm. and its external diameter 11·0 mm. with a slight projection for the light-carriers. Since the lens tube would completely occlude the proximal 9·0 cm. of the lumen of the bronchoscope, it was necessary to provide an alternative airway. This was done by arranging an oval chamber measuring 7·0 mm. by 1·5 mm. on each side of the bronchoscope. These chambers, or respiratory vents, extend only 12 cm. from the proximal end of the bronchoscope; hence this increased diameter does not reach the glottis. The lumina of the respiratory vents are in constant communication with the lumen of the bronchoscope throughout their lengths. The vents give an increase in diameter of about 1·25 mm., which gives 14·0 sq. mm. of free breathing space—i.e., the maximum that is required for normal quiet respiration.[1] The bronchoscope is provided with an accessory tube to house twin light-carriers. In spite of its somewhat large size the bronchoscope can be passed easily and without discomfort under local anæsthesia in an adult as far as the segmental bronchi.

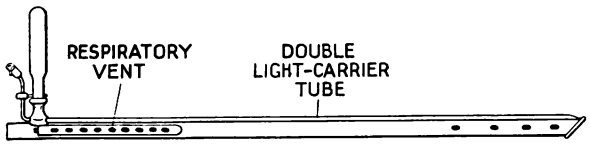

FIG. 2—Bronchoscope for cinebronchography.

Lighting is afforded by overrunning two endoscopic lamps. The normal voltage of these lamps is 2·5 V with a wattage of 0·45 W. To get sufficient light for cinebronchography the bulbs have to be run at 4·4 V with a wattage of 1·25 W; hence, to avoid breakages, it is advisable to overrun the lamps only during the exposure. The current is regulated with a resistance and a voltmeter. The housing for the lamps at the distal end of the bronchoscope is chromium-plated to enhance the brilliancy by reflection.

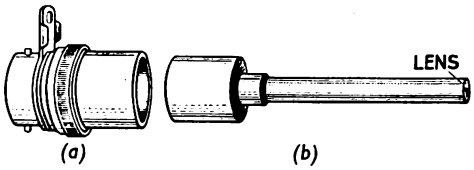

FIG. 1—Lens assembly for cinebronchography: (*a*) camera-socket attachment; (*b*) lens tube with adaptor for camera-socket at proximal end and lens cell at distal end.

The camera is an f 1·9 Magazine Cine Kodak, its light weight and small bulk making it convenient to handle. Super-X Cine Kodak film is used and run at the normal camera speed of 16 frames per sec.

TECHNIQUE

The f 1·9 lens is removed from the camera and replaced by the camera-socket. The bronchoscope is then passed in the usual manner under local anæsthesia and fixed at the site required for photography. The area that can be photographed is less than 1·5 cm. from the tip of the bronchoscope and in the same central line; hence the instrument must be closely approximated to the subject to be photographed; otherwise there will be no image on the film. The lens tube, which has been sterilised and warmed to body temperature with a hot-water bottle, is inserted to its full extent into the bronchoscope, and an assistant attaches the camera. The lamps are put up to the required overintensity by a second assistant and the film exposed as required. While taking the photographs the bronchoscope is slowly rotated, because the variations of the light-reflexes thus produced give a more realistic photograph.

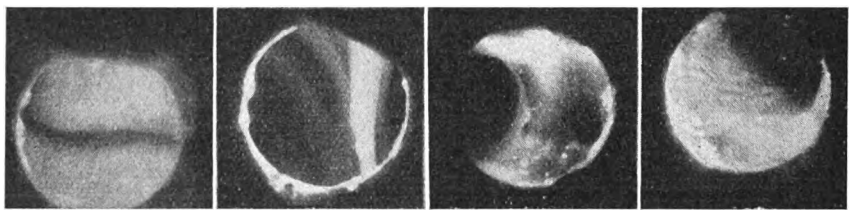

FIG. 3—Photographs taken in cinebronchography: (*a*) epiglottis; (*b*) carina and orifice of left main bronchus; (*c*) pus issuing from a left basal bronchus in bronchiectasis; (*d*) compression stenosis of right lower bronchus.

RESULTS

Several films were made before the outbreak of war interrupted this work, and, although improvement of technique is necessary, the results are of considerable interest. A study of the films suggests that similar motion pictures would be of value as a means of teaching and possibly of research and as a method of making permanent records of cases and of noting the effects of treatment. Fig. 3 shows merely the photographic results and in no way conveys the impression of the various movements—respiratory, cardiac, and on coughing—which are demonstrated very beautifully when the films are projected.

The experimental optical work and the final assembly of the lens were made by Mr. W. Buckstone, of Messrs. Kodak's medical department, and the bronchoscope was designed with the help of Mr. Percy Phelps, of Messrs. Mayer & Phelps Ltd. To both of these gentlemen my thanks are due.

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VI AGGLUTINATION IN DETECTION OF TYPHOID CARRIERS

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THE original suggestion (Felix, Krikorian, and Reitler 1935) that Vi agglutination might prove a useful method of detecting typhoid carriers has stimulated a series of researches, and satisfactory results have been reported by Giovanardi (1936, 1937) in Italy, Pijper and Crocker (1937a, b) in South Africa, Felix (1938a, b) in England, Bhatnagar (1938) in India, and Eliot (1940) in the U.S.A. Such a method would be invaluable in a vast and thinly populated country, such as the Anglo-Egyptian Sudan, where owing to distance and transport problems it is often a matter of the greatest difficulty to obtain repeated specimens of fæces and urine for cultural examination. A series of small outbreaks of typhoid fever during the past year in various towns along the Nile gave us an opportunity of testing the value of Vi agglutination. We hoped to gain information on the significance of a positive Vi titre in convalescent cases (following Bhatnagar's suggestion that such cases show a tendency to the carrier state) and the value of the method in the routine detection of typhoid carriers.

TECHNIQUE

Felix (1938a, b) has emphasised the fundamental importance of standardising the agglutinability of the Vi suspensions used as antigens, and in the present study great care has been taken to follow all the details of the serological technique as laid down by him.

Three strains—Vi I Bhatnagar, Watson, and Ty 2—were originally used as antigens for every serum; but, owing to the more satisfactory results obtained with Vi I, the other two strains were omitted, and all titres mentioned in the paper are those obtained with this strain. The earlier suspensions were standardised against a standard serum kindly supplied by Dr. Felix, and a further batch of rabbit serum was prepared against the Vi I strain. The Vi titre of this serum was estimated against a living suspension standardised by Felix's serum, and the serum was then frozen, desiccated, and stored in sealed ampoules in vacuo. Every subsequent suspension was standardised against this serum. The suspensions were also examined for their agglutinability with pure 0 serum—in no case was a positive result obtained (<1 in 5 trace). The stock cultures were kept on Lemco agar, and subcultures for the preparation of suspensions were made on to digest agar, as recommended by Felix (1938a). The macroscopic method of agglutination was used, the dilutions of serum ranging from 1 in 12·5 to 1 in 250, and living suspensions (eighteen hours) were employed throughout. Wilson and Blair's medium was used for the culture of fæces and urine, because since its adoption as a routine medium in these laboratories (Horgan 1935) it has given most satisfactory results, far surpassing those obtained with MacConkey's medium. All batches were prepared by one of us (A. D.), and plates were poured on the same day, because it has been noted that those poured and kept for even twenty-four hours in a refrigerator seem to lose some of their selective action for *Bacterium typhosum*. All specimens of fæces and urine were examined at intervals of five to seven days, and five negatives were obtained before returning a final negative result in any given case.

RESULTS

The results in convalescent patients are given in table I and those in healthy contacts, examined to see if they were carriers, in table II. The + or − signs under the heading "Fæces and urine" indicate the results after three months. A patient who gave a positive result after this was considered to be a chronic carrier. The figures within brackets indicate the dilution of sera. All sera were first examined when the patients had become clinically convalescent, the sera being sent at the same time as the first samples of fæces and urine. Further examinations were carried out on at least one other occasion during convalescence but in no case was there any alteration in titres. Convalescent patients were not discharged from hospital until five successive specimens of fæces and urine had given negative results.

TABLE I—VI AGGLUTINATION IN PATIENTS CONVALESCENT FROM TYPHOID FEVER

Vi agglutination	Titre	Fæces and urine	Number of cases
+	(500)	+	1
+	8(25), 8(50), 12(125), 3(250)	−	31
−	..	+	0
−	..	−	97

In 11 of the 31 Vi-positive cases *B. typhosum* was isolated from the fæces or from the urine on several occasions during convalescence—in one case ten times from the fifth to the fiftieth days of convalescence. In 37 of the 97 Vi-negative cases positive results from fæces or from urine were obtained—in one case seven times from the fifth to the thirty-fifth days. All these 128 cases had become and remained permanently negative before the ninetieth day. The results, with one exception, do not confirm Bhatnagar's suggestion that Vi-positive cases in convalescence indicate a tendency to the carrier condition. The question might also be asked whether the Vi-positive patients continue longer than the Vi-negative to shed typhoid bacilli in convalescence. A careful analysis of the results was made but established no such correlation.

TABLE II—VI AGGLUTINATION IN HEALTHY CONTACTS

Vi agglutination	Titre	Fæces and urine	Number of cases
+	1(50), 1(250)	+ (fæces)	2
+	2(25), 6(50), 7(125), 1(250)	−	16
−	..	+ (fæces)	2
−	..	−	213

The results shown in table II are of considerable interest. It will be noted that of the 4 carriers 2 were Vi-positive and 2 Vi-negative. One of these latter cases was a native milk vendor, whom it was possible to observe over a period. The serum was re-examined after nine months, together with the fæces and urine; the serum was still negative (<1 in 12·5), but the fæces again showed numerous colonies of *B. typhosum*. The second Vi-negative carrier was examined over a period of ten weeks to date; the findings serologically and culturally have remained unchanged. The 4 carriers were healthy persons without any history of typhoid fever. It may be noted that Felix (1938b) found 2 chronic carriers among 16 Vi-negative cases, while 4 remain undecided.

The fæces and urine of the 16 persons with positive Vi titres were examined on at least five different occasions, but all remained consistently negative. In only one instance a history of typhoid, three years earlier, was obtained. There is a significant difference, however, between the average level of Vi titres of typhoid contacts and that of random samples of the population of the Sudan—approximately 8 per cent. with titres of 1 in 25 or over, as compared with 0·3 per cent.—but the present data are inadequate to explain it. Felix (1938b) found 5 out of 100 persons

in a female mental hospital showing Vi titres considered to be characteristic of the carrier state but whose fæces and urine were negative. He remarks: "It must be remembered that sera from persons who cannot be shown to be carriers occasionally also give positive reactions in 1 in 5 or even higher dilutions, and this may lead to a person being wrongly designated as a carrier suspect." We dissent from the conclusion of Pijper and Crocker (1937b) that "all persons possessing significant amounts of Vi agglutinin had better be regarded as carriers". Felix (1938b) cites a case of empyema resulting from typhoid osteitis (Lane and Francis 1938), which lends some support to this statement and further suggests that such a conclusion might be valid if the term "carrier" were intended to include those persons who harbour typhoid bacilli but do not excrete them. It remains to be proved that most of the Vi-positive persons with negative fæces and urine do harbour typhoid bacilli. Even if it is shown that they harbour but do not excrete typhoid bacilli, they can scarcely be reckoned as a menace to public health, and it seems unduly severe to group them in the same category as the true "carrier." Until more light is thrown on the problem, it seems advisable to retain the long-established meaning of this term. As regards the category of Vi-negatives, 2 of the 4 carriers would have been automatically excluded on the result of the serological test, and in 1 at least—the milk vendor—such rejection might have endangered public health.

DEFINITION OF "VI-NEGATIVE"

In the present series the minimal dilution of 1 in 12·5 was chosen after considerable deliberation, because previous work in the Sudan (Horgan 1936) had indicated that Vi agglutinins were present, in a titre of 1 in 10 or less, in 10 out of 100 normal individuals—4 positive in a dilution of 1 in 5 (trace) and 6 positive in a dilution of 1 in 10 (trace). This work had been carried out with the strain Ty 2; but, as Felix (1938a) has since pointed out that this strain is not suitable for Vi agglutination owing to its comparatively low sensitiveness to Vi antibody, the previous work has recently been repeated with suspensions of Vi I. From specimens received from all parts of the Sudan for the Kahn test 200 sera were chosen; a considerable number of these were from southern and western districts, where typhoid or other enteric fever is very rare. Of the 200 sera 55 were positive in a dilution of 1 in 5 (trace), 37 positive in a dilution of 1 in 10 (trace), and 1 positive in a dilution of 1 in 25 (trace). In other words, if Felix's (1938b) figure of a dilution of 1 in 5 or over is accepted as significant, 46·5 per cent. of the inhabitants of the Sudan would be under suspicion as typhoid carriers.

Pijper and Crocker (1937a) found no Vi agglutinins in the sera of 70 normal people in South Africa; but, if the technique used was the absorption method indicated in the same paper, it appears that the lowest dilution used was 1 in 20. Eliot (1940) also used an absorption method with a lower limiting titre of 1 in 20. In his series of 219 sera classified as "unknown" (as regards typhoid) 4 showed Vi agglutinins in dilution of 1 in 20 or more. "For one reason or another it has been impossible to investigate these cases with regard to their possible carrier condition." The absorption method used by both the latter workers would exclude a considerable number (36 out of 50) of Felix's positive cases. Apart from these findings we have been unable to find any references to normal Vi agglutinins in a population.

CONCLUSIONS

An accurate knowledge of the limits of normal Vi agglutination among the population of the country in which the survey for carriers is being made is essential in the establishment of the lowest significant Vi titre in a suspected carrier. Such a preliminary survey should be based on the standard method laid down by Felix (1938a).

In every survey a complete cultural examination of fæces and urine of all persons—not only those whose sera show significant titres for Vi agglutinins—should be carried out.

SUMMARY

(1) We could not confirm Bhatnagar's (1938) suggestion that patients convalescent from typhoid fever whose sera shows significant titres of Vi agglutinins tend to become carriers.

(2) In a series of healthy typhoid contacts no correlation could be established between positive Vi titres and the carrier condition (excretion of typhoid bacilli in fæces or urine).

(3) The average Vi titres of typhoid contacts with negative fæces and urine are, however, well above the normal level of those of the population of the Sudan, but the significance of this finding is unknown.

(4) Two carriers (fæcal) were discovered whose sera remained negative for Vi agglutination.

(5) Before the lowest significant titre for a suspected carrier can be established, more information is required about the natural level of Vi agglutinins among the general population.

Our thanks are due to Dr. A. Felix, of the Lister Institute, London, for providing his standard sera and strains of typhoid cultures; and to Dr. H. M. Elliott, senior medical inspector in the Upper Nile Province, for his coöperation in this inquiry.

Since the completion of this paper another typhoid contact has been found who was Vi-negative (<1 in 5) but excreting typhoid bacilli in the urine. He is a Sudanese boy, aged 12, from Omdurman, and careful inquiry by the British Public Health Inspector has failed to reveal any history of previous illness.

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The Lancet 100 Years Ago

June 13, 1840, *p.* 409

From a note on croup

The propriety of opening the trachea in certain cases of croup has been questioned by some of the best authorities in this country. Indeed, tracheotomy in croup and the Cæsarean operation seem to stand exactly in the same position. English practitioners shrink from the responsibility of performing them, more from a fear of consequences to themselves than from a just estimation of the value of those operations.

A BIOGRAPHY OF TYPHOID MARY.—Mary Mallon known as Typhoid Mary died on Nov. 11, 1938, and a short obituary notice based upon material from available authorities appeared in our columns a week later (*Lancet*, 1938, **2**, 1188). Mr. Geo. W. Soper, Ph.D., who discovered this unfortunate carrier in 1907 and invented her sobriquet, considers that the accounts of her career so far published have been so inaccurate that it is desirable to put the established facts on record. He has done this himself with a wealth of detail in a paper which appeared in the *Bulletin of the New York Academy of Medicine* for last October.

REVIEWS OF BOOKS

Diseases of the Digestive System

A Textbook for Students and Practitioners. By EUGENE ROSENTHAL, M.D., lecturer in the medical faculty, Royal Peter Pázmány University, Budapest. London: Henry Kimpton. 1940. Pp. 394. 42*s*.

Two years ago THE LANCET published a short paper by Dr. Rosenthal on "associative illustration" in medical teaching.[1] It was a plea for the greater use of diagrams and pictures by lecturers in medicine, on the ground that with so much to teach in so short a time the teacher should use every available port of entry to the student's mind. In most students the visual memory is more strongly developed than the auditory, so they should be given something to look at as well as words to listen to. This something will often be a straightforward representation of some pathological change in structure, like an acromegalic hand or a pneumothorax; or it may be a graph like a sugar-tolerance curve. Dr. Rosenthal is more interested, however, in the drawing which emphasises some association of ideas, often with a few words, arrows, or simple geometrical devices to trick it out, and preferably done in colour. His chosen example is an outlined female figure, with her liver-area coloured brown and her gall-bladder green; a red circle round the gall-bladder is joined to a legend giving the local causes of cholecystitis, a blue circle round the liver calls attention to disturbance of liver function, and a yellow line surrounding the whole patient indicates that disturbance of the cholesterol metabolism of the body is the third ætiological factor in gall-bladder disease.

Dr. Rosenthal has now produced this sizeable volume to show how the thing should really be done. It has 234 illustrations, including 104 in colour, beautifully drawn and reproduced; and there is no doubt that they are both striking and apt. The points they emphasise are often elementary, but it is difficult to be too elementary for the average student, and the need is to emphasise by such means as these the facts and the ideas that are important. Occasionally Dr. Rosenthal excels himself, as in the picture of the woman with the cirrhotic liver, lying with her swollen abdomen fully exposed, and the physician's trocar about to enter it at the appropriate spot; on the bedside-table is a urinal containing bright yellow urine—"the patient must empty the bladder beforehand" says the legend. The text of the book is fairly full, and, in the style of the printed lecture as distinct from the conventional textbook, it makes easy and pleasant reading. In the main the teaching follows what in England are orthodox lines, though discrepant views sometimes reflect its continental origin. For instance, Dr. Rosenthal recommends X-ray therapy to reduce gastric acidity in duodenal ulcer, and the application of radium over the spleen to reduce its volume in hæmatemesis; we thought the former procedure had been shown by animal experiment to be impracticable, and the latter we should consider unnecessary since splenic contraction is a physiological response to hæmorrhage.

The idea is not a new one. It is exploited already by every teacher who is handy with a bit of chalk, and is used a good deal in American textbooks and papers. As blackboard technique it is first-class. For the illustration of books it is apt to be laborious and expensive, and we should scarcely wish to see the whole of medicine presented in this form. But every student who sees this volume should busy himself with pencils and paper next time he reads an ordinary textbook and make his own illustrations to it; while every teacher who from laziness or ineptitude has neglected his blackboard should under Dr. Rosenthal's stimulus seize his chalks again with renewed vigour.

1. *Lancet*, 1938, **2**, 546.

Forensic Medicine

(7th ed.) By SYDNEY SMITH, M.D. Edin., F.R.C.P.E., regius professor of forensic medicine, University of Edinburgh. London: J. and A. Churchill. 1940. Pp. 680. 25*s*.

UNTIL now the illustrations of this familiar book have not been up to the standard of the text, but in this edition there has been a general improvement. Certain poor plates have been eliminated and effective substitutes or additions been made, and the plates are more clearly reproduced.

The clarification of the Infanticide Act, the celebrated McNaghten interpretation of the Bourne case, and the report of the interdepartmental committee on abortion which followed, have clearly been used in reshaping the text, and this is now something more than a textbook for students; it contains an astonishing amount of information and bears fair criticism in every department. It is steadily developing into a sound authoritative volume built on the scale of a book of reference.

Periodontal Diseases

(2nd ed.) By ARTHUR H. MERRITT, D.D.S., M.S., F.A.C.D. London: Macmillan and Co. 1939. Pp. 205. 18*s*.

THE author of this useful book says with truth that "gingivitis (and, if this is unchecked, its serious ultimate consequence of ill health and total loss of useful teeth) shares with dental caries the unenviable distinction of being the most common ill to which flesh is heir." Of what value is all our boasted skill in the field of repair, he asks, if the end result is the loss of teeth through failure to care for their supporting tissues? He points out that few periodontal conditions are, at least in their early curable stages, really painful, and so are often overlooked by patients and even by harassed practitioners. There is an excellent chapter on nomenclature; and the gross and commercialised misuse of the term "pyorrhœa," which should be interpreted in its literal sense and confined to that condition, is rightly stigmatised. His attempt at classification, which seems an advance on those formerly produced, is yet open to criticism, for the pathology of the various types of periodontoclasia is often multiple, even if the ætiology, when known, can be tabulated. The value of early treatment is correctly emphasised and its methods clearly stated; and the importance of the prompt reference to a physician of cases not yielding readily to local treatment, and therefore suspect of "blood dyscrasia or other systemic disturbance," is reiterated. In this connexion the chapter on Vincent's infection clears away much misconception. There is an account of a useful "surgical cement" for covering exposed alveolar bone after radical gum resection, and other practical advice on the treatment of pulp hyperæmia and the use and misuse of tobacco; the author concludes that smoking, while undoubtedly very harmful to some, has an almost negligible effect, even in excess, on the mouths of others.

The style is pleasantly readable and concise, and altogether this is a book to be commended.

THE LANCET

LONDON: SATURDAY, JUNE 15, 1940

A.R.P.: WHERE THE G.P. COMES IN

IT is probably not generally recognised that the work of saving life and minimising the effect of damage during air-raids does not depend only on the efficiency of the members of the various civil-defence services—at hospitals and first-aid posts, and in the fire services, first-aid parties, rescue parties and the like. In order that A.R.P. and A.F.S. workers may carry out their task a carefully thought-out system of control is necessary. In the early days of civil defence exercises it was a common thing to find keen and efficient volunteers unable to carry out their jobs as well as they would have wished owing to the mass of workers, vehicles and spectators crowding the scene of the incident. Fortunately, steps have been taken to remedy such a state of affairs, and a doctrine on the policy of operational control at air-raid incidents has been evolved and propagated. It is clear that the responsibility for controlling the movement of vehicles and persons must devolve upon the police. They will have to arrange for vehicles to be marshalled in such a way that each service can most effectively do its work, to control the movement of spectators and would-be helpers, and to perform many similar tasks which are a natural extension of their everyday duties.

At incidents where a number of units of several services are engaged, some specific organisation for control is needed and the senior police officer present will establish an incident post for the purpose. It is here that he and the senior officers of the other services present, or their representatives, will be found. From the incident post general coördination and control will be effected, calls for further assistance will be initiated, and it is to the incident post that leaders of reinforcements will report on arrival. Certain police officers are specially selected and trained to take charge at major incidents. The incident post will be marked by a flag of Cambridge-blue and white checks, or by two blue lamps placed one above the other. The position of senior officers of services at the post will be marked by pennants of selected colour and pattern—e.g., police dark blue, casualty services black and white, and so on. The scene of the incident will if possible be enclosed by a cordon, outside which officers and parties will be required to wait while their leaders report to the incident post and make any essential reconnaissance. In the case of fire, engines and pumps will of course go close to the actual scene of damage, and will normally have priority over other vehicles; next priority will generally be given to the vehicles of the rescue parties who will usually be urgently required. Ambulances will normally remain clear of the damaged area, and first-aid or stretcher parties must be prepared to carry casualties to them.

A development of considerable importance in the problem of handling casualties is the increased use which can be made of mobile first-aid units. The "mobile aid-post," as it was originally called, was devised to provide temporarily a first-aid post in less densely populated areas—to take the post to the casualties rather than the casualties to the post. Experience at exercises has shown, however, that these units will be very valuable in built-up areas as well. Mention may be made of two of the possible uses to which a mobile first-aid unit might be put at an incident. It might go actually to the site of the damage and, without unloading equipment, the doctor and trained nurse might leave the unit and go to the places where the injured are lying, to give any immediately needed treatment (such as an injection of morphia) and supervise generally the work of the stretcher parties which are rescuing casualties from beneath wreckage. Again, the unit could go as near as possible to the site of the damage and, with any necessary items of its equipment unloaded, form a rallying and classification point to which stretcher parties could bring their casualties, and from which the ambulances could go to the receiving hospital or first-aid post after this initial classification. Where there is no mobile unit to function in one of the ways described, the problem of loading casualties into ambulances and deciding on their disposal will not be easy. The establishment of an ambulance loading point will obviously be required, and first-aid party workers will have to make use of all the knowledge at their disposal to determine which casualties are to be sent to the reception hospital and which to the first-aid posts.

It may be asked how any doctor who finds himself near the scene of air-raid damage can most usefully help in the work of dealing with the wounded. It would seem clear that where there is a mobile unit working at the incident any doctor at hand should get in touch with the medical officer in charge. Where there is no mobile unit he should make contact with the senior police officer at the incident post and, in accordance with the requirements of the situation as there ascertained support, advise and even organise the casualty work. If there is only one doctor he can usefully station himself at the ambulance loading point. Here he can check any first-aid work that has been done and help by first-line classification and by advice as to the initial disposal of the casualties, assessing relative priorities for removal. Where initial division (for dispatch either direct to hospital or to a first-aid post) is necessary his advice will be valuable in relieving the first-aid party leaders of this by no means easy task. We earnestly commend this primary duty of citizen service to the consideration of every general practitioner who has not already defined his position in an emergency which may now overtake him at any moment. He will, we feel sure, not be found wanting.

IMMUNISATION OF CIVILIANS AGAINST TYPHOID AND TETANUS

A QUESTION was asked in Parliament the other day [1] whether steps would be taken to inoculate the civilian population, beginning with civil defence and other key workers, against typhoid and tetanus, in case of the danger of epidemics following serious air-raids. The Minister of Health replied that he did not think any such general inoculation was either practicable or advisable. In particular circumstances and for some diseases, he said, inoculation may be of value, and facilities were available for anti-typhoid and anti-tetanus vaccination where required.

Immunisation against typhoid and tetanus, although voluntary, is now almost a routine practice among new recruits to the Army and Air Force, while in the French Army combined immunisation against these two diseases and diphtheria has been compulsory since 1936. But in any discussion about the advisability of actively immunising the general public against a particular infection we must decide, first, whether immunisation is reasonably safe, secondly, whether it is effective, and thirdly, whether it is worth while. In considering safety we must remember the tribe whom the Israelites persuaded to be circumcised, and on the third day when they were too sore to resist they were smitten down. T.A.B. inoculation, as practised in this country, is not devoid of reaction, which may be severe enough to cause several days' invalidity. Detoxicated or dissolved vaccines, or vaccines by mouth after the doctrine of BESREDKA, do not evoke the same antibody response, and are therefore regarded as less reliable than two or three subcutaneous inoculations of a heat-killed mouse-virulent organism. GRASSET [2] has prepared an "endotoxoid" vaccine which is said not to produce systemic reactions and to be at the same time an efficient immunising agent. Tetanus toxoid has now been used on a large scale in the Services, and apart from a few cases of anaphylactoid shock, probably due to the peptone in the medium and easily controlled by adrenaline it can be regarded as a safe innocuous prophylactic.

To the question whether immunisation is effective equivocal answers must be given. There is sufficient proof that T.A.B. inoculation is effective in reducing the incidence of the enteric fevers, but it does not entirely prevent infection and indeed might prove not to be highly protective in the face of endemic typhoid plus very adverse sanitary conditions. It is most effective when immunisation is completed before the population is exposed to the risk of infection—e.g., in troops before going on active or foreign service, or among the nursing staff of a fever hospital. It is least effective when begun after an epidemic has already broken out, and at this stage, if given in the usual dosage, it is not without danger by inducing cases of severe "provocation" typhoid among persons already incubating the disease. In these circumstances a safer and probably more satisfactory means of protection—although there is little clinical evidence on this point—is a combination of passive and active immunisation, that is, a single injection of antityphoid serum of the kind prepared by FELIX together with repeated *small* doses of vaccine at intervals of two or three days. The value of active immunisation against tetanus is based mainly on experimental and field work on animals; for example, only one case of tetanus has developed among 35,000 immunised French cavalry horses over a period of three years. However, estimations of the serum antitoxic titre of men inoculated with tetanus toxoid suggests that even after two years the residual immunity is in most cases adequate to prevent infection. BOYD has shown that two injections, each of 1 c.cm., are sufficient provided there is an interval of six weeks between them, but because immunisation in the British Army is voluntary, and as an additional precaution all wounded soldiers must also be given a prophylactic dose (3000 units) of tetanus antitoxin. In the French Army the wounded man gets a dose of toxoid to "boost" up his acquired immunity, which seems a more rational arrangement.

Is immunisation of the civilian population, or even certain sections of it, against these two infections worth serious consideration as a war-time expedient? Typhoid fever is, fortunately, now rare in this country, and chronic typhoid carriers who are the primary foci of infection are comparatively few and being constantly sought out. Mr. PARKER'S question in Parliament was almost certainly prompted by reports that epidemics of typhoid fever broke out in Helsinki and Rotterdam after they were bombarded from the air. In the face of danger here—for example, the accidental or purposive contamination of a large water-supply—certain precautionary measures could be immediately put into effect. The water-supply, which in any case should be under continuous bacteriological supervision, could be chlorinated, household tanks emptied, and householders told how by simple hygienic measures they could prevent or minimise the spread of infection. If, however, primitive sanitation were forced on us by destruction of the water-carriage sewage system or by large encampments of evacuees and refugees in rural areas, the danger of intestinal infections would be greatly increased and artificial immunisation—which should be compulsory and free—might then have to be considered, despite the drawbacks of systemic reactions and incomplete protection. With tetanus there are stronger grounds for advocating active immunisation for certain sections of the community. The method is safe, easy and apparently effective. It has obvious advantages over passive immunisation on which the Services relied in the last war and which, according to the plans already made, is to be extensively used in this war for the protection of civilians actually wounded in air-raids. Passive immunisation means the injection of a foreign serum with its attendant complications. It gives protection only

1. See *Lancet*, June 8, p. 1067.
2. Grasset, E. *Brit. med. J.* 1939, **2**, 58.

for a few weeks, it permits a number of cases of late tetanus and there is the added risk of re-injecting horse serum into a person within a few months of a previous dose. Active immunisation would therefore have distinct advantages especially for those likely to be repeatedly exposed to the risk of bomb splinters, falling masonry and the like—fire brigades, A.R.P. workers, police officers, ambulance men, and perhaps medical and nursing staff. Local authorities in towns which might be particularly subject to air attack should also consider offering free immunisation to economically important groups in their community. Tetanus spores are present wherever there are domestic animals, and the risk of infection, if less than on the battlefield, is probably as great for the town-dweller as the countryman.

On the wider issue of immunity to infectious diseases, evacuation and dispersal of our child population has resulted in a remarkable reduction in the incidence of childhood infections, but probably to the detriment of the process of natural immunisation which constantly goes on in crowded urban areas. Every effort should therefore be made *now* to encourage active immunisation of school and pre-school children against diphtheria and pertussis and to collect convalescent or adult serum for the control of measles. Too often the day of reckoning comes and we are not prepared for it.

THE MUNICIPAL HOSPITAL

Dr. ARTHUR MORRIS, in his lecture to the Harveian Society on June 5, spoke as one fully convinced that the administrative head of a hospital should be a medical man. Business capacity has been urged on the other side but a talent for business management is not unknown among doctors and he did not think that important decisions concerning the patient and the medical or nursing staffs should be made by a layman—if a hospital is to be progressive it must be administered by one who knows how the medical work ought to be done and how to provide facilities for doing it. The Society of Medical Superintendents now has some 150 members, so there is no question of the principle not being tried out on a large scale. It was, he said, the last war that revolutionised the type of cases admitted to municipal hospitals; many of the voluntary hospitals being then filled with wounded soldiers their civilian cases had to be diverted to the poor-law infirmaries. These hospitals can now offer almost the same advantages as the voluntary hospitals. Their patients are no longer humble; they demand the best. In the old days if a medical superintendent was economical in his purchase and use of supplies, if he kept his hospital clean and bugs out of the beds, if he gave his patients fairly decent food to eat and kept his staff in order, he was considered exemplary. Now he is expected to keep abreast of every modern method of treatment, and his knowledge must extend from cookery to practical epidemiology. Many-sided and versatile as he has to be, and a good mixer into the bargain, he should not be a specialist except in his own branch. But in this some special qualties are required. For example, he needs wisdom and tact if his heart-to-heart talk with each patient before he leaves the hospital precincts is to prevent complaints later. Under the poor-law guardians the infirmary was an ideal training ground for the general practitioner, for it offered a wide and varied experience, though many of the acute cases were filtered off by voluntary hospitals. Now under council control the majority of the patients come straight from their doctors and are classified so that it has become possible for residents to be employed exclusively on this or that work—medical, surgical, obstetrical or gynæcological—and the resident assistant physicians or surgeons are young, ambitious men in the heyday of their career. In this formative stage not the least factor is the human element in their work. By interviewing relatives and friends they learn to realise practical possibilities and how to conduct themselves in their future practices. These may be the most profitable lessons of their training.

About the scope of outpatient departments at municipal hospitals Dr. MORRIS had something interesting to say. While it was proper to avoid invading the province of the general practitioner, actually many of them were sending up cases for a second opinion and were encouraged to do so. Should a further attendance be suggested the patient is very properly referred to the almoner to determine whether he should not return to his own doctor. At St. Leonard's a district medical officer resides in the hospital and attends the relief dispensary which is a part of the outpatient department. Making treatment available for outpatients effects a major saving in hospital beds. Thus scores of ulcerated legs are now treated ambulant. Some 90 per cent. of medical outpatients at St. Leonard's are diabetics and 2 per cent. are suffering from pernicious anæmia. For these laboratory facilities are essential. On the surgical side the outpatient department is almost solely a fracture clinic. The antenatal clinic is the only place where the work of the private doctor has been much encroached upon.

Finally, Dr. MORRIS dealt briefly with one of the ticklish problems of hospitals which cannot refuse admission to needy cases. A large proportion of the patients are suffering from incurable or chronic diseases and occupy beds for long periods. They should, he felt sure, be nursed in chronic-sick hospitals where the cost of maintenance is much lower. This is the greatest municipal hospital problem awaiting solution at the present time.

SPECIAL surgical centres have been set up by the Emergency Medical Service to which orthopædic cases and patients suffering from maxillo-facial, head or chest injuries may be sent for treatment. These centres are open to both service and civilian casualties. Now that a considerable number of war casualties have been admitted to E.M.S. hospitals the removal of suitable patients to these centres should be undertaken as soon as it can be done without risk to the patient. It is specially desirable that maxillo-facial cases for whom plastic surgery may be needed should be transferred without delay.

ANNOTATIONS

CONSULTANT PHYSICISTS FOR LONDON HOSPITALS

THE King Edward's Hospital Fund, which has already done so much for radiotherapy and is responsible for seeing that the radium needs of the London metropolitan area are satisfied, is now to provide a panel of consultant physicists to help hospitals where radium and X-ray therapy is carried out and which cannot afford to employ a physicist of their own. The panel will consist of Mr. H. T. Flint, D.Sc., of the Westminster Hospital, Mr. L. G. Grimmett of the Radium Institute, Prof. F. L. Hopwood, D.Sc., of St. Bartholomew's Hospital, Mr. W. V. Mayneord, D.Sc., of the Royal Cancer Hospital, Prof. Sidney Russ, D.Sc., of the Middlesex Hospital and their colleagues in their various departments. Radiotherapy should be and is prescribed at some centres on a quantitative basis, and for this purpose a physicist is very necessary. The establishment of a quantitative basis for gamma-ray therapy has been delayed by the difficulty of determining the comparability of the X-ray and gamma-ray r unit, but thanks to the work of L. H. Gray the expression of gamma-ray dosage in r is now accepted in this country and is rapidly gaining acceptance in the United States. To obtain an accurate assessment of dosage the quantity of radiation absorbed at the point selected must be measured or calculated with due regard to the complex physical factors of scatter, wave-length, and, for radium, distribution of the radioactive foci. The guidance of a physicist is essential to calibrate X-ray tubes and teleradium apparatus, to prepare isodose curves, and to devise rules for the distribution of radium tubes and needles which will give a reasonable degree of homogeneity. No competent radiologist is now content to carry out treatment unless these fundamental physical measurements are available, and it is a happy idea to make coöperation with physicists trained in this specialised field available for all those who need it. On the other hand, the physicist is not a substitute for the medical radiologist. The treatment of disease by radiation, particularly of malignant disease where the margin between success and failure may be narrow, is not merely a question of determining a dose to be delivered to a chosen point, but of ensuring by physical means that this dose actually is delivered. Questions of volume of tissue irradiated, local and general tolerance and the complex usually called the time factor are the province of the radiologist who has specialised training superimposed on ordinary clinical knowledge and experience. Any attempt to substitute the physicist for the medical radiologist would be a retrograde step, and it is satisfactory to note that the King's Fund realises the importance of the two branches working together.

FASHION IN ANÆSTHETICS

THE tendency to follow fashion, being closely related to habit-formation, is probably inseparable from all forms of human endeavour. In medicine the fashions that are past—mucous colitis, perityphlitis and "blood pressure"—stand out in their true nature, though in their full flower they were honestly thought to be based on pure reason. Moreover, changes which seem to the outsider to be guided merely by contemporary fashion may be quite rational to those who are intimate with their causation. The anæsthetist will claim that he is free from the base desire to do the latest thing and that the changes in his methods and materials are made solely for the safety and comfort of his patients, but there is no branch of medicine in which change is more constant and striking. The trends in America are well illustrated by an analysis of the practice at the Mayo Clinic.[1] The most notable change there is the increase in the use of intravenous anæsthesia and this apparently applies to almost every kind of operation. For example, in 1934, the method was employed seven times for intra-abdominal operations; in 1939 it was employed for 659. The rise is as great in operations on the brain and in orthopædic surgery and is greater still in the region of gynæcology where the figures were 4 in 1934 and 1060 in 1939. There are no comparable figures for this country but the general tendency is the same, though Avertin is more popular here. Intravenous anæsthetics undoubtedly have immense advantages in rapidity, convenience and comfort which commend them to both anæsthetist and the patient, but their comparative safety remains to be settled by long experience. Whether their present wide use will continue or whether the historian will call them a passing fashion time will show.

SULPHONAMIDES BY INJECTION

THE therapeutic effect of sulphonamides depends on an adequate concentration being attained in the blood, and it is not possible to be certain that this level has been reached without a fairly complex biochemical investigation. We cannot assume that the same dosage given by mouth to different patients will necessarily lead to identical concentrations in their blood, because of irregularities in absorption from the gut; in fact the failure of certain cases to respond to sulphonamides given by mouth may be due to defective absorption. That is one argument in favour of giving the drugs by injection, but a still more practical one is the frequent inability of the patient to swallow. Unfortunately, many active sulphonamides are only sparingly soluble in water, while the attachment of a solubilising group to such compounds tends to reduce their therapeutic activity. This was found to be the case with sulphapyridine, or M. & B. 693, the only equally active soluble compound being the sodium salt. The production of sodium sulphapyridine is a normal intermediate in the manufacture of sulphapyridine, but knowledge of its high alkalinity retarded its use in clinical medicine until Marshall and Litchfield[2] published an account of its chemical and pharmacological properties. Gaisford, Evans and Whitelaw[3] recorded their experiences with the compound given intramuscularly in the treatment of acute infections, and its subsequent success in clinical medicine illustrates the possibility of pharmacological experimentation being belied in practice. It is often an advantage to the practitioner if intramuscular rather than intravenous injection is possible, but alkaline salts such as sodium sulphapyridine are known to cause local necrosis of the muscle into which they are injected unless the local circulation is active. And the severely ill or collapsed patient who needs parenteral therapy is the one most likely to have an inactive peripheral circulation. At a recent meeting of the Royal Society of Medicine W. R. Thrower[4] demonstrated specimens illustrating this necrosing effect on muscle, and also the effect of giving acciden-

1. *Proc. Mayo. Clin.* April 17, 1940.
2. Marshall, E. K. and Litchfield, J. T. *Trans. Ass. Amer. Phys.* 1939, **54**, 154.
3. Gaisford, W. F., Evans, G. M. and Whitelaw, W. *Lancet*, 1939, **2**, 69.
4. See *Lancet*, May 25, 1940, p. 967.

tally a subcutaneous injection. Taplin, Jacox and Howland [5] have now introduced a technique which they say largely overcomes the objections to giving sodium sulphapyridine subcutaneously. An amount of the drug ranging from 3 to 7 g. is dissolved in about a litre of normal saline, the exact volume depending on the patient's body-weight and fluid balance, and this is given slowly by hypodermoclysis into the thighs or under the breasts. In spite of the high alkalinity of the preparation (pH 10·5) no untoward local reactions have been observed with a rate of flow of 200 to 300 c.cm. per hour. With this method there is no question about absorption, even when vomiting is present, and a concentration in the blood-plasma of 4–10 mg. per 100 c.cm. can be reached within a few hours and maintained for eighteen to thirty-six hours. Experience in cases of pneumococcal pneumonia and other diseases has proved the efficacy of the method, but it is not one that is likely to be applied much except in hospitals. What is the ultimate effect of the solution on the subcutaneous tissues time alone will show, and every opportunity should be taken of observing any histological changes, especially in patients with some measure of peripheral stasis.

EASIER LABOUR WITH A LOW-SALT DIET

Dr. Wadlow [6] of St. Joseph, Missouri, wisely remarks that a reduction in the pain and duration of labour is more important in the minds of the layman than any amount of careful supervision of pregnancy and labour, and he claims to have attained such a reduction in a simple way. He observed that patients given a salt-free diet for toxæmias of pregnancy often had a quick and easy labour and he therefore began to put his healthy patients on a diet poor in salt for the last few weeks of pregnancy. The effect was striking. He gives figures for the duration of labour in 70 patients on a low-salt diet, including 45 primiparas and 25 multiparas, and compares them with those for 100 primiparas and 100 multiparas given an ordinary diet. In normal cases the average duration of labour in the controls was 13 hours for primiparas and 7·9 hours for multiparas. In those given a low-salt diet the corresponding figures were 6·9 and 4·3 hours. In abnormal labours the figures were equally impressive. Labour was shortened chiefly in the first stage, but there was a decided reduction in the expulsive stage. Wadlow also had the impression that labour pains were less severe in a high proportion of these patients. The babies were up to average weight and the mothers' lactating ability was not affected in any way. The explanation of this observation is difficult, but it may depend on the dehydration of the maternal tissues produced by a reduction in salt intake. Normally the output of urine diminishes and water retention consequently increases in the last few weeks of pregnancy. This may be a protective mechanism intended to act as a reserve against loss of blood during labour or to provide for the milk supply. One of the large reservoirs for the retained water is the uterine musculature, and this physiological œdema may impair the efficiency of uterine contractions. Similarly œdema of the cervical tissues will lead to slower dilatation. Wadlow suggests that the reduction in the severity of labour pains that he sometimes observed may be connected with a lessening of central and peripheral nervous excitability. He points out that there may theoretically be some danger in a patient embarking on labour without her full reserve of fluid, though there was no evidence in his cases that this was of any significance. He does, however, advise forcing fluids immediately after delivery to help in the establishment of lactation.

5. Taplin, G. V., Jacox, R. F. and Howland, J. W. *J. Amer. med. Ass.* May 4, 1940, p. 1733.
6. Wadlow, E. E. *Amer. J. Obstet. Gynec.* May, 1940, p. 749.

ASPIRIN AS A POISON

THE latest report of the Registrar-General gives the number of deaths due to poisons in England and Wales in 1938 as 735, about the same as in the year before. Of these, 591 are classified as suicide and 92 as accident, the remainder being doubtful. A fact clearly revealed by the report is that these deaths are mostly caused by readily accessible poisons—there is little evidence of ingenuity. In no less than 43 suicides—25 women and 18 men—the drug used was aspirin. Aspirin was also the cause of 8 accidental deaths and of 14 of the unclassified ones, so that altogether it was responsible for 65 in the year. This was twice the number recorded in 1936, though only 4 more than in 1937. If the rise can be taken as reflecting the growth of the aspirin habit it is perhaps fair to assume that the consumption of the drug is now reaching saturation point. However that may be, it is a curious position when a drug that is chosen by 43 people in a year for the definite purpose of making away with themselves and is blamed by coroners' juries for the deaths of 22 others is not a poison in the eyes of the law. If it were, some of the suicides who used it might have had enough difficulties put in their way to make them think again. On the other hand, it would need a brave legislator now to make aspirin purchasable on prescription only.

PUNCH DRUNK

THE pathology of cerebral concussion is still far from being understood, but some experiments described by Scott [1] have carried our knowledge a step further. In these single blows of measured strength were applied to the heads of dogs while their blood-pressures and intracranial pressures were recorded continuously. Scott showed conclusively that a blow to the head, sufficient to cause a brief period of unconsciousness, but not to produce any intracranial hæmorrhage or other pathological alteration detectable with the naked eye, is invariably associated with a rise in the intracranial pressure to a level considerably above the existing blood-pressure. Eyster [2] and Wolff [3] have demonstrated that the cerebral anæmia that results when the intracranial pressure rises above the blood-pressure is complete, that is, it involves not only the superficial but also the deep cerebral vessels. The brief anæmia, however, is not enough to account for the unconsciousness, which lasts much longer; one must assume the existence of vasomotor reflexes which produce more prolonged stasis and anoxia. In keeping with this assumption is a fact known from other work,[4] that the rate of change in the cerebral circulation is more important than its absolute degree. For human beings the knock-out blow in boxing comes nearest to these animal experiments. Scott tries to apply his results to explain the production of the syndrome called punch drunk, which is the result of repeated boxing injuries.[5] It is doubtful whether the knock-out is always brought about in the same way, and if so whether the mechanism is the one reproduced in these experiments. However, Scott suggests that the irreparable damage to the central nervous system of

1. Scott, W. W. *Arch. Neurol. Psychiat.* 1940, **43**, 370.
2. Eyster, J. A. E. *J. exp. Med.* 1909, **2**, 489.
3. Wolff, H. G. *Physiol. Rev.* 1936, **16**, 545.
4. Weiss, S. and Baker, J. P. *Medicine*, 1933, **12**, 297.
5. Winterstein, C. E. *Lancet*, 1937, **2**, 719.

some fighters may be the effect of many sudden anoxæmias of short duration, the periods of anoxia acting cumulatively in damaging the tissues. This may be a difficult assumption to justify if there are long intervals between the "accidents," but it may help to explain (and prevent) the well-known ill effects of sparring and too frequent fighting, which seem particularly liable to produce damage. One of Scott's observations may be more significant than he thinks. In half of his experiments the arterial blood-pressure fell considerably, and if the same is true in human beings (as Cannon assumed) it will need less force to produce a second anoxia after one punch has been effective, and this may be the mechanism which leads to permanent structural damage and the clinical picture of punch drunk.

ECONOMY IN ERGOT

SINCE the outbreak of war shipments of ergot to this country have been irregular and the wholesale price has risen by something like 300 per cent. It is unlikely that the position will become easier for some time and the war-time requirements committee appointed by the Medical Research Council now urge the need for strict economy in the prescription and administration of preparations and alkaloids of ergot. They point out that many practitioners give ergot twice daily to every puerperal woman for a week or more after delivery with a view to promoting involution of the uterus, but that recent observations and statistics have failed to show any difference in the rate of involution as the result of prolonged ergot therapy. While, therefore, it is wise to give a single dose of the drug after delivery, and a case can be made out for two or three doses, the committee maintain that there is nothing to be gained by further administration unless a definite abnormality has arisen. Continued administration is needless in normal women and may indeed be harmful. Ergot is also used for certain cases of menorrhagia, but it is of no value for non-uterine bleeding. Ergot is best administered in the form of prepared ergot (ergota præparata B.P.), which is powdered ergot deprived of its fat and standardised, and may be prescribed in 5 grain tablets or capsules. Prepared ergot is more economical than the liquid extracts, for the methods of liquid extraction have been shown to be incomplete and wasteful. Moreover, the liquid extracts lose their activity more rapidly than the defatted powder.

BLOOD-SUGAR AFTER DEATH

HYPOGLYCÆMIA as a cause of death is still rare but the possibility may have to be borne in mind from the medico-legal as well as the clinical point of view. There are difficulties in the diagnosis of either hypo- or hyper-glycæmia after death because of the post-mortem changes that take place in the blood-sugar values owing to glycolysis. Hamilton-Paterson and Johnson[1] have now studied these changes by repeated blood examinations in fifty cadavers including eight cases of diabetes. They found that glycolysis was so rapid that estimations of the blood-sugar made more than three hours and a half after death were of little significance unless the blood had been taken from the left side of the heart. Refrigeration had little influence on results since it was unable to lower the temperature of the internal organs sufficiently within this period. In eight non-diabetic cadavers there was a progressive rise in the sugar values of blood taken from the right auricle within the first 24–48 hours after death. The increase occurred in the fermentable portion of the blood-sugar and was presumed to be due to glucose. There was no corresponding rise in non-protein nitrogen, so that protein breakdown was not the explanation. The high values were associated with a correspondingly high content of fermentable sugar in the liver, and it therefore seems possible that the blood obtained from the right auricle may have acquired more sugar by diffusion from the liver, the livers in these cases having presumably had a high glycogen content at death. Such cases can be distinguished from cases of diabetes mellitus because in the latter the blood-sugar value is high in both the right and left side of the heart. In-vitro experiments revealed little difference in the glycolytic power of diabetic and normal blood whereas diabetic blood appeared to glycolyse more slowly in the cadaver than in vitro. The in-vitro experiments, although few, indicated that heparin was as effective as oxalate in delaying glycolysis. The conclusion drawn from these observations is that post-mortem blood-sugar determinations are of little value in the diagnosis of hypoglycæmia unless they are made within two hours of death, but that hyperglycæmia can be diagnosed if a value of not less than 200 mg. per 100 c.cm. is obtained in blood drawn from the left side of the heart.

1. Hamilton-Paterson, J. L. and Johnson, E. W. M. *J. Path. Bact.* April, 1940, p. 473.

A NEW BOARD OF FACTORY WELFARE

THE powers of the Home Secretary under the Factory Acts have been transferred by an Order in Council to the Minister of Labour and National Service for the duration of the war. A factory and welfare department has been set up in the Ministry of Labour and the factory department of the Home Office has been transferred there. The new department will work in close coöperation with the Industrial Health Research Board. The Minister will himself preside over a factory and welfare advisory board of which Air Vice Marshal Sir David Munro, secretary of the I.H.R.B., is a member.

CHEMIST AND LEXICOGRAPHER

Sir Jocelyn Thorpe, eminent organic chemist, died on Monday at the age of 67. After training in London and Heidelberg he worked for many years in Manchester, and from 1914 till his retirement in 1938 was professor of organic chemistry in the University of London at the Imperial College of Science and Technology. He was perhaps best known for his work on structural organic chemistry, including his studies of dynamics, isomerism, the theory of free valencies and of ring formation and stability. He also discovered a reaction which has been named after him. He was joint author of books on the synthetic dye-stuffs, and undertook with M. A. Whiteley the pious task of editing the great Dictionary of Applied Chemistry.

Surgeon Rear-Admiral EDWARD SUTTON, C.M.G., who died at Newcastle-on-Tyne on June 5, saw service in the East before he was appointed principal medical officer of the East Indies Squadron in 1911. At the end of the last war he was in charge of the Royal Naval Hospital, Haulbowline, Queenstown, and in 1920 he was appointed deputy director-general of the Naval Medical Service. In 1923 he became second in charge at the Royal Naval Hospital, Haslar. Three years later he was appointed principal medical officer at the Royal Naval Hospital, Chatham, and he held this post until his retirement in 1929.

SPECIAL ARTICLES

GESTALT PSYCHOLOGY AND NEUROLOGY

Prof. K. Koffka, of Smith College and Colombia University, has just completed four lectures at the Nuffield Institute, Oxford, on "Human Behaviour: A Brief Survey of Psychology with some Reference to Pathological Phenomena." He has been working on the psychological aspects of disorders due to diseases and injuries of the brain in the Nuffield Department of Surgery, and the lectures were primarily addressed to physicians and surgeons interested in organic cerebral disturbances. The lecturer was introduced by Sir Farquhar Buzzard and Prof. Hugh Cairns.

Professor Koffka began by saying that sensitivity, motility, memory and reasoning were all interdependent functions. In the study of the reactions of the individual as a whole a simple receptor-effect formula fails to satisfy the facts. Sensory effects are controlled by the motor effects they produce. The effective side of behaviour should include such things as wishes, needs and intentions. Some of the reactions of the individual are determined by the environment, some by the self or "ego," and the distinction is not absolute. The first lecture dealt with the phenomena of perception, and the distinction between figure and ground first established by the Danish school. The background on which a figure is seen is, said Professor Koffka, as important as the figure itself. It is a framework which extends to three dimensions and affects all kinds of perception. The background is more stable than the object. The effect of local stimulation is therefore dependent on the background on which that stimulation occurs. Perception must be "organised" to have effect. Thus the after-image of a portrait has no meaning because the intermediate shades are lost. So in some occipital-lobe lesions recognition of form may be lost because of poor definition (Goldstein, Schneider). In agnosia the visual shape may be perceived but the organisation with the background lost. Thus in object agnosia the patient will behave normally if the object being tested is in its proper setting, and yet the object will be meaningless when presented in unusual circumstances. In this way simple features of the process of perception can be rendered obvious in patients suffering from cerebral lesions, if only because cerebral functions are in them slowed down.

MEMORY

The second lecture was a theoretical analysis of the function of memory. Dr. Koffka gave as the psychological definition of memory "the totality of facts in which the past survives in some form or other." A past performance remains part and parcel of the structure and influences future performances. Thus a continuous sound has to involve the past in order to be appreciated as continuous; the beginning of a sentence is already a function of memory by the time the end is reached. There is psychological "organisation" in time as well as space. The images or traces of something past are not merely added to something present, but give the total situation a special meaning. A picture of a green leaf looks greener than that of a green goat. Recall, and remembering in the ordinary sense, are more difficult feats than simple recognition. The acquisition of motor skill is due to memory, which is thus closely related to learning. Past performances leave a trace, not just as ripples in the sand reflect previous waves, but traces which themselves have wider possibilities. Memory appears when the trace is effective, and similarity is the main factor in the selection of traces to produce memory. The trace is not always available, and psychology finds the explanation of lack of availability one of its most difficult problems. In verbal aphasia the traces remain intact. Disintegration of memory for recent events, a common feature of cerebral disorder, lies in the disruption of the processes which create the trace, a lack of organising power in perception. The disorganisation of recall function in aphasia is related to the circumstances. The patient may use a word in one context which he could not recall in another. It is not the word alone that matters. The whole process is changed. This kind of difficulty is not essentially a pathological process but is encountered in normal people in ingenuity problems. So from another point of view it is found that in cerebral disease or injury normal function is slowed to the point of breakdown. All mechanisms are affected. Memory in its effects and failures presents an array of facts which continuously modifies perception and recall. A general effect of injury is to lessen wider implications.

In the third lecture Professor Koffka described some modern experimental psychological work on memory, which has developed from the old work of Ebbinghaus on learning followed by tests. The material for the test must be free from all implication, and for this reason nonsense syllables and numbers are used in the test. Many laws have been formulated. It is possible to measure the energy required to remember (number of repetitions necessary for recall) and the damage done to memory by other occupation in the interval between learning and recall. Memory for certain events is improved by later events. Professor Koffka deprecated the use of words such as facilitation and inhibition for these processes in the present state of knowledge. The tests show that memory traces interact with each other. The old conception of learning wearing a deeper channel (canalising) did not fit the facts. Learning is affected by such factors as uniformity of the material and massing of similar material. Massed traces lose their individual characteristics. All the principles found are applicable to voluntary recall as well as to recognition and memory perception. The survival of a memory trace depends on the "organisation" of the original material. It must be bound into a system or situation. If traces are left alone they will disintegrate, especially if they are at the limit of the individual's capacity, and this is seen as a failure of voluntary recall in patients with cerebral damage. The rapid progress made in work on memory from the point of view of the experimental psychologist is due to the application of the laws discovered in relation to perception. Thus two separate fields of psychology can be unified under the same laws.

INFLUENCE OF ENVIRONMENT

In his last lecture Professor Koffka returned to the effect of the environment in inducing reactions. Instancing the process of accommodation of vision to a near object, and the steps which occur between initial perception and a final state of more accurate perception he laid down that through its action the organism changes the conditions imposed on it and thereby alters its senses. The initial perceptive process supplies the force and the energy. All actions are governed by this principle. Behaviour takes place in an environment and is determined by stimulation arising from that environment. Actions cannot be studied without reference to the external world, the "perceptual world." A self or "ego" acts within the environment. Psychology cannot build up a system without a "self." The self is in the environment just as is any other object. The ego and the environment form the "total field." All variations occur between the two extremes, the one where both ego and environment are little differentiated and what happens to one happens to the other, and the other where the ego is overemphasised. The emphasis varies from time to time in the same individual. An action can only be understood fully if the framework in which it arises can be well defined. Loss of functional framework means loss of security ("like trying to stand on one leg with one's eyes shut").

There are not only spatial frameworks, but also intellectual, social and moral frameworks. Loss of any one of these means loss of security (instancing minority problems as an effect of a social instability). In cerebral damage failure over a task or an adjustment brings about a "catastrophic reaction" (Goldstein). The patient then fails chaotically in the simplest tests and complains of headache and giddiness. In severe degrees speech may be lost. The patient with cerebral injury has to limit his field and stay within the security zone. Security is connected with "freedom" just as much in intellectual function as in social events. Professor Koffka instanced a dysphasic patient who when shown a fountain pen and asked what it was said "a quarter to five." He had been anxious about the time, and a previous glance at his watch determined his behaviour. His behaviour was not free to transfer from one process of thought to another.

Perseveration of speech, a common feature of aphasia, is due to the same loss of freedom of intellectual function. Here again actions are determined not by the present situation but by actions gone before, for all perseveration is related to a trace of a previous performance, and is more obvious the more difficult the task (Goldstein). Such a defect is an exaggeration of a normal process, such as occurs when a difficult new word is acquired and is then applied to other later and not quite appropriate ideas. Perséveration in agnosia and apraxia is an instance of the same phenomenon in other spheres. Object agnosia is not due to failure of visual organisation, but to a failure of objects to find a proper background. If the framework is provided by a previous performance perseveration results.

Loss of "freedom" in patients can be seen as an inability to do things, particularly when the actions need much support from memory. Words come easily sometimes, but with most difficulty in situations requiring spontaneity. Thus concrete words are the easiest to produce from memory. The assessment of freedom of action is made on two criteria—actions should follow intention and should be adequate for the total situation. Adequacy comprises both facts in the ego and in the environment. A response may be very concrete though adequate. Primitive peoples are very concrete in thought, and abstract behaviour is developed by western civilisation. Patients with cerebral lesions become more concrete in their type of reaction.

These novel points of view advanced by Professor Koffka have aroused great interest for they explain many curious features of the disorders seen in aphasia, apraxia and agnosia, and promise wider application. The unsatisfying nature of current theories of aphasia is widely felt and a contribution of this kind not only opens the way to a better understanding of this kind of disorder but through that allows better assessment of the nature, extent and progress of cerebral damage.

D. D-B.

LOCAL GOVERNMENT POSTS IN IRELAND

(FROM OUR IRISH CORRESPONDENT)

A BILL to make certain amendments in the law relating to local government has been introduced into the Dáil by the minister for local government and public health, and was circulated a few days ago. In it is buried a provision which gravely affects the existing rights of medical and other officers of local authorities. Section 23 proposes to empower the appropriate minister to declare any specified age to be the age-limit for officers under the local authorities, and when such declaration has been made the holder of an office who has reached the specified age shall cease to hold such office. Moreover, in that event he, for the purposes of existing enactments concerning the superannuation of officers of local authorities, shall be deemed to have become incapable of discharging the duties of such office with efficiency by reason of old age and shall be deemed to have resigned such office. In fact, the bill provides for a compulsory age of retirement of the officers of local authorities without making any alteration in the scale of superannuation provided by existing laws. There are some eight or nine hundred medical men holding offices under local authorities at the moment, and it would appear that a grave change in their conditions of employment, either now or in the future, is proposed to be made to their detriment without their consent. This seems to be contrary not only to natural justice but to existing practice.

It will be remembered that some four or five years ago the department of local government and public health sent a circular letter to the several local authorities under their control, advising them to invite any officer who had reached the age of sixty-five years forthwith to resign. A few, believing that they had no option but to do so, sent in their resignations. The Irish Medical Union advised its members that neither the department nor the local authorities could compel resignation unless the individual officer could be shown to be rendered incapable of performing his duties by old age or bodily incapacity. Without formally withdrawing the circular, the department, recognising its blunder, forbore from pressing any further advice on the local authorities. There is no doubt much to be said in favour of the imposition of an age-limit for the holding of public offices, but it is impossible to justify the compulsory application of a new condition to their detriment on those who have entered the public service on other terms.

UNION OF SOUTH AFRICA

EARLY this year Dr. A. J. Orenstein was appointed director-general of medical services to the Union Defence Force. Except for the word "general" the appointment is the same as the one he relinquished in June, 1919. The rank is that of colonel, as it was 21 years ago. The medical service is basically similar to the other branches of the defence force. It consists of a few officers, W.O.s, N.C.O.s and men on the permanent establishment, a certain number of ambulances with attached medical officers for regimental duties, and hygiene sections on what is called the Active Citizens' Force. These are the backbone of the whole organisation. They undergo an annual period of continuous training and attend periodical evening or afternoon instructional parades, lectures, &c. Most of the personnel are volunteers. There is also a reserve of the A.C.F. The war organisation is being built up on these A.C.F. units, at present on a voluntary basis, with the assistance of the medical and trained nurses' associations. Some 80 per cent. of the medical profession have volunteered their services for war work, either full or part-time, and about half of these have offered to serve in any theatre of war. The response from trained nurses has been equally gratifying and the same applies to the dental profession and health workers. Our correspondent adds: "On the whole, for a small people far away from the war theatres, we are not doing so badly. We are not lacking in understanding of the justice of our cause, nor in desire to do all we can to win the war. We can do only what we can manage to do in our circumstances. It may be but a very little, but I doubt not we shall do it reasonably well. So do wish us luck." And we certainly do.

WITH THE B.E.F.

MEDICUS, M.P., IN FRANCE

To write of visits, inspections and special units in the B.E.F. up to the beginning of the German offensive on May 10 is to write of something which has lost its immediate interest for the medical administration but which has become part of a glowing page of history. The story of the B.E.F.'s battle out of Flanders to the coast after the surrender of the Belgian army by King Leopold and the unsurpassable bravery of officers and men makes a picture like an ancient tapestry of the most splendid human qualities. But the fact that the B.E.F. has fought its way out as a welded, organised disciplined force shows that the army of a democracy can do something that Hitler's driven men could never do. Though the army were outnumbered on the ground and the Air Force in the air the B.E.F. have outfought the highly mechanised German forces, not only because the quality of the individual British soldier and airman is higher than that of the German, but because the disciplined organisation of the Army and Air Force is a better organisation. Our men are better than the Germans and our machines are better than theirs.

All that I saw in France of the care for the men's food, billets and recreation, the measures for the prevention of disease and the maintenance of good physical condition, has been shown in the last three weeks to have had magnificent results. The unbeaten B.E.F. has been subjected to the most furious of attacks on its morale as well as on its physical defences. And anyone who has seen or talked to officers or men returned from Flanders knows that their morale is even higher than before and that their physical efficiency only needs sleep to restore it to the hundred per cent. level.

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When I was with the B.E.F. I met a number of the officers of the department at G.H.Q. which deals with press matters. They were cheery, pleasant, unperturbed and casual about possible dangers of bullets, bombs or shells as such a mess always is. After Dunkirk two of them came to see me at the House of Commons. One of them explained it would be a bit of a rest "to listen to a debate after being bombed and machine-gunned pretty continuously." These two men had "assisted slightly," as one of them said, at the battle of Louvain and motored over the Belgian roads jammed with crowded refugees "like Derby day." They had been bombed on the roads, but the German aim was bad, and they had seen the refugees bombed.

One officer recalled that at three different places in Belgium he had seen ordinary respectable Belgian women clench their fists at the sky as German dive bombers went by and curse "Ces sales Boches de Leopold." This was before King Leopold had surrendered his army and the terms of the curse were difficult to understand. Those three women in places in Belgium widely separated from each other must have had some foreknowledge of King Leopold's actions. One of my two friends had been in charge of part of the demolition work at Boulogne when docks, cranes and other works were blown up. And he looked just the same as he had been in France when G.H.Q. was still a place of calm and quiet in a lovely old town filled with a quietly busy civilian population and plenty of good shops with everything one needed to buy. Among other duties these two officers had acted as scouts to spot the approach of German tanks over the hill into Boulogne. They described how they saw them come lumbering slowly along heaving up over the crest of a field parallel with a road and then dip into a hollow.

Clearly both the human material and the armament equipment of our armies are excellent—but we want more of both. The morale of the army officers and men could hardly be higher—my friends did not "jest with death," they just took the chance of death or wounding quite casually and left it at that.

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In the light of the war since May 10, on the fighting side we need more machines, particularly fighter aircraft and tanks, but on the medical side we probably need less. Elaborate apparatus of cylinders and bottles on big stands for the giving of anæsthetics do not fit in with a war of movement. And other elaborate equipment should probably be cut down in battle units and transferred to those on L. of C. The M.O. of a battalion or of a field ambulance will have to be less of a surgeon or physician and more of a soldier whose duty it is to clear the wounded away from the battle area in the shortest possible time. And for this purpose it is well worth while our Army medical authorities examining the possibilities of the French form of wheel-stretcher. This is a low-slung stretcher to which the wounded man is strapped almost in the same way as to a navy stretcher, so that he can be moved in any direction without displacement. The stretcher with the wounded man on it is only a foot or so above the ground and below the centre of gravity of the wheeled apparatus as a whole. The apparatus is economical in man-power—two men can take it anywhere—and it is safe for the wounded man.

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The next great trial of strength our nation will have to face may very well be in the homes of the civilians in our cities and not in the armies in the field. Is the care given to the civilian population to guard it against disease as good as that given to the Army? Is the nutrition of the civilian population as good as that in the Army? Is the civilian morale as good as that of the Army? Nothing less than B.E.F. standards of courage and endurance will be enough for the civilian population under bombing attacks from the air and the attempts at landing of troops. The high standards of the B.E.F. rest on a very solid foundation of excellent organisation and excellent nutrition. We had better look to it that our civilian standards are as good as those of the Army—for they will need to be. The war in Flanders with refugees machine-gunned and bombed on the roads while furious air warfare and land warfare went on round about them has its simple lesson on totalitarian war. We are all in it.

SCOTLAND

(FROM OUR OWN CORRESPONDENT)

MENTAL DEFECTIVES

AT a recent meeting of the Scottish Association for Mental Hygiene several speakers urged discharge from the army of a small proportion of mental defectives who had entered the services. Dr. R. D. Clarkson said that one of the major problems at the present time was the fact that mental deficients were being conscripted into the fighting services. They had records of almost 200 certified defectives who were now serving in the army. Experience in the last war had shown him an extraordinary thing that many mental defectives who joined up did surprisingly well.

One youth whom he knew was awarded the Military Medal for gallantry as an ambulance driver in 1918. Many mental defectives could fight, and did fight, as well, as hard and with the same sort of feelings as normal soldiers and it was important to remember that there would probably be no more than 1 per cent. of defectives in the army, which was about the same proportion as existed in the general population. The American army of the last war, the only army which was mentally measured, had an average mental age of under 12! Dr. Kate Fraser, commissioner of the Board of Control, said that though they could all give individual cases of satisfactory military services rendered by defectives, the present war was different from the last. The handling of mechanical contrivances demanded high intelligence. Defectives could not operate tanks, range-finders, and wireless although they might make good infantrymen. She said that she was convinced that no defective should be allowed to have a lethal weapon. When it was reported that a soldier was mentally deficient he was discharged and sent home. That was discouraging and some of them would make excellent members of labour corps. Some form of group-testing could surely be established in the first few months of training and those with lower intelligence could be under observation. Prof. James Drever, D.Phil., said that a man of low intelligence could be a danger not only to himself but to others. Indeed the question was one which concerned not only those who were frankly defective but also in the borderland between deficiency and normality. The meeting decided to approach the Scottish Command to see what could be done to obtain the discharge of mental defectives from the army.

CARNEGIE UNITED KINGDOM TRUST

The policy of this trust has always been of peculiar interest in Scotland since so many of its activities have been concerned with Scottish affairs and with the provision of financial assistance to Scottish institutions. During 1914–18 the trust's work was practically uninfluenced by war conditions. Today the situation is quite different, for in the last 25 years its activities have spread over a much wider area. The effect of the war on its activities is described in the recent annual report. Applications for financial grants will continue to be sympathetically entertained from bodies which, after receiving aid from the trust in the past, had become self-supporting, but are now in danger of collapsing. Applications will be considered on their merits from bodies aided by the trust which found that the war meant an intensification of their activities. The intention of the war-time policy is to preserve the greatest possible measure of fluidity. All consideration of a long-term policy has been postponed in order to apply the trust's resources where they are most needed, whether for immediate projects or for the task of post-war reconstruction. Of particular interest perhaps to the medical profession is the statement that the whole of the field work of the nutrition inquiry carried out under Sir John Orr, F.R.S., has been completed. An interim statement of the findings has been issued and the material is now available for a final report.

GLASGOW ROYAL INFIRMARY

A new outpatient department and rehabilitation centre for this hospital has been constructed and equipped at a cost of over £100,000 and was recently opened by Mr. John Colville, M.P. The building was purchased from the Royal Glasgow Asylum for the Blind and has been reconstructed in order to meet the needs of over 1000 outpatients daily. Up-to-date facilities for physiotherapy and rehabilitation are provided in order to handle the large proportion of industrial accidents with which the infirmary has to deal.

NEW HOSPITAL IN FIFE

The Fife county council has recently completed the new Cameron Hospital, Buckhaven, at a cost of £85,000. This hospital was intended for the treatment of infectious diseases but it has been decided to use it for the reception of civilian air-raid casualties. After correspondence between the county council and the Department of Health for Scotland it has been suggested that the department should undertake the entire financial responsibility for the working of the hospital, including post-war replacements and repairs; that the department should pay the salaries and wages of all members of the staff, but that the entire running of the hospital should remain in the hands of the local authority. It was also recommended that the department should supply all equipment other than that required for an infectious diseases hospital and that the local authority should be empowered to use one of the blocks for the reception of cases of a more medical type. The public-health committee accepted these recommendations and discussion with the Department of Health proceeds.

UNITED STATES OF AMERICA

(FROM OUR OWN CORRESPONDENT)

EPIDEMIC ORIGINATING IN A TRAILER CAMP

NOT long ago it seemed likely that a large part of the population of this country was about to exchange stationary for mobile residence. This promise has not been fulfilled. The latest statistics for Yellowstone National Park are for 1938 and in that year 597 trailers entered the park with an average of 3·89 persons per trailer. At the present time, however, the traveller on our main highways meets many fewer trailers than he did.

An epidemic of typhoid fever and gastro-enteritis originating in a trailer camp near Oswego, New York, has convinced epidemiologists in this country that trailer travel is still a matter of serious import to them. The circumstances were described by Drs. Paul A. Lembcke and Philip J. Rafle at the meeting of the Medical Society of the state of New York on May 9. The district office of the New York state health department was notified on Aug. 28, 1938, that several people in a trailer camp at Chautauqua Lake were ill of an enteric infection. Investigation of the camp on the same day disclosed 8 cases of typhoid fever in four related family groups who had been touring the country in four trailers. Two families were from Rhode Island, one from Texas, one from Louisiana. Investigation of all cases of typhoid fever reported in the state directed suspicion to a camp at Oswego. From the registration records of the camp investigation was extended and 18 cases of typhoid fever were found to have occurred among persons who had patronised this camp during the first ten days of August. Since the registration was very imperfect it is probable that there have been other cases which could not be traced. Of the 18 known cases 3 died and 2 became chronic typhoid carriers. Water at the camp was supplied from a well located in fissured limestone rock. This water was unfiltered and unchlorinated. Two cesspools, a pit privy, an open-joint line from flush toilets to the cesspools, a lavatory seepage pit, and a septic tank were all located within 166 feet of the well.

The infected trailer population had travelled some distance before their illness was brought to the attention of the health department. Had they in the meantime pitched an informal camp on a watershed serving a municipality with raw water, a disaster of some magnitude might well have resulted. The fact that the permanent residences of the typhoid-fever victims are in no less than seven different states points also to the special hazard of spreading communicable disease through this form of travel. Lembcke and Rafle draw attention to the importance of supervising trailer camps and giving instruction to the proprietors. They commend the regulations set out in the yearbook of the American Public Health Association for 1938–39.

TUBERCULOSIS IN YOUNG WOMEN

Another paper read at the same meeting by Drs. Robert E. Plunkett and Julius Katz concerned the investigations made by the state health department into the incidence of tuberculosis in certain groups of young women. They point out that since 1915 in upstate New York the tuberculosis-rate has declined more rapidly among males than among females in all age-groups except those over 45 years, and that the difference is greatest in the age-group 15 to 24 years where the rate has decreased by 86 per cent. in males as compared with 79 per cent. in females. In the three-year period 1936 to 1938, 26 per cent. of all cases of tuberculosis reported among women in upstate New York were between 15 and 24 years of age and 53 per cent. were between 15 and 34. These findings bring out the importance of looking for cases of active tuberculosis among young women. Investigation in the age-group 15 to 24 years carried out by the state tuberculosis hospital clinics during 1937 yielded 3·1 per cent. cases found among those examined compared with 2 per cent. in males of the same age-group. Special studies have been carried out among normal school students, a school for female delinquents and a group of women in a food-packing industry. The 7000 individuals in these three groups yielded but 0·4 per cent. of active cases of tuberculosis. It is proposed to continue these studies in other selected groups of the population.

SALMON MEMORIAL LECTURES

These lectures were to have been given this year by Dr. Alexander Luria, but the difficulties of travel from Russia have decided him to postpone his visit to the United States. His place will be taken by Dr. Nolan D. C. Lewis, director of the New York State Psychiatric Institute, who for the past five years has acted as coördinator of research in dementia præcox for the Scottish Rites Masons. The lectures will be given at the New York Academy of Medicine on Nov. 8, 15 and 22.

MEDICINE AND THE LAW

Hospitals and Certificates of Insanity

LAST week the *Solicitors' Journal* ventilated a solicitor's grievance against the medical superintendent and secretary of a rate-aided mental hospital. He was acting for a client who sought a divorce on the ground of insanity under Section 2 of the Herbert Act. He could not begin proceedings without a recent medical report. The hospital, claiming to be acting on the express instructions of its committee, refused to give him a certificate or any other information. This obstruction, says our contemporary, nullifies the effect of the statute so far as this prospective petitioner is concerned. The Board of Control, with consent of the Ministry of Health, has decided to make all statutory documents available. The attitude of a local authority, in refusing to follow so clear a lead, is described as monstrous. A year ago the President of the Probate Divorce and Admiralty division drew attention to a similar act of obstruction and expressed the displeasure of the court at being thus treated. Counsel attended the court next day on behalf of the corporation concerned and the committee of the hospital, and expressed unqualified regret. The President remarked upon the seriousness of the failure to lend assistance to litigants in the early stages of their proceedings. If this incident were brought to the notice of any hospital which has not yet fallen into line, it would presumably have the effect which the *Solicitors' Journal* justifiably desires.

The complainant drew attention to a second difficulty. The hospital committee, it seems, was unlikely to meet for some months. If, after waiting until the committee met, he succeeded in obtaining a medical report, he was not certain that his client would be able to pay the fees required for bringing a medical witness to London. Petitions for divorce on grounds of insanity are put into the list of defended cases. Only undefended cases can be taken at assizes except where the parties are "poor persons." There are many prospective litigants whose incomes are not so low as to bring them within the Poor Persons Rules, yet not so large as to enable them to pay the fee required by a doctor who has to come to London to give evidence. This, observes our contemporary, is a matter of distinct hardship, a reform awaiting attention in more propitious times and meanwhile deserving wide publicity.

Psychological Pain

The same journal briefly reports a workmen's compensation case where a colliery company contended that the sole pain from which he suffered was the memory of the pain before a surgical operation; the pain was said to be similar to that felt by a patient in his toes after his leg had been amputated. The applicant suffered a leg injury and underwent an operation, being paid full compensation for a time, and afterwards, when adjudged fit for light work, having the amount reduced to 3*s.* 7*d.* a week for partial incapacity. In March, 1939, he found himself unable to do even the light work. In the following October the case was again before the county court and was adjourned for a second operation to relieve the pain in the leg. At the adjourned hearing the workman said his leg was no better, while the respondent company's medical witnesses maintained that the pain was entirely psychological. The court awarded full compensation down to Jan. 23, 1940. Pain being a subjective sensation, not necessarily identified with objective signs visible to the examining surgeon, this type of case presents obvious difficulty. The recently issued official statistics for workmen's compensation for the year 1938 indicate, by the way, that in rather more than 75 per cent. of disputed cases the workman wins.

On June 22 at 6.45 P.M. in the series of talks "I Knew a Man," Sir StClair Thomson will speak on Lord Lister.

The council of the Tuberculosis Association has decided that it would be inadvisable to hold the provincial meeting in Oxford on June 27 and 29. All meetings have been postponed until further notice. Communications should be addressed to the hon. secretary at the London Chest Hospital, Victoria Park, E.2.

IN ENGLAND NOW

A running commentary from our Peripatetic Correspondents

As a worker in the academic field, engaged only at long intervals in jobs that might legitimately be defined as war-work, the organisation of the Local Defence Volunteer Force seemed to me to offer a welcome opportunity of playing a small but more direct part in the country's war effort. With, or more often without, permission I had roamed through nearly every field and wood in my country village, so at least I was well qualified to patrol its boundaries. There would, too, be a peculiar pleasure in securing thus the right of entrée to the few remaining areas which an irate farmer or testy squire had denied to me. A colleague kindly warned me that I should soon find the duties boring. I did not deny it. War, I remembered, has been defined as long periods of intense boredom punctuated by short periods of intense fear. I could easily recall personal experiences of both during 1914–18, and should certainly have no grounds for complaint if the former were to prevail in 1940. Twenty-three years ago, proud pilot of a Sopwith "Pup," I had made my last dawn-patrol over the Dardanelles, looking down on the Turkish shipping, eager to spot any changes in its dispositions, in its entries and exits from the Narrows. Now it was to be on foot, eyes fixed up rather than down, slowly encircling an obscure village on the Chiltern Hills, not ten miles from the pleasant and peaceful retreat of THE LANCET itself. And as I watched the perennial beauty of the dawn of a new day I thought that there was indeed something to be said for a duty that drove one from one's bed at 2.15 on a fine June morning. It seemed too that an unscrupulous "parashot" could live very comfortably "on the country," at this time of year, before its inhabitants wakened to their tasks. My own round took me through a poultry farm with a daily production of over a thousand eggs where hens were already uttering their cries of relief and triumph over their first stages of maternity; past cows only waiting for some kind soul to empty their distended udders; and along the banks of a river pool from which trout might be tempted by fair means or foul. No fisherman myself I speculated on the latter; how did one set about tickling their tummies? Advice would be welcomed from readers versed in the art. On my second patrol I had as companion the chauffeur of a local business magnate. In the mysterious light 'twixt night and day he drew caressingly from his pocket a long and tapering knife. "This is the weapon I like to have handy," he said. Warnings against trusting even one's best friend to-day flashed through my mind. Was I to be ignominiously bumped off by a fifth columnist? But no, he was a good Englishman, with much to tell me about the habits of the countryside—not excluding rich employers—and a proper regard for his words of emphasis. The moment for intense fear had not come yet.

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To visit a preparatory school is an excellent method of escaping for a time from the atmosphere of war. The young, thank Heaven, are not gravely concerned about the fate of nations and have a trick of being able to give their whole attention to the things around them. Within my small orbit are two preparatory schools run on very different lines. The one is "modern" and unconventional. The pupils are subject to few rules, call the staff by their christian or nicknames and are taught neither manners nor cricket. The other school is as conventional as may well be. Here the staff are treated with respect and good manners are insisted on no less than the importance of keeping the left elbow up when playing back. The children at both schools appear to be equally happy, attractive and devoted to their preceptors, from which it might be inferred—as some of us have been suspecting for a long time—that the educator is of more importance than any particular system of education.

Those of us who served in the last war and who, though past our physical prime, have not yet reached the last stages of decrepitude are inclined to feel restless when we read or hear of the big battles. It is not so much that we want to go through these grim experiences (for we have a shrewd idea of what they are like) but we know that later on we shall wish that we had been through them. The fact that he is not actively participating in this war is apt to inspire in the ex-serviceman something akin to a sense of guilt which is not fully dispersed by the conventional reflection that we are all in a total war. Recently I discussed this point with a lifelong friend seriously wounded in the 1918 Somme, at which I also was among those present. "What you've got to remember, old boy," he said, "is that you and I have already been killed once." From this profound observation I derive a certain comfort.

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It is easy for a reviewer to condemn any book. He has but to pounce on a point with which he is in disagreement and harp on it. It is much harder to find the good that he should look for in every book however profoundly he may disagree with it. Every writer is entitled to this until the contrary is proven, just as a man is entitled to be believed until you know him to be a liar. But short of being a liar, there is many a man who handles the truth carelessly; he may write what he believes is right so carelessly that it may do more harm than actual wrong. This is where the reviewer's task is hard, especially with medical books. The reviewer may hold his own views strongly and yet have to admit they may be wrong; he may hate the opposite view and yet have to admit it may be right, and bring out the points in its favour.

Then there is the question of finance. Dr. Johnson said: "No man but a blockhead ever wrote except for money." It is no doubt reasonable to deduce that all the members of our profession who can give a single reference in the Medical Directory are either blockheads or write for money, directly or indirectly. "Numerous instances to refute this," goes on Boswell, "will occur to all who are versed in the history of literature." Blessings on Boswell. He absolves most of us thereby. And yet we do write for gain, even reviewers. The young write to gain a position, the middle-aged to retain it, the elderly in the hope of yet a few more patients. This underlying commercial vein in medical literature is well exemplified in the specialty-in-general-practice type of books. How does the treatment of the patient differ in one form of practice from another? No doubt the publisher has an influence here. He gets someone to write a book on the elements of his subject. The author puts into it all he has been teaching his students, envisaging the various lives that they may lead in all parts of the world, in the public health service, or with the Forces, as well as in general practice. And then the publisher adds as a subtitle, "A book for general practice" as though it were not meant for all those in other walks of life. In the past the G.P. has been his best customer; and he must recoup himself for advertising our wares; even a publisher has to live. But perhaps this phase will pass, for it is doubtful today whether half the profession are in general practice, and the proportion is sure to diminish still further in the future. As he finds a wider market, he may no longer want us to write for a clique.

A book must aim at the truth, yet it cannot contain the whole truth, nor is it within the bounds of human nature to include nothing but the truth. Even were the writer so inhuman that he could not err, still the world of medicine would slightly change before his typescript became print. The reviewer must also serve the truth, but he does not do so by enumerating minor blemishes—a private note to the author, by way of an editor, will be more helpful.

"Turrible times," said the large bucolic man, lowering himself on to at least three-quarters of the 'bus seat we were to share. "And the worst of it is," giving me a suspicious look, "you don't know who you are talking to." "That's very true," I said, and tried to give his large honest countenance what I hoped was an equally suspicious look back. This preliminary formal scrutiny over the way was apparently open for a cosy chat. "Just been to O——," he said, "turrible lot of soldiers there." "Back from France?" I asked. "That's right," he said, "some of them looked all right, but some of them looked pretty tough. This morning on the way to Watford," he went on, "I was talking to a lady in a 'bus." (I found this easy to believe.) "Her husband was in France. She said he'd joined up years too late for her. They'd been married seven years and had neither chick nor child. Seems he used to lock the door at 8 o'clock every night and go straight to bed. Used to punch something horrible. Still she said he was a good enough husband." I opened my mouth, but my heavy friend was getting off the 'bus before I could ask if he had ever talked to a lady with a bad enough husband.

OBITUARY

FRANCIS JAMES STEWARD

M.S. LOND., F.R.C.S.

Mr. F. J. Steward, who died at Kingswood on May 31, at the age of 68, had given his whole professional lifetime to Guy's Hospital, and as "Frankie" had become a tradition there. The regard in which he was held was remarkable, for few were on terms of real friendship with him. He was reserved and difficult to know, though easy to approach. It was his directness and genuineness that appealed both to his colleagues and his students and made them trust him implicitly.

Vandyk

He was born at Bitterne, Hants, the son of J. D. Steward, and was educated at Bedford. As a student at Guy's he took the school gold medals in anatomy and physiology, another in his intermediate M.B., first-class honours in his final, the Beaney prize for pathology and the treasurer's gold medal for clinical surgery and clinical medicine. After doing house appointments he demonstrated anatomy in the medical school and was assistant in the throat department, and he was appointed to the surgical staff at Great Ormond Street. It was not long before he got on the staff at Guy's, and he was the last assistant surgeon there who also had charge of the throat department. Writing never appealed to him, but at this period he was joint author with W. H. A. Jacobson of "The Operations of Surgery" and edited the *Guy's Hospital Reports*.

In 1912 Steward had to choose between becoming a full surgeon or a surgeon in his special department, and he decided to remain on the general side. Laryngology and rhinology thus lost a great exponent, writes T. B. L.; his accuracy of observation, his critical acumen and his balanced judgment would have had a great influence in that specialty. His views were based on wide general principles. One of these was that in the upper respiratory tract nature demands that there should be a due proportion of area of mucous membrane per cross-section of air-way. The applications of this in clinical rhinology are endless. He had an unusual knowledge of rare lesions in the pharynx and never forgot them, so that even when he had not been dealing with such cases for twenty years his opinion was as sound as that of his colleagues who had been constantly at it. He used to say of any rare appearance that you would find it described in Morell Mackenzie, to whose book he used to turn whenever he was in doubt. He had long agile fingers with which he would find an unexpected gland among the scalene muscles and could palpate the sinus pyriformis without making the patient retch. His slow dilation of a subglottic stenosis was a masterly example of care for detail and gave the best results to be had in this serious condition, but he could not be got to collect his cases and describe them. He was one of our earliest exponents of endoscopy by proximal illumination but had given up the subject before distal illumination came in.

As a general surgeon, writes A. J. C., Steward laid no claim to brilliance of execution, but he showed an uncanny ability in diagnosis and surgical judgment, and the consistently high standard of his operative results were due to this carefully cultivated gift and to the care he took with postoperative treatment. He was persistent often to the point of obstinacy, and while he would listen attentively to another point of view he was seldom turned from his opinion. He demanded clearness of idea and speech in his dressers and house-surgeons. "Yes, I hear you," he would say, in his rather nasal voice, "but I don't understand what you mean." His insistence on clarity and accuracy of statement was strikingly valuable when taking a patient's history, and he was no less insistent that his instructions should be implicitly carried out. He retained his interest in throat work for the whole of his career and in his late years he could still do an occasional major operation on the larynx or pharynx. There was nearly always some child in his wards with a retained tracheotomy tube and it was a common sight to see a Steward H.S. sprinting to his ward in any stage of undress, when all would know that Katie's or Tommy's intubation tube had come out. His memory was a byword, but shortly before his last illness this faculty left him and with it he lost much of his interest in life.

Mr. Steward leaves a widow and one son, Dr. D. V. Steward, who is in practice at Tadworth. His elder son died in Africa several years ago.

HERBERT RICHARD HURTER

M.D., LL.D. LPOOL

Dr. Herbert Hurter, who died on June 3, came of good scientific stock. His father was a brilliant technological chemist and was the first to invent an actinometer. His name lives with us still in the H. & D. numbers of photographic plates—H. for Hurter, D. for Driffield. There is something in birth, for as a student at the beginning of the century at the University College of Liverpool, which was then emerging from the Victoria University, Hurter won medals and scholarships with apparent ease. He graduated M.B. with first-class honours in 1909, and five years later he obtained his M.D. After holding house appointments at the Royal Infirmary he went into general practice and became a "family doctor" with a busy and responsible life. His work aroused his interest in the problems of old age, and in his

writings he asked such pertinent questions as what do we mean by "old age," and of what do old people die? His colleagues' recognition came in 1933 when he was elected president of the Liverpool Medical Institution, and the following year at the celebration of the centenary of the foundation of the medical school the university conferred on him the honorary degree of LL.D.

Hurter's hobby fitted the man himself; it was the study of words and syntax. He had a deep respect for the English tongue as a vehicle of thought, and he held that it was part of a man's integrity to use words rightly. To him, as to the Greeks, λογός was not only word, but thought, reasoning, wisdom. It seemed natural that his presidential address to the Liverpool Medical Institution should be on Language, Jargon and Modern Medicine. It well repays repeated reading—a grammarian's lively survey of medical language and medical writing, salted with a quiet, almost apologetic wit, and his colleagues realised gleefully that one of their numbers could give tips to Fowler himself. This was a hobby which he took in his stride; for he was first and foremost a doctor with very little leisure. During the summer, however, he was occasionally to be found snatching half an hour or so between visits, watching a Saturday afternoon cricket match from the balcony of the pavilion at Aigburth.

LAURENCE O'SHAUGHNESSY

M.D. DURH., F.R.C.S.; MAJOR R.A.M.C.

Laurence O'Shaughnessy, who has been killed on active service in Flanders, was one of the most vivid personalities among our younger surgeons, and his place in experimental thoracic surgery will not be easily filled. He was born in December, 1900.

Elliott & Fry

Attracted early to medicine he entered Newcastle Medical School, and after winning almost every scholarship open to him he qualified before he was 22. After holding resident appointments in Newcastle and London, including one as assistant pathologist, he entered the Sudan Medical Service, and wisely spent several years gaining experience in general surgery, taking his F.R.C.S. in 1926. He had already begun experimental work at the Kitchener School of Medicine before he returned home in 1931. He was then appointed its first research scholar by the Royal College of Surgeons, and after six months in Berlin as assistant to Professor Sauerbruch he continued his experiments in the newly opened Buckston Browne Research Farm. He later received a personal grant from the Medical Research Council. He was Hunterian professor in 1933 and 1935, and two years later was awarded the John Hunter triennial medal and prize. He contributed widely to experimental surgery. His first paper was on the ætiology of peptic ulcer, and this was followed by studies of the surgery of the œsophagus and the root of the lung. His paper on traumatic shock is already a classic, and it is noteworthy that he chose this research as a counterbalance to too exclusive an interest in thoracic surgery. His long experimental work on revascularisation of the ischæmic heart found practical application when, in 1936, with the encouragement of Lord Dawson and the far-sighted coöperation of the London County Council, a clinic was formed at Lambeth Hospital for the surgical treatment of cardiovascular disease, with him as consultant surgeon. He was also thoracic surgeon to Preston Hall, the City of Birmingham tuberculosis scheme, the Notts County Council and the Grosvenor Sanatorium. In addition to his numerous original papers he wrote the sections on the diaphragm and the œsophagus in Maingot's "System of Surgery," and he collaborated with Sauerbruch in his Textbook on thoracic surgery, and with Dr. Kayne and Dr. Pagel in a book on pulmonary tuberculosis. He had just completed the manuscript of a monograph on the surgery of the heart.

Like the Athenian of old O'Shaughnessy was "revolutionary, equally quick in the conception and the execution of every new plan." He based his work on an encyclopædic knowledge of the literature, both native and foreign, and relied on a mind of exceptional originality, an untiring industry and a fanatical love of his art. He aimed to divide his time equally between the wards, the operating theatre and the laboratory, but R. W. R. recalls that after a busy day he was often to be found in the library of the Royal Society of Medicine thinking, discussing, reading or writing. He was oblivious of the financial side of practice, and valued money only as a means of furthering his researches by increasing his material and intellectual equipment. To his hospital patients he was devoted; he never failed to pay them a visit on the evening of an operation, and thought nothing of ringing up from Paris or Berlin to inquire about them. He always stressed the importance of coöperation, and kept himself in constant touch with European and American colleagues. At Lambeth he worked closely from the first with physician, anæsthetist, radiologist and pathologist, and his ideal team, which he did not live to see completed, would have included as well a physiologist and a 24-hour service of house-officers. In looking forward he did not forget his predecessors. Thus in his Carey Coombs memorial lecture, a contribution of characteristic excellence, he gracefully acknowledged his debt to that great cardiologist. He was a born fighter, and his innate charm was sometimes screened from strangers by a misleading brusqueness of manner, but those who took pains to look behind found a gay and generous friend. His operative technique was unpolished, but like himself rational, original and courageous.

It is too early yet to assess his work on cardiac ischæmia, and it is idle now to speculate on how soon he would have opened the way to the vast possibilities of intracardiac surgery, though there are indications that he already held the key. His reputation was worldwide. His clinic was visited by physicians and surgeons of many nations, and he accepted invitations to lecture in France, Germany and the United States. When war came he was quick to realise that without victory his work could not go on, and he was content to leave it for a time to others while he faced the urgent problems concerning shock and chest wounds which could best be studied near the front-line. It was of a chest wound he died.

O'Shaughnessy's death, writes T. H. S., has deprived our profession of a most valuable and rare type: the truly scientific experimental worker. His attitude towards surgery was dominated by a desire to attack problems which had defeated others. If he felt there was a possible solution he would advise and carry out experiment after experiment until his critical mind could find no hindrance to putting his findings into practice in human surgery. In this way his work on cardiac surgery began. I remember seeing him several

years ago at the College of Surgeons Farm at Downe where, surrounded by specimens and data, he defended his thesis triumphantly against friendly but outspoken criticisms from physician, surgeon and pathologist. There he was in his element—forceful, clear-thinking and argumentative, yet with a characteristic generosity that freely admitted the possibility of a weakness in his train of thought. Another picture that I remember is of the dinner table with plates pushed to one side and food half-eaten, while "O'Shaugh" covered the cloth with a mass of diagrams to illustrate the subject under discussion. He would become completely absorbed in his thoughts and then suddenly would "come to earth" and apologise with a charming whimsicality. He seemed almost tireless, and though he deliberately freed himself from the usual ties of practice, that only meant that he carried on his own work at all hours of the day or night. He might have grown old in years, but it is impossible to believe that that spirit could ever have aged. Idealists are not always men of action, but O'Shaughnessy's militant and constructive example will remain an inspiration and stimulus to those who knew him.

PETER ROBERTSON GOODFELLOW

M.B., D.M.R.E.; MAJOR R.A.M.C.

Dr. Peter Goodfellow was killed when the hospital where he was serving was bombed. He was born at Manchester in 1910 of a medical family and was educated at Clifton and Cambridge. When he decided to study medicine he took the earlier professional examinations from Cambridge, but completed his clinical studies in Manchester. After qualifying he held the posts of house-physician and neurological and orthopædic house-surgeon at Manchester Royal Infirmary. He became interested in radiology and returned to Cambridge to take the course for the diploma in medical radiology and electrology which he obtained in 1935. Then began his connexion with the Christie Hospital and Holt Radium Institute, which lasted until he was called up for service on the outbreak of war. Appointed first as an unpaid clinical assistant he soon obtained the post of assistant radium officer, and gradually undertook more and more responsible work until finally he took charge of certain of the special clinics in hospitals outside Manchester besides sharing in both the therapeutic and diagnostic work within the institute. In December, 1938, he passed the examination for the fellowship of the Faculty of Radiologists and was at work on his thesis when he had to interrupt his clinical research.

He had been for five years medical officer to the 8th Battalion Lancashire Fusiliers and held the rank of captain. He was called up with his battalion, but it was soon realised that his services would be of greater value as a radiologist, and he was transferred to the specialist list of the R.A.M.C. with the rank of major. When he met his death he was radiologist to the 1st General Hospital, with the B.E.F., and although news had been received from him that he was being transferred to another part of France, he was one of those who were not able to leave their posts before bombing attacks on the hospitals made escape impossible, and who gave their lives for their patients.

He was a fully trained radiotherapist at the beginning of a promising career in a branch where there is ample opportunity, and his loss leaves his specialty much the poorer. Peter Goodfellow was also a fine musician, a pianist of outstanding ability and the possessor of a rare knowledge and understanding of music. He will be remembered by his many friends for his generous cheerful nature. One of those who thoroughly enjoyed life, he gave all when the need came.

He married in 1938 Agnes Duthie and leaves a baby girl.

NORMAN JAMES HAGGAR

M.R.C.S.; SURGEON-LIEUTENANT, R.N.V.R.

THE name of Norman James Haggar has appeared in the list of those who are "missing believed killed" amongst casualties "not connected with any particular incident or ship, but which have occurred in meeting the hazards of war."

Ellis.

The son of a civil servant whose duties necessitated frequent removals, Haggar was brought up in many different places and among different peoples. He was educated at Dundee High School and at Borden Grammar School in Kent. He qualified from Middlesex Hospital in 1938, and after holding a house appointment at Beckenham Hospital he became assistant medical officer at the Bucks Mental Hospital at Stone in the spring of last year. He was a keen and competent golfer, and in the short time he was at Aylesbury he made many friends. When war came his eagerness to volunteer for naval service overrode all obstacles and he joined the R.N.V.R. last November. He was twenty-five years of age and leaves a young widow, Isobel Britton of Glasgow.

I. S. writes: "Haggar was appointed to the Bucks Mental Hospital from a large and representative field of candidates, of whom he was by no means the eldest or the most senior in terms of experience, but the impression of essential soundness and level-headedness which he gave on personal contact, as well as the buoyant nature of his personality, could not be ignored in filling an appointment in a public service which calls imperatively for such qualities. Wisely, he did not commit himself to any light-hearted embarkation upon his new field of study, but said that he would see how he got on. After holding his appointment for six months he came rightly to the conclusion that he was fitted for the work, and had evolved an interest and keenness in it together with a natural adaptability which rendered him well suited to institutional life; and so he decided to specialise in psychiatry. We feel his loss here deeply, not only in the professional sense but because, as a man, he embodied those qualities of freshness, vigour and outstanding honesty of purpose which in the fullness of time must surely have evolved into a strong and lovable personality who would have added to the richness of human values in the community."

The distinguished service cross has been awarded to Surgeon Lieutenant A. P. B. Waind, H.M.S. *Hardy*, and Surgeon Lieutenant K. W. Donald, H.M.S. *Hotspur*.

PARLIAMENT

ON THE FLOOR OF THE HOUSE

By MEDICUS, M.P.

ON Tuesday of last week we had the Prime Minister's statement on the magnificent coöperative effort of Navy, Merchant Navy, Army and Air Force in the successful evacuation of Dunkirk; this Tuesday there was to have been a debate in secret session, chiefly about home defence, of the need for which Mr. Churchill spoke so vigorously. It is worth while reviewing the general picture which Mr. Churchill then gave of the balance of forces in case of attempted invasion. The main power of the enemy the Prime Minister called "their far more numerous air force," which was thrown into the battle or else concentrated on Dunkirk and the beaches. This was "a great trial of strength between the British and German air forces." "Can you conceive," Mr. Churchill asked, "a greater objective for the Germans in the air than to make evacuation from these beaches impossible, and to sink all these ships which were displayed almost to the extent of thousands? Could there have been an objective of greater military significance for the whole purpose of the war than this? They tried hard and they were beaten back." In these facts, "when we consider how much greater would be our advantage in defending the air above this island," we can find "a sure basis upon which practical and reassuring thoughts may rest." Dealing with home defence, Mr. Churchill said that "we have in this island incomparably more powerful military forces than we have ever had at any moment in this war or the last." But we cannot be content with a defensive war—we have our duty to our ally and we must build up again the B.E.F. for offensive action. Of civil defence proper, of the new home-defence battalions, and of the Local Defence Volunteers, Mr. Churchill did not speak. These vast defence plans have already brought many thousands more people into the ambit of military organisation.

The L.D.V. are playing the rôle that other volunteers played in the days of Napoleon. From 1795 until 1805 we were under the threat of invasion, and in 1804 there were 500,000 volunteers, apart from the regular Army and the Militia, consisting of men chosen by lot from each parish. There was menace from the air even then, for cartoons of that day show large balloons carrying platforms crowded with soldiers—the parachutists of that day—and vast rafts which had been prepared to carry infantry, horse and artillery, but which never sailed. Napoleon needed command of the sea if only for a few hours, but he never got it, and Trafalgar put an end to the threat of invasion. There were watchers on the coast then, with beacons, despatch riders, and each district had its gallant volunteer band, not content with drab khaki, but each in its distinctive and often brilliantly coloured uniform. A popular song of the day is strangely apt now:

> The little Boney says he'll come
> At merry Christmas time,
> But that I say is all a hum
> Or I'll no longer rhyme.
>
> Some say in wooden house he'll glide
> Some say in air balloon,
> E'en those who airy schemes deride
> Agree he's coming soon.
>
> Now honest people list to me,
> Though my income is but small,
> I'll bet my wig to one penny
> He does not come at all.

Today there is the same spirit in the people, the same great power in the hands of the Navy, but what is new is the weapon of the air bomber over which our Air Force demonstrated their superiority in the battle of Dunkirk.

The curious should look up Hardy's "Dynasts" and the notes to Sir Walter Scott's "The Antiquary," in which contemporary pictures are given of events of that other time when the threat of invasion hung over the land. Medicus has not had time for research in old pamphlets, broadsheets and histories but takes these 1804 parallels with gratitude and thanks from a B.B.C. talk on Local Defence Volunteers on Wednesday of last week.

• • •

Another aspect of the war struggle is the proposals for the regulation of labour given in answer to an inspired question in the House last Wednesday. By these regulations, which came into effect on June 10, labour is to a large extent mobilised and its movements restricted, the coal-miner must remain a miner and the agricultural labourer must stay on the land, but he gets a rise of wages to 48*s*. a week. When these regulations are considered in conjunction with the drive for the seven-day week it is seen that they create an unparalleled situation which could not have been created except by a Labour Party minister of supply and a Labour Party minister of labour. But this labour organisation will need careful watching if we are to avoid the evils of a fall in production from industrial fatigue. Bad workshop organisation can decrease and good workshop organisation increase production irrespective of the hours worked per man. The workers are willing, indeed exceedingly anxious, to be used to produce to the utmost, and they have agreed to work long hours and to throw rights and customs of their trade into the melting-pot for the time. But they will not be willing to be wasted. The problem of fatigue in industry has become a front-rank problem—it causes not only delay but also waste of materials and for our war effort only the best will do.

• • •

On the same day as these labour regulations were announced the House discussed draft regulations made under the new Old Age and Widows' Pensions Act, 1940, for dealing with cases of hardship. The effect of these regulations is to increase some pensions but by imposing a household means test to decrease the income of other pensioners because they are living with relatives on whom they are legally dependent. This form of means test was strongly opposed by the Labour Party before the recent change of Government and was not allowed to pass without strong protest last week. Many members felt that the net result of these regulations will be the standardisation of the incomes of households in which old-age pensioners are now living with their sons or daughters and their grandchildren at a level too low to allow for adequate nutrition. The Labour Party members not in the Government did not vote against the regulations, but they are not happy about them and neither are many members of other parties. Adequate nutrition is an essential element of national defence and the feeding of the people as a whole may have to be dealt with on lines comparable with the labour regulations just promulgated rather than on the basis of a household means test.

FROM THE PRESS GALLERY

Old-Age and Widows' Pensions

In the House of Commons on June 5 Mr. MALCOLM MACDONALD, Minister of Health, moved that the Draft Supplementary Pensions (Determination of Need and Assessment of Needs) Regulations 1940 should be approved. He explained that under the Old Age and Widows' Pensions Act 1940 it was the duty of the Assistance Board to pay supplementary pensions to people other than blind people, who were in receipt of old-age pensions, and to those in receipt of widow's pensions who had attained the age of sixty, if they proved their need. The questions whether an individual was qualified for a supplementary pension, and what its amount should be, were to be determined according to regulations made jointly by the Secretary for Scotland and the Minister of Health. He believed that there would be agreement as to the fairness of the regulations drawn up. He gave some examples of how the regulations would work. The pension for a single pensioner living alone, either as a householder, a lodger or a boarder, would be 19*s.* 6*d.* a week. Generally speaking, in the case of married couples both the husband and wife would be pensionable, and their pension worked out at 32*s.* a week. Where only one of the married couple was a pensioner the figure would be 31*s.* a week. The board could increase supplementary pensions during the winter months if necessary. Certain resources had to be disregarded by the board in its administration of this business. They were the first 5*s.* a week of any sick-pay from a friendly society, the first 7*s.* 6*d.* a week of benefit under the National Health Insurance Acts, the first £1 a week of any wound or disability pension, half of any weekly payment of workmen's compensation, the first 7*s.* 6*d.* a week of any superannuation payment, and the first 7*s.* 6*d.* a week of any sickness payment under part 1 of the act of 1940. The earnings of the pensioner himself up to 5*s.* a week would be disregarded. If he was earning more than this he would continue to benefit by the supplement until his earnings valued 8*s.* a week, and the same would apply to the earnings of his wife, whether she was a pensioner or not. Capital owned by the pensioner or his wife up to £50 would be disregarded; capital amounting to between £50 and £300 was to be treated as equivalent to an income of 1*s.* a week for the first complete £50 and an additional 1*s.* a week for every £25 on top of that. As regards capital owned by other members of the household the provisions would be the same as those under the Unemployment Assistance Regulations and the capital value of any interest on the house in which the household resided was to be disregarded. By these regulations large numbers of pensions would undoubtedly gain advantage. Many of the 275,000 old-age pensioners now receiving relief from public-assistance authorities would get higher rates. In addition to those there would be scores of thousands of pensioners who were now getting no relief who will be able to qualify for a supplementary pension.

Milk Policy

Mr. BOOTHBY, parliamentary secretary to the Ministry of Food, in a statement on June 11 said that the cost of producing and distributing milk had increased under war conditions, but the consumer was still paying the same price for milk as he paid in June of last year. The disparity between revenue and costs was reduced by a Government subsidy during the first three months of this year, and more lately by increasing the price of milk used in manufacture. This expedient, however, would not produce sufficient revenue to bridge the gap which already existed. The milk distributors had, therefore, been informed that an increased margin would be allowed for the period up to Sept. 30 next. In the interval the Minister of Food was arranging for an exhaustive inquiry into the system of distribution with a view to bringing about a substantial reduction in cost. Meanwhile there was no alternative but to increase the retail price of milk by 4*d.* a gallon from July 1. To avoid hardship to those members of the community to whom milk is an indispensable food, a comprehensive national scheme was now in course of preparation which it was hoped to bring into operation on July 1, under which one pint of milk would be available daily at 2*d.* a pint for expectant or nursing mothers and for children under school age in every household which desired to take advantage of the scheme. The scheme would also provide for the supply of milk free to households which could not afford to buy it. A simple criterion of need would be necessary in order to prevent abuse, but there was no intention of instituting a detailed inquiry in the form of a "means test." The scheme could be administered under the central authority of the Ministry of Food through local officers, and its details were now being worked out. It would in no way affect the milk-in-schools scheme which the Government hoped would now be more universally adopted.

QUESTION TIME

Bombing of British Hospital Ships

Mr. ROBERT GIBSON asked the First Lord of the Admiralty how many British hospital ships had been bombed; and how many sunk by enemy action during the present war.—Sir VICTOR WARRENDER, Parliamentary Secretary to the Admiralty replied: Since the outbreak of hostilities nine hospital ships have been bombed, shelled, or machine-gunned by the enemy—two of them on more than one occasion. These attacks have been made despite the vessels' distinctive and unmistakable markings, and in contempt of the lives of the wounded and of the doctors and nurses tending them. The hospital ship *Atlantis* alone was bombed no less than five times in Norwegian waters. The only sinking is that of the hospital carrier *Paris* on June 2, which succumbed to three separate waves of attack by bomber aircraft. The hospital carrier *Brighton* was holed and run aground; the hospital carrier *Maid of Kent* set on fire.

Medical Examination of Evacuees and Refugees

Rev. R. W. SORENSEN asked the Minister of Health whether he was satisfied that arrangements were adequate for the medical examination of children to be evacuated; whether the examination was fully carried out in the recent evacuation; whether he was making arrangements medically to examine refugees and their children; and whether those refugees could fully utilise the public medical services in the municipal areas in which they were billeted.—Miss F. HORSBRUGH replied: Very thorough arrangements for the medical examination of children in the event of further evacuation have been prescribed for all evacuation areas. The evacuation last Sunday from towns on the east coast which had not hitherto been classed as evacuation areas was carried out at short notice, but so far as time permitted the same arrangements were made there. The evacuation on the previous Sunday, referred to in the second part of the question, was a transfer of London children from reception areas on the east coast to other reception areas in Wales. This was carried out at still shorter notice, but reports show that the authorities in the new reception areas are well satisfied with the condition in which the children arrived. As regards the third and fourth parts of the question, refugees are medically examined both at the ports where they land and at the receiving centres in Greater London. Directions have been issued to authorities in whose areas refugees are accommodated to bring to the notice of refugees the health services that are there provided.

Guaranteed Minimum Diet

Mr. DAVID ADAMS asked the Parliamentary Secretary whether steps had been taken to secure a guaranteed minimum diet for all persons; this diet to be constructed according to the results of dietetic research so as to secure continued health and working power and to be distributed free for the duration of the war to any persons unable to afford it or otherwise unable to secure its equivalent.—Mr. BOOTHBY replied: The Ministry's food import programme and the food production campaign of the agricultural department are designed to ensure a sufficient supply of the foods essential to an adequate diet. The

Ministry is guided by the advice of experts on nutrition, and in addition it will in future have the benefit of the advice of the scientific food committee which has been appointed by the Lord Privy Seal. Close and urgent consideration is also being given to the provision of food supplies at prices within the reach of every class of consumer.

Nursery Schools

Mr. DAVID ADAMS asked the Minister of Health whether, in view of the heavy increase of the infant-mortality rates in industrial areas during the last war, he would take immediate steps to secure the setting up of nursery schools throughout the country.—Mr. MACDONALD replied: Nursery schools are not the concern of my department, but I am now actively engaged in consultation with the Minister of Labour, in considering the establishment of day nurseries in certain areas in which large numbers of married women with children are employed in industrial work of national importance.

Mr. ADAMS: Will you make representations to the proper quarter for the establishment of nursery schools as a necessity?—Mr. MACDONALD: That is a matter for the President of the Board and perhaps you will approach him.

British Soldiers and Maisons Tolerées

Dr. E. SUMMERSKILL asked the Secretary of State for War what were his reasons for not adopting the practice of the last war of putting maisons tolerées out of bounds for the British Expeditionary Force.—Mr. EDEN replied: This matter has been the subject of most careful and anxious consideration. The policy of the Army Council and of the Commander-in-Chief of the British Expeditionary Force has been to promote good behaviour and health in the Army both by precept and by the provision of all possible opportunities for sound physical and mental recreation and entertainment. The temptations afforded by the establishments referred to in the question have been ignored or resisted by an overwhelming majority of our soldiers, and it is felt that to place the establishments out of bounds would result in far worse evils.

Price of Drugs

Mr. SORENSEN asked the President of the Board of Trade if he would state the approximate increase in the price of drugs and medicines since the beginning of the war; and whether he is now satisfied that effective measures had been taken to prevent undue and unnecessary increases in the price of these articles.—Sir ANDREW DUNCAN replied: I am informed that the extent to which the prices of various drugs and medicines have increased since the outbreak of war varies very considerably. As from yesterday drugs and medicines, other than dispensed medicines, have been brought under the Prices of Goods Act.

Nutritive Value of Flour

Sir ERNEST GRAHAM-LITTLE asked the Parliamentary Secretary to the Ministry of Food whether he had considered a new process of milling, details of which had been sent to him, which claimed to have the effect of improving the nutritive value of the flour so prepared and of reducing the volume of shipping required for the importation of wheat; and whether he would institute an immediate inquiry into these claims.—Mr. BOOTHBY replied: The matter is under consideration.

T.A.B. Inoculations

Mr. ALFRED EDWARDS asked the Secretary of State for War whether in view of the fact that men were unable to perform their duties for 48 hours, and sometimes much longer, after each T.A.B. inoculation, he would consider suspending this practice during the present conditions of emergency.—Mr. R. K. LAW, Financial Secretary to the War Office, replied: The proportion of men unfit for duty within 48 hours of inoculation is not great, and my advisers do not recommend any change in the present practice.

HOSPITAL APPOINTMENTS AND MILITARY SERVICE

THE Central Medical War Committee have written a letter to all hospitals in the country explaining the rather complicated arrangements made with regard to hospital appointments. They begin with some definitions. An R practitioner is one who has registered under the National Service Act, 1939. Hospital appointments are divided into A and B. A posts are those whole-time resident appointments for which no previous experience is required. B posts are also whole-time and usually but not always resident, and for these previous experience is essential. The B posts are again subdivided into those within the hospital senior establishment, which are called B1 and include the R.S.O., R.M.O., registrar, and so on at a voluntary hospital and appointments with a tenure of more than one year and carrying a salary of more than £350 at a municipal hospital. The rest of the B posts are called B2.

The recruitment for the Services of doctors registered under the act who are holding A or B2 appointments will be decided upon by the C.M.W.C. The recruitment of holders of B1 posts will be in the hands of local medical war committees outside London and of the Committee of Reference in London. R doctors who qualified after December, 1939, are urged to apply for an A appointment. If they do not obtain one, and failure is unlikely with the present shortage of doctors, their recruitment will be considered six months after qualification. If they do obtain an A appointment their recruitment will be considered when they have held it for six months. If before this six months is up they secure a B2 appointment they will be reserved for a further period of six months. If they are appointed to a B1 post their recruitment will be decided upon by the local medical war committee or the committee of reference. The position of R doctors who qualified before December, 1939, and who now hold A or B2 appointments, will be considered after they have held them for six months, or, if this period is already up, on June 30, 1940. Renewals of A appointments cannot be granted. Requests to renew B2 appointments must be received by the C.M.W.C. not later than June 21.

Owing to the shortage of newly-qualified doctors hospitals are asked to try to reduce their number of A posts. In appointing R doctors to such posts they should favour those who are just qualified and should limit these appointments to six months. They should fill B appointments as far as possible from doctors not on the R list. In appointing R doctors to B2 posts they should make a point of choosing present holders of A posts and should avoid making any interval between the old and new appointment. The same applies when appointing holders of B2 posts to B1 posts.

Teaching hospitals are asked to appoint medical students to a substantial proportion of their A posts. When any hospital has a vacancy in a B post, and does not normally fill such posts from the holders of its own A appointments, it should advertise in the medical press at least two months before the vacancy occurs and if no suitable applicant is found should apply to the dean of the nearest medical school or if this fails to the C.M.W.C. Hospitals are asked to notify the C.M.W.C. of all A and B appointments immediately they are made.

The address of the drugs branch of the Home Office is now Rodborough Grange, 66, West Cliff Road, Bournemouth. Application for import or export licences under the Dangerous Drugs Acts should now be addressed to the drugs branch there and not to the finance branch in Whitehall.

LETTERS TO THE EDITOR

BOMB CONCUSSION AND THE EAR

SIR,—The urgent question your annotation of June 8 raises—how to protect our ear drums from the noises and concussions of modern war—is not an easy one to answer. Damage to the ears by explosions, apart from actual fracture of the skull, is of three kinds:

1. Rupture of the tympanic membrane. This is probably usually due to the suction action of the blast; it is well seen in cases where a gunner stands too near the muzzle of a gun at the discharge. Here the cochlea often escapes lightly.

2. Concussion deafness without damage to the middle ear. (*a*) From a single explosion; there has been some doubt as to the existence of such deafness as a permanent effect. My personal experience compels me to believe that such cases do occur and that they are more usually the result of small "sharp" explosions—e.g., small calibre shells, rifle grenades, &c.—than of heavier projectiles. (*b*) From repeated explosions near the ear and usually in a confined space—e.g., a gun turret, or the cabin of an aeroplane. This is comparable to the industrial "noise deafnesses."

3. The ordinary deafness of a bombardment. This is transient and passes with a few days rest.

Protection against "blast suction" is given by the vulcanite Mallock-Armstrong plug, or by well-greased cotton-wool packed firmly but not too tightly into the ear. A German firm made a satisfactory plastic preparation called "ohropax." Probably some substitute for this could now be obtained. If such packing is used a generous amount should be left protruding from the meatus, otherwise it may become impacted.

Against high-pitched noises like the siren there is no easy protection. Fortunately, disturbing although such noises are, only prolonged and continuous exposure to them can damage the cochlea.

Packing and the Mallock-Armstrong plugs give some protection against repeated small explosions, but some better device, such as rubber-padded earshields, should be attempted. The difficulty is to make communication possible without destroying the efficiency of the shield.

It may not be out of place here to remind those of us who have not yet had experience of explosion injuries that an ear with a burst drum must not be syringed on any account unless already infected.

I am, Sir, yours faithfully,

Wimpole Street, W.1. F. W. WATKYN-THOMAS.

*** With reference to the remark in our annotation that plasticine when used to make ear-plugs tends to break away and leave debris in the meatus, Messrs. Harbutt's Plasticine Ltd. point out that it is their *fibrous* plasticine that they advertise for this purpose. This substance, which was specially made for the Government during the last war, has a base of antiseptic fibre mixed with it which prevents any part breaking away.—ED. L.

MASS INOCULATION

SIR,—Would it not be advisable, in view of the probability of enemy action against this country and the possibility of dislocation of the water and drainage systems, that the civil population should as quickly as possible be protected from those diseases from which we can offer considerable hope of protection? I refer particularly to two conditions—the enteric group and tetanus developing in those wounded by aerial activity. Unless some authoritative body, such as the press or the B.B.C., will take the matter up nothing effective can be accomplished by private opinion or enterprise, for one merely preaches to deaf ears. I am prepared to give the whole of my spare time to carrying on this service without any remuneration if it were generally adopted.

I am, Sir, yours faithfully,

London, W.1. D. C. DOBELL.

HOMŒOPATHY INVITES CRITICISM

SIR,—Homœopathy has always invited criticism but until this moment has been denied the space in which to reply. The admission in your leading article of June 1 that homœopathy has survived much longer than most forms of mere quackery would be welcome if it were not for the sting left behind. However, you have emphasised, for which you merit our thanks, that the homœopathic practitioner is as well qualified as the majority of his colleagues and may reasonably be expected to be in as good a position as they to judge of his clinical findings and results.

Most homœopaths have been attracted to homœopathy because it has introduced law into therapeutic chaos. That law is the law of similars, "let likes be treated by likes," and it must come as a surprise to practitioners reared in an atmosphere of vaccines and vaccination to read in your leader that this law is incongruous with the main body of scientific principle. Many of its chief exponents have admitted that the principle of vaccine therapy, of smallpox vaccination, of tuberculin therapy, and so on is undoubtedly homœopathic. Indeed, homœopaths believe that vaccine therapy would not have fallen into its present state of disrepute if the laws of administration and repetition had followed homœopathic practice—the single dose, the recognition of an initial aggravation (Wright's negative phase), and a following amelioration (Wright's positive phase), and no repetition of the dose whilst amelioration lasts.

Then surely the modern desensitisation treatment of asthma and hay fever is a definitely homœopathic procedure. It is now accepted that stimuli other than drugs—e.g., X rays and radium—also obey the same laws. The action of many of the so-called empirical "specifics" such as arsenic in skin diseases, mercury in syphilis, potassium iodide in tertiary syphilis, and sulphur in furunculosis, can only be explained by their homœopathicity, and indeed this seems to be the explanation of the fact that some cases do not improve simply because they are not similar to the disease in question in that particular patient.

Nor is history wanting in support. Hippocrates may be acclaimed the first homœopathic practitioner, for it is recorded that he cured his old teacher Democritus of mania by the prescription "give the patient a draught made from the root of mandrake in a smaller dose than is sufficient to induce mania." Minim doses of vinum ipecac. were frequently prescribed for vomiting by the most brilliant physicians of the last generation. Still treated infantile diarrhœa with 5 minim doses of castor oil, in which doses the drug has a constipating effect. Both were surely simple though unconscious examples of homœopathic prescribing!

An ex-president of the Royal Society has expressed the opinion that the law of similars must be taken for granted since it is simply common sense. An ex-president of the Royal Society of Medicine declared

publicly that he could recollect cases of his own in which the cure or amelioration might well be explained by the same law. Professor Bier, from personal experiments, rediscovered the law for himself in the use of iodine for coryza, ether for post-anæsthetic bronchitis, and sulphur for axillary furunculosis. Such an experienced observer believed that "there is much in homœopathy, that we can learn a great deal from it, and that it has ceased to be pertinent for the orthodox school to ignore it or treat it with contempt." "Above all," he states, "I am of the opinion that no-one should judge homœopathy who has not tried homœopathic remedies and who has failed to familiarise himself with the theory of homœopathy." Thus does one scientist of international reputation confirm Dr. Wheeler's contention that only experiment can confute what the homœopath has claimed. Schulz, who demonstrated the Arndt Schultz biologic law that strong stimuli destroy or inhibit cellular activity, moderate stimuli inhibit it or do nothing at all, and still weaker stimuli enhance it, thus quite independently reaffirmed the law of similars.

This generation of practitioners must be equally surprised by the alleged incongruity of the infinitesimal dose. The minimum dose of the toxin botulinus is 1/400,000,000,000,000,000,000, or the 20X of the homœopath. Pharmacological activity has been demonstrated in the 24X of copper sulphate, in the 30X of iron salts, and in the 32X of silver nitrate. In these days of rat units in vitamin therapy, or even of vaccine dosage, surely, Sir, the infinitesimal dose should offer no barrier.

There is no need for me to discuss the higher potencies, except to state that many reputable practitioners whose judgment is rarely questioned in clinical matters are convinced by experiment that such dilutions, whatever their nature, are effective. The Horder Committee of the Royal Society of Medicine, reporting on the Boyd emanometer technique, admitted the detection of some form of energy from a 10M of more than one homœopathic drug.

The wealth of the homœopathic materia medica is unsurpassed in orthodox medical literature, for its clinical observations record for more than 500 drugs, a number that is constantly being added to, not only pathological effects but symptoms in the patients own words. Though many of these were recorded years ago they are simple facts, and are therefore as intelligible and useful at the present-day as they were when first set down, and are free from the weakness of much of the so-called science of the past century.

That the parallelism between symptoms of drugs and those of disease has not been demonstrated to your satisfaction must be attributed, at least in part, to the fact that the medical press has consistently closed its columns to even the mere whisper of homœopathy. If you were to open your columns to the reports of orthodox and homœopath alike it would then be possible to demonstrate such a parallelism as you crave.

I am, Sir, yours faithfully,

Highgate, N.6. W. LEES TEMPLETON.

SIR,—Reading your leading article of June 1, I was reminded of, and stimulated to reproduce, some calculations which I read many years ago which demonstrated the mathematical aspect of the homœopathic "potencies."

Assuming, for the sake of simplicity, that sodium chloride is to be administered, I find from books on chemistry that one gramme of this substance contains $1{\cdot}0517 \times 10^{22}$ molecules. A 1 in 10^{24} solution therefore contains one molecule in $0{\cdot}93 \times 10^{8}$ c.cm., or just under one litre, so that if a patient consumes one litre of this "potency" (which is at the end of the range of "medium potencies") he will have a fairly good chance, though not a certainty, of getting one molecule of salt.

If we consider the extreme limit of the "high potencies," 1 in 10^{60}, the results are even more interesting. At this dilution one molecule is contained in $0{\cdot}95 \times 10^{36}$ litres, and this volume represents a sphere of water of 61 million kilometres radius—a distance roughly equal to two-fifths of the distance from the earth to the sun. Considering the problem from the point of view of time, we find that a patient would have to drink one litre a day for 2603 million million million million million million years to have a reasonable chance of getting one molecule of salt. This figure is approximate only, for I have not taken leap-years into account. I am, Sir, yours faithfully,

Cardiff. R. M. FRY.

SIR,—While entirely sympathising in principle with the views expressed in your leading article of June 1, I venture to ask whether the presentation of medicine as "orthodox" and homœopathy as a "heresy" is really a just statement of the actual position. It is true that in a somewhat loose fashion the word orthodoxy is sometimes applied to that which is customary or conventional; its more exact and serious associations, however, are with doctrines and opinions defined by authority and claiming assent, under threat of penalty, as entirely beyond question and debate. But in medicine there is certainly no authority, whether personal or corporate, which is allowed to be competent for such definitions and claims. On the contrary, every member of the profession is free to form his own opinions, to express and to teach these opinions, and, within the permission of the law, to put his convictions into action and practice. "There is no opinion so ancient or so general that he *must* receive it, and no opinion so modern or so eccentric that he *must* perforce reject it," to quote from an address by the late Sir William Gairdner.

It follows that as there is no standard of medical orthodoxy there can be no possibility of a medical heresy. Odd, unusual, extravagant and dissentient views may be held and expressed by minorities or by individuals, but none of these can claim the dignity of heresies which authority would fain suppress, and each is entirely free to endeavour to attract and to establish converts.

Hence to apply to the homœopath the not altogether unwelcome title of heretic and martyr is to present him with a status to which he has no claim. His real position in the free and catholic atmosphere of medicine is that, as his right, he has elected to anchor his mind to a formula and has adopted a sectarian title which announces to the public that he is different from, and inferentially therefore superior to, his less particularised fellows. I am, Sir, yours faithfully,

London, W.C.1. C. O. HAWTHORNE.

REFUGEE DOCTORS

SIR,—I wonder if you will allow me, a German refugee doctor, to say a few words in your journal. I have lived in this country and worked in hospitals as a qualified medical practitioner and specialist for over five years. In order to show my gratitude to this country, which has given me shelter and a new home, I considered it my duty to offer my services to the medical branch of any of the three fighting services. To my regret, in view of the existing service regulations, all my applications have so far been unsuccessful. Many refugee doctors, like myself, deeply regret that they are not allowed to join in the common cause.

I feel certain that the infiltration of "fifth columnists" could be checked effectively by careful scrutiny, without depriving all those who are genuinely anxious to serve this country of the possibility to do their share.

I am, Sir, yours faithfully,

H. C. S.

DEATH IN THE FIRST MONTH AND THE FIRST YEAR

SIR,—I have read with great interest and admiration the four masterly articles on infant mortality by Prof. Charles McNeil. To his charges that we are behind New Zealand, Holland, and the U.S.A. in our infant care there is no answer. He stresses the advantage to the student of clinical teaching on infants, in maternity hospitals and wards. Every pædiatrician would agree with him, but the opportunities of doing pædiatric work and student teaching at maternity hospitals in London are rare indeed. The student must be taught on the small and inadequate material from the maternity ward in the general hospital, and there is a strong tendency on the part of some public-health authorities to frown on a "well baby clinic" at the teaching hospital itself. This I think is a mistake. Surely the greatest constructive step would be for a woman who has had a baby to remain in the hospital a little longer? Being sent home on the tenth or fourteenth day is too soon. She should be allowed to stay there for, say, three weeks, or longer if necessary, until she is up and about and has properly recovered and her flow of breast milk has become definitely stabilised. It is during this last week, when she is convalescing, that she could be taught mothercraft, and the services of the pædiatrician would then be of the maximum value. I am, Sir, yours faithfully,

Devonshire Place, W.1. DONALD PATERSON.

SIR,—Prof. McNeil's articles make disturbing reading and it is to be hoped the significance of his analysis and the conclusions will not be overlooked because of graver matters. He has done good service in drawing attention to the heavy toll taken by infection which in this country, in contrast to certain others, goes on throughout the first year of life. It is on this aspect of the problem that I would like to comment. Speaking broadly, any infant born without congenital abnormality or severe birth injury, and of reasonable weight, should live *provided he is kept free of infection*. The marasmic, anæmic or rachitic infant, with his terminal respiratory or alimentary infection, presents a picture which pædiatrists are constantly seeing in the outpatient department and in the wards of all children's hospitals. Indeed, much of their time is spent in attempting, often unsuccessfully, to save the lives of these babies.

Marasmus is not a clinical entity but is synonymous with inanition, due in the majority of cases to the fact that the infant is offered less than he requires. In large industrial centres, nutritional (iron-deficiency) anæmia affects about two-thirds of the infant population in the six to twelve months' age period because of the absence during this time of iron-containing foods in the diet. Rickets, albeit in a mild form, affects almost half the same infant population. Its cause is well enough known. In the presence of one or more of these three conditions infection occurs and the death is attributed to the infection. No mention is made, even by the pathologist, of the part played by the nutritional defects. But there is abundant evidence to show that marasmus, nutritional anæmia and rickets greatly predispose to infection—and they are preventable. If they are prevented it seems only logical to assume that infection would be much less likely to occur, or if it did occur much less likely to prove fatal.

By all means let us do everything we can to prevent exposure to infection, but it should be possible to apply our present knowledge to the prevention of the nutritional defects which predispose to it. Let us see to it (1) that infants are fed up to the full caloric requirements for their age, (2) that nutritional anæmia is prevented by the early addition of iron-containing foods to the diet (oat-flour, sieved vegetables, gravy and potatoes), and (3) that rickets is prevented by the early use in adequate doses of a suitable preparation of vitamin D.

In discussing the problem of infection in this way I do not minimise the importance of Prof. McNeil's remarks about breast milk. Of its great value there can be no two opinions, but I would point out that none of the three nutritional defects mentioned is necessarily prevented by breast-feeding.

I am, Sir, yours faithfully,

STANLEY GRAHAM.

Royal Hospital for Sick Children, Yorkhill, Glasgow.

X-RAY FLYING SQUADS

SIR,—The arrival of the first casualty convoys has shown that, in spite of the efforts of the manufacturers, many E.M.S. hospitals had not sufficient X-ray apparatus to meet the emergency. Supplies are likely to be reduced rather than increased over the next few months, because the first call will be for re-equipping the B.E.F. To equip each of the E.M.S. hospitals receiving convoys with stationary full-power X-ray sets, and one or more portable sets for ward work, is probably impossible under present circumstances. It is, however, unnecessary to do this. Eighty per cent. of war casualties do not require full-power plant, for examinations of skeletal or chest injuries and the localisation of foreign bodies can be carried out equally well by mobile or portable apparatus. These portable machines cost from a quarter to a third as much as full-power units and are much more quickly and easily produced, but it is at present impossible to produce one for each E.M.S. hospital.

The X-ray department in a hospital receiving convoys of wounded is working under conditions quite different from those in a general hospital in peace-time. Under war conditions patients do not arrive by appointment from 9 o'clock in the morning. They come in hundreds, with little warning, at any time of the day or, more usually, night. They are all urgent cases which have to be dealt with at once, and whereas in peace-time patients pass through the department in steady streams throughout the year, in war-time superactivity persists for twenty-four hours a day for a few days and then the department sinks back into a more than peace-time ease until the next convoy arrives, which may not be for some weeks.

The only way to meet this sudden and short-lived strain is by the use of an X-ray "flying squad" of portable or mobile units. The portable machines can be carried in an ordinary car, and when the strain has been taken off one hospital they can be moved to another. They can be worked for twenty-four hours a day, with relays of radiographers, and therefore a few machines would serve several hospitals. They can be used either to assist the existing X-ray plant of the hospital or to X-ray those patients who are too ill to leave their beds. They can be used in hospitals where there is no existing X-ray plant. A further advantage is that if the electric mains of a hospital

are damaged by bombs the machine can be taken to any neighbouring building where there is an electric supply.

For portable radiography one requires very efficient radiographers. I would suggest that two radiographers from each sector should be sent up for a few days' intensive course in portable X-ray work and the emergencies which arise in this type of work. After training they would be attached to their own sectors, and under convoy conditions would come temporarily under the radiologist in charge of the mobile units.

The mobile unit should be a separate unit serving all sectors, and the radiologist in charge would have authority to move the machines to wherever the pressure of work was greatest. He would be responsible for the training of personnel and for the arrangement of transport. There are now available in London thirty-two such portable machines, and a few rotary converters for use in hospitals which are supplied with direct and not alternating current.

I feel sure that the scheme I have outlined would solve our present difficulty of lack of apparatus, and at the same time would effect a great economy.

I am, Sir, yours faithfully,

London, W.1. H. GRAHAM HODGSON.

PUBLIC HEALTH

Retirement of Dr. Isabella Cameron

Dr. Cameron, who retired last week, came into the service of the Local Government Board under Sir Arthur Newsholme during the last war, and in 1919 was appointed a medical officer of the newly created Ministry of Health. During the whole of her official life she was concerned with questions of maternity and child welfare, with the building up of the organisation for the care and protection of infancy, and with the reduction of maternal mortality, taking part in various inquiries into special aspects of these problems. Until she became a senior medical officer of the Ministry most of her work was done in the north-west of England, where she was a well-known and popular figure. Her devotion to duty, her kindliness and her willingness at all times to listen to other people's difficulties were greatly appreciated by her professional colleagues.

Points from Annual Reports

Dr. Constant Ponder's report for *Kent* was not published until after the declaration of war, though apart from the preface it must have been written in peace-time. In Kent, as in most parts of Britain, 1938 was a healthy year undisturbed by any unusual occurrence and afforded opportunity for the preparation of an extensive scheme of development, including a large sanatorium for tuberculosis and the inauguration of a scheme for the treatment of cancer. These plans for development must lie dormant during the war. Dr. Ponder is of opinion that the diagnosis and treatment of tuberculosis must rank of equal importance with the diagnosis and treatment of cancer. The death-rate from cancer in Kent in 1938 was 1·71 and accounted for 16 per cent. of the total mortality, while that of tuberculosis was 0·583 and accounted for 5 per cent. of the total, the former rate being the highest and the latter the lowest ever recorded in the county. Several districts show very high cancer death-rates, notably Tunbridge Wells with 3·07 out of a total mortality of 16·1. These figures suggest that in Kent cancer is a far more serious problem than tuberculosis; but critical analysis of the comparable death-rates justifies Dr. Ponder's opinion, for though life is terminated three times as often by cancer as by tuberculosis the actual loss of potential life-years is greater from the latter disease. The general death-rate of the county was 10·8; that of the urban districts 10·6 and that of rural districts 11·6. Prior to 1933, the nadir of the birth-rate, the rural death-rate was always below the urban death-rate, but in 1933 they were equal (11·7) and since then the urban rate has fallen and the rural rate has not, so the relation has been reversed. The increase of the county birth-rate from 14·1 in 1933 to 15·0 in 1938 was due entirely to increase in the urban rate. In 1938 the excess of births over deaths was 5791, but the population increase was 19,000; so Kent is still growing by immigration, chiefly into the metropolitan area of the county.

Dr. Christopher Rolleston is county medical officer of *Rutland*, the smallest of the English geographical counties, and also of the Soke of Peterborough, which was carved out of Northamptonshire and created an administrative county in 1888, apparently for sentimental reasons. The acreage of Rutland is 97,273 and its population in mid-1938 was 17,860. Soke of Peterborough is rather more than half the size (53,494 acres) but has over three times the population (55,660). The population of Rutland increased in 1938 by 250, of which 63 could be accounted to excess of births over deaths. Dr. Rolleston says everything points to an increase in the population of Rutland. Agriculture must increase in prosperity and "the flight from the towns has already begun." But the increase is, in one rural district, connected with the building of an aerodrome and that in another to "the successful enterprise of the cement works." In Soke of Peterborough the increase of population was 520, but the city of Peterborough increased by 620 and the rural district which surrounds it by 70, while the truly rural area of Barnack lost 170. The increase in the Soke is accounted for "by the continued prosperity of engineering." We cannot therefore substantiate Dr. Rolleston's belief in the flight from the town. The birth-rate of Rutland was 14·1 and that of the Soke 15·2. The illegitimacy-rate is just over 5 per cent. in both counties and the stillbirth-rate 38·1 in Rutland and 37·2 in the Soke. Of the live births there was one more male than female in Rutland and four more female than male in the Soke; but of the 43 stillbirths in the two counties 26 were males, so the sex proportion of all births was about normal.

Infectious Disease in England and Wales

DURING THE WEEK ENDED MAY 25, 1940

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 917; whooping-cough, 575; diphtheria, 673; enteric fever, 50; measles (excluding rubella), 7628; pneumonia (primary or influenzal), 694; puerperal pyrexia, 152; cerebrospinal fever, 275; poliomyelitis, 6; polio-encephalitis, 1; encephalitis lethargica, 2; dysentery, 40; ophthalmia neonatorum, 114. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on May 24 was 705, made up of: scarlet fever, 129; diphtheria, 122; measles, 15; whooping-cough, 29; enteritis, 62; chicken-pox, 33; erysipelas, 30; mumps, 9; poliomyelitis, 1; dysentery, 4; cerebrospinal fever, 70; puerperal sepsis, 26; enteric fevers, 5; german measles, 30; other diseases (non-infectious), 49; not yet diagnosed, 91.

Deaths.—In 126 great towns, including London, there was no death from smallpox or scarlet fever, 1 (0) from enteric fever, 3 (0) from whooping-cough, 3 (0) from measles, 15 (1) from diphtheria, 41 (11) from diarrhœa and enteritis under 2 years, and 18 (2) from influenza. The figures in parentheses are those for London itself.

Liverpool reported the fatal case of enteric fever. There were 7 deaths from diarrhœa at Birmingham and 3 each at Tottenham and Willesden.

MEDICAL NEWS

University of Oxford

The Osler memorial medal for 1940 has been awarded to Sir Farquhar Buzzard.

On June 1 the following degrees were conferred :—

D.M.—R. C. MacKeith, J. W. A. Turner, C. F. Hamilton-Turner, and *F. E. Buckland.

* In absentia.

University of Cambridge

On June 7 the degree of M.B. was conferred on E. T. W. Starkie.

Mr. Harold Chapple has been appointed an examiner in midwifery in part I of the final M.B. examination to be held in June in place of Mr. H. G. Taylor who is unable to act.

University of London

At recent examinations the following were successful :

THIRD EXAMINATION FOR M.B., B.S.

Nathaniel Hochman (*g*), St. George's ; F. E. Joules (*a*, *g*), Middlesex ; A. A. G. Lewis (*d*), Middlesex ; Frank Riley (*d*), St. Thos. ; I. G. Fergusson (*f*), Westminster ; Joseph Marks (*c*), St. Mary's ; Alec Sakula (*d*), Middlesex ; and B. A. D. Stocker (*g*), Westminster (all with honours) ; J. C. Angell, Middlesex ; J. D. F. Armstrong, St. Mary's ; V. H. Bowers, Middlesex ; Brian Brownscombe, Univ. Coll. ; R. F. Butterworth, St. Bart's ; M. M. A. Cader, King's Coll. ; R. H. Carpenter, St. Bart's ; H. A. C. Chalmers, Westminster ; C. K. Cole, Guy's ; C. M. Craig, St. Bart's ; J. D. Cronin, St. Bart's ; H. D. Davies, Univ. Coll., Cardiff ; J. R. Dow, Univ. Coll. ; Beryl M. Gee, King's Coll. ; Aitolia Georgiadis, Univ. Coll. ; Irving Gilbert, London ; G. N. L. Godber, Guy's ; L. C. L. Gonet, St. George's ; J. W. Goronwy, St. Mary's ; J. H. Gould, St. Bart's ; John Greene, St. Mary's ; J. J. Hamilton, St. Thos. ; J. A. Harpman, St. George's ; Denise O. Henry, Roy. Free ; Joseph Henry, Leeds ; J. A. G. Horton, St. Bart's ; D. B. Irwin, Westminster ; I. G. Isaac, Westminster ; P. V. Isaac, London ; Joseph Jacobs, St. Bart's ; J. A. James, Univ. Coll. ; D. R. M. Jones, London ; M. H. Kinmonth, St. Thos. ; Christine Kirby, Birm. ; W. C. Lawrence, Guy's ; F. H. Lee, Guy's ; J. S. Lillicrap, St. Bart's ; Eluned M. Lloyd-Davies, Roy. Free ; H. L. Maclure, St. Thos. ; R. R. McSwiney, St. Thos. ; F. W. Marshall, King's Coll. ; K. W. Martin, St. Thos. ; R. P. M. Miles, St. Mary's ; I. H. Miller, Middlesex ; John Newsome, Middlesex ; M. D. M. O'Callaghan, St. Bart's ; Albert Peacock, London ; E. U. H. Pentreath, St. Bart's ; S. D. Perchard, Univ. Coll. ; Hyman Pomerantz, Charing Cross ; Jakob Rabinowitsch, Univ. Coll. ; E. H. Rees, St. Bart's ; Hilda M. Robertshaw, Roy. Free ; J. D. Rochford, St. Bart's ; L. B. Scott, St. Thos. ; I. M. G. Stewart, Guy's ; J. W. Thompson, St. Bart's ; P. H. Thompson, Middlesex ; W. G. Tillmann, Guy's ; J. I. Timothy, Westminster ; Abraham Tober, Univ. Coll. ; H. D. Venning, Guy's ; A. J. Walker, St. Bart's ; R. F. Welch, Westminster ; L. J. Wolfson, Guy's ; Fanny D. Wride, Roy. Free ; T. A. H. Adkins, Guy's ; J. J. L. Ablett, King's Coll. ; Harold Auger, London ; A. F. Baldwyn, St. Bart's. ; Margaret Bennett, Roy. Free ; A. C. Bingold, London ; Monica M. Bird, Roy. Free ; Frances D. Bosanquet, Roy. Free ; Barbara J. H. Broadwood, Roy. Free ; P. M. Burton, St. Mary's ; Jean R. C. Burton-Brown, Roy. Free ; Isabella S. Chalmers, Roy. Free ; Joan M. Cheale, Roy. Free ; I. R. Davies, St. Bart's ; S. D. Elek, St. George's ; Enid J. Fair, Roy. Free ; D. A. Ferguson, Univ. Coll. ; H. J. Friend, St. Mary's ; A. D. M. Greenfield, St. Mary's ; C. W. Griffiths, Univ. Coll. Cardiff ; J. T. Harold, St. Bart's ; J. C. Houston, Guy's ; J. R. Hudson, Middlesex ; W. H. W. Jayne, Westminster ; Anis Jones, Roy. Free ; R. V. Jones, Univ. Coll., Cardiff ; E. P. Kempsey, Univ. Coll. ; P. R. Latcham, St. Bart's. ; Frank Luckett, King's Coll. ; C. D. L. Lycett, St. Mary's ; D. G. C. Macdonald, King's Coll. ; Jean D. McKendrick, King's Coll. ; L. A. H. McShine, St. Bart's ; R. M. Mayon-White, St. Thos. ; J. V. Mitchell, Middlesex ; Robert Moore, Guy's ; B. L. Morgan, Middlesex ; Margaret E. Morgans, Univ. Coll. ; Sheila M. Newstead, King's Coll. ; Doreen Nightingale, Univ. Coll. ; J. W. Paulley, Middlesex ; J. D. Randall, Univ. Coll. ; P. D. Rawlence, St. Thos. ; H. H. Renyard, King's Coll. ; A. G. Riddell, Univ. Coll. ; M. H. Rotman, Charing Cross ; R. W. Rowan, Charing Cross ; H. A. Rowley, Guy's ; A. F. Rushforth, Guy's ; Erich Schlesinger, Middlesex ; L. G. Scott, Guy's ; G. F. Smart, Guy's ; B. E. C. Stanley, St. Mary's ; Arthur Webb-Jones, St. Thos. ; May D. Westerman, Roy. Free ; Elizabeth Whatley, Roy. Free ; D. A. J. Williamson, St. Bart's and Hugh Wormald, Guy's.

(*a*) Distinguished in pathology. (*c*) Distinguished in hygiene and forensic medicine. (*d*) Distinguished in medicine. (*f*) Distinguished in surgery. (*g*) Distinguished in obstetrics and gynæcology.

Ophthalmological Congress

A Pan-American congress of ophthalmology will be held in Cleveland, Ohio, on Oct 11 and 12 under the asupices of the American Academy of Ophthalmology and Otolaryngology. The executive secretary is Dr. William P. Wherry, 1500, Medical Arts Building, Omaha, Nebraska.

Oxford Graduates Medical Club

The annual dinner of this society, which was to have been held on June 28, has been cancelled.

Faculty of Radiologists

At the annual general meeting of the faculty on May 31, with Dr. S. Cochrane Shanks, the president, in the chair, the following were admitted to the honorary fellowship : Sir Robert Hutchison, * Mr. E. Rock Carling, * Lord Dawson, * Sir Walter Langdon-Brown, * Sir Humphry Rolleston, and * Sir Cuthbert Wallace. The following were admitted to the fellowship :

O. Chance, W. M. Levitt, A. G. C. Taylor, B. W. Windeyer, Constance A. P. Wood, *F. E. Chester-Williams, *J. L. Dobbie, *J. A. C. Fleming, *T. A. Green, *M. M. R. Hall, *E. L. Gwen Hilton, *R. G. Hutchison, *S. Nowell, *J. R. Nuttall, *W. R. Scott and *A. Turnbull.

* In absentia.

It is hoped to hold the next examination for the F.F.R. as usual in December, 1940.

British Pharmaceutical Conference

At the seventy-sixth annual meeting of this conference, held on June 12, Mr. H. Humphreys Jones, the chairman, gave an address on Pharmacists and Food. It was, he thought, curious that pharmacists did not take up the clue given by the pioneer work of Pereira on the science of dietetics just a hundred years back. Less than a decade ago the chemistry of food was first introduced into the curriculum of study of students of pharmacy which now contains " the physiology of the alimentary tract, including a knowledge of the control of salivary, gastric, pancreatic and biliary secretion, and of the movements of the alimentary tract ; the chemistry of the common food substances and the properties of the digestive juices and bile." This addition to the over-loaded syllabus was made, he assumed, because it was recognised that the pharmacist must keep pace with medical progress. It was important, too, that the pharmacist should be equipped for service in conditions arising out of the general awakening regarding food values. In pharmacy, Mr. Jones went on, the central aim had been to provide drugs to cure diseases rather than to prevent them, but since it has been recognised that some diseases were due to deficiencies of certain food constituents a broader outlook was revealed and the aim should now be to prevent disease and raise the general standard of health at all periods in life. There ought, he urged, to be an avenue available through which the pharmacist's knowledge of nutrition should be available to the community.

Births, Marriages and Deaths

BIRTHS

CONCANNON.—On June 5, at Fulmer Chase, the wife of Major J. N. Concannon, R.A.M.C.—a daughter.

COSGROVE.—On May 26, the wife of Dr. P. C. Cosgrove, Colonial Medical Service, Gold Coast—twin daughters.

RYAN.—On June 6, at Fulmer Chase, the wife of Captain Charles Ryan, R.A.M.C.—a son.

MARRIAGES

DIXON—RUSSELL.—On June 4, at Woodhall Spa, Francis Wilfrid Dixon, F.R.C.S., Flight-Lieutenant R.A.F., of New Norfolk, Tasmania, to Pamela Russell.

NEWMAN—FLETCHER.—On June 8, Ronald Eric Newman, M.R.C.S., Lieutenant R.A.M.C., of Southall, to Nancy Fletcher.

DEATHS

BONAR.—On June 7, Thomas George Doughty Bonar, M.D., M.S. Lond., F.R.C.S.E., of St. John's Wood Park, N.W.

BURNIE.—On June 6, William Gilchrist Burnie, M.R.C.S., formerly of Heaton, Bradford, in his 84th year.

CUTTS.—On June 6, George Lambert Cutts, M.R.C.S., D.P.M., L.D.S., Surgeon Lieutenant, R.N.V.R., aged 49.

GOODFELLOW.—In May, in France, Peter Robertson Goodfellow, M.B. Camb., D.M.R.E., Major R.A.M.C.

WILSON.—On June 5, at Rondebosch, South Africa, Norman Octavius Wilson, F.R.C.S.

Notes, Comments and Abstracts

ITALY AND THE DRUG SUPPLY

ITALY is an important source of many vegetable drugs but, with the possible exception of manna, which is obtained from a tree cultivated in Sicily, all of them are produced elsewhere. The increased difficulties in the transport of drugs produced in other countries may be more serious. Fortunately British importers had taken the precaution of bringing in supplies of most of the items of materia medica which are likely to be affected, and so far as can be judged, existing stocks will meet our needs for a considerable time. There is one exception; stocks of Sicilian squill in London warehouses are subnormal and as shipments from the other sources of squill are in doubt it would be advisable to use this drug sparingly. Orris root is already very scarce and may be unobtainable in a short time; but this is of more interest to makers of cosmetic preparations than to medicine. Lemon and orange oils are imported in great quantities from Italy but there are other sources of abundant supplies. Imports of olive oil from Italy will cease and will be almost negligible from other Mediterranean countries, but the new addendum to the B.P. will authorise the use of other vegetable oils to take its place.

NO SHORTAGE OF QUININE

THE Trade Commissioner for the Netherlands in New York has stated that the quinine factory at Bandoeng, Java, which is under official control, is sufficiently equipped with plant and has enough raw material to supply the normal demand of all countries for quinine. The German occupation of Holland, from whose capital the quinine market was controlled, need not therefore interfere with the practice of prescribing this alkaloid. Stocks in this country for the use of civilians are below normal, but they are adequate to satisfy ordinary demands for the time being. Apart from the alkaloid supplies of cinchona bark are available to manufacturers for export from Java. Some idea of the output from the Bandoeng factory may be obtained from the fact that an order recently placed by the United States government for 800,000 oz. of quinine sulphate, believed to be the largest contract of its kind, was executed promptly.

HEALING FAITHS

Dr. Ralph Major begins his book "Faiths That Healed" (D. Appleton-Century Co. 16*s.*) with a somewhat fanciful reconstruction of a scene at the temple of Æsculapius in Epidaurus in the second century A.D. He passes to the vision of St. Bernadette at Lourdes and describes the pilgrimages there. He narrates the history of the dancing mania of the Middle Ages, the rise and decline of the worship of St. Vitus at Saverne, and the origin of the tarantella. He tells of the Bloody Host and its modern explanation, and then passes to the stories of faith-healers, both genuine and fraudulent. In his last two chapters he gives an inadequate account of witchcraft and witches, though exactly what witches have healed by faith, except possibly a few warts, it would be difficult to say. There is nothing in the book which has involved much research, for the facts are all well known, but it has been competently compiled.

MYXOMATOSIS IN RABBITS

IN a well-illustrated monograph[1] Prof. Gennaro di Macco of Turin and his collaborators present the results of a detailed study of this malady, which was the first neoplastic disease proved to be of infective origin. They confirm the view that the causative agent is the virus discovered in 1898 by Sanarelli. They show, however, that the appearance and course of the disease are influenced by various extrinsic and intrinsic factors; in other words, that the virus can reproduce and determine disease only under certain favourable conditions. Trauma plays an important part in the localisation of the nodules of myxomatous tissue for an injured area constitutes a centre of attraction for the virus. The authors are content to report the results of their researches without trying to deduce conclusions applicable to the general problem of malignant disease. The whole monograph bears the mark of careful and accurate work.

1. Mixomatosi (Virusmalattia di Sanarelli). Ricerche Sperimentali. Torino: Industrie Tipografico-Editoriali Riunite. 1940. Pp. 256. Lira 76.

Medical Diary

Week beginning June 17

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1.

THURSDAY

Dermatology—4 P.M., cases. 5 P.M., clinical meeting.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 26 Portland Place, W.1.

THURSDAY—4.30 P.M., Dr. J. Bryant: Field Experiences with the Sulphanilamide Group of Drugs in the Southern Sudan.

CHADWICK LECTURE.

THURSDAY—4 P.M. (Chelsea Physic Garden, Swan Walk, S.W.3), Prof. William Brown, F.R.S.: Plant Disease in relation to the Public.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES.

SATURDAY—2.30 P.M. (11, Chandos Street, W.1), Lieut.-Colonel E. T. Burke: Blood Dyscrasias in the Treatment of Venereal Diseases.

FELLOWSHIP OF MEDICINE AND POSTGRADUATE MEDICAL ASSOCIATION, 1 Wimpole Street, W.1.

London Chest Hospital, Victoria Park, E.2. WED. and FRI., 6 P.M., M.R.C.P. course in heart and lung diseases.—West End Hospital for Nervous Diseases, Gloucester Gate, N.W.1. MON. to FRI., afternoon course in neurology.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W.12.

WEDNESDAY—11.30 A.M., clinico-pathological conference (medical). 2 P.M., Dr. T. H. Belt: Pathology of Diseases of the Breast. 3 P.M., clinico-pathological conference (surgical).

THURSDAY—2 P.M., Dr. Duncan White: radiological conference.

FRIDAY.—2 P.M., clinico-pathological conference—gynæcological. 2.30 P.M., Mr. V. B. Green-Armytage: sterility clinic.

DAILY.—10 A.M.–4 P.M., medical clinics; surgical clinics and operations; obstetrical and gynæcological clinic and operations. 1.30–2 P.M., post-mortem demonstration.

Appointments

ANDERSON, CHRISTINE, M.B. Glasg., D.P.H., assistant medical officer for Carlisle.

ANDERSON, MAY D., M.B. Glasg., D.P.H., L.M., temporary assistant school medical officer for Stoke on Trent.

BENHAM, L. R., M.B. Melb., D.P.H., assistant medical officer of health (maternity and child welfare) for Halifax.

CROWE, ELSIE V., M.B. Edin., F.R.C.S.E., lady medical officer, Malaya.

EWEN, J. B., M.D. Aberd., D.P.H., temporary assistant county medical officer for Middlesex.

FEHILY, J. P., M.B. N.U.I., D.P.H., senior officer health at Hong-Kong.

HANSEN, ANNA L., M.B. N.Z., temporary assistant medical officer of health for Plymouth.

HODDER, REGINALD, M.R.C.S., D.O.M.S., resident surgical officer at the Birmingham and Midland Eye Hospital.

KELLY, T. D., M.B. Adelaide, resident surgical officer at the Newcastle-on-Tyne General Hospital.

LISHMAN, F. J. GARRATT, M.D. Lond., D.P.H., D.L.O., deputy county medical officer for Devon.

LLOYD, W. E., M.D. Lond., F.R.C.P., physician to the Westminster Hospital.

MACAULAY, H. M. C., M.D. Lond., county medical officer of health for Middlesex.

PERKINS, A. C. T., M.D. Lond., D.P.H., temporary acting deputy county medical officer for Middlesex.

YATES, F. H., M.R.C.S., assistant pathologist at the Royal Cancer Hospital (Free), London.

British Postgraduate Medical School:

ZEAL, B. MARGARET, M.B. Lond., D.P.M., obstetric house-surgeon;

BLISS, THEODORE, M.R.C.S., house-surgeon;

EVANS, M. O., M.R.C.S., BABER, MARGARET, M.B. Lond., GREENE, J., M.R.C.S., SPENCE-SALES, DOROTHY, M.B. N.Z., and CRUICKSHANK, DOROTHY, M.B. Aberd., house-physicians.

ADDRESSES AND ORIGINAL ARTICLES

MUSCLE LESIONS SIMULATING VISCERAL DISEASE

By J. B. Harman, M.D. Camb., F.R.C.S., M.R.C.P.
PHYSICIAN TO OUTPATIENTS AT ST. THOMAS'S HOSPITAL, LONDON; AND

R. H. Young, F.R.C.S.
MEDICAL OFFICER TO PHYSIOTHERAPEUTIC DEPARTMENT AT THE HOSPITAL

"Rheumatic" lesions of the deep muscles of the back often cause pain referred to the front of the body which simulates other diseases. In the past eighteen months we have treated twenty-four patients in whom this cause of pain had been overlooked. Most of them came with a definite diagnosis of some visceral disease, but this was excluded, and cure or relief by treatment by local anæsthesia or by massage proved that deep muscle lesions were responsible for the pain.

PATHOLOGY

The localisation of deep pain has been studied (Kellgren 1939, Lewis and Kellgren 1939) by injecting small quantities of hypertonic saline into various structures. A deep injection into the back gives a dull ache which diffuses throughout the corresponding spinal segment so that it is sometimes more noticeable in the front of the body. This front pain is accompanied by hyperalgesia of the skin and by tenderness, rigidity, and sometimes spasm of the muscles. It is to be remarked that all these phenomena, which in the abdomen are recognised as signs of visceral disease, can be produced equally well by damaging the muscles and ligaments of the back. In our cases it was possible to perform the reverse experiment—i.e., to abolish these phenomena by injecting procaine into the back—and, since it is easy to tell where the point of a needle is, it could be shown that the irritating focus was in muscle or fascia and not in joint, bone, or ligament.

Although the pathology of these muscular lesions is unknown, the natural history of the affection is similar to that variously known as "fibrositis," "muscular rheumatism," and "myositis," which in special situations may give the syndromes of brachial neuritis, lumbago, sciatica, and so on. All these affections have certain features in common. For example, some persons are unusually prone to them and suffer in their lifetime from several manifestations. This was a common complaint in our patients, and while under treatment for abdominal pain one patient also had sciatica and another patient had brachial neuritis. Whatever form the attacks may take they are all liable to be aggravated by damp and strain and are all relieved by the same treatment. Hence there is some reason to believe that the lesions causing these pains may have a similar pathology.

Though we cannot define any further the intimate nature and ætiology of these lesions, it is still possible to disprove certain other hypotheses. For instance, the lesion is not a neuritis in the sense of an inflammation of nerve trunk. Irritation of a nerve gives pain referred only to the peripheral distribution of its contained fibres. Since our patients felt pain in the abdomen or in the chest, any neuritis must have been in the main trunk of a spinal nerve or in its anterior division. Either of these parts would have to be anæsthetised to relieve a neuritic pain, because the pain impulses must be blocked central to their point of origin. This could not have happened in our cases, because both the anterior division and the main trunk were out of range of the needle, which lay in the deep muscles of the back.

The association of chronic abdominal pain with spinal osteo-arthritis has led to the suggestion that the pain is referred along a nerve that is nipped by osteophytes, or from the pathological joint. But osteophytes were present in only a few of our cases, and even in these the effect of infiltrating the muscles shows that no pathological change of the nerve in the intervertebral foramina could have been responsible for the pain. For the same reason it can be said that neither were the joints directly responsible for the pain in our cases, though this may be the cause in others. This question of osteoarthritis is of more than purely academic importance because, if a normal radiogram is allowed to exclude the suspicion that an abdominal pain was referred from the back, then the commoner, younger, and more easily treated cases will be overlooked.

The vast majority of patients with painful lesions in the back localise their pain accurately and complain simply of backache, and it is only relatively few who feel their pain in the front or the sides. Now, if the pathology of these muscle lesions is the same in the two cases as we have suggested, then some explanation is required of the difference in localisation. First, the usual site of backache is the small of the back or over the sacrum, which segments have no abdominal component; therefore pain in them can only be diffused into the buttock and down the leg, causing lumbago and sciatica. The only parts of the back from which an abdominal pain can arise are the last five or six thoracic segments, and these appear to be less susceptible to muscle lesions than those lower down. This distribution of the lesions explains the comparative rarity with which they give abdominal pain but not the fact that even in the lower thorax they often cause backache only. Kellgren (1939) has shown that the accuracy of localisation of experimental pains depends on the depth of the saline injections. A superficial injection is felt at the site of injection, but a deep injection is poorly localised and the pain is felt anywhere in the corresponding segment. This would be a satisfactory explanation of the differences observed clinically, though it has not proved possible to measure the depth and position of the natural lesions with sufficient accuracy to confirm the supposition. It is, however, possible to produce at will a backache by a superficial injection of saline or, by a deeper injection, to give a pain which the patient recognises as having the same distribution and quality as his symptoms.

SYMPTOMS

The referred pain is a dull internal ache; it is usually mild and persistent, though occasional sharp twinges may produce a catch in the breath and keep the patient quiet and wary for the next few minutes. The severest pains are described as grinding or bursting, and after half an hour or so they may leave the patient sweating and shaken, with the conviction that something is very wrong inside. Occasionally there is nausea. As might be expected with a muscle lesion, the pain is related to movement and position. Often patients have discovered for themselves the movement that brings on a twinge, such as carrying a bag or reaching for books off a shelf. This sudden stimulation of the lesion by movement commonly exaggerates the pain momentarily, so that a mild dull ache is punctuated by sharp pains stabbing round the body into the front. This series of events is often mistaken for renal colic when it occurs in the appropriate segment, and the similarity was made even greater in one of our patients with a lesion in the lateral abdominal muscles, who complained of an aching in the right testicle which died away slowly after the attacks. More usually the pain is only made worse after some position has been maintained for a time, such as lying in bed or driving a car. In this event there will be little more than a dull soreness in the abdomen and no shooting pains to connect it with the mild discomfort in the back; hence conditions such as chronic appendicitis are commonly suspected.

Patients will often adopt curious attitudes for the relief of this type of pain, such as sleeping with a pillow under the buttocks or with the arms outstretched in the crucified position to prevent "angina," while it is common to hear that they cannot sleep on one side owing to the pain "dropping across" the abdomen. One woman with a supposed ulcer dyspepsia was constantly disturbed by pain half an hour after she went to bed; it was dispersed by movement or by sipping hot water, but by the water only if she had to walk to the bathroom to get it. Sufferers from persistent pains show that restless seeking after a comfortable position that is so characteristic of those who have brachial neuritis or sciatica.

Maintenance of posture tends to excite pain more often than does movement, but the effect of movement is more helpful in diagnosis, for it is more immediate and obvious. Gentle exercise may ease a pain where the muscles have stiffened up, but pain will be worse after too strenuous exercise has been taken. Mild cases may persist for months or years with only slight variations corresponding to the state of health or the weather. Infections, such as tonsillitis and influenza, are particularly liable to stir up a weak spot.

Reflex muscular spasm appears to cause special symptoms which may be distinguished from the effects of pain. In one patient the knotted abdominal muscles produced a palpable tumour which was thought to be a movable kidney, because it appeared in the groin and moved slowly towards the front during an attack of pain. In another, diagnosed as intermittent intestinal obstruction, the whole of the left side of the abdominal wall went into spasm, pushing the viscera to the right, so that the patient said that his stomach blew up when an attack of pain came on. It has been suggested (Lewis and Kellgren 1939) that the sensation of strangling in angina pectoris is due to muscle spasm, and we have heard this symptom complained of by a man with lesions in the supraspinati muscles. We suspect that spasm is also responsible for the sense of constriction in the lower chest and the compulsion to take great sighing breaths or to breath "gingerly" which accompanies it, whereas the same feeling in the abdomen makes the patient "want to hold the muscles" or "grip something and stretch." Cutaneous hyperalgesia is fairly common and, though it is not very painful, it tends to persist and may be annoying enough to make a woman loosen her clothes.

Since these muscle lesions are so common, it is not surprising that they sometimes accompany unrelated visceral disease. When the troubles are in different parts of the body they are not confused; but, even when both affect the same spinal segment, it is sometimes possible to distinguish the muscle pain merely by its dependence on position and movement. We have seen one patient with a gastric ulcer and typical pain who also had a constant stitch under the right costal margin which caught him sharply when he twisted round. This was abolished by infiltration of the back with procaine. Another patient was diagnosed as colitis due to chronic appendicitis; she had a genuine colitis, but the supposed appendicitis was a muscle pain referred to the right iliac fossa and was successfully treated as such. A third had a supposed pleurisy complicating silicosis.

MUSCLE LESIONS SIMULATING VISCERAL DISEASE

Sex	Age	History and clinical findings	Treatment and result
F	38	Pain left iliac fossa 8 months, back lesion at Th. 11	Massage and injection; 10 months' complete relief
F	24	Pain left hypochondrium 1 month, back lesion at Th. 9	Injection and exercises; 1 year's complete relief
F	53	Epigastric pain 5 months, back lesion at Th. 6–7	Two injections; 18 months' complete relief
M	49	Left-sided abdominal pain 2 months, extensive back lesions and osteo-arthritis	Injections; temporary relief only
M	25	Pain right hypochondrium 1 month, back lesion at Th. 9	One injection; complete relief
F	37	"Chronic appendicitis" 18 months and colitis, back lesion at Th. 11	Pain relieved much by one injection for 5 months; reinjection two months ago gave complete relief, colitis unaffected
F	16	"Chronic appendicitis" 6 months	One injection into back at Th. 11; complete relief
M	60	"Angina pectoris" intermittently 3 years, lesions in pectoral and scapular muscles	Three injections; complete relief one year
M	52	"Coronary thrombosis"; pain 8 hours	One injection into intercostals at Th. 4; instant complete relief
F	30	"Chronic salpingitis" left side intermittently 5 years	One injection in back at Th. 11–12; complete relief
M	40	"Chronic cholecystitis" intermittently 5 years	One injection at Th. 8–9; complete relief
F	56	"Cholecystitis" 1 month	Infiltration of upper part of right rectus abdominis; complete relief
M	42	"Cholecystitis" 3 months complications proved gastric ulcer	One injection in back at Th. 8; complete relief
M	64	"Carcinoma of colon with obstruction" 4 months, extensive back lesions with osteoarthritis	Massage and heat; slight temporary relief
F	60	"Hydronephrosis" 5 months	One injection in back at Th. 12; complete relief 14 months
F	53	"Dietl's crises" 1 month	One injection in back at Th. 12; complete relief
F	48	"Pyonephrosis" 2 weeks	One injection in back at Th. 12; complete relief 11 months
M	47	"Renal pain" 2 months	Tender points in internal oblique muscles injected; complete relief
M	30	"Renal pain" 3 months	One injection in back at Th. 12; complete relief 2 months
F	26	"Renal pain" 5 months, since confinement	One injection in back at Th. 11; complete relief
F	34	"Renal pain" 8 years	Injection in back at Th. 10–11; complete relief 10 months
M	60	"Renal colic" 4 years	Two injections in back at Th. 10; complete relief
M	46	Silicosis and pleuritic pain 2 months	Injection in pectorals; complete relief of pain 6 months
F	30	"Appendicitis" 1 month	Two injections in back at Th. 12; complete relief 10 months; sudden recurrence relieved by another injection

EXAMINATION

The object of the physical examination is to discover the painful focus, to reproduce the symptoms by stimulating it, and to abolish them by anæsthetising the focus with procaine. The patient's description of his pain sometimes indicates fairly accurately which muscle is affected, and this can be confirmed by getting him to go through set movements which bring various groups of muscles into action or put them on the stretch. For example, a supposed angina of effort, which came on whenever a man walked briskly enough to swing his arms, could be reproduced easily by getting him to press his palms together and a supposed renal colic could be precipitated just when the abdominal oblique muscles contracted as the patient rolled from the supine to the prone position. The exact spot must be sought for by firm pressure with the thumb, and the area of skin under which tenderness can be elicited is commonly about the size of half a crown. Several such spots may be found, but the one responsible can only be in the same spinal segment and on the same side of the body as the symptoms. Even a correct anatomical position does not mean that any given tender spot is responsible for the abdominal pain, because it may be a mere coincidence and unrelated to the symptoms; it is therefore necessary to demonstrate a relationship by making the symptoms either better or worse. Deep pressure on a suspected spot usually causes such acute pain locally that the patient notices nothing else. Sometimes, however, a stabbing twinge to the front results, or, more convincing still, the patient says that the abdominal pain is made worse and feels as if it were being "pushed through to the front." The response

obtained depends to some extent on the original symptoms, and in mild cases often nothing more than the back pain will be admitted even on direct questioning. A more certain way of showing that the back pain is the cause of the symptoms is to abolish it with procaine. The patient should then be able to perform those movements which before were prevented by pain; or, in those cases where the effect of posture was more important, they should be free from pain as long as the local anæsthesia lasts. Rigidity of the abdominal muscles disappears quickly, but cutaneous hyperalgesia tends to remain during the period of an ordinary consultation.

TREATMENT

The diagnostic injection of procaine may produce a complete and permanent cure. The technique is as follows:—

The tender spot is marked on the surface with a grease pencil. The skin is anæsthetised, and a long fine needle is pushed slowly into the deeper tissues. Its passage is painless until an acutely tender spot is struck, which should be promptly infiltrated with a few minims of a ½ or 1 per cent. solution of procaine. Other tender spots are then sought for and anæsthetised until all tenderness is abolished; 5–10 c.cm. is generally required. The patient is warned that there may be a temporary return or exacerbation of the pain some hours after the injection. This is probably due to the acidity of the procaine, for it is uncommon when dilutions of 1 per cent. or less are used.

This is such a simple procedure that it is worth repeating at least three times at intervals of a few days if the first attempts are not entirely successful. Infiltration with procaine is impracticable in patients with very extensive lesions; these are better treated by massage and exercises. The massage should be performed by rubbing the skin and subcutaneous tissues against the affected muscle, and it is bound to be painful at the time. Exercises to recover strength and mobility are useful in dealing with a slight residual pain. They are particularly important when there is any postural deformity, for this in itself may determine the site of an acute attack or, being a habit resulting from chronic pain, may set up a vicious cycle. To prevent these relapses we give instruction in remedial exercises in every case which is of long standing or where there is any abnormality of posture. We have not found that light massage or the various forms of radiant heat give any permanent relief in the rather chronic cases which are under consideration. They are, however, comforting at the time and are sometimes useful in winning the confidence of those timorous or sceptical patients who are apt to regard immediate injection as a painful assault and to excuse themselves from further visits.

DISCUSSION

It is common knowledge that disease of structures of the back, such as Pott's disease, carcinomatous deposits in the spine, and osteo-arthritis, may cause pain in the abdomen, because the disease will sooner or later become obvious. But muscle lesions will be missed completely if not thought of, because they never declare their presence by disablement or death, and there is not even an abnormal radiogram to suggest a diagnosis. They will be wrongly diagnosed or looked back on merely as obscure pains which came and went and caused no harm. Nevertheless they have been recognised before as mimics of angina pectoris and headache, and doubtless many practitioners have their own experience of similar traps in diagnosis. From our own cases we can point to the imitation of carcinoma of the colon, hydronephrosis, chronic appendicitis, and so on; but there is no point in extending this list of errors that have or could be made. The lesions affect various muscles, and the pain may be diffused to almost any part of the body, yet they have their own peculiarities and natural history, and it is better to regard the syndrome as more characteristic of itself than of a host of other diseases with which it may be confused.

SUMMARY

(1) Twenty-four cases, summarised in the accompanying table, have been collected in which an affection of the back caused pain in the front of the abdomen and chest and led to an erroneous diagnosis of visceral disease.

(2) The mechanism of this false localisation is discussed in relation to recent work on deep pain sensation.

(3) The lesions are shown to have been in muscles, and it is suggested that they were similar to "rheumatic" affections.

(4) The pain and its usual variations and associated phenomena are described, and it is held that the syndrome is sufficiently characteristic to suggest a correct diagnosis. This can be confirmed by discovering the muscle lesion responsible.

(5) Treatment is effective enough to make it an essential part of the diagnosis; it consists of infiltrating the lesions with procaine, supplemented by massage and exercises.

REFERENCES

Kellgren, J. H. (1939) *Clin. Sci.* **4**, 35.
Lewis, T. and Kellgren, J. H. (1939) *Ibid*, p. 47.

THICKENED LIGAMENTA FLAVA IN LOW BACK-ACHE AND SCIATICA

By W. E. Carnegie Dickson, M.D., B.Sc. Edin., F.R.C.P.E.
PATHOLOGIST AT THE WEST END HOSPITAL FOR NERVOUS DISEASES, LONDON; AND

R. J. Twort, M.A. Camb., M.B. Aberd.
FORMERLY RESIDENT MEDICAL OFFICER AT THE HOSPITAL

Fibrotic thickening, hyperplasia, or, as it is sometimes rather loosely called, hypertrophy, of the ligamenta flava (subflava in the older terminology), with compression of the cauda equina, was first described by Elsberg, of New York, in 1913. The study of low back-ache with or without sciatica has aroused much interest in America, and attention has been focused on intraspinous lesions of the intervertebral disk (with its nucleus pulposus) and of the ligamentum flavum. In this country, although protrusion or herniation of the intervertebral disk into the vertebral canal is now being recognised more often, little attention has yet been paid to abnormalities of the ligamentum flavum. Either condition must be suspected in low back-ache and/or sciatica not responding to ordinary forms of therapy, and the conditions sometimes coincide. There have now been many reports of rapid relief of symptoms after laminectomy and removal of thickened ligaments.

CASE-RECORD

A male rent-collector, aged 35, was admitted to hospital under Dr. Colin Edwards on Jan. 4, 1940, with left sciatic pain of six months' duration. There had been an acute onset of low back-ache after unwonted use of a scythe. A few days later there was a burning pain down the back of the left thigh and calf. Left sciatic pain had persisted almost continuously since then and had resisted treatment by rest and physiotherapy. Pain was to some extent relieved by rest in bed, was made worse by standing, walking, or lifting a weight, and had been aggravated by an epidural saline injection given at another hospital. There was no difficulty in micturition, and sexual power was normal.

The circumferences of the left thigh and left calf were half an inch less than those of the right side. Knee-jerks brisk and equal, plantar reflexes flexor, left ankle-jerk absent. No appreciable motor weakness in left leg, no sensory loss in leg and buttocks, no tenderness on pressure over the sciatic nerve, no pain or limitation of movement on

extending left knee with hip flexed. Movements of hip-joints and lumbar spine unrestricted, no scoliosis or any appreciable tilt of the spine to either side.

Radiography of the lumbar spine did not show any narrowing of the intervertebral spaces or other skeletal abnormality.

Lumbar puncture between the third and fourth lumbar vertebræ produced cerebrospinal fluid (C.S.F.) at a pressure of 150 mm. C.S.F., no evidence of spinal block being elicited. C.S.F., clear and colourless, contained 2 small lymphocytes per c.mm., a slight excess of globulin, and 120 mg. of total protein per 100 c.cm. Wassermann reaction and Meinicke clarification reaction (M.K.R.II) negative. Lange's colloidal-gold curve: 2 : 1 : 1 : 1 : 1 : 1/0 : 0 : 0 : 0 : 0. The large amount of total protein suggested an intraspinal lesion. Lipiodol 5 c.cm. was injected by high lumbar puncture between the first and second lumbar vertebræ. The anteroposterior view (fig. 1), taken with the patient prone on a tilting table at an angle of 40° showed a symmetrical constriction of the theca, beginning at the interspace between the fourth and fifth lumbar vertebræ.

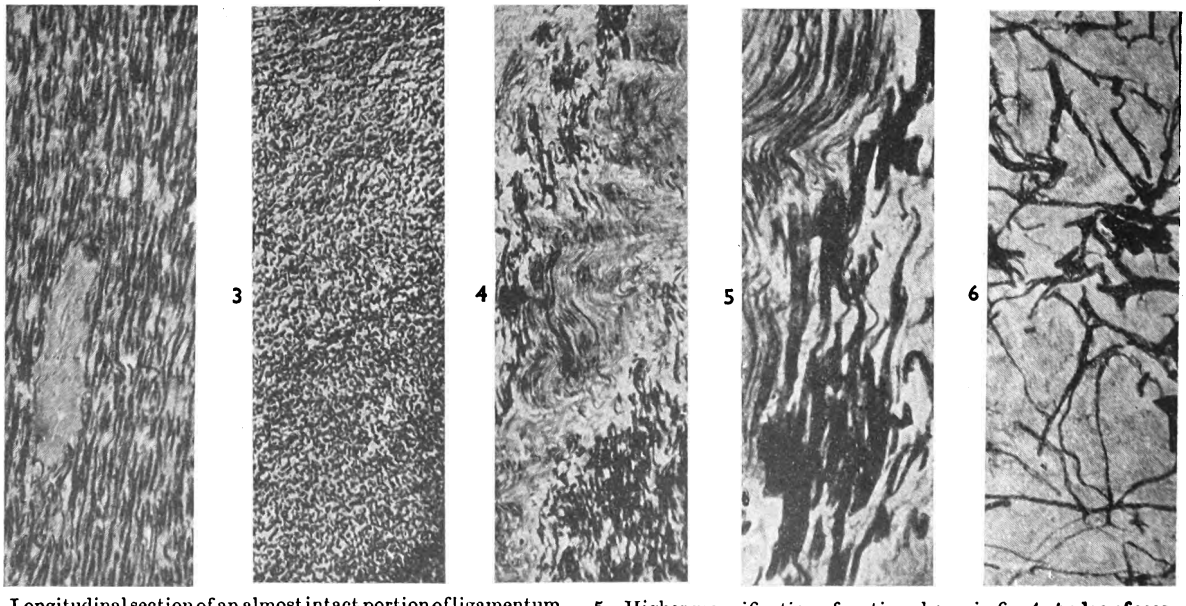
At operation by Mr. Geoffrey Knight on Jan. 15 the arches of the fourth and fifth lumbar vertebræ were removed, and great thickening of both right and left ligamenta flava between the laminæ of these vertebræ was found. The ligaments, which formed a single thickened transverse band, were tough and pale pinkish-red and had lost most of their normal yellow colour. The thickening or hyperplasia extended on both sides, partly encircling and compressing the immediately subjacent theca, the lateral prolongation being more pronounced on the left side. There was no evidence of any protrusion of an intervertebral disk. The thickened and coalesced ligaments were adherent to the subjacent dura, from which they were readily dissected, and after their removal the theca was opened to drain off the lipiodol.

The ligaments had been excised in three shred-like portions of firm, tough, pale reddish-white fibrous-looking tissue about 11 mm. long and 2·5–6 mm. thick. The fragment excised from the right portion of the ligament was comparatively normal (figs. 2 and 3), its elastic fibres being arranged in abundant regularly parallel bundles with only a minimum of fine collagenous connective tissue between them, both of these elements of the ligament being relatively non-cellular. Blood-vessels were scanty and mostly towards the surface. In this portion there were only a few small scar-like patches of fibrous connective tissue (fig. 2).

The more definitely thickened left-hand portion of the ligament showed an extensive mass of dense firm fibrous-tissue scarring (fig. 4). This cicatricial tissue was almost non-cellular but contained a few thickened blood-vessels with fibrous walls. In the elastic tissue adjoining this scar the fibres were irregularly thickened, many of them having abrupt or broken ends; there were also numerous wisps and bundles of much thinner elastic fibres, many of them arranged like locks of curly hair (figs. 4 and 5). At first we were inclined to regard this as an attempt at repair of the elastic tissue, and it is possible that the appearances may be in part so interpreted; but, especially in the corresponding transverse section (fig. 6), they are more consistent with thinning and degeneration in the damaged fibres, with the thicker remnants of which they are directly continuous, both being embedded in the dense scar-tissue.

FIG. 1—Anteroposterior radiogram of lumbar spine after intrathecal injection of lipiodol 5 c.cm.

In some of the intermediate areas, where the results of the injury have been less—e.g., round the small scar illustrated in fig. 7—the elastic fibres tend to lose their regular parallel arrangement and to form a network, and we suggest that this photomicrograph illustrates a criss-cross reparative "darn" of a slight tear in the ligament.



2—Longitudinal section of an almost intact portion of ligamentum flavum. (Mallory's connective-tissue stain.) (× 100.)

3—Transverse section corresponding to fig. 2, showing normal regular arrangement of elastic fibres. (Verhoeff's elastic-tissue stain.) (× 100.)

4—Longitudinal section of the margin of the main area of hyperplastic scar tissue. (Verhoeff.) (× 100.)

5—Higher magnification of section shown in fig. 4 at edge of scar, showing thick fragmented fibres and thin wisps of (?) degenerating fibres. (Verhoeff.) (× 400.)

6—Transverse section at margin of same scar as in fig. 4, showing that the thin fibres appear to be degenerating rather than regenerating. (Verhoeff.) (× 400.)

Comparison of the regularity in the arrangement of the fibres shown in the longitudinal and transverse sections of the more normal part of the ligament (figs. 2 and 3) with the irregularly fractured and thickened fibres (figs. 4–6), often with the thin and more faintly staining fibres in direct continuity with them, suggests attenuation and degeneration rather than regeneration.

Convalescence, except for some difficulty in micturition for the first two days, was uneventful. There was immediate relief from pain in the left leg. Stiffness and limitation of movement of the back at the site of laminectomy were rapidly improving when the patient was discharged on Feb. 12 and have now completely disappeared. The left ankle-jerk had not returned.

ANATOMY AND PATHOLOGY

The ligamenta flava are composed normally of yellow elastic tissue and connect the laminæ of adjacent vertebræ. They also blend with the interspinous ligament and help to form the capsules of the intervertebral synovial joints, and their lateral or anterolateral edge forms the posterior margin of each intervertebral foramen, leaving a comparatively narrow space (fig. 8) for the outward passage of the nerve-roots, dorsal and ventral, which unite within the foramen to form the corresponding spinal nerve.

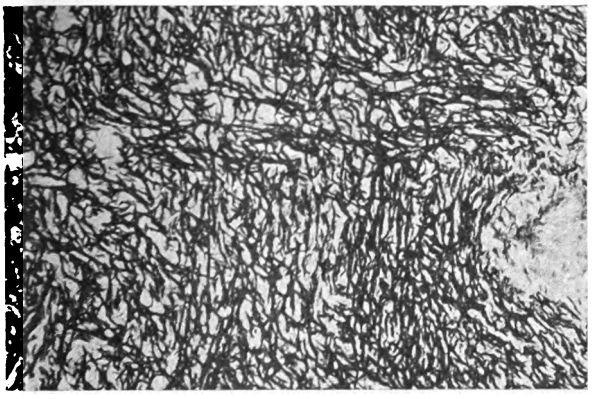
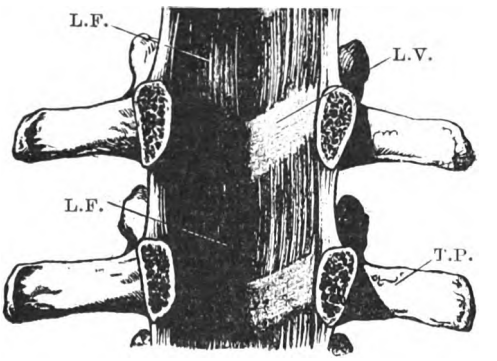


FIG. 7—Section of a small round fibrous scar, with a darn-like (?) repair of a neighbouring slighter tear. (Verhoeff.) (× 100.)

The foramen is shaped like an inverted pear, the nerve passing out through the upper or larger part of the opening, and the lower part being narrow or slit-like. For convenience in describing these ligaments, and although they are more or less continuous with one another across the middle line, anatomists usually regard each intervertebral interval as containing a pair of ligamenta flava, right and left (fig. 9). The normal ligaments are 2–3 mm. thick; they are the only predominantly elastic ligaments in the human body and, in virtue of their elasticity, can accommodate themselves to the separation and approximation of the laminæ in forward and backward flexion of the vertebral column. The forces at work, and consequently the strain, on this part of the body are considerable. Naffziger et al. (1938) call attention to the extraordinary resilience of the vertebral column associated with the cushion-like "turgor" of the intervertebral disks and the elastic retraction of the various ligaments, even apart from the action of the muscles; and they estimate that the various force-vectors at work—e.g., in lifting a 50 lb. weight—are multiplied about ten times, and sometimes, especially in sudden effort, to an even greater degree, with a resultant pressure upon the lower



From Cunningham's Anatomy.

L.F.=Ligamentum flavum. L.V.=Lamina of vertebra. T.P.=Transverse process.

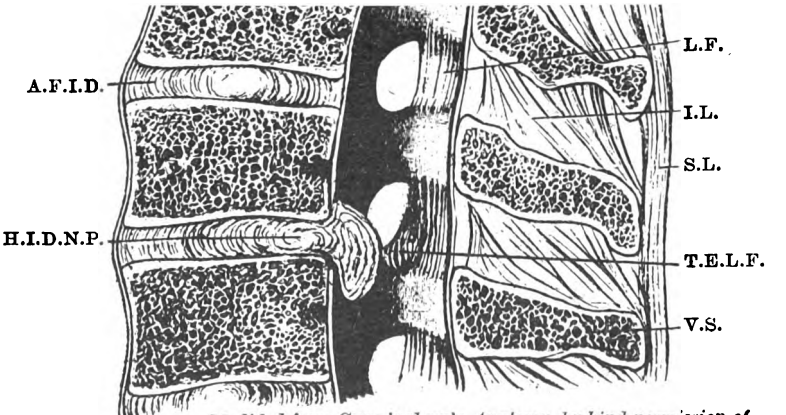
FIG. 9—Ligamenta flava seen from the front after the removal of the bodies of the vertebræ by saw cuts through the pedicles.

lumbar disks of some 500 lb. or more. Similarly, great strain is put on the ligamenta flava and the other vertebral ligaments. By their elastic tension the ligamenta flava help the posterior vertebral muscles to maintain the erect posture. Histologically they consist almost entirely of elastic fibres held together by a small amount of intervening collagenous or white fibrous tissue (figs. 2 and 3).

The elastic fibres of the ligamenta flava are normally under tension. Torn from their attachments or ruptured they contract and thicken; and acute or chronic trauma appears to cause the pathological thickening. Tears heal by the formation of scar tissue, and a ligament in which such changes have taken place may be 10 mm. or more in thickness and is usually adherent to the dura. This fibrotic hyperplasia may be unilateral or bilateral, the histological changes being a replacement of the normal yellow elastic tissue by collagenous white fibrous tissue in which there may be calcareous deposits. The site of election for the lesion is, as we have already stated, in the lower lumbar region, affecting most commonly the ligaments between the fourth and fifth lumbar vertebræ.

DIAGNOSIS

The symptoms of thickening of the ligamentum flavum are essentially the same as those of protrusion of an intervertebral disk, and by clinical examination alone it is rarely possible to differentiate between them. Adult males are predominantly affected.



Modified from Cunningham's Anatomy, by kind permission of the publishers.

A.F.I.D.=Annulus fibrosus of intervertebral disk.
H.I.D.N.P.=Herniation of intervertebral disk and its nucleus pulposus.
L.F.=Ligamentum flavum.
I.L.=Interspinous ligament.
S.L.=Supraspinous ligament.
T.E.L.F.=Thickened edge of ligamentum flavum.
V.S.=Vertebral spine.

FIG. 8—Median section through part of the lumbar spine, showing narrowing of an intervertebral foramen between the thickened edge of a ligamentum flavum and a herniated intervertebral disk.

There is usually a history of a fall, or of violent bending, lifting, or torsion of the spine, and the patient complains of low back pain, sciatica or both. The onset is most often sudden but may be gradual, and there is commonly an interval between the onset of the pain in the back and the pain of sciatic distribution. There may be motor weakness, numbness or sensory loss in the feet, legs or buttocks. Urinary incontinence is rare, but sexual impotence is common. An absent or diminished ankle-jerk on the affected side is the objective finding most often reported, with lumbar scoliosis and tilting of the pelvis, usually to the same side as the lesion, although sometimes to the opposite side. There may or may not be tenderness on pressure over the spinous processes of the lower lumbar vertebræ, tenderness of the sciatic nerve to pressure in the buttock or thigh, and limitation of flexion at the hip when the leg is straight.

Lumbar puncture should be carried out when neurological examination suggests the presence of a lesion within the vertebral canal or theca, or when the condition proves intractable to ordinary treatment. In fibrotic thickening of the ligamentum flavum, as in hernia of the intravertebral disk with protrusion of the nucleus pulposus, the total coagulable protein of the cerebrospinal fluid is commonly but not invariably raised above the normal upper limits of 25 to 30 or 35 mg. per 100 c.cm., these normal figures varying with the age of the patient. An obstructive lesion in the vertebral canal is characteristically associated with a rise in total protein in the fluid both above and below the lesion. If the lumbar puncture is made at or below the fourth lumbar interspace (the common site of obstruction in hyperplasia of the ligamentum flavum) a partial or complete spinal block may be demonstrated.

Epidural injection of saline is often valuable in doubtful cases. The injection of even a few cubic centimetres of saline will cause an exacerbation of pain if there is already any degree of compression of the cauda equina.

Myelography is essential for diagnosis. Opinions differ as to the quantity of iodised poppy-seed oil which should be used. With the patient in the erect posture, some 5 c.cm. is required to fill the lower spinal theca to the level of the third lumbar vertebra. This amount is therefore required in order to be sure of showing up any filling-defects due to protruded intervertebral disks or thickened ligamenta flava in the lower lumbar region, if diagnosis depends on straight films and cannot be assisted by fluoroscopy. Anteroposterior films with the patient prone, and lateral films, are taken with the tilting-table at an angle of 40°. If the fluoroscope can be employed along with a tilting-table, 2 c.cm. of oil may be enough, for this can be run up and down the lower theca and films taken when the oil is seen to be at the site of any notching or obstruction in the flow. The smaller amount is less likely to be followed by urinary troubles and arachnoiditis. Irritation of the roots of the cauda equina from the oil may sometimes be relieved by draining it off by repeated lumbar punctures, but this is not always effective. If an obstructive lesion is diagnosed and laminectomy performed the theca is opened at operation and the oil evacuated then. Otherwise, if myelography proves negative, the oil should be drained from the theca after sacral trephining.

According to Bell and Spurling (1938) the commonest abnormality found on myelography in cases of thickening of the ligamentum flavum is a unilateral filling-defect or notching of the column of oil. This is because the thickening of the ligament is usually predominantly unilateral. A similar defect is the common finding in cases of protrusion of an intervertebral disk. Myelography will not therefore always distinguish between these lesions, but fortunately the same surgical approach is required for both. When the thickening of the ligaments is bilateral a symmetrical hour-glass constriction of the dural sac and the enclosed column of oil is demonstrated, as in the case reported here. A complete hold-up of the oil is still more rare, both in protruded intervertebral disk and in hyperplasia of the ligamenta flava.

SUMMARY

A case of sciatica due to fibrotic thickening or hyperplasia (so-called hypertrophy) of the ligamenta flava in the lower lumbar region is described, and the anatomy and pathology of this lesion are explained.

We thank our colleague, Dr. Colin Edwards, for permission to use the clinical notes; Dr. Alexander Orley and Mr. A. York, the radiological assistant, for the radiogram, and Messrs. Charles Martin and Ronald Egan for technical assistance in the preparation of the microscopical sections and photographs.

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CHRONIC MENINGOCOCCAL SEPTICÆMIA

ASSOCIATED WITH AN OUTBREAK OF CEREBROSPINAL FEVER

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THE meningococcus has long been familiar as the cause of cerebrospinal fever in epidemic and in sporadic form. Meningococcal meningitis is usually easy to diagnose, because the symptoms of an acute infection and of meningeal irritation lead at once to puncture of the spinal theca and to the discovery of a turbid cerebrospinal fluid in which the meningococcus is readily identified. The meningococcus is also well known as an inhabitant of the upper respiratory passages in some healthy people. Much less familiar in England is chronic meningococcal septicæmia, in which the meningococcus inhabits the blood-stream for weeks, months, or even years and causes an illness which is so characteristic that it should be as readily recognised as meningococcal meningitis.

Chronic meningococcal septicæmia was first described by Soloman (1902), and since then cases have been reported with increasing frequency from the Continent and, of recent years, from America. Dimson (1938) mentioned the scarcity of English reports and gave a clear picture of the disease. Other good accounts are those of Appelbaum (1937), Carbonell and Campbell (1938), Binns and Clancy (1939), and Heinle (1939).

Recent experience in France has led us to agree with several previous writers that chronic meningococcal septicæmia is not uncommon but is often overlooked because of a superficial resemblance to other conditions. The accompanying table gives some details of seventeen out of about twenty-seven cases which we have recently encountered.

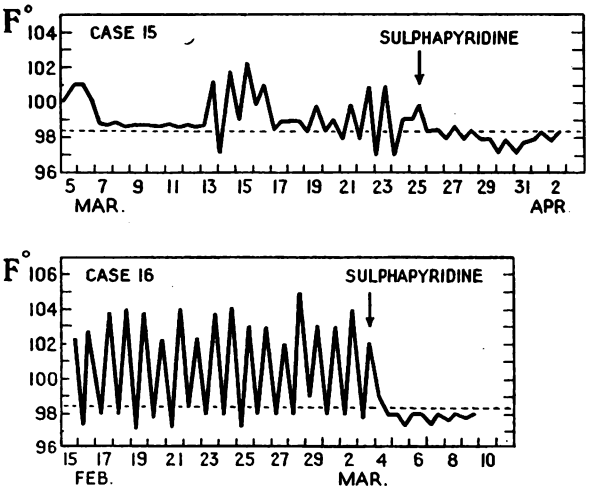
COMMENTS

Blood-cultures.—Although positive blood-cultures were obtained in only three cases in the series reported (and in a further two cases not included in this report), we have no doubt on clinical grounds that the remaining cases were chronic meningococcal septicæmia. Many authors allude to the difficulty of isolating the meningococcus from the blood, especially in the early

stages of the disease, and repeated cultures are often necessary for success.

Clinical diagnosis.—Although the isolation of the meningococcus from the blood is the only certain method of diagnosis, we believe that chronic meningococcal septicæmia is so characteristic that bedside diagnosis is simple. Early diagnosis is important; for, although the disease does not appear to be dangerous or to make the patient acutely ill, grave complications may arise at any time, especially after a few weeks. Early diagnosis is also important because sulphonamides are a prompt and effective remedy.

Clinical picture.—The onset is usually sudden, with fever, chilly feelings, or a rigor; severe headache; and severe migratory joint and muscle pains. Joint effusions are not uncommon. Within a few days the characteristic rash appears. Many different skin lesions have been described, and more than one type is usually found. The commonest lesions are pink or red macules, papules, and nodules varying from a few millimetres to 2 cm. or more in diameter. The papules and nodules are sometimes painful, and some of them were tender in sixteen out of the seventeen cases reported. On pressure the colour fades but a small central hæmorrhage can often be identified. Petechiæ are not uncommon. In six cases large lesions were present, often referred to as "blind boils." In a few cases there were tender subcutaneous nodules, especially on the front of the legs; in these the "tenderness of the shins" suggested trench fever. The rash is most profuse on the limbs and on the back of the trunk; fewer lesions are found on the chest, abdomen, and face. Successive crops appear, often with the rise of temperature, and each crop lasts for a few days, leaving a slight brownish discoloration. Skin



Temperature charts of case 15 and case 16 (see the accompanying table), showing different types of fever and rapid response to the administration of sulphapyridine in chronic meningococcal septicæmia.

CHRONIC MENINGOCOCCAL SEPTICÆMIA

Case	Age	Onset	Initial symptoms	Recurrent tender rash	Headache	Muscle and joint pains	Joint effusions	Type of fever	Afebrile periods	Duration of disease (weeks)	Blood culture	Throat culture	Leucocytes per c.mm.	Original diagnosis
1	19	Gradual	Sore throat and cold	+	+	+	0	Irregular, rising to 102° F.	+	?	1 neg. 1 pos. Gr. 1	Neg.	11,000 P. 68%, L. 21%	Erythema nodosum
2	21	,,	Joint pains	+	?	+	0	Ditto to 102·6° F.	+	3	1 neg.	,,	16,900 P. 73%, L. 21%	Rheumatic fever
3	28	,,	,, ,,	+	+	+	0	Intermittent to 103° F.	O.D.	8	2 neg.	,,	34,000 P. 70%, L. 25%	Arthritis
4	32	Sudden	Muscular pains and shivering	+	+	+	0	Irregular, rising to 101·6° F.	+	3	Not done	Not done	8000 P. 70%, L. 30%	Erythema nodosum
5	19	,,	Headache, rigors, "pains all over"	+*	+	+	+	Unknown, 100° F. on admis. then afebrile	+	2	1 neg. 1 pos. Gr. 1	,,	7000 P. 60%	Influenza
6	39	,,	Joint pains, sore-throat, redness and swelling of back of right hand, rigor	+	+	+	+	Intermittent to 100·6 F.	0	2	1 neg.	Neg.	24,000 P. 85%, L. 14%	Rheumatic fever with erythema marginata
7	25	,,	Rigor, sweating, muscular pains, sore-throat	+	?	+	0	Ditto to 103° F.	0	3	,,	,,	20,000 P. 87%	Rheumatic fever
8	35	,,	Rigor, sweating, muscular pains	+	+	+	+	Ditto to 101·6 F.	0	5	3 neg.	,,	16,000 P. 67%, L. 32%	,,
9	26	,,	Muscular pains, sweating, shivering	+	+	+	0	Irregular, rising to 102·6 F.	+	3	2 neg.	,,	7200 P. 72%, L. 25%	Acute myalgia
10	31	Gradual	Joint and muscular pains, sweating	+	+	+	+	Ditto to 102° F.	+	8	1 neg.	,,	6100 P. 69%, L. 28%	Subacute rheumatism
11	27	Sudden	Malaise, "painful lump on right leg," shivering and sweating	+	+	+	+	Intermittent to 104° F.	O.D.	3–4	3 neg.	,,	18,200 P. 84%	,,
12	30	Gradual	Malaise, anorexia, pains in legs	+	?	+	+	Irregular, rising to 101·2° F.	+	9	,,	,,	Not done	,,
13	20	,,	Pain and stiffness in limbs and back, rigor	+	+	+	0	Ditto to 102·4° F.	+	3–4	,,	,,	17,000 P. 78%	Rheumatic fever
14	32	Sudden	Rigor, "all joints ached"	+	+	+	0	Ditto to 103·2° F.	O.D.	?	1 neg. 1 pos. Gr. 1	,,	7000 P. 67%	Rheumatism, toxic erythema
15	42	,,	Shivering, sweating, pains in limbs	+	?	+	0	Irregular, rising to 102° F.	+	4	1 neg.	,,	16,600 P. 59%	Rubella
16	32	,,	Headache, pains back of limbs and back	+	+	+	0	Remittent to 105° F.	0	8	2 neg.	Pos. Gr. 1	12,700 P. 71%	Influenza
17	29	,,	Malaise, shivering, fever	+	?	+	0	Irregular, rising to 104·5° F.	+	4–5	1 neg.	Neg.	6400 P. 48%, L. 46%	,,

* No tender lesions. O.D.=Only for occasional day. Gr.=group.

lesions occasionally are scanty and then easily overlooked. If untreated with drugs of the sulphonamide group the fever persists for weeks, months, or even years. It is either intermittent, with a rise of temperature to 101°–105° F., or more irregular and relapsing, with short bouts of fever separated by afebrile periods during which the patient may feel well and be discharged to duty (see figure). The rise of temperature may be accompanied by chilly feelings or a rigor and a fresh crop of skin lesions; it may be followed by a profuse sweat. In two patients the spleen was easily palpable. A remarkable feature of the disease, noted by several writers, is the absence of debility, wasting, and anæmia, even after an illness lasting many months. The chief complications reported in the literature are meningitis and infective endocarditis; nephritis and acute epididymitis also occur. In our series one patient developed acute epididymitis, which disappeared rapidly with sulphapyridine treatment; one patient had a mild peripheral neuritis in the legs with loss of ankle-jerks and sensory disturbances; and a few complained of a residual painful stiffness of muscles after all signs of active infection had disappeared. Two patients with cerebrospinal fever gave a history strongly suggesting that they had had chronic meningococcal septicæmia for 2–4 weeks before the onset of meningitis.

Differential diagnosis.—The commonest original diagnoses were rheumatic fever or subacute rheumatism (eight cases), influenza (three cases) and erythema nodosum (two cases). A diagnosis of trench fever was made in two cases not included in this series.

Treatment.—Sulphapyridine in moderate doses by mouth terminates the disease in a dramatic manner. Fifteen of the patients were so treated, and all manifestations of active disease disappeared within twenty-four hours. There was a rapid return to health, and many patients were discharged to a convalescent depot.

Incidence.—We have unfortunately been able to refer to only a few recent papers about this disease, and these report sporadic cases of chronic meningococcal septicæmia, though Appelbaum (1937) mentions a "recent noticeable rise in incidence in New York City. This is not unusual preceding or following an outbreak of meningococcal meningitis." Our experience with the disease recorded here has led us to believe that this type of meningococcal infection is common whenever meningococcal meningitis becomes prevalent in a community.

SUMMARY

(1) Seventeen cases of chronic meningococcal septicæmia without meningitis are recorded. They were seen (together with about ten other cases whose case-notes are not available) within a period of nine weeks during the prevalence of cerebrospinal fever in the British Expeditionary Force.

(2) Chronic meningococcal septicæmia in sporadic form is not rare, and the suggestion is made that this form of meningococcal infection becomes common whenever meningococcal meningitis is prevalent in a community.

(3) The disease presents a characteristic clinical picture which enables bedside diagnosis to be made with ease.

(4) Sulphapyridine by mouth rapidly cures the disease.

We thank Major H. A. Magnus and other officers for their bacteriological and clinical assistance in furnishing the material for this article; and Major-General J. W. L. Scott, director of medical service, B.E.F., for permission to publish this paper.

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TROPICAL MACROCYTIC ANÆMIA IN AN INDIAN TREATED WITH ANAHÆMIN

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Wills and Evans (1938) report that Indian patients with tropical or nutritional macrocytic anæmia do not respond to the more highly purified liver extracts, such as Anahæmin, which contain the liver principle curative in pernicious anæmia in relatively pure form. They cite this as evidence further differentiating this disease from pernicious anæmia and conclude that there is a new hæmopoietic factor in crude liver extracts and in autolysed yeast extracts responsible for the cure of tropical macrocytic anæmia. The factor, though probably part of the vitamin-B complex, was proved not to be B_1, B_4, lactoflavin, or nicotinic acid. It had not then been separated from the yeast-fuller's earth filtrate of Edgar and Macrae (1937), but recent observations of Foy and Kondi (1939) in Macedonia indicate that in the nutritional macrocytic anæmia of that country this filtrate factor is inert. Napier (1939) stated that, in Indian patients with tropical macrocytic anæmia, anahæmin, in doses which would produce a maximal response in pernicious anæmia, sometimes produced no hæmopoietic response; in other cases even moderate dosage produced a response, and, apparently more often, massive doses produced a response which might be delayed and slightly submaximal. Foy and Kondi (1939), employing even larger doses of anahæmin than those used by Wills and Evans (1938) or Napier (1939), found that Macedonian cases responded as satisfactorily to anahæmin as to the more crude liver preparations, such as Campolon. They suggested that the Macedonian cases differed from those in India, where a high indirect van den Bergh reaction is rare, glossitis is common, and the highly purified liver preparations are inactive. In the following case of tropical macrocytic anæmia in an Indian Moslem the patient was under strict observation longer and was investigated in more detail than is generally possible either in India or in Macedonia.

CASE-RECORDS

A Moslem, aged 33, working in a ship's engine room, had been born in Calcutta and had lived there until he went to sea at 16. Since then he had been employed almost continuously in ships running between India and England or other countries. At 12 he had had malaria, associated with rigors lasting three days. Five years later the fever recurred but soon responded to treatment. A year ago he had transient diarrhœa, but neither mucus nor blood was noted in the stools.

Present illness.—On March 15, 1939, he became giddy and had a syncopal attack. Subsequently he suffered from anorexia, bouts of giddiness, abdominal distension, and looseness of the stools, the bowels acting twice daily. On the 30th he developed fever, with slight shivering, but unassociated with cough or sore-throat. After this he noted giddiness, weakness on walking, and some shortness of breath, cardiac palpitations, and tremors of the extremities. On April 14 he was admitted to the Hospital for Tropical Diseases, London.

Physical examination.—Well nourished, mucosæ pale, but no jaundice. Tongue large, pale, indented laterally by the teeth, and covered with light whitish fur; no ulceration and no atrophy of papillæ. No abdominal distension or atrophy of parietes; abdominal wall contained several subcutaneous nodules, proved by biopsy to be lipomata. Pelvic colon palpable but not tender; spleen and liver not enlarged. Pulse 120, fair volume; B.P. 110/50. Optic disks pale; no hæmorrhages. Lungs normal. No abnormality found on radiography of chest or of stomach and duodenum after barium meal.

Hæmatological investigations.—While under observation for six days the anæmia increased. Red cells (R.B.C.)

fell from 2,000,000 to 1,700,000 per c.mm. and hæmoglobin from 45 to 38 per cent. (see figure). On April 19 R.B.C. 1,700,000; hæmoglobin 38 per cent. (Haldane); colour-index 1·1; mean corpuscular volume (M.C.V.) 105·9 $c\mu$; mean corpuscular average thickness (M.C.A.T.) 2·16 μ. Price-Jones curve: M.D. 7·91 μ, σ 0·7, v 9·56 per cent., megalocytes 18·8 per cent. No evidence of spherocytosis such as occurs in the hæmolytic type of tropical microcytic anæmia. Stained blood smears showed poikilocytosis, fair number of megalocytes and occasional corpuscles presenting polychromasia or basophilic stippling. Normoblasts scanty. Reticulocytes 1·2 per cent.; leucocytes 10,000 per c.mm.; differential count normal; platelets 201,000 per c.mm. Smears of sternal marrow showed many Ehrlich megaloblasts similar to those seen in pernicious anæmia.

Other laboratory examinations.—Van den Bergh negative direct reaction and positive indirect reaction (0·5 unit). Wassermann and Kahn reactions and agglutination tests against the enteric organisms negative. Urine normal; culture negative. Stools contained no ova or protozoa on several examinations; culture gave no dysentery bacilli but numerous small hæmolytic streptococcal colonies. Stool liquid, yellow and very acid, with some

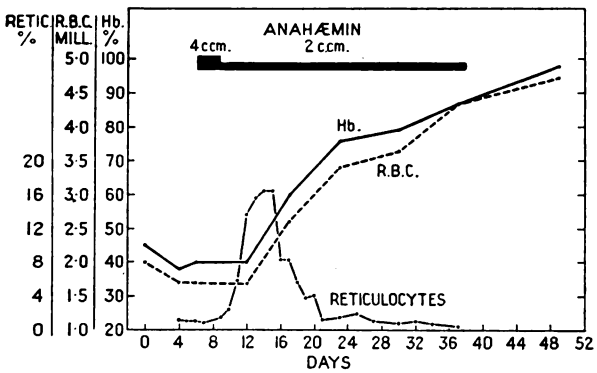

Chart showing response of tropical macrocytic anæmia to injections of anahæmin.

undigested starch residues. Fatty acids 16·2 per cent.; neutral fat 3·9 per cent.; total fat 20·1 per cent.; split fat 80·6 per cent.; unsplit fat 19·4 per cent. Histamine test-meal revealed a maximal acid secretion of 10 c.cm. of decinormal hydrochloric acid half an hour after the injection. Fasting blood-sugar 111 mg. per 100 c.cm.; glucose-tolerance curve fell within normal limits, except that the maximal rise to 174 mg. per 100 c.cm. was not reached until 1½ hours.

Dietary.—The patient's diet during the previous twelve months had been the same as that of the rest of the crew, and there had been no loss of appetite until he fell ill in March, 1939. He took two good meals a day, at 8 A.M. and 5 P.M., and his diet mainly consisted of dal soup, polished rice, ghee, chapatties made from whole-wheat flour, curry, spices, occasional melons, and a limited amount of vegetables (cabbage, pumpkin, and mangels). Fish and meat—about 4 oz.—were eaten two or three times a week, but the diet contained no eggs and practically no milk. Beverages included tea and coffee but no alcohol.

Treatment.—Uncomplicated tropical macrocytic anæmia was diagnosed. Owing to the difference of opinion about the efficacy of the more purified forms of liver extract in in this disease, the patient was given large doses of anahæmin (British Drug Houses) by intramuscular injection, 4 c.cm. being administered daily for the first three days and 2 c.cm. each day subsequently for the next twenty-nine days. Ordinary hospital light diet was given without reinforcement with vitamins.

Progress.—During the first fortnight the patient had a mild fever, the maximal temperature of 101·5° F. being recorded on the seventh day. Subsequently there was an occasional evening rise to 99° F., but never higher. The pulse- and respiration-rate were similarly raised, and diarrhœa during the febrile period was somewhat troublesome. The only abnormality found was the predominance of hæmolytic streptococci in the fluid stools.

The administration of anahæmin was rapidly followed by clinical improvement. A reticulocytosis with a maximal rise of 16·4 per cent. on the eighth day followed the injection, and this was succeeded by a rapid fall to normal limits within a week (see figure). Rapid regeneration of blood ensued, and within thirty-one days the red cells increased by 2,640,000 and the hæmoglobin by 47 per cent. This represented a daily average increase of 85,000 red cells per c.mm. and 1·5 per cent. hæmoglobin. The secretion of hydrochloric acid also improved, and on May 11, twenty days after the start of treatment, a test-meal showed 52 c.cm. N/10 HCl an hour after the meal; some forty-five minutes after the administration of histamine 105 c.cm. was recorded. The diarrhœa gradually ceased, giddiness and palpitation disappeared, and the reserve of energy increased. The patient became mentally alert, the mucosæ lost their pallor, and normal health was restored. Forty-three days after the start of treatment a blood-count showed R.B.C. 4,710,000; hæmoglobin 98 per cent., C.I. 1. The Price-Jones curve was almost normal: M.D. 7·61, σ 0·61, v 7·98, megalocytosis 2·6 per cent., M.C.V. 92·5 $c\mu$, and M.C.A.T. 2·035 μ.

COMMENTS

The clinical features, the megalocytic anæmia, the numerous Ehrlich megaloblasts in sternal marrow smears, the presence of hydrochloric acid in the gastric juice, and the absence of reticulocytosis, spherocytosis, and hyperbilirubinæmia showed the case to be one of typical uncomplicated tropical macrocytic anæmia. At no time did the picture remotely resemble tropical sprue.

The response to large doses of anahæmin was unexpectedly satisfactory. It was associated with reticulocytosis, rapid regeneration of blood, and a restoration of the secretion of hydrochloric acid from one of hypoacidity to a level bordering on hyperacidity. Similarly the Price-Jones curve indicated a remarkable degree of improvement. The dosage of anahæmin employed was larger than that used by Wills and Evans (1938) in their Indian series, and the submaximal reticulocytosis noted in certain of their cases suggests that their results would have been more satisfactory with a larger dose. Foy and Kondi (1939) have suggested, largely because of the reported lack of response to anahæmin, that the tropical macrocytic anæmia of India may differ from the nutritional macrocytic anæmia observed in Macedonia. In my opinion the difference lies in a more widespread incidence, among the refugee population of Macedonia, of chronic malarial splenomegaly associated with generalised hypertrophy of the reticulo-endothelial system and the hæmolytic type of anæmia which it induces. The peasants there live on a border-line dietary poor or deficient in good animal protein and probably other blood-building constituents. It is not surprising that, with an overworked and undernourished bone-marrow, the demands of pregnancy are likely to precipitate widespread nutritional megalocytic anæmia.

Fairley, Bromfield, Foy, and Kondi (1938) have emphasised the necessity for massive doses of liver extract administered parenterally or of Marmite in the treatment of nutritional macrocytic anæmia, especially where a hæmolytic factor coexists. Anahæmin has to be given in still larger dosage and possesses no advantage over the more crude liver extracts given parenterally; on the grounds of expense alone its administration becomes prohibitive in the routine treatment of tropical or nutritional macrocytic anæmia.

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SEROUS PLEURAL EFFUSIONS

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AND
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THERE is a considerable divergence of opinion about the prognosis and appropriate treatment of serous pleural effusions (Maurer 1937). The possibility that such effusions might be due to chill, trauma or rheumatism used to be emphasised (Anderson 1928, Christian 1938), but now all are regarded as tuberculous unless some obvious cause, such as secondary carcinomatosis, is found.

EVIDENCE OF TUBERCULOSIS

At necropsy cases of pleural effusion have shown changes macroscopically and microscopically characteristic of tuberculosis. This is conclusive evidence so far as it goes; but most patients with pleural effusion recover, and it is arguable that in many of those who recover the effusion is due to some other cause. The finding of tubercle bacilli in the pleural fluid either on direct examination or by culture of the centrifuged deposit or by inoculation of guinea-pigs has shown that some of the patients who survive are tuberculous, but probably half of the tests give a negative result. Evidence of tuberculosis in the underlying lung or elsewhere in the body always strongly suggests that the effusion is tuberculous, but again it is by no means constant; and the very presence of an effusion makes small tuberculous lesions in the lung difficult if not impossible to detect even radiologically. Further investigation along this line is necessary either after replacement by air or after absorption of the fluid. The tuberculin reaction has been used in evidence, but it is so often positive in healthy adults in this country that it cannot be regarded as of much value for this purpose. The subsequent course of the disease is the most important evidence. It is generally accepted that patients with pleural effusions of uncertain ætiology subsequently develop tuberculosis of the lungs more frequently than would be expected from the incidence of tuberculosis in the general population; but how frequently and in what form is still unsettled.

Serous pleural effusion arises in both sexes at all ages. Chronic pulmonary tuberculosis is rare below the age of 15 and is common above that age; it has a notoriously bad prognosis in girls aged 15–25. Above the age of 40 carcinoma of the bronchus and secondary carcinoma are increasingly common, whereas tuberculosis becomes more chronic and fibrotic and less likely to lead to effusion. These factors should therefore be taken into account in any analysis of pleural effusion. Attention should be paid also to any radiological evidence of disease in the lung underlying the effusion. This may be seen after replacement by air or after the fluid has been absorbed.

PROGNOSIS

In this country, children show apparently more favourable results than adults. Graham (1925) traced 39 of 56 children, and found 7 cases of tuberculosis and 2 deaths. Smithers (1934) followed up 32 cases out of a series of 49 and also found 7 cases of tuberculosis, 2 of which had proved fatal. An interesting point is that the von Pirquet test was negative in 8 of Graham's cases, and that the incidence of tuberculosis among near relations was no higher than 2 in Smithers's series. Both of these points are at least a little surprising if every serous effusion is assumed to be tuberculous.

Many investigations to elucidate the prognosis have been made in adults. One of the earliest, by Hammon in 1897, showed that of 562 cases of pleural effusion 167 (30 per cent.) developed tuberculosis. It is remarkable that such a high figure should have been found as early as 1897, when radiology of the chest was not practised. In more recent times two large series have been reported from Scandinavia. Borelius (1932) followed up 230 patients, ten to twenty years after their pleural effusion, and found that 23 had died of pulmonary tuberculosis. Kallner (1937) gives a detailed analysis of 690 cases which he followed up for periods up to twenty years. He gives a mortality of 22 per cent. and a morbidity of 39 per cent. from tuberculosis in those followed for the longest time—i.e., till twenty years or earlier death. Trudeau (1939) reports a series subdivided into those complicating recognised pulmonary tuberculosis and those apparently primary. In the tuberculous group, out of 73 patients 49 were well and working five or more years later and 10 had died. These figures compare favourably with cases of pulmonary tuberculosis without effusion, and this may be due to their earlier recognition or to the natural collapse of the lung produced. In the other group, where effusion was apparently primary, out of 83 cases 74 were well and working 4 others were alive, and 5 had died. Trudeau's figures, however, are based on a questionnaire issued to the patients and not on clinical or radiological examination. Further, the questionnaire was issued only about three years after the effusion had occurred. Our series was therefore collected of all patients with pleural effusion in the London Hospital between 1926 and 1936, and an attempt was made to examine them again and take radiograms of their chests. The results can be grouped into three main classes.

(1) Pleural effusions for which no cause was found clinically, radiologically or bacteriologically.
(2) Pleural effusions in which the presence of tuberculosis was established.
(3) Pleural effusions for which some other cause was found.

We have subdivided the first two groups into age-groups and differentiated between those before 1933, when the follow-up period was at least five years, and after 1933, when it was at least two years. In the third group we considered such subdivision of no value and only separated those cases where the diagnosis was confirmed by necropsy. An apparent duplication will be noted here, some cases due to carcinoma appearing in table I and some in table III; but all patients who were at the time of their admission regarded as having primary effusions have been placed in table I, regardless of their ultimate course.

TABLE I—TUBERCULOUS CASES

—	Aged under 15	M. 15–25	F. 15–25	26–40	Over 40	Total
Total	6	15	14	16	19	70
Not traced ..	3	7	10	13	7	40
Traced ..	3	8	4	3	12	30
Died	1	2	0	2	3	8
Recurrent effusion	1	0	0	0	1	2
Well, radiogram clear ..	1	2	0	0	0	3
Well, no radiogram	0	4	1	0	4	9
Extensive pulmonary tuberculosis	0	0	2	1	4	7
Tuberculosis elsewhere ..	0	0	1	0	0	1

M, males; F, females.

The tables show that there were some 300 apparently primary cases, 70 tuberculous cases and 70 symptomatic cases, besides 21 with necropsy records. The follow-up was disappointing, and in some groups less than half of the patients were traced. The outbreak of war prevented this work from being completed as thoroughly as we could have wished. The attempt to visit the homes of those who did not reply had to be abandoned for this reason. We feel that probably a larger proportion of the untraced group were tuberculous than of the traced group, but we have felt justified in drawing tentative conclusions

TABLE II—PRIMARY EFFUSIONS

—	Under 15		M., 15–25		F., 15–25		26–40		Over 40		Total		
	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	
Total	45	18	61	19	43	14	46	13	32	17	227	81	308
Not traced	26	4	32	7	28	6	31	8	11	7	128	32	160
Traced	19	14	29	12	15	8	15	5	21	10	99	49	148
Well, no radiogram	7	0	7	1	6	2	2	2	3	1	25	6	31
Well, radiogram clear	11	12	15	9	4	4	5	3	6	4	41	32	73
Evidence of pulmonary tuberculosis	0	0	2	1	3	1	5	0	0	0	10	2	12
Recurrent effusion	0	1	0	0	1	1	0	0	0	1	1	3	4
Died of pulmonary tuberculosis	1	0	2	0	1	0	1	0	2	1	7	1	8
Died of new growth	0	0	1	0	0	0	0	0	6 (+ 1)*	1	7 (+ 1)	1	8 (+ 1)
Died—other condition or cause uncertain	0	1	2	1	0	0	0	0	3	2	5	4	9
Tuberculosis elsewhere	0	0	0	0	0	0	2	0	0	0	2	0	2

(1) Followed up more than 5 years. (2) Followed up 3–5 years.
* One case definitely carcinoma of lung treated surgically now alive.

from the material available. An appreciable number of patients died of conditions other than tuberculosis, a striking example being a patient who in 1926 had a pleural effusion and in 1932 developed a carcinoma of the breast, from which she died in 1934. At necropsy no evidence of tuberculosis of the lungs was found.

In the youngest age-group (0–14) just over half the patients were traced, and only 1 out of 33 in the primary group had subsequently developed tuberculosis; hence children with pleural effusions often do well and do not develop tuberculosis. Only 6 children with manifest tuberculosis and pleural effusion were found, and of these 3 are certainly alive and only 1 is dead. Many more cases were found between the ages of 15 and 25. Of the primary ones 80 were men and 57 women; 2 of the men and 1 the women died of tuberculosis; 3 of the men and 4 of the women had extensive pulmonary tuberculosis when radiographed subsequently. In 24 men and 8 women, however, the subsequent radiogram showed no evidence of disease. Though these figures are less favourable than those obtained among children, they do show a high recovery-rate. The third age-group, 25–40, shows similar figures to the second, though the numbers are much smaller. The fourth group, 41 and over, shows the complicating effect of carcinoma, from which about a quarter of the patients died. Deaths from other conditions, such as hyperpiesia, cerebral hæmorrhage and diabetes mellitus, were also recorded. Altogether half the patients traced had died, and only 3 of them from tuberculosis. The outlook is grave for the patients with proved tuberculosis when there are tubercle bacilli in the sputum and even more so when infiltration is seen in the radiogram. Of 30 patients 6 died within a year and 2 others in three and six years. Occasionally, however, the condition may improve and the radiogram clear considerably, as happened in 3 of our cases.

DIAGNOSIS

The character of the fluid may be a key to further diagnosis. The material at our disposal had not been very fully studied from this point of view. A recent paper by Gloyne (1939) indicates various methods by which the tubercle bacillus may be demonstrated more often in fluid, and emphasises the possibility of tubercle bacilli and cells being lost when the fluid is allowed to clot before examination. With such modifications as he suggests there can be little doubt that tubercle bacilli will be found more often. In the present series we can only comment on two features: the results of inoculation of guineapigs and the presence of blood in the effusion. Inoculation of guineapigs has proved distinctly disappointing: of 39 pleural fluids so tested * only 11 were positive for tuberculosis, and among the negative were 2 with radiological evidence of tuberculosis and even 1 with tubercle bacilli in the sputum. It is not surprising, therefore, to find that in following these cases up there was no significant difference in the prognosis of the two groups: 4 of our patients were subsequently radiographically clear and clinically well in spite of having previously had tubercle bacilli so demonstrated in the fluid. The presence of a bloodstained pleural effusion does appear to be of some diagnostic importance, for of 39 cases in the present series carcinoma was certainly the cause in 8 and was very probably the cause in 8 others; 2 were certainly and 1 probably due to endothelioma; 1 was certainly tuberculous and 1 probably was tuberculous, for he had previously had tuberculous peritonitis. Hyperpiesia, mitral stenosis and Hodgkin's disease each accounted for 1 case, and in 15 no obvious cause was found; 8 of these are known still to be alive and well and have had no further trouble.

TABLE III—SYMPTOMATIC PLEURAL EFFUSIONS

—	Necropsies	Died in hospital; no necropsy	Discharged alive	Total
Carcinoma	10	8	26	44
Endothelioma	2	0	0	2
Hodgkin's disease	1	0	4	5
Lymphosarcoma	1	0	2	3
Heart-failure (rheumatic carditis)	2	1	11	14
Heart-failure (other causes)	2	1	9	12
Nephritis	0	0	4	4
Tuberculosis	3	4*	0	7
Total	21	14	56	91

* Alleged to be tuberculosis but not proved.

The series is small, but it is remarkable that only 1 or at most 2 cases of bloodstained effusion due to tuberculosis should have been met in eleven years at the London Hospital among some 450 pleural effusions. Thus, contrary to orthodox teaching (Price 1937), bloodstained effusions seem seldom to be tuberculous. Carcinoma, with which may be included other new growths, is the commonest cause and is responsible for half the cases. Carcinomatous effusions are, however, not always bloodstained, and in the present series there were 2 cases with clear fluid confirmed by necropsy.

If tuberculosis does develop after a pleural effusion, it is usually found on the same side of the chest. In the present series only 2 cases were recorded in which the tuberculous process was confined to the opposite lung, and in 6 it was bilateral, with the more extensive process in the opposite lung in 2. In 2 cases tuberculosis had developed elsewhere in the body—i.e., wrist and knee—but by far the commonest site was the lung on the affected side, and this was affected alone in 20.

TREATMENT

Opinion is also divided about the most appropriate treatment. There are advocates of aspiration, air replacement, sanatorium treatment and masterly inactivity. Since cases, especially in those under 15

* The method for demonstrating tubercle bacilli used was to inoculate a guineapig with the centrifuged deposit of 10 c.cm. of fluid from which the clot had been broken.

years of age, usually run a favourable course, unless pulmonary tuberculosis is also discovered, conservative methods are justified; but such patients must be repeatedly examined clinically and radiologically. If, however, pulmonary tuberculosis is found, treatment in a sanatorium by pneumothorax is probably indicated. Aspiration alone is sometimes needed to relieve symptoms due to the large volume of the fluid, but is mostly used for diagnosis. The risk of aspiration must be small, because no death attributable to it took place in this series.

SUMMARY

A study was made of all cases of serous pleural effusions at the London Hospital 1926–36. Of these, 308 were apparently primary, 70 showed definite evidence of tuberculosis, and 91 were symptomatic of some other disease. An attempt was made to discover the subsequent course of these cases, and the results are given, tabulated according to age. The most striking features were the infrequency of pulmonary tuberculosis following pleural effusions below the age of 15, the infrequency of pulmonary tuberculosis following bloodstained effusions, and the frequency of carcinoma among patients with bloodstained effusion. In the intermediate age-groups, 15–25 and 26–40, the incidence of tuberculosis was much higher; and, in spite of many cases not traced, the incidence of subsequent tuberculosis can hardly have been less than 30 per cent. When tuberculosis is manifest at the time of the effusion, the prognosis is worse, though possibly not worse than that of pulmonary tuberculosis without effusion.

We thank the physicians of the London Hospital for permission to investigate the patients who had been under their care; Dr. Horace Evans for much helpful advice and criticism; and the Yarrow Research Fund for a grant to defray the expense of this investigation.

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IMPROVED OUTLOOK IN X-RAY CARCINOMA

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IN 1934 (THE LANCET **1**, 120) I expressed the hope that for the future X-ray carcinoma would be prevented. But the latent period of the disease is sometimes so long that sporadic cases are still bound to arise, and carelessness will still claim its penalties if known methods of protection are neglected. Briefly stated, my view is that, if a suspicious warty area locally excised is found to be a carcinoma, the patient's safety demands a complete dissection of glands, at least as soon as glandular enlargement can be detected in the axilla or in the supratrochlear gland of the affected side. The precaution is wise even in cases where the glands feel normal on palpation, though it cannot then be so strongly urged. The object of the operation is to cut the main line of dissemination in an early stage.

Of the two cases of X-ray carcinoma recorded in my previous paper, the British radiologist on whom I operated in June, 1931, excising the supratrochlear and all the axillary glands, died of coronary embolism in 1934, without recurrence of the growth. The second case was in a continental radiologist with multiple recurrent X-ray carcinomata of the right hand. In 1931 I removed a portion of the hand, the axillary and bicipital glands, and a band of deep fascia intervening between these glands and carrying the lymphatic vessels. This patient has wisely abandoned radiology but is now in active medical practice and free from recurrence.

I have since seen five further cases.

A manufacturer of X-ray apparatus consulted me in June, 1934, for a large advanced carcinoma of the left fourth finger, with hard and enlarged left bicipital and axillary glands. The case was an unpromising one, for after removal of the axillary contents nodules of growth were found in the axillary fat round the lymphatic glands. The axillary glands were infected right to the apex of the axilla. In January, 1935, a fresh carcinoma was removed from the palm of the left hand, and in May, 1935, he was free from signs of recurrence and had gained 20 lb. in weight; but in September, 1935, the appearance of deeply situated nodules, two in the forearm and one in the upper arm, led to an amputation through the shoulder-joint. In December, 1935, a new carcinoma appeared in the left submammary fold, and, though it was removed, recurrence took place in the axilla with widespread permeation of the axillary fat, leading to the patient's death in 1937. Operation in this case was a forlorn hope. The patient was seen too late but was enabled to live a fairly normal life until near his end and was probably saved much pain.

A radiographer with multiple X-ray carcinomata of both hands consulted me in 1934. No enlarged glands were palpable. The axillary and bicipital glands were completely cleared on both sides, and the necessary local operations were performed on the hands. One gland in the right axilla showed a secondary deposit. Further local operations on the hands have been necessary to deal with fresh carcinomata, and the patient now has one finger remaining on the left hand and two on the right hand. The thumbs are intact. Another finger may have to be removed, but there is no sign of axillary or visceral recurrence. At the present time he is active, free from pain, and in good general health.

A professor of surgery with X-ray carcinoma of the hand had his axillary glands removed. He died four years later from an independent visceral growth. There was no recurrence of the X-ray carcinoma.

A lady who has handled radium for many years consulted me for an early radium carcinoma. I removed the affected finger and a bicipital gland and she is now well.

A medical man had had repeated local operations on the hand for X-ray carcinoma. I removed a recurrent nodule in his palm and cleared his axilla. One of the axillary glands was infected. He has since had no recurrence.

In the *Times* in December, 1939, there appeared an obituary notice of the eminent French radiologist, Prof. Charles Vaillant, who had died at the age of 77. He was in charge of the X-ray departments of the Baudeloque Clinic and Lariboisière Hospital in the 'nineties.

"Gradually the characteristic dermatitis set in," says the *Times*, "and in 1906 he had to lose a finger. Four years later another finger was amputated, but he refused to give up his work in spite of much suffering, with the result that a hand had to be amputated in 1915. Even then he went on working, and in 1920 it was necessary to disarticulate the left shoulder. A year later his condition became so grave that he was forced to retire, being incapable of further activity."

Professor Vaillant's tragic history epitomises the usual fate of sufferers from X-ray carcinomata of the hands who are treated by purely local operations on the primary growths. In his case the course of the disease was unusually prolonged—a doubtful advantage. On the other hand, of six patients whom I have personally treated by early removal of glands one died of an independent disease without recurrence; one, a late case when first seen, died of recurrence; and four have remained well for various periods up to nearly nine years.

CONSERVATION OF A USEFUL THUMB
AFTER COMPLETE PHALANGEAL NECROSIS

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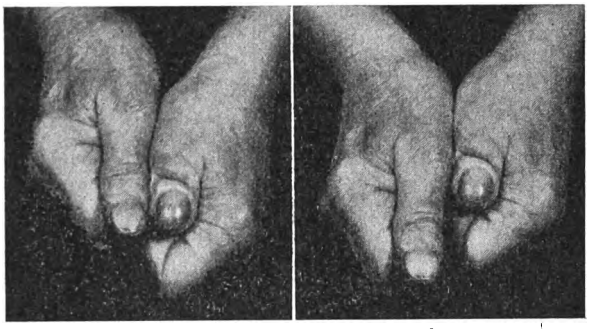
SEPTIC necrosis of distal phalanges seldom calls for amputation, which leads to nailless stumps that lack the character of fingers. Mere removal, on the other hand, of dead bone, allowed to loosen spontaneously, will leave recognisable digits; often nails remain, and sometimes bones regenerate, but even if they do not the fingers keep a natural shape. Appreciation, however, of this fact is still too rare, and the record of a case with widespread necrosis of the thumb may further emphasise the value of treatment confined to acts of timely scavenging.

Infection of three weeks' duration, caused by a splinter in a man aged 71, gave the following signs: a swollen, purplish-red, and not very painful left thumb, exuding pus from four small openings and moving only at the metacarpophalangeal joint; localised inflammation; a blood-count of 7000 leucocytes, with 58 per cent. of polymorphs. A radiogram showed necrosis of both phalanges, which were removed under gas-oxygen anæsthesia, leaving behind a resistant flake from the base of the proximal bone. The wound was cleansed with ether and packed for four days with ribbon gauze impregnated with dilute bipp. After withdrawal of the pack discharge stopped but reappeared in three days. Meanwhile my then house surgeon, Mr. G. S. Barbour, drilled a hole in the thumb-nail and, with silk thread and wire splinting, applied extension in the hope that bone might grow again. Five weeks later the basal flake left at the first operation had become loose and was removed; no trace then remained of either phalanx, and suppuration ceased. Bone did not regenerate, but the soft parts which once had clothed the two phalanges gradually shrank down on the metacarpal head to form a firm and satisfactory "pulp" backed by a normal nail. The patient's happy disposition helped to preserve the movements of the metacarpophalangeal joint, and this allowed him to bring the dwarfed thumb into strong contact with all the left fingers except the little one.



(a) (b)

Phalanges of left thumb lost by necrosis: (*a*) patient's spontaneous method of presenting thumbs for comparison; (*b*) correct alignment of thumbs.

A photograph (see figure, *a*) taken two years later shows how the patient offers both hands for inspection. The counterfeit presentment of the left looks then sufficiently natural to leave him vaguely informed of its true state, and we thought it best to let his mind dwell on this picture without obtruding the other (*b*); for, though men add no cubits to their stature by taking thought, they assume quite easily the presence of a lost phalanx.

My special thanks are due to Mr. V. Willmott for his photographs.

PANEL AND CONTRACT PRACTICE

IT has again become necessary to suspend the regional medical service.

Interned Practitioners

Internment of enemy aliens has led to a number of medical men being taken from their practices, and some insurance committees have had difficulty in arranging for treatment of the patients and for remuneration of the interned doctor. In a circular addressed by the Ministry of Health to insurance committees it is pointed out that the treatment a practitioner is required to render to his insured patients under his contract is personal, subject to his right to act by deputy when prevented from giving personal attention by other professional duties, temporary absence from home or other reasonable cause; subject also to his right to act through any partner so long as reasonable steps are taken to secure continuity. It does not appear that an interned practitioner could satisfy the requirements of his terms of service if his internment is to be protracted. The Minister suggests that where an interned practitioner is able to make satisfactory arrangements for the conduct of his practice, the committee might properly recognise such arrangements as a temporary expedient, reviewing the position after a period of (say) three months. If, however, there is no apparent likelihood of early release the committee should consider whether the contract is not at an end in consequence of the doctor's inability to fulfil it. If they take that view they should notify the practitioner of their intention to remove his name from their medical list.

There is nothing to disentitle an interned practitioner to remuneration in respect of his insured patients for the period while he is still in contract with the committee. The question whether an interned practitioner should be accorded the benefit (total or partial) of any protection of practices scheme which may be in operation in the area is primarily one for the authorities concerned. The London local emergency committee has decided that the benefits of their scheme do not apply to internees.

Essex Public Medical Service

The sixteenth annual report of this pioneer service shows that despite some war-time dislocation it has done better financially than ever before. Subscriptions increased by over £900 as compared with 1938 and the surplus of income over expenditure (£710) is up by £60. In the areas affected by the evacuation scheme there were between 7000 and 8000 subscribers. At the end of March collectors enumerated the evacuees on their books, the total being 1460. These are being kept on their doctors' lists but are not paying; the average weekly loss in respect of them is estimated as at least £20. Some forty members have been called up; at the end of the year the number of doctors on the books was 416, of whom 306 were active and the remainder honorary.

"... A frog or a university professor are examples of what is called living matter."—Prof. LANCELOT HOGBEN, F.R.S., Principles of Animal Biology, London.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF THERAPEUTICS AND PHARMACOLOGY

AT a meeting of this section held on June 11, with Dr. J. W. TREVAN in the chair, a discussion on clinical experiences with

Sulphathiazole in Staphylococcal Infections

was opened by Mr. A. J. EWINS, D.Sc. Dealing with the chemistry of this new drug, he said that a number of publications concerning it had recently appeared in the United States, and claims have been made that it is a particularly effective chemotherapeutic agent against staphylococcal infections, as effective as sulphapyridine against pneumococcal infections, better tolerated and less toxic. It was first prepared in this country in early 1938, and is one of the derivatives of the original sulphonamido-chrysoidine. He traced the steps of its evolution.

Mr. E. C. BUTLER said that staphylococcal septicæmia is much more common and fatal than is generally realised. Every death from osteomyelitis, nearly every death from cavernous sinus thrombosis, and many deaths from boils, carbuncles and infected fingers can be attributed to *Staphylococcus aureus*. Death may take place in two or three days from an overwhelming staphylococcal bacteræmia. Any treatment, to be effective, must therefore be started at the beginning of the disease, and must either be able to cure a patient who has a positive blood-culture, or else accelerate recovery in such lesions as may cause bacteræmia—e.g., carbuncles of the face. The problem of treatment is first to raise the resistance of the serum to the toxins produced by the staphylococcus. The important toxin is the leucocidin, and most patients have a low antileucocidin content in the blood for the first two days. The staff of the London Hospital therefore now give to every patient with a severe staphylococcal infection 25 c.cm., or about 20,000 units, of staphylococcal antitoxin with a high antileucocidin content. Secondly, it is necessary to find a drug which may help to destroy staphylococci once the patient's resistance has been raised. The prontosil derivatives do not affect the course of the severe cases. Thirdly, it is necessary to eliminate the source of the blood infection by adequate drainage, excision or amputation. The resistance of the patient may then be strong enough to deal with the remaining systemic infection.

Mr. Butler described the treatment with sulphathiazole of five cases of severe staphylococcal infection. A woman of 62 with a painful infected finger had a continuous pyrexia which did not yield to sulphanilamide. Blood-culture was positive to *S. aureus* and the white-cell count was 12,000. When first seen she was running an irregular temperature and apparently had no active infection of the finger. She received four tablets of sulphathiazole, and then two tablets four-hourly for four days. The finger was amputated after a week and the course was repeated. The blood-culture became negative and the temperature normal, but she died of heart failure and toxæmia, with no active focus of infection or signs of septicæmia. In a man of 55 with a poisoned cheek no definite improvement followed the administration of sulphathiazole, possibly because the infection was of a mixed type. He died of a pyopneumothorax from two small pyæmic abscesses in the right lung. Another old woman with a very bad staphylococcal infection of the skin did not respond to treatment. A woman of 32, however, who suffered from a severe cellulitis of the leg after bursting a varicose vein, and whose blood culture showed pure *S. aureus*, rapidly improved and recovered after receiving 20,000 units of antitoxin and a full course of sulphathiazole up to 30 g. A boy aged 12 with staphylococcal bacteræmia was given 20,000 units of antitoxin and a course of 30 g. of sulphathiazole, but did not improve. He developed hemiplegia and pneumothorax, but his blood meanwhile became sterile. It is doubtful whether the sulphathiazole destroyed the blood infection, for at the end of the course the culture still contained 140 colonies, and the drug is too rapidly excreted—as far as present knowledge goes—to have any delayed action.

Staphylococcal infections, Dr. Butler went on, are far more difficult to treat than hæmolytic streptococcal infections. In his limited experience sulphathiazole has little or no beneficial effect on a staphylococcal infection where the blood-culture is positive. It may, however, be of benefit after the source of the bacteria has been removed, or when the lesion is localised, such as in a carbuncle or cellulitis. Since all deaths from staphylococcal infections are due to bacteræmia, sulphathiazole should not appreciably lower the high mortality. Early bacteriological diagnosis is essential and should be supplemented by quantitative blood-cultures. The minimum dose of sulphathiazole is 2 g. at the start and then 2 g. four-hourly up to an average of 30 g. In severe cases 2 g. every two hours could be given safely if a differential white-cell count were made at the end of the second day. The drug should not supplant conservative surgery or the giving of adequate antitoxin. The high mortality of staphylococcal bacteræmia will only be diminished, he thought, by continuous research and close co-operation between the surgeon and the bacteriologist.

Dr. H. M. MCCREA gave details of two cases treated with sulphathiazole.

A middle-aged man suffered from a large carbuncle on the back of the neck, culture from which gave a pure growth of *S. aureus*. After a week's ordinary treatment he was discharged with a small area of healthy granulations at the site of the carbuncle. Next day he complained of very severe pain in the left ilium, and two days afterwards the temperature suddenly rose from normal to 105° F. The blood was sterile, but the leucocyte count rose to 16,000, with 91 per cent. polymorphs. The temperature dropped and rose again to 104° F., the rise being accompanied by a severe rigor. The blood was still sterile but *S. aureus* was found in the urine and sputum. The pain in the ilium increased and extended to the knee, and both elbow-joints became very painful on movement. An abscess in the ascending ramus of the pubic bone was drained, and a piece of the bone gave a pure culture of *S. aureus*, which could also be cultured from the fluid of the elbow-joints and from the pus expectorated from the base of the right lung. Sulphathiazole was given, 6 g. in the first twelve hours and then 1 g. four-hourly. The condition quickly improved, and the improvement held until the sixth day, when a circumscribed swelling appeared in the left triceps. The sulphathiazole was stopped because of extreme nausea after 25 g. had been taken. After another four days a second course of the drug was given. In twenty-four hours multiple painful raised red papules about the size of a shilling appeared on the front of the right tibia, and a small swelling was palpable at the insertion of the deltoid. At the end of the course the temperature was normal and the symptoms were improving. Convalescence now set in, and recovery was practically complete. The evidence for the action of the sulphathiazole was, in Dr. McCrea's opinion, that the purulent fluid did not again collect in the elbow-joints, the triceps swelling did not break down, the swelling in the deltoid quickly disappeared, the painful papules on the tibia disappeared, and the urine became sterile after the second course.

The second case was in a spinster of 33 with a carbuncle on the back of her neck. Culture gave a pure growth of *S. aureus* and the blood-count showed nearly 25,000 white cells. Under conservative treatment the temperature suddenly rose to 105° F. and blood culture gave *S. aureus*. Sulphathiazole was given, but irregularly and in 1 g. doses because of vomiting. On the sixth day, when the tablets

were stopped after 28 g. had been given, the temperature rose again to 103° F. and acute pain was felt in the epigastrium. The blood-culture was negative, but the leucocytes, after a steady fall, rose to 20,000. The blood clot in a large plug of sputum gave a pure growth of *S. aureus*. The patient then made slow and steady progress and recovered. A later injury to the knee caused effusion, but the fluid was sterile. The other points in favour of the curative effect were the fact that the septic infarction was not followed by abscess or empyema, and no other complications occurred.

Dr. McCREA concluded that the product had an extremely beneficial influence on the course of a particularly fatal disease.

Dr. GEORGE MELTON described six cases of osteomyelitis and five cases of carbuncle of the face treated with sulphathiazole. The first of the osteomyelitis cases showed a marked improvement. In the second case the pyrexia resisted the drug but subsided after a subperiosteal abscess had been drained. In the third case the condition cleared up after the drug was given. In the fourth case, a Brodie's abscess, pyrexia followed drainage but receded after sulphathiazole was given. In the fifth case the drug failed to reduce the pyrexia. The sixth case was still under treatment. All the five patients with carbuncles recovered. Symptoms of intoxication with the drug were vomiting and nausea, and a tendency to leucopenia was observed after large doses. Two patients developed a rash like that of erythema nodosum.

Dr. H. S. BANKS gave the results of the treatment with sulphathiazole of meningococcal infections in thirteen adults and two children. None of the cases was severe. He usually started with a few doses of sulphapyridine, and after it produced vomiting he changed to sulphathiazole. He would not say more than that he had been impressed with the rapidity with which clinical improvement followed the giving of the drug and the cerebrospinal fluid was cleared of organisms and cells. He found that the drug caused no nausea or depression, and vomiting was never comparable to that caused by sulphapyridine; there was practically no cyanosis. The cerebrospinal fluid levels were considerably less than would be found after corresponding doses of sulphapyridine.

Dr. K. M. A. PERRY contributed an account of three cases. The first, an osteomyelitis of the spine with abscess, did not improve after 25 g. of sulphathiazole, aspiration of the abscess, and splinting in plaster. In the second case, an osteomyelitis of the head of the radius, the blood-culture was sterile but a course of 25 g. did not clear up the condition; nevertheless, pus withdrawn from the arm was sterile. The third patient, a boy who had a boil on his right elbow, was admitted with a temperature of 104° F. and some neck rigidity. During a course of sulphapyridine his temperature dropped two degrees, but afterwards it rose again. The blood showed thirty colonies of *S. aureus*. He then received a course of 60 g. of sulphathiazole—two doses of 4 g. each at the beginning and then 3 g. every four hours—but his temperature remained at 104° F.

Dr. E. N. ALLOTT observed that many specimens of urine of patients who have received sulphathiazole contain crystalline derivatives of the drug, sometimes in large quantities. In a febrile patient who is not excreting much urine these products threaten to interfere with the efficient working of the kidney. Sulphathiazole tends to form a more insoluble compound than sulphapyridine. Fluids should therefore be pushed energetically during the whole course.

The CHAIRMAN suggested that sulphathiazole does not give the same dramatic control over the staphylococcus as sulphapyridine and sulphanilamide give over streptococcal infections. Differences in its observed action may be due to differences in the strains of the organism. Staphyloccocal infections tend, he said, to produce abscesses containing loculi into which the drug cannot penetrate; these may account for some of the failures.

REVIEWS OF BOOKS

Religion in Science and Civilisation

By Sir RICHARD GREGORY, F.R.S. London: Macmillan and Co. 1940. Pp. 366. 12*s.* 6*d.*

"Because science signifies new knowledge it must at all times be a disturbing influence upon society and require adjustments of thought and action to it. On this account there has always been a clash between it and traditional beliefs, whether relating to religion or to other humanistic standards of value."

These aspects of science have always interested Sir Richard Gregory and after he had crystallised his thoughts on them in a series of addresses delivered in the United States, he determined to review the whole history of the relation between the religions of mankind and the newer knowledge which science has acquired. To make clear the steady progress which knowledge of natural phenomena is achieving, and its consequences to our beliefs and our social organisations, he has surveyed man's religious beliefs from their first dim dawning in neolithic or even palæolithic times, through Mesopotamia, Assyria, Egypt, Greece and Rome, to the rise of Christianity, Mohammedanism, and the great religions of the Eastern world. The studies of the archæologist, the anthropologist, the theologian, and the philosopher have all contributed to his theme, for Sir Richard Gregory is perhaps the nearest approach in our time to the scholars of the past who took all knowledge for their province. His book is of absorbing interest, though it is not always easy reading, partly because the main argument is sometimes obscured by side-issues, such as the chapter on "The Month, Easter and the Calendar." But when he strays from the straight path his divagations are so fruitful that it is easy to forgive him.

His last chapter on science and social ethics is a noble consideration of the difficulty caused by the rapid advance of the application of scientific discovery to human industry compared with what General Smuts called "our stationary ethical development." Scientific men have in the past lived too much in the laboratory, but they are citizens as well as scientific workers and can no longer remain indifferent to the social consequences of their own labours. "It would be a betrayal of the scientific movement," says Sir Richard Gregory, "if scientific workers failed to play an active part in solving the social problems which their contributions to natural knowledge have created."

Field Ambulance Organization and Administration

By Lieut.-Colonel JAMES HARDIE NEIL, late officer commanding No. 3 New Zealand Field Ambulance. London: H. K. Lewis. 1940. Pp. 128. 5*s.*

MANY small books have been written to guide field-ambulance officers in the diversity of their duties. Here is a good one. It contains both general principles, such as "if food suitable for any class of disease in the ambulance is not forthcoming for the patients, the fault does not lie with the army authorities, but with bad quartermastering arrangements," and details such as the contents of the field-ambulance panniers. These can only be learnt by experience and practice but Colonel Hardie Neil gives a helpful rhyming mnemonic for them. There are valuable pages on clerical work and lists of duties for the various members of the personnel. Every young doctor when he

joins up would be well advised to start at once the study of his duties in the field ambulance, to which he probably will be sent before the war is over. This book has been written for a field ambulance dug in during trench warfare and some of it does not apply to the mobile warfare of today, but most of its practical wisdom still holds.

Theory and Treatment of Fractures of the Jaws in Peace and War

By H. H. BOYLE, L.D.S. Glasg., H.D.D., late captain (D), Army Medical Service; dental surgeon to the Ministry of Pensions. London: Henry Kimpton. 1940. Pp. 288. 21*s*.

THIS book is based on the author's sphero-ellipsoidal theory of occlusal curvature of the upper teeth. He maintains that the curvature of the anterior teeth is ellipsoidal, and of the posterior teeth spherical. He disposes of the views of others with ease, but does not make his own any more easily acceptable, in spite of the use of algebraical formulæ. In any case these curvatures can have little application in fractures of the jaw, for it is usual to mould the jaw upon its counterpart, and it is unusual for both jaws to be shattered in the same patient.

The practical section of the book contains a review of the many methods that have been used in the past, with free quotations from other works, and from the memorandum of the Army Council on maxillo-facial injuries. Many of the illustrations are likewise from standard works. The author then continues to apply his theory to fracture cases, and recommends transparent splints made with the curvature constantly in mind. These are freely illustrated on normal models, and it is a pity that few of the author's own fracture cases are described, for it is only from these that the method can be appraised. The text is rather redundant and circumlocutory, and it is doubtful if the book will have much appeal to the practical dental surgeon, to whom these cases are rightly referred.

Handbook of Skin Diseases

By LEON H. WARREN, M.D., formerly instructor in dermatology, Temple University; assistant dermatologist, United States Public Health Service. New York: Paul B. Hoeber. Pp. 321. $3.50.

ANY attempt to compress the teaching of dermatology into a manual of this size must presuppose more than an elementary knowledge in the reader, and this book's value to the practitioner is further diminished by the absence of illustrations which have done so much to popularise the smaller textbook. The author has given clinical descriptions of over 200 dermatoses in what he calls "telegraphic" form. They could hardly be memorised, but he hopes they may provide the lecturer with an aide-memoire, and it is to this relatively small class that the book may prove useful. The brief descriptions are standardised under seven headings: etymology; synonyms and eponyms (e.g. Boeck's sarcoid, Darier's dyskeratosis follicularis); essential nature, which includes the "telegraphic" description of the disease, its ætiology and clinical varieties; diagnostic features, such as localisation and induration; histology; differential diagnosis; and finally three or four lines on treatment. Treatment is further considered in a complete section to itself which is mainly pharmacological, and teems with advice beyond the resources of all but the most modern dispensaries. In it the author shows an unusual acquaintance with the preparation and finer therapeutic effects of dermatological and cosmetic applications. He has a natural bias in this direction, and hardly touches on the use of radiotherapy. The volume is original within its limited scope and it will appeal to all who teach dermatology or who wish to refresh their memory about the differential diagnosis and nomenclature of some of its rarer manifestations.

Chirurgie réparatrice et correctrice

By L. DUFOURMENTEL. Paris: Masson et Cie. Pp. 407. $3.

THERE has lately been a stream of new books on plastic surgery, particularly from America and the Continent, and since there will shortly be a great demand for plastic operations it is important that the best procedures should be made known. M. Dufourmentel holds a high place in this branch of surgery in France, and his book covers the subject fairly completely, concentrating particularly on deformities of the face, including the nose, lips, jaws and ears. The book is illustrated by photographs of patients before and after operation, but the line drawings of intermediate stages might be more plentiful. Chapters are included on harelip and cleft palate—following closely the work of Veau—and on breast reduction. The procedures described are in common use on the Continent but differ in some respects from the practice here. Thus for eyelids full-thickness grafts are used rather than razor grafts. Flaps are taken from the neck for the cheek and from the cheek for the nose, often leaving unpleasant secondary scarring. The distant tube pedicle does not receive much attention although it produces such excellent results. Cartilage is used freely for deformities of the nose and eye sockets rather than bone. It is not clear how the lining is obtained in rhinoplasty. With these reservations the book is a welcome addition to the plastic surgeon's library.

Medical Annual, 1940

Edited by H. LETHEBY TIDY, D.M. Oxfd, F.R.C.P., and A. RENDLE SHORT, M.D. Lond., F.R.C.S. Bristol: John Wright and Sons. 1940. Pp. 604. 20*s*.

THE Medical Annual is more than a mere summary of important publications. The contributors, who are all authorities in their different fields, choose the subjects reviewed with discretion and give readers the benefit of their specialised knowledge with critical comments and helpful suggestions. In the new volume the sulphonamide drugs are discussed by R. St. A. Heathcote; the large number of communications on cystic diseases of the lung are reviewed by Maurice Davidson; and the present position regarding shock therapy in schizophrenia is lucidly presented by Aubrey Lewis. E. W. Hey Groves summarises the important information which has come from Spain about the treatment of war fractures and air-raid casualties, and also of much general interest today are the articles on the medical aspects of flying and the medical hazards of submarine crews by A. F. Rook and Macdonald Critchley. All the reviews are clear and concise and the many illustrations, some in colour, add greatly to the attraction of the book.

Synopsis of Regional Anatomy

(4th ed.) By T. B. JOHNSTON, M.D., professor of anatomy, Guy's Hospital medical school. London: J. and A. Churchill. Pp. 462. 12*s*. 6*d*.

THERE has been little change in the text of this edition, except in the section on the central nervous system, where some new and clear diagrams have also been inserted. The original high standard of the book has been maintained, and it can be recommended as before to students who want to polish up their anatomy before facing the examiner or want to keep it from getting rusty during their clinical work.

THE LANCET

LONDON: SATURDAY, JUNE 22, 1940

ANTITOXIN IN THE TREATMENT OF GAS GANGRENE

IT is generally agreed that early surgical excision of a wound is the best prophylactic against gas gangrene, but there are as yet no reliable data about the best means for the treatment of an established infection. Surgery must still play its part in the removal of gangrenous tissue, whether by amputation in the case of massive gangrene of a limb or by excision of a single devitalised muscle, though with adjuvant treatment the removal may not have to be so radical as in the last war. Controversy is likely to arise as to the relative importance of the sulphonamides and antitoxin. That antitoxin per se can save the lives of animals experimentally infected with *Clostridium welchii* or *Cl. septique* has already been sufficiently proved; none the less this method of treating the clinical infection has rather fallen into disrepute. The reasons are a little difficult to find. The only large-scale experience in the application of gas-gangrene antitoxin was that obtained towards the end of the last war with sera of very low potency when the results, both prophylactically and therapeutically, exceeded expectations. In civil practice since then antitoxin has been little used, and the disappointing results may have been due to too late administration or inadequate dosage. Be that as it may, there is little doubt that in this chemotherapeutic era clinicians are tending to rely more on the sulphonamides than on antitoxin for the treatment of gas gangrene—witness, for instance, a recent report by MCNEILL LOVE.[1] The experimental evidence in support of such an attitude is far from satisfactory. LONG and BLISS [2] obtained good results from the use of sulphanilamide in mice injected intraperitoneally with *Cl. welchii*. STEPHENSON and ROSS [3] reported similar results from small numbers of similarly infected mice treated with either sulphanilamide or sulphapyridine, while in mice infected with *Cl. septique* only sulphapyridine had some effect. The objection to these experiments is that the route and type of infection do not closely simulate the clinical disease, which is essentially a local infection of muscle accompanied by an intense toxæmia. Indeed, when STEPHENSON and ROSS injected mice intramuscularly they found that these two drugs had no effect on *Cl. welchii* infection and very little on *Cl. septique*.

The treatment of experimental gas gangrene with sulphapyridine alone (it was found to be much more effective than sulphanilamide) or in conjunction with antitoxin or antibacterial serum has now been tackled thoroughly by HENDERSON and GORER.[4] Using *Cl. septique*, the infecting dose of which could be accurately controlled, and the intradermal and intramuscular routes, these workers found that the drug alone was fairly effective in controlling and curing intradermal infection, but that even when given prophylactically and in continued dosage it could not save more than half the mice infected intramuscularly. Sulphapyridine had a slight but statistically significant action on intradermal infection with *Cl. welchii*, but none at all, even prophylactically, on intramuscular infection with the same organism; nor had it any neutralising effect on the toxins of either *Cl. welchii* or *Cl. septique*. On the other hand, antitoxin was spectacularly successful in saving mice even when given six hours after intramuscular infection with *Cl. welchii*. To test for a possible synergic effect between drug and antitoxin or antibacterial serum the more sensitive intradermal infection with *Cl. septique* was chosen, and the experiments were so designed that any of these agents, when used alone, would protect not more than 5–10 per cent. of the infected animals. The results were dramatic. Sulphapyridine plus antitoxin produced a survival-rate of 88 per cent., compared with 7–8 per cent. in the controls, while drug plus antibacterial serum was only slightly less effective (72 per cent. survivals). In contrast the combination of antibacterial and antitoxic sera saved only 15·5 per cent. of infected animals. In mice infected intramuscularly with *Cl. septique* one dose of antitoxin combined with continued administration of sulphapyridine raised the survival-rate from 0–20 per cent. to 70 per cent. This is a particularly important finding, since it points the way to a rational use of the two forms of therapy in clinical gas gangrene.

In the discussion of their results, HENDERSON and GORER are careful to point out that, particularly with *Cl. welchii*, there is considerable variation in the toxigenicity and invasiveness of different strains and that their results were obtained with single strains of *Cl. welchii* and *Cl. septique*. But there is no doubt that there exists a synergic action—the meaning of which is not sufficiently understood—between drug and antitoxin, for which the most likely explanation is that the antitoxin neutralises the bacterial toxin while the drug exerts a bacteriostatic effect on the organism itself; thus the body's natural defences are able to play their part in completing the destruction of the invader. In view of these results it would be unwise in any wounded patient in whom gas gangrene is diagnosed or even suspected to withhold treatment with polyvalent antitoxin. It should be given intravenously at the earliest possible moment and in adequate dosage —say, one therapeutic dose for the suspected case, and for the established case three to five doses combined with 6–9 g. of sulphapyridine daily until the infection is obviously controlled.

1. Love, R. J. McN. *Brit. med. J.* June 1, 1940, p. 908.
2. Long, P. H. and Bliss, E. A. *Canad. med. Ass. J.* 1937, **37**, 457.
3. Stephenson, D. and Ross, H. E. *Brit. med. J.* March 23, 1940, p. 471.
4. Henderson, D. W. and Gorer, P. A. *J. Hyg., Camb.* May, 1940, p. 345.

WOMEN AND THE SERVICES

IN the current issue of the *New Statesman* is a disquieting but well-documented article by Miss ELEANOR RATHBONE, M.P., on the waste of woman power. She points out that although in the last war women proved themselves capable of almost entirely staffing munitions factories, and even of playing a substantial part in the building of battleships, no real effort has yet been made for utilising their services in this desperate national crisis. Of 15,000 names on the central register of women suitable for administrative posts only 200 to 300 have been placed in employment since the war started, and of 5000 registrations of professional women at Bedford College only 40 were placed in May. For women over 35, except nurses, there is, she writes, practically nothing doing anywhere, no evidence that the field is being surveyed or that women are being trained for the supervising posts for which they will be needed if maximum production is to be achieved.

How far does this indictment apply to the medical profession? There is reason to think that with certain exceptions our record is considerably better than that of others. In private practice women are taking on a good deal of the work of men called to the colours. In the public-health services movement was slow to start with and the deplorable tendency to keep women, however widely qualified, in a pen labelled "Maternity and Child Welfare" brought its inevitable harvest of difficulties. For this the women themselves are in no way responsible; for some years the Medical Women's Federation has been trying to ensure that women assistant medical officers had more opportunities for broadening their experience and taking a share in administrative work to fit them for promotion. In this great emergency the reasons, not always very creditable, for opposing these suggestions are yielding to the national need. A few instances have occurred since the war of women medical officers being compelled to retire on marriage at a moment when shortage of medical staff in the neighbourhood was acute, but these anomalies are being rectified and the Ministry of Health will see they are not repeated. In one department, however, there is evidence of a prejudice (quite unknown in the last war) against the employment of senior medical women. Women officers have been appointed on very satisfactory terms to all the women's services, but to junior appointments only. It is manifestly impossible to construct a service satisfactorily without an administrative head and the longer such appointments are delayed the more difficult will efficient organisation become. When the late Mrs. CHALMERS WATSON was asked, early in 1917, to organise a uniformed service of women for the Army (the Q.M. A.A.C.), she planned at the outset for a special service of women medical officers, attached to the R.A.M.C., to supervise the health, hygiene and medical boarding of her corps. A chief woman medical officer, Dr. JANE TURNBULL, afterwards senior medical officer at the Ministry of Health, was stationed at the War Office with full powers to organise and administer the service under the D.M.S. and junior women administrative officers were appointed to command headquarters. A similar service for women of the W.R.A.F. was subsequently established with a chief woman medical officer at the Air Ministry. The W.R.N.S. had also a senior medical woman officer.

Far from interfering with or cutting across the duties of the R.A.M.C. or R.A.F. medical staff, it was freely acknowledged by the medical officers of those services that their women assistants relieved them of much important work for which they had neither the time nor the specialised knowledge. The needs of the women's corps were much less likely to be overlooked in times of pressure when they were dealt with by one person specially appointed for the purpose, for although attendance on the sick can usually be carried out acceptably by practitioners of either sex it would be strange if women had not a definite advantage in dealing with hygiene and accommodation and the medical boarding of women recruits. That complaints on all these points are much more numerous now than in the last war is probably not a mere coincidence. The medical examination of recruits is still, more than a year after the A.T.S. and W.A.A.F. were started, in a chaotic condition. It is said that in some areas no women doctors at all have been employed on this work. Owing to the lack of central control there is no means of collating experiences or of giving adequate instructions to examiners. There are now many thousands of women in the uniformed services and there seems to be no valid reason why their medical requirements should not be met at every point.

IS VITAMIN C STABLE?

IT has been rudely said that it takes years to get a discovery into the medical textbooks and the rest of time to get it out. Certainly the idea that cooking destroys the vitamins has taken firm root. Two years ago Mrs. BOAS FIXSEN [1] wrote that the ordinary processes of cooking are unlikely to cause any significant loss of carotene, vitamins A or B_1, the B_2 complex, or vitamin D, her only proviso being that riboflavin was much diminished by heating or canning in an alkaline medium. There remains only vitamin C to be considered. The instability of this vitamin is notorious, but has been much exaggerated. In 1919 the committee on vitamins appointed by the Medical Research Council and the Lister Institute remarked [2]: "Seeing that the antiscorbutic accessory factor is sensitive to high temperatures, it is clear that the value of fresh vegetables and fruit must of necessity be greatly impaired by cooking." This opinion was repeated almost verbatim in the new report of the committee issued 13 years later,[3] but since then a mass of data have accumulated to show that cooked and canned fruits and vegetables retain a fair proportion of their vitamin. After all, BARLOW used to cure infantile scurvy with baked potato, and frank scurvy appears in Great Britain and Ireland

1. Boas Fixsen, M. A. *Nutr. Abstr. Rev.* 1938, **8**, 281.
2. *Spec. Rep. Ser. med. Res. Coun., Lond.* No. 38. 3. *Ibid*, No. 167.

only when the potato crop fails, so that many people must be getting much of their anti-scorbutic material from the boiled potato.

Part of the destruction described by earlier workers was really a solution of vitamin C in the water used in boiling the comestibles. With stewed fruits this does not matter, for the juice is consumed as well, but with vegetables vitamin C dissolved out is a complete loss unless put into the stockpot. None the less, according to OLLIVER,[4] a helping of 3½ oz. of brussels sprouts may contain at least a day's requirement (30 mg.) of vitamin C. The same is true of spinach and asparagus tips, boiled or canned, and new potatoes may contain a third of a day's ration in a helping. Among the fruits cooked or canned blackcurrants have between three and five days' rations per helping, red currants one or two, gooseberries half a ration, loganberries two-thirds to one, and strawberries one or more. Lately OLLIVER, in some unpublished work,[5] seems to have disposed of the view put forward by HARDEN and ZILVA [6] in 1918 that if soda is added to the water when boiling greens most of their vitamin C is destroyed. Cookery books now suggest other more or less satisfactory ways of keeping the colour, such as leaving the lid off so that the volatile sulphides which discolour the chlorophyll can escape, or adding sugar or butter. But if OLLIVER is right, and his figures leave little doubt that he is, the housewife may keep her greens really green with soda with a clear conscience.

All this makes it clear enough that vitamin C is not as sensitive to heat and alkali as we had long supposed. Nevertheless it is relatively unstable. Prolonged "keeping hot" or reheating, which is unavoidable in canteens and restaurants, may make fruits and vegetables nearly useless as antiscorbutics. To be on the safe side, then, we should eat our fruit and vegetables freshly cooked and supplement them liberally with others in the raw state.

SOLDIER'S DOCTOR

WHEN any qualified medical man becomes attached to a field ambulance he assumes the functions of a soldier, an officer and a doctor. As a soldier he must know something about tactics in order to understand what the troops with which he is serving are doing and in order that he may reach them when they need his help. He must be able to read a map, find his way by day and in the dark, and have some eye for ground. As an officer he has men under him whom he must care for and command; he is responsible for their billet, their equipment, their clothing and their health. For the last he must see that they get sufficient food and adequate rest. He must watch them to know whether they are at breaking point from over-work, whether they are going stale from excess of training, or getting tired and out of hand through not having enough to do. He must know about the organisation and administration of the Army in order to obtain for his men all that is needed for their mental, moral and physical health, and the materials for them to do their work. As an officer he also has to teach them what they do not know, and to practise them in what they do—the twin essentials of training which must never cease. When he has done all this he is entitled to expect them to carry out any order he may give. He is not then likely to give one that will be disobeyed.

As a doctor he must have a wider outlook upon the practice of his art than in any other sphere of life. He has to advise himself as an officer on all matters concerning the health of his men; he has to advise himself as a soldier of any attempt to go beyond the physiological power of the human being; under the commanding officer he has to take his share in the sanitary and preventive medicine of the unit as a whole; he must be prepared to be drafted, for a time or for good, to any unit in the formation with which his field ambulance is serving, where he will have to carry on not under a medical man nor with fellow medical officers but as adviser-in-chief in all medical matters to a lay commanding officer and the lay officers under him. No wonder an experienced brigadier said that the members of the medical services were the most powerful people in the British Army when they used their knowledge properly. And with all this he has his duties as a clinician. He must know how to treat every minor disorder, and, how to hold his hand in the presence of lesions, of the body generally and of its special parts such as eyes, ears and skin, with which he is not competent to deal. He must have the wit to suspect every kind of medical diseases, including the acute infections, and a number of tropical diseases. He may be called upon at any moment to do some minor surgery passing well or to give an anæsthetic in emergency. Finally he must be a good natural psychologist, able to interpret the motives behind the complaints and to decide which need firmness and which compassion, kindly to all and showing his sympathy whether he sends a man back to his unit or tucks him in an ambulance on his way to Blighty. And when he gets there our correspondent Pertinax makes the same call on the essential qualities of the soldier's doctor.

4. Olliver, M. *J. Soc. chem. Indust.* 1936, **55**, 153 T.
5. Cited by Callow, A. B. Food and Health, Lond. 1938, p. 55.
6. Harden, A. and Zilva, S. S. *Lancet*, 1918, **2**, 320.

THIS war moves so rapidly that a new suggestion today is a discarded practice tomorrow. The Dominions have invited us to send children from England overseas until this country is safe for them. A meeting of the National Baby Welfare Council held on June 15 was strongly in support of the principle and urged the Government to proceed with the scheme on a large scale and as quickly as possible. In a letter to the *Times* of June 17 responsible officers of the Society for the Overseas Settlement of British Women offer the machinery of their organisation to carry out the migration. The society has many years' experience of sending women and children overseas to the Dominions. A government committee is already considering Canada's offer to receive and educate several thousand British children and the Board of Education has circularised local authorities on the subject. The children would be absorbed into Canadian schools, each province taking an allotted number. There is probably still time to make use of this valuable opportunity.

ANNOTATIONS

SACCHARIN'S OPPORTUNITY

THE minor correspondence column of the *Times* has lately been enlivened by a controversy on saccharin, beginning with Mrs. Marie Stopes calling it a subtle poison and ending with an octogenarian saying he has taken it for 25 years without ill effects. Dr. Stopes's charges, though unsupported, may have made the user pause before dropping a tablet into his tea. In fact, there seems to be no real evidence that saccharin in reasonable doses does any harm, though in large ones it is said to upset digestion, as might any condiment taken in excess. In 1911 the United States Department of Agriculture carried out a controlled experiment on 12 Harvard medical students, 7 of whom took gr. 2½–12 a day for five months and kept in as good health as the other 5 who took sugar. A much larger though less scientific experiment has been carried out by the great body of mineral-water addicts and diabetics, who between them have consumed some tons of saccharin, consciously or unconsciously, without damaging their digestions. Those who like their tea sweet can therefore try saccharin without qualms, though they may find themselves slowly preferring their cup unsweetened. If they object to the occasional bitter after-taste, produced by a particle of undissolved saccharin left on the tongue, they should try one of the solutions or elixirs that are on the market, in which the solubility of the saccharin is increased by combining it with sodium bicarbonate. Just now a more urgent question is how far saccharin can be used instead of sugar in jam-making, for it seems unlikely that the Minister of Food will allow any extra ration for preserving the soft-fruit crop. Recipes for sugarless jams are given in diabetic cookery books, and apparently the results are not unpalatable. The necessary consistency is given by the addition of gelatin. In one such recipe the constituents are 1 lb. raspberries, gr. 16 saccharin and ½ oz. powdered gelatin.[1] It is apparently wise to add the saccharin, dissolved in a little hot water, after the fruit has been cooked, since long boiling may reduce its sweetness. Saccharin seems, however, to be reasonably heat-stable, since it is used in making diabetic biscuits and even by some makers of ordinary biscuits to prevent the wafer sticking to the heating plate. The objection to sugarless jams is their poor keeping qualities after the pot is opened, and the diabetic recipes all advise the use of small pots for this reason. This difficulty could, however, be overcome by the addition of a preservative such as benzoic acid. With a little hasty research on these lines cookery experts should be able to evolve recipes which will satisfy the average palate and prevent our soft fruits from being left to the birds.

POLYPS OF THE COLON AND RECTUM

THE relationship of polypi of the large intestine to malignant disease is now so well known as not to require special note, but several points of value have been brought out by Phillips and his colleagues[2] of the Mayo Clinic. They first refer to the statement of L. I. Dublin that out of 160,000 annual deaths from cancer in the United States some 30,000 (17 per cent.) are from cancer of the colon and rectum. The incidence is therefore second only to that of cancer of the stomach, and exceeds that of cancer of the uterus and breast, which come third and fourth. In the surgical treatment of carcinoma of the colon it is well to remember that a polyp in the precancerous stage may coexist in another part of the colon at the time of operation, or may develop subsequently. Hence the remainder of the colon should be carefully palpated before a part of the colon is removed, and even after a successful resection there are grounds for advising a periodical re-examination including an air-contrast radiological study. The discovery of polypi in the rectum by digital and sigmoidoscopic examination opens up a number of possibilities. The family history will tell us whether the condition is likely to be the hereditary type of polyposis in which carcinoma is almost certain to develop early. If irregular mucosal tags are seen the polypi are likely to be due to a severe chronic ulcerative colitis, and Bargen considers that adenomatous change may take place in these tags to be followed eventually by the growth of a low-grade carcinoma. In other cases when the inflammatory disease is very destructive there may follow an uncontrolled state of repair and the development of a diffuse carcinoma of a high grade of malignancy; this is prone to occur in subjects under thirty, the growth being rapidly progressive and inevitably fatal. The conclusion which C. F. Dixon arrives at is that all polypi of the rectum and colon must be considered as precancerous lesions and should be removed. Those within reach of a proctoscope and sigmoidoscope can usually be destroyed by fulguration, for which a number of ingenious instruments are now available. Hæmorrhage in these cases may be somewhat difficult to control and may necessitate admission to hospital. Polypi of the colon constitute another problem, and radiography will help in determining whether they are single or multiple. The simplest procedure in the case of a solitary pedunculated polyp is to excise it locally, but if it is sessile a more radical operation such as segmental resection is required.

THE RAY FUNGI

ACTINOMYCOSIS is rather rare in mankind but more common in animals, especially in cattle and pigs. In animals actinomycotic-like lesions are most often found in soft tissues, such as the tongue and udder, and in these cases the infecting organism is usually an aerobic gram-negative actino-bacillus; infection involving bony structures is, like human actinomycosis, almost always caused by anaerobic streptothrices. Because of the strictly parasitic nature of these pathogenic anaerobic actinomyces, the one-time belief that in the human disease the streptothrix was carried in by oat or barley seeds or bits of straw has been discarded, although these agents probably favour infection by causing laceration of the mucous membrane. There is still the possibility that man may be infected from domestic animals, and it is important to know if the human and animal pathogens are biologically identical or not. Miss Dagny Erikson[1] has concluded from a detailed bacteriological examination of some 20 strains of pathogenic anaerobic actinomyces (15 of human origin and 5 from cattle) that the human strains are clearly distinguishable on cultural and serological grounds from the bovine. Colonies of the bovine type are smoother and softer than the human variety, and do not adhere to the medium; growth is very poor and the mycelium readily breaks up into diphtheroid

1. See Weight Reduction—Diet and Dishes. By Dr. E. E. Claxton.
2. Phillips, R. B. *Proc. Mayo Clin.* February, 1940, p. 97.

1. Pathogenic anaerobic organisms of the actinomyces group. By Dagny Erikson. *Spec. Rep. Ser. med. Res. Coun., Lond.* No. 240. H.M. Stationery Office. 1940. Pp. 61. 1s.

forms; turbidity may occur in liquid media. But this bovine type has occasionally been isolated from human lesions just as the human type has from animals, particularly pigs, and these facts, together with the greater frequency of infection among those in intimate contact with domestic animals, must still leave as an open question the possibility of spread of infection from animals to man. It may be significant that 8 of Erikson's 15 human strains were derived from patients in the London area. That the human lesion is often due to autogenous infection with anaerobic actinomyces present in the alimentary tract is now generally accepted, and it is a pity that Erikson was unable to include strains from uninfected persons in her series.

Erikson is an advocate of Ørskov's technique of microscopic examination of living cultures growing on the surface of solid media as the best means of studying the morphology of the streptothrices and has shown that the anaerobic strains may even develop aerial hyphæ as the aerobic species do. The diphtheroid forms commonly seen in stained preparations result from the easy fragmentation of the mycelium, and have been the cause of much confusion and even mistakes in diagnosis. Whether the micro-aerophilic character of this group is due to the need for diminished oxygen tension or increased carbon-dioxide pressure is left unsettled; the zone growth in shake cultures suggests that the latter is the more important. No evidence for a filtrable form of the actinomyces was obtained. Serological typing of these organisms is extremely difficult owing to their poor growth and great granularity, and it is to Erikson's credit that after much painstaking and careful work she was able to classify the human strains into one homogeneous serological group, with no apparent affinity for the bovine species or the aerobic actinomyces. In discussing taxonomy, she suggests that the common human strain should be called *Actinomyces israeli* and the corresponding bovine strain *A. bovis*, while the aerobic actinomyces of Bostroem should, as suggested by Topley and Wilson, be named *A. graminis*.

WHAT TO EAT IN WAR-TIME

So far our appetite for news bulletins has not destroyed our appetite for dinner. The Ministry of Food and the housewife are anxious to see that between them we get a nourishing diet at the table to fortify us against any kind of news. The doctors have come to the help of the housewife in a cheerful pamphlet published by the British Medical Association [1]; this gives the advice of a committee of experts on diet in relation to rationing, and has, besides, very good pictures by someone who signs himself J. H. When the housewife has looked at all the pictures, especially that of the cow mistakenly taking only one kind of food at a meal, she will have time to read the text and will find it really helpful. There are no technical terms but much technical information so simply and adroitly set out that it need alarm no-one. Foods are grouped as body builders, body warmers and protective foods; substitutes for rationed foods are suggested, and some notes on particular foods, near the end; answer most of the questions the housewife has been asking herself about substitutes. She is assured, for example, that manufacturers of margarine have undertaken to add vitamins A and D, up to the level found in summer butter, to all margarine sold during the war; that syrup and treacle are better than refined sugar because they contain lime and iron; and that there is no difference between the food values of fresh killed, and chilled or frozen meat. The potato and the herring are given their just due; rabbits and offal are called to mind, and cheese excites the enthusiasm it deserves. It is a handy little pamphlet which ought to get into the English home as soon as possible.

1. The Doctors tell you what to eat in war-time. Price 3*d*.

BERKELEY MOYNIHAN

Dr. Donald Bateman has essayed the difficult task of writing the life of Lord Moynihan [1] only four years after his death. He has collected facts which will be a store from which future writers will draw, but he does not give us a balanced picture of this remarkable man. Like most who came much under Moynihan's personal influence, his judgment has been subjugated so that in his eyes his hero could do no wrong. The foibles and the weaknesses of great men, from which none are free, do but show off their greater qualities. How much more human Moynihan would seem had they been allowed to obtrude a little more into this account of one who was held in affection by rich and poor alike. At his funeral thousands of mourners lined the streets of Leeds, a sure sign that Moynihan did not keep so completely aloof as many who met him casually were inclined to think. But the book does bring out the main facts. Moynihan had great ideals to which he adhered, he had an unusually good memory, he had a splendid physique, untiring energy, and was handsome to look at; but above all, he had an engaging and powerful personality which enabled him to influence others to help encompass his ends.

An effort is made in the book to prove that his greatness was the direct result of his heredity. He came of good stock, but there is no getting away from the fact that he was a biological sport. He became a surgeon almost by chance, as the result of a sudden impulsive emotional decision. A whim, affection for his mother, an impish delight in doing unexpected things, all seem to have played their part in causing him to abandon a military career for that of the doctor. But as he passed through his apprenticeship that calling gradually gripped him and held him fast. He had all the qualities of a successful surgeon. He became rich, and was ultimately honoured as only Lister had been. Yet he never lost his ideals in the attainment of his ambitions. He really did want to improve the general standard of surgery. It is true to say that this one man, more than any other, raised the quality of surgery performed in every operating-theatre in the land. He was not only a superb technician himself, but his great powers of oratory enabled him to instil the principles of his methods into others with enduring effect.

He could always get things done. During the war of 1914 when he visited America to advise the Army Medical Department in its preparations, he accomplished more than any other envoy could conceivably have done. He was so popular that, after the war, there was some talk of his going as ambassador to that country. When he became president of the Royal College of Surgeons, he did more to bestir that august body than any president from its very beginnings, and rescued it from being a mere examining body and the custodian of the Hunterian museum and library. He made it a living research unit, and in doing so forced it to be true to its traditions. He reinfused it with the true Hunterian spirit.

He was aloof and vain, but upright and true to his ideals. He did not smoke and drank but little alcohol.

1. Berkeley Moynihan, Surgeon. By Donald Bateman. London: Macmillan and Co. 1940. Pp. 353. 12*s*. 6*d*.

He had few intimate friends amongst men. He worked apart and apace and must needs be alone. He was curiously unresponsive to the appeal of pictures and music, but he loved fine words and good literature. The contemporaries of a great man can seldom guess the place that history will assign to him, but it is fair to say that Moynihan will always be a milestone in British surgery.

EXPERIMENTS ON SOIL FERTILITY

THE growing of plants without soil, which was discussed in these columns on June 1, seems to have demonstrated that vegetables of normal quality and dietetic value can be produced by supplying the plant solely with inorganic salts in watery solution. Yet the belief that vegetables grown on a "fertile" soil are more nutritious than those grown on a poor soil supplied with artificial fertilisers is firmly held by one school of medical and agricultural opinion. The experiments of Sir Robert McCarrison in India, when he fed rats with the diets of different peoples, have been widely adduced as proving the importance of a diet rich in fresh plant products grown on soils of high fertility. According to this view the difference lies in the absorption by the plant roots of organic substances, as yet unspecified, derived from the organic material in the soil or from the mycorrhiza shown to be associated with root systems on such soils. Some support for these views has lately come from New Zealand,[1] where all the farms are manured by chemical fertilisers. In 1936 Dr. G. B. Chapman, of the Physical and Mental Welfare Society of New Zealand, persuaded the authorities of a boys' school hostel to grow their fruit and vegetables on soils treated with humus. This has since been done, and a striking improvement is reported in general health and physique, particularly as regards freedom from infections, alimentary upsets and dental caries.

A brave attempt to decide this question is being made by Lady Eve Balfour, the moving spirit in the formation of the Haughley Research Farms experiment. An area of 236 acres in Suffolk has been acquired by the trustees and is to be divided into two approximately equal units. Each unit will be farmed in as nearly identical a way as possible, except in the matter of manuring. One unit will be treated with complete dressings of artificial fertilisers, organic matter being supplied only by ploughing in green crops. The other will receive only humus, manufactured from the waste products of both farms by the Indore process of Sir Albert Howard. As far as possible the crops on each unit will be grown from seed raised on that unit, and the stock on each fed from the produce of that unit. If the experiment confirms the superiority of the humus unit an attempt will be made to carry the experiment into the human field, selected families being chosen who are willing to submit themselves to feeding tests with the produce, vegetable and animal, from the two units.

Whatever its result, it is doubtful whether this experiment can give an unequivocal answer to the problem set. It is claimed that the only difference between the two units will be in the manuring and by implication therefore in the nutrition of the plants grown. But the crux of the matter lies in the plants' water-balance. In a "fertile" soil the colloidal organic material—humus or whatever it may be—has great water-holding capacity, and plants grown in such soils can derive that steady supply which they so vitally need. On a "poor" soil it is water-deficiency as much as nutrient-deficiency that limits growth and destroys quality. Herein lies the explanation of the success in growing plants in a nutrient solution; the water-supply is under control. Unless, therefore, in the Haughley experiment some means can be employed to ensure that the water-supply to the plants is equal and adequate in both units the results must be inconclusive. Nor is such an elaborate experiment essential. An early and convincing answer to the problem could be obtained if vegetables were grown by the sub-irrigation soilless cultivation method and others on a "fertile" soil and controlled feeding experiments were conducted on rats with the produce.

1. See *Nature* June 8, 1940, p. 905.

RESEARCH ON WOUND HEALING

THE speed at which a wound heals depends on a large number of variables. These, to quote but a few, include its site, extent, depth, and degree of raggedness, the apposition of the divided tissues and the factor of infection. Hence the assessment of claims made for substances or methods which accelerate healing presents considerable difficulty. The vast majority of claims rest on clinical impression, which has a tendency to develop into personal preference, and the way in which fashions change and recur as to antiseptics, dressings, irrigation or other treatment of wounds is some indication of the complexity of the problem. When war broke out it was decided at the Strangeways Research Laboratory at Cambridge to replace most of the purely academic work by studies of wound healing and to test on animals the various new methods of treatment which are being tried clinically. In addition, investigations are being made into the biological mechanism by which successful methods act. The essential preliminary to such experimental work was the elaboration of a method for producing and measuring standard wounds in lower animals, and this has been done. Otherwise only preliminary results were available when the report for 1939 was published. Experiments at the laboratory have, however, confirmed the beneficial action of urea on wounds which involve muscular tissue. The work being done should provide valuable information for the committee on wound healing that has been set up by the Medical Research Council.

FOR. MEM. R.S.

Dr. Peyton Rous of the Rockefeller Institute for Medical Research who, with the Duc de Broglie, Prof. R. G. Harrison and Prof. G. N. Lewis, has lately been elected a foreign member of the Royal Society, is distinguished for his versatility and the ingenuity and boldness of his use of technique. He is both a physiologist and experimental pathologist. His physiological work includes attacks on problems concerning the fate of blood-cells and preservation of blood; the reaction of tissues to injury; the permeability of blood-vessels and disease of the liver. He was responsible for a technique which opened the way for experiment on the peripheral lymphatic system in mammals, and himself made important observations on the flow and turn-over of lymph. The discovery for which he is best known is the transmission of cancer in fowls by a cell-free filtrable agent. Experiments published more than thirty years ago broke ground for all subsequent work on these minute agents. In recent years his belief that they are the nearest approach to the cause of cancer which has yet been found has been strengthened by experiments with a virus derived from papillomas of wild rabbits. This virus when inoculated into domestic rabbits produces true carcinomas.

SPECIAL ARTICLES

AN EXERCISE IN A.R.P.

A SKELETON routine to be followed during air-raids always looks very well on paper, but practical exercises show that though the general plan is clear in everybody's mind the details are not, and prove to be much more hampering than anyone expected. In our last issue a general plan for dealing with an air-raid incident was set out in a leading article; working on this broad pattern it is not difficult to make a clear table of duties for everyone engaged. An experienced medical officer in a small town found that an exercise conducted on broad principles, but without specified duties for individual A.R.P. workers, led to confusion and delays; but that a second exercise in which every worker had been given a clear programme was precise and successful.

FIXED FIRST-AID POSTS

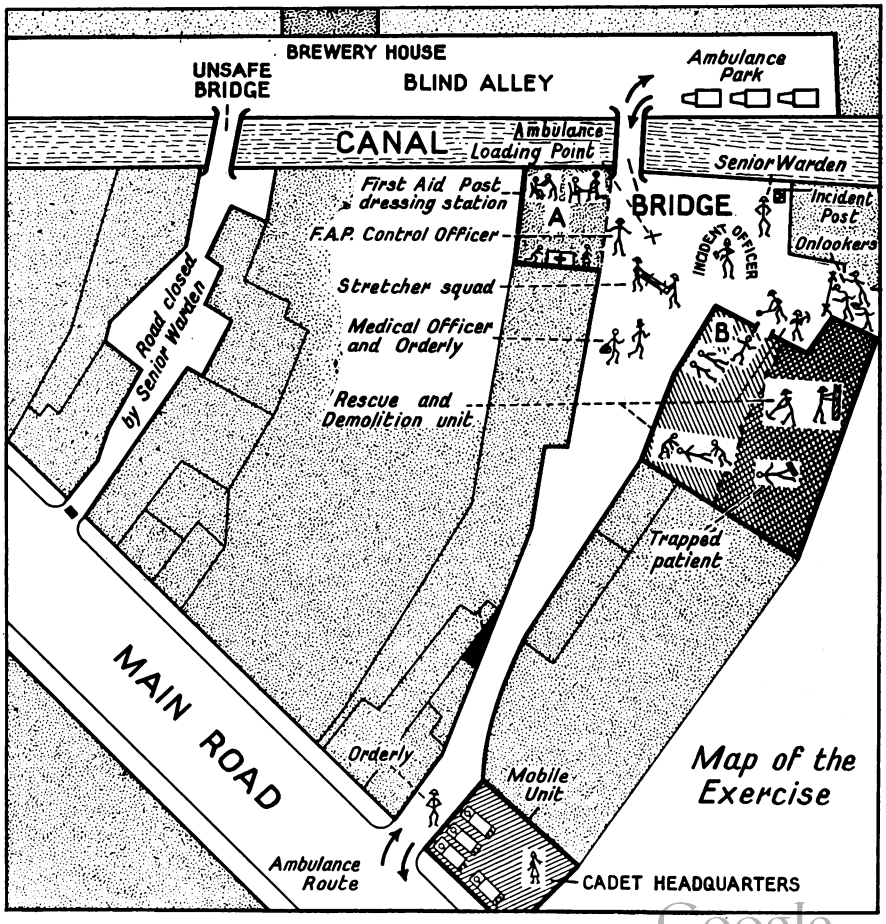
In his town fixed first-aid posts have been established in congested areas. Following a surprise raid, or in early raids before the public learn to make full use of cover, a large number of lightly wounded casualties can be given treatment at these posts, or shelter pending treatment. Many of those injured within half a mile of a first-aid post will be able to get to it by themselves.

Two of the posts are situated near hospitals; as it is likely that there will be a natural flow of casualties in these neighbourhoods, the posts will relieve hospital congestion. Mobile first-aid units have also been organised, but the scope of treatment at a fixed post is wider than that of a mobile unit because permanent hot-water supplies and appropriate lighting can be arranged beforehand. Moreover, if the local hospital reception unit is damaged or overworked the fixed posts can be used as temporary reception units and a member of the hospital staff comes over to select cases needing urgent treatment.

MOBILE UNITS

It would be ideal to have one mobile unit to every fixed post. At present the units are not based on hospitals as they should be, and their staff is almost completely made up of part-time voluntary workers, many of whom live a mile or two away from their base; this means that they could not get to the unit during an air-raid in time for an early call. The unit ought to be ready to go into action as soon as it is called and it would be better to have a smaller personnel than the regulations allow provided it included a higher proportion of trained full-time workers. The staff of choice would consist of a doctor in charge of one trained staff nurse, five junior nurses and two trained male orderlies. In danger areas a minimum of four members should be on full-time duty and employed at one of the local hospitals. On the "yellow" warning the unit would assemble at the appointed hospital. If the doctor in charge was not available when the call came in, another member of the hospital staff might be able to act as his deputy. Actually, a plan has already been made to provide extra medical help if it is needed. Medical officers in charge of first-aid posts have been told to stand by after an air-raid, with an orderly, an emergency bag and a car at hand. If their posts are not called into action they can be directed by central control to the area in which the incident has occurred either to take charge of the mobile unit or to help with evacuation.

The doctor, like everybody else, has to have his duties clearly defined. He need not see all casualties at an incident when there is a hospital within easy reach; indeed, if he did he would delay treatment, sometimes seriously. Nor can he operate and supervise cases within the mobile unit if, at the same time, he is expected to see all cases before evacuation. He has a chance to see casualties and make suggestions for their evacuation while his own unit is getting ready to receive cases, but after that he must leave evacuation to the first-aid post officer or to another medical officer dispatched from central control. It is sometimes suggested that all casualties should be seen by the doctor before they are moved so that they can be treated for shock if necessary; but shock cannot be treated effectively on the spot and the patient will be better served if he is carried straight to the ambulance, instead of two or three hundred yards to the mobile unit. Lifting and moving, with increase of shock, are inevitable either way, but it seems better to postpone treatment until it can be given without interruption under hospital conditions.



The task of loading ambulances is carried out from the dressing-station established by the first-aid post. This station also acts as a clearing-house where cases can be selected for treatment by the mobile unit and where first-aid treatment can be supervised. In some cases the first-aid dressing-station and the mobile unit may be lodged in the same building, but in most cases the dressing-station can be placed nearer the main incident than the mobile unit, thus saving stretcher carriage.

STAGE MANAGEMENT

The successful exercise is illustrated by the accompanying map. It was assumed that a ruined factory site had been partly destroyed by a high explosive bomb; in the cross-hatched area the building had collapsed completely; elsewhere the roof and first floor had begun to collapse. All entrances, except the one shown on the plan, were blocked, and a large iron girder had fallen completely across the doorway preventing stretchers from being taken into the building. The rescue and demolition unit (R. and D. unit) had to clear the entrances and shore up the floor. Dummies were used to represent casualties. The mobile unit was able to open up in the building marked Cadet Headquarters, a large well-built house with a permanent caretaker, good lighting and water supply and easily accessible doors and exits. The duties allotted to the various workers engaged in the exercise are best illustrated by an account of their activities.

A.R.P. UNITS IN ACTION

The local warden, first to arrive at the site of the disaster, reported the damage to a central control body, and the senior warden, coming quickly to the scene, heard the details of this report and took over from him. The police had not yet arrived, so the senior warden, having inspected the entrance to the factory and found it highly dangerous, sent all onlookers to an adjacent yard. He planned at first to let the ambulances come through the bottle-neck by the Cadet Headquarters to load outside the factory, cross the bridge into the blind alley and make their way back to the main road across the other bridge. On enquiring at the brewery house, however, he found that the second bridge was unsafe, so he changed his plan, arranging that the ambulances should enter and leave by the bottle-neck and park in the blind alley while waiting to be loaded. To prevent mistakes he closed the other road. By that time the police had arrived; the senior police officer took complete control of the situation from this point onwards and was referred to as the "incident officer" (I.O.). The senior warden gave him a record of the message sent to central control, withdrew any of his own men whose duties could be taken over by the police, and stayed himself to act under police orders. He suggested that his men might help the first-aid party as a stretcher-bearing squad, and put his special messenger at the disposal of the police.

The senior police officer (I.O.) began by establishing an "incident post" close to the damaged building and marking it with a flag checked in pale blue and white; had the raid taken place at night, he would have used two blue lamps, one above the other. He next got into touch with central control by telephone and then made what arrangements still seemed necessary to direct traffic and clear the area of onlookers, now all herded together in the yard. He looked for a protected area where the first-aid party might set up a dressing station, choosing the shed A, where the available cover would be equally welcome against a second wave of bombers or a shower of rain. He also established an ambulance loading point outside the dressing-station, to which the ambulances could be summoned as they were required. Looking round for more elaborate quarters for the mobile unit, he decided on the Cadet Headquarters and sent a message to the senior warden asking him to halt the mobile unit there until the medical officer had been asked his opinion of the site.

The inspector of R. and D. had arrived by now. The I.O. described the situation to him and proposed forming a stretcher-bearing squad to bring casualties from some point inside the building (the area B was chosen) to the dressing-station. The first-aid party had just appeared and were told that they could not enter the factory until the R. and D. unit gave the word; they were directed to A to set up their dressing-station. Ambulances arrived and were sent by the I.O. to the blind alley to await loading. Meanwhile the inspector of R. and D. had sent a message to say that he wanted the special acetylene cutting apparatus, to remove the girder from across the door; the I.O. sent a messenger to central control to fetch it. The first-aid post control officer (F.A.P. officer) now arrived and was told to take charge of the first-aid organisation, to report progress and to ask for any help he wanted. These officers are senior members of the F.A.P. organisation, one being stationed at each depot and holding himself ready to go to the scene of an incident on orders from central control.

ARRIVAL OF THE MOBILE UNIT

At this point the medical officer of the mobile unit came upon the scene, accompanied by an orderly with the emergency bag. The I.O. received him and suggested the Cadet Headquarters as a site for his unit. The doctor agreed and the I.O. sent a message to the unit asking them to open up there as quickly as possible and to report when they were ready. As more ambulances came rolling in the F.A.P. officer was informed.

The R. and D. inspector sent out a message to say the factory was now safe for stretcher-bearers, and the I.O. relayed the message to the F.A.P. officer. He now had time to send round for a few reports on progress, receiving one from the medical officer, who had gone into the factory, one from the inspector of R. and D. and, later, one from the F.A.P. officer on the progress of evacuation. He remained in charge until all officers reported their work complete, when he notified central control and returned to his station.

RESCUE AND DEMOLITION

The work of the rescue and demolition unit has already been indicated. After reporting to the I.O. and hearing details of the damage, the inspector cut his way into the factory and formed his men into two parties—a small rescue party of one or two men, and a larger party for construction and demolition. The rescue party had the task of searching for casualties; they noted especially those so dangerously trapped that only immediate release could save their lives, those trapped but not needing immediate release, those not actually trapped but injured in such a way that they could not get out of the debris, and those partially trapped by a limb under debris which it would take many hours to remove; the single casualty in the last group was shown to the medical officer as soon as he arrived in order that he might perform an emergency amputation if he thought fit. Casualties were being assembled at B by the rescue party and as soon as the building was sufficiently safe the R. & D. inspector notified the I.O. that the stretcher squad might come in. The medical officer came in with the F.A.P. officer and made a quick survey of the casualties, ordering morphia where necessary and dealing immediately with the one pinned by the leg. The R. and D. inspector reported progress to the I.O. at intervals and finally left after reporting the work of his unit to be complete.

THE FIRST-AID DRESSING-STATION

Meanwhile the first-aid party had been steadily working at evacuation. The F.A.P. officer, after establishing his dressing-station, instructed some of his party to get ready to enter the factory and help the R. and D. rescue squad to bring casualties to the collecting point, and to give first-aid. He also organised, with the help of the I.O. and senior warden, a stretcher-bearing squad to bring cases from B to the dressing-station; wardens and onlookers were used as stretcher-bearers. After the mobile unit had

been opened the control officer saw all cases at the dressing-station and directed which were to be put into the ambulances at once and which sent to the unit. The ambulances when summoned drew up at the agreed loading point; when any delay occurred the F.A.P. officer notified the I.O., and he also kept him informed of the progress of evacuation. When the factory was reported to be clear of casualties, he made a final inspection to assure himself that no-one had been missed and reported that his work was completed to the I.O. and the doctor.

WORK OF THE MEDICAL OFFICER

The medical officer, while still in the factory, investigated the condition of such casualties as he could find and gave the F.A.P. officer the necessary instruction about priority of treatment and evacuation. He then decided to free the casualty who was trapped by a leg, as the leg was already severely crushed and it was unlikely that he could be released from the debris for some time. An emergency amputation was performed on the spot, with the aid of his medical orderly. Meanwhile he was informed that the mobile unit was open and ready to receive casualties. He returned to the unit, inspected the arrangements and got ready to operate; after which he worked on the cases sent in from the first-aid post, getting them ready for transfer to hospital. There is no time, in such an emergency, to perform any advanced wound toilet—to remove fragments of shell or excise the wound—even if it were desirable. In any case it is dangerous to remove foreign bodies without excluding additional fragments by screening; and good lighting and full equipment are needed for the safe debridement of wounds. Primary suture should be reserved for clean incised glass cuts, and other wounds can be packed with flavine gauze to prevent hæmorrhage and left for further treatment in hospital. The doctor notified the I.O. when he needed ambulances, and when the work of the unit was complete.

GROUPING THE CASUALTIES

The cases regarded as suitable for treatment by the mobile unit fell into three groups: those who would obviously benefit from immediate surgical operation or toilet; those whose condition was so unsatisfactory from shock or collapse that the F.A.P. control officer thought them unfit to be removed by ambulance before they have received temporary treatment from the doctor; any minor cases.

In the exercise described, the cases in the first group included a compound fracture of the upper end of the left femur with uncontrolled arterial bleeding; a large open wound of the chest wall, with air sucked in during inspiration; and an abdominal wound with bowel protruding. The second group, less obviously serious and much more difficult to assess, included a patient suffering from internal hæmorrhage with abdominal pain, a small wound in the region of the liver, thirst, pallor and a rapid, feeble pulse; a case of compound fracture of the skull with brain protruding, shallow irregular bleeding and a poor pulse; and a third patient who was unconscious with blood on the lips and an imperceptible pulse. Unconscious patients whose colour and pulse were good were loaded into the ambulance without ado.

FITTING THE PLAN TO ANY INCIDENT

The plan followed in this exercise can be made to apply to an incident in any area. The first duty of any new person coming on the scene is to seek the incident post and get into touch with the I.O. who will direct him to his proper station. Any doctor who comes to the scene spontaneously will be asked to go to the mobile unit to receive instructions from the medical officer in charge. He will probably be most useful at the ambulance loading point, checking and classifying casualties and deciding on their initial disposal, or in the dressing-station, helping to treat them.

In areas where no mobile unit is available, casualties needing urgent treatment are assembled at the first-aid dressing post and taken by ambulance either directly to the hospital or to a fixed first-aid post.

MEDICINE AND THE LAW

Standards of Insanity

PERHAPS the main difference of opinion between medical and legal practitioners arises over the rigidity of the legal standard of insanity in relation to crime. An allied difficulty is the different standards applied by the law to insanity in different contexts. The divorce court, for instance, is nowadays much concerned with questions of "incurable unsoundness of mind" under the Herbert Act. Is the standard of insanity here the same as that of the famous rule in McNaghten's case which the judges apply in criminal prosecutions? Last year, in Astle *v.* Astle, Mr. Justice Henn Collins seemed to answer the question in the affirmative. He was reluctant to establish in the divorce court a measure of legal responsibility not applied to any other court. The facts of the case, it may be recalled, were these. The husband made murderous assaults upon his wife and other persons in May, 1927; he was certified insane in June and was detained in an asylum. Coming out on parole, he told his wife he meant to kill her and commit suicide. In the following October he was discharged, but his wife was too frightened to live with him. In 1931, being now at liberty, he visited his wife and uttered violent threats. Six years later he was again certified and placed under restraint. The wife petitioned for divorce on the ground of his cruelty. The judge held that the acts in the first period were not cruelty because the husband was insane and therefore was incapable of being knowingly and wilfully cruel. His insanity at this period, said Mr. Justice Henn Collins, was insanity within the rules in McNaghten's case; the man was labouring under such a disease of the mind as not to know the nature and quality of the acts he committed. The judge found himself able, however, to accept as sufficient evidence of cruelty the incident of the threat, uttered at the visit to the wife during the supposedly sane period in 1931. A recent article in a legal contemporary (*Law Times,* June 8) doubts whether the judge was right to apply to divorce proceedings so stiff a test as the McNaghten standard. A suit for divorce is not a criminal prosecution.

In this connexion there was an interesting decision in a county court last year where the victims of a traffic accident sued in respect of the negligence of a taxi-cab driver. The defence was that the taxi-cab driver was insane and therefore not responsible. Judge Konstam held that the driver understood the nature and consequence of his act in causing the cab to swerve, that he knew he was driving a motor-vehicle and that, in swerving, he would be endangering his own and other vehicles. Findings such as these would mean that the driver was certainly not insane within the rules in McNaghten's case. The county court judge nevertheless decided that the driver was insane enough to be relieved from liability for civil negligence.

This diversity of legal standards is inconvenient. It is a pity that the criminal courts cannot see their way to modify the McNaghten test laid down nearly a hundred years ago. However conservative the judges may be in the administration of criminal justice, medical opinion cannot help reflecting the progress made by our ideas of mental disease since 1843.

Guilty of Criminal Abortion

Severe sentences were passed at the Central Criminal Court last week upon two men found guilty of conspiring together to perform illegal operations

on three women. One of the accused, Crichton Alison, M.B., Ch.B. Aberd., a medical practitioner described as a specialist in anæsthetics, had a consulting-room in Harley Street and a panel practice in Lambeth. The other was an oriental medical student named Kermani, living at West End Lane, Hampstead. The prosecution alleged that the procedure was similar in the case of all three women. They called at Harley Street and were sent by Alison to Kermani, who used instruments with intent to procure miscarriage. The fees charged were said to have been £50, £50 and £65 respectively. Alison gave evidence that he received 3 guineas as his consultation fee in each case; he thought Kermani was a doctor; all three women, he said, had been interfered with before they came to consult him. Kermani said he never pretended to be a doctor; he denied using an instrument; he only examined the women and gave them treatment for threatened abortions which had been caused before they came to him; he received only £20 for each patient. Mr. G. B. McClure, who prosecuted, said that Alison used the respectability of his Harley Street address to carry on a criminal practice with Kermani. Sentence of five years' penal servitude was passed upon both the accused. A woman living at the same address as Kermani, also found guilty of the charge of conspiracy, was bound over.

On the second day of the trial prosecuting counsel informed the court that two men had approached the foreman of the jury and asked him how much it would be worth to him to "make the case go the other way." Acting on the instructions of the police, the juryman accepted £50 in £10 notes which the men offered him. On this statement Mr. Justice Atkinson caused a new jury to be sworn and the case was started afresh with the result already mentioned. Two men were subsequently charged at the police-court with conspiring together and with other persons to prevent the due course of justice, and were remanded in custody.

IN ENGLAND NOW

A running commentary from our Peripatetic Correspondents

FOR some months our hospital had been in commission, treating casual sick and injured among the forces at home, and becoming, as we hoped, thoroughly seasoned in the process. From time to time there were rumours of impending convoys from overseas, and on several occasions we carried out minor evacuations to enable us to take them; but always something miscarried and our patients were snatched away from us. Then, late one evening, there came the story that a train was standing by to bring overseas casualties to our hospital—a convincing touch that made us feel that something really was about to happen—and the morrow was largely dedicated to putting finishing touches to preparations long elaborated and well-rehearsed. Members of staff away from the hospital were recalled, the adequacy of ambulance personnel at the station duly verified, voluntary stretcher-bearers warned for duty within the hospital, the local sergeant of police asked to hold in readiness his plans for patrolling crossings between station and hospital, and thought given to as many as possible of the hundred and one little things that in the aggregate mean so much to the reception of a large number of patients. Which members of the staff should be sent off duty to rest now? Should we not give the stretcher-bearers a meal before they began work? Had we plenty of cigarettes for the incoming patients? How could we best redistribute existing patients? Hundreds of questions like these hurried the day away, and in the evening we received official information that our train would arrive at 1 A.M., that it carried 200 casualties, of which about a third were British and the remainder Allies, and that about 40 were stretcher cases. This news created something of a stir. But the tension was fortunately relieved by the mixed nature of our bag. French was hurriedly polished, linguists were in demand and distributed throughout the departments; everywhere there was a feeling that the events of the morning were not to be without their lighter side. This anticipation was amply justified. The make-up of our first convoy could scarcely have been better: it was searching enough to test our arrangements yet not heavy enough to be really burdensome, either in medical need or psychological upset.

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The machine was put in motion. The staff, permanent and coöpted, was fed and sent to battle stations, and after a last quick look round we hied ourselves to the station to meet our train. Just on time it crawled in, and we greeted the train officer, extracting from him his passenger list. He reported that he had nothing in need of immediate surgical attention, and we left him with our colleague in charge of detraining to send up first all the sitting cases and then the stretcher patients. We had some fourteen ambulances, most of them capable of taking four sitting patients, so that it soon became apparent that the hospital would be hard put to it to keep pace with the numbers arriving at the reception room. In practice it was found necessary to suspend dispatches from the train for fifteen minutes during the detraining of the sitting patients and for a similar period before beginning to unload stretcher-cases.

In the reception room itself the scene was an animated one. The Allies proved to be a heterogeneous crowd—predominantly French, but with smaller contingents from Belgium and Poland. The faces—and the tongues—made a striking contrast. At the entrance door each patient had enough particulars taken to identify him later and was relieved of his equipment, such as it was. In the reception room he was rapidly examined by a member of the staff and his condition compared with his medical record. Then it was decided on the results of examination and traffic conditions within the hospital to which ward he should be admitted. The selected ward was marked on his forehead by grease pencil and relays of porters took him to it. All the patients were in bed within two and a half hours of the arrival of the train, so that the work of distribution was intensive while it lasted. That did not mean that it was without its lighter moments. Some of the patients regarded their branding with profound distrust; one Frenchman was overheard to ask another what it was all about, and the reply was sinister enough—"Abattoir!" Hasty explanations per suaded the victim that our intentions were honourable. There were many minor difficulties. Allies who would insist on being together, though their medical conditions did not lie that way in any well-conducted hospital, and Allies who would persist that they were officers, though we had been informed that there were none such on our train: they went into our officers' ward, discretion being the better part of valour.

Amid the bustle and apparent confusion of the reception room the prevailing impression of these tired and rather haggard men was one of cheerfulness; only one was noticeably dour, and he, appropriately enough, was a Scot from Banff. The same Scot preserved for some time his rather pagan outlook. He took unkindly to a suggestion that he should have an enema. "Ach, Sister," he said, "dinna kirn aboot wi' ma bools; it's no natural, the Picts and Scots didna dae it." But even he relented. Enemata were distinctly unpopular. A Frenchman, whose bowels had refused to function for six days, when

ordered one had to be chased all over the building before he could be got to bed. Indeed, it was difficult to persuade many of our patients to go to bed at all—they seemed to think that it was so near 4 A.M. that it was not worth while doing so, though why they thought 4 A.M. was rising time in our hospital was beyond our comprehension. These Allies seemed to desire nothing better than to parade our corridors in almost complete undress, and it was no unusual sight to see a fluttering sister trying to guide her charges back to bed to the tune of Couche ! Couche ! rather like a scandalised hen shepherding her chicks, I am afraid.

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Perhaps the most striking feature about the clinical condition of the patients was the great improvement brought about by a day or two under hospital conditions. Soon they were thirsting for fresh adventure and meeting it in all sorts of places, not all of them orthodox. It was not unusual to find a nimble Frenchman skipping blithely through our shrubbery, pursued by one of our lumbering custodians of law and order ; he in turn pursued by our hound, Bobby, barking furiously. In the main the patients are a happy, contented lot, not difficult to handle. Our Allies had only one complaint to make of our cuisine, and that a curious one—they wanted more bread, thickly cut. Their entertainment presented no great difficulty, for they were quite pleased to sit in the sun and talk the hours away. They liked croquet, and bowls seemed to intrigue them. Concerts and entertainments—garden fêtes and the like—there were in plenty, and one highlight was a visit to the local cinema to see in a news reel the sinking of a vessel from which some of our patients had been rescued : as one of them exclaimed excitedly, " I saw me." One man applied for a pass to visit a neighbouring village, giving as his reason that he needed new boots, and when it was pointed out to him that these would be provided from our pack store the true nature of the main disability emerged : " I do not the water drink," he said.

News of the arrival of our convoy spread rapidly and brought the usual swarm of locusts, visitors of all hues greatly interested in our colourful Allies—" Aren't they pets ! " The visitors included a bevy of press photographers who snapped many strange sights, most of them fortunately suppressed by a benevolent censor. Most of our patients were willing enough to be photographed, and the few whose modesty or sense of decorum restrained them found their misgivings melting away when they saw that the nurses, too, were being photographed. Our final impression is that the reception of a convoy is as nothing to the disposal of it.

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Many stories are told with the general theme of " What does A. do now ? " Matron vouches for the truth of this one, for it happened to a friend of hers. This friend had two engagements one afternoon—a somewhat formal attendance at a funeral, and a more genial encounter at a tea-party. She put on a sober black hat, intending to change it after the funeral for her new " this season's flowery creation," which she carefully laid on the back seat of her Austin Seven. She drove to the cemetery, parked her car in the general line, and made her way to the little chapel. At the graveside, like many people, she could not forbear when it was all over to look around at the wreaths and their inscriptions. Suddenly she saw her own new hat among them ; one of the undertaker's men had seen it left behind in the car, and had tried to be helpful.

I read your Peripatetic's appreciation of the stallion's prowess to my friend the V.D. officer. " Yes," he said thoughtfully, " last week at the clinic I saw a Norwegian sailor with gonorrhœa. He had been knocking about our seaport for three weeks, and I asked him the usual questions about when he had last exposed himself to the risk of infection. The man found considerable difficulty in deciding, for nineteen out of the twenty-one nights had been spent in different but still accommodating arms. If THE LANCET had a ' silly season ' one might be inclined to ask ' Is this a record ? ' "

Public Health

From the School Reports

FROM his report for 1939 to the education committee we learn that Dr. J. V. A. Simpson, M.O.H. of *Torquay*, was appointed chief billeting officer under the evacuation scheme. Admitting the obvious advantages of this arrangement, for in small boroughs the M.O.H. has in his head and his desk full information of the billeting facilities of his district, most medical officers are thankful that the work of billeting was not added to the numerous honours thrust upon them. Before the war the number of names on the elementary-school register of Torquay was 4076 ; at the end of December 1939 the number was 4521. The boys' grammar school at Torquay received 410 pupils from St. Olave's School, Uckfield, Sussex. Moreover, at the end of August 110 children on holiday were " left behind " and billeted as unaccompanied children, and 800, which subsequently shrank to 400, unofficial evacuees drifted into the elementary schools. The added children produced no special health problems, but Dr. Simpson calls attention to the interest and importance of studying the effects of evacuation on those evacuated.

Taunton is another reception town. Dr. John Allen in his school report gives the number of evacuees received as 420 official and 160 unofficial. The average number on the roll of elementary-school children in 1939 was 2994, so the added children were well diluted. They do not appear to have given any special difficulty. A scheme for free immunisation against diphtheria of all children aged 1–8 years was introduced at Taunton in December 1938, but so far the response has been poor, for only 296 children had been protected by the end of 1939. Taunton has no blind or deaf children as defined by the Education Act 1921. In 1939 there was no head ringworm and only 3 cases of body ringworm, but 44 cases of scabies.

Exeter, which unlike Torquay and Taunton is a county borough, is another reception area for which the annual school report for 1939 was published early. Dr. G. F. B. Page in this report gives separate tables for the defects treated of native children, official evacuees (about 780) and refugees (about 930). Amongst the natives there were 9 head and 12 body ringworms and 45 scabies. Amongst the foreigners there was no ringworm but 8 scabies.

Infectious Disease in England and Wales

DURING THE WEEK ENDED JUNE 1, 1940

Notifications.—The following cases of infectious disease were notified during the week : smallpox, 0 ; scarlet fever, 1079 ; whooping-cough, 633 ; diphtheria, 766 ; enteric fever, 39 ; measles (excluding rubella), 7842 ; pneumonia (primary or influenzal), 644 ; puerperal pyrexia, 162 ; cerebrospinal fever, 275 ; poliomyelitis, 4 ; polio-encephalitis, 0 ; encephalitis lethargica, 2 ; dysentery, 36 ; ophthalmia neonatorum, 105. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on May 31 was 709, made up of : scarlet fever, 142 ; diphtheria, 131 ; measles, 23 ; whooping-cough, 22 ; enteritis, 63 ; chicken-pox, 21 ; erysipelas, 26 ; mumps, 7 ; poliomyelitis, 1 ; dysentery, 3 ; cerebrospinal fever, 63 ; puerperal sepsis, 28 ; enteric fevers, 6 ; german measles, 30 ; other diseases (non-infectious), 55 ; not yet diagnosed, 88.

Deaths.—In 126 great towns, including London, there was no death from smallpox, 1 (0) from scarlet fever, 3 (1) from enteric fever, 2 (0) from whooping-cough, 4 (0) from measles, 13 (0) from diphtheria, 31 (0) from diarrhœa and enteritis under 2 years, and 19 (2) from influenza. The figures in parentheses are those for London itself.

Newcastle-on-Tyne and Bristol reported the second and third fatal cases of enteric fever. There were 3 deaths from diphtheria at Plymouth. Birmingham reported 10 deaths from diarrhœa.

PARLIAMENT

ON THE FLOOR OF THE HOUSE

By MEDICUS, M.P.

THE new situation created by the declaration of war by Italy led to the postponement of the secret session fixed for Tuesday in last week, because the Prime Minister and all the service ministers were so occupied outside the House that they had not time to attend and take part in a debate. But, as at present arranged, the session is to be held on Thursday of this week, and except for any official statement which may be issued that is all that the public will hear. Despite all statements to the contrary the previous secret session—on which certain persons pretended to have inside knowledge—was in fact really secret. I was there and I know. Thursday's session, if held, and all arrangements now are liable to sudden alteration without notice except by the wireless, will be equally secret. The subject will be Home Defence.

As Mr. Churchill was too occupied to attend Parliament on Tuesday of last week, Mr. Attlee, Lord Privy Seal, made a statement dealing not only with the Italian declaration of war, but with the withdrawal of our forces from Norway—after rendering Narvik unusable. So rapidly has the perspective of war changed that this withdrawal attracted little comment. It is accepted on all hands that the war is an all-Europe war. The Italian decision to come in has extended the war not only to the Mediterranean Sea but to north and central Africa. In his broadcast to the French nation on June 13 M. Reynaud appealed for greater aid from President Roosevelt, and spoke of France in certain circumstances continuing the war in north Africa or even in the French American possessions. The war is in an explicit and literal sense becoming a war which touches all continents and in which all the world's populations and resources are likely to be involved.

Members of the House of Commons are having to readjust their views of the war situation rapidly and at short intervals, but even under the stress of the new major development the comment on Italy was very different from the comment on Germany. In Mr. Attlee's statement Italy came third on the list of subjects, the first being the withdrawal from Norway and the second the naval losses following on that withdrawal. The Italian attack we were told "does not cause us dismay," and it was one for which we were prepared. Many members in private expressed sympathy for the Italian people led against their will into war.

In one sense the declaration of war by Italy simplifies the situation. The chief difficulties about economic blockade arose in the case of Holland, Belgium and Italy, because it was through them that supplies went into Germany. Now these entries for supply are stopped. The problem now is more that of pre-emption—"buying up under the nose of Germany," as the Minister of Economic Warfare put it the other day—in those countries still open to trading with our enemy. But what the Italian intervention will bring about in the military sense has at the moment of writing still to be demonstrated.

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Leaving the general consideration of the war and its conduct on the European field of battle the House considered some useful measures. The Colonial Development Bill went through its committee and third-reading stages on Tuesday of last week, and the Labour Under-Secretary proved himself as unyielding about accepting amendments as his predecessor had been, but as reassuring as to the Government's good intentions. Colonial development in war-time must clearly be limited to matters closely connected with the war effort or resulting immediately in an increase of productive capacity, as, for example, improvement of African agriculture. But it is unfortunate that neither the Colonial Advisory Committee nor the Colonial Research Committee is to be appointed at present.

There was a great deal of criticism of the Government's refusal to appoint these committees, reference to which is specifically made in the memorandum to the bill only recently introduced by Mr. Malcolm MacDonald. The excuse that men of the required capacity cannot be found or should not be employed on such duties at the present time is not a good one. It is well known that there are many men of great experience in colonial affairs who are not fully employed and who could give time to consider the long term programmes of development which are essential in the colonies. But the bill will very soon be on the statute book and we all hope it will not be stillborn.

Another useful bill passed was that for giving the local authorities in London powers to remit rates in the cases of hardship caused by war conditions. These powers have been in the possession of local authorities in the provinces for a long period, but the London rating authorities have had no option but to demand payment or inflict punishment. The many war sufferers, including boarding-house and hotel proprietors or lessees, will now be able to get relief and to claim retrospective relief if a court order against them has not already been made.

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The B.B.C. and Mr. Val Gielgud, as director of features and drama, came in for scathing criticism in connexion with the dramatisation of the battle of Narvik and there has been a good deal of uneasiness about the position of men of military age employed by the B.B.C. But Mr. Duff Cooper, who is such an excellent broadcaster himself, and with a sense of news which has been very reassuring on several occasions, put up a good defence.

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Other debates last week, one on civil defence and one on evacuation, brought interesting statements from Sir John Anderson, the Minister of Home Security, and Mr. MacDonald, now the Minister of Health. But on neither day could debate be very free because these subjects are so intimately bound up with home defence on its military side. One medical member wished to know whether the problems of civil defence had been re-surveyed in the light of our most recent knowledge of methods of German attack by the parachutist and the troop-carrying plane—new methods which affect not only A.R.P. precautions of the local civil defence type but also the policy of evacuation.

Because of the rapidly changing face of war our policy on all these matters, as on questions of hospitals and medical matters generally, needs continual re-survey. We fight on the home front now as well as overseas, and that insistent problem of standards of nutrition of the population keeps putting up its head.

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One day last week the Parliamentary Secretary to the Ministry of Food made a statement on milk prices and the supply of cheap milk which will certainly be implemented to the extent of an increase of 4*d.* a gallon on the price of milk from July. Will it be implemented as regards the supply of cheap milk, at 2*d.* a pint, to children below school age, expectant and nursing mothers and persons unable to afford the normal market rate? It must be stated quite simply that the obstacle in the way of this being done is dissatisfaction by the milk distributors at the margin of profit they are allowed to charge for distribution. Their opposition has prevented the cheap milk scheme working as it ought to have worked for a long period. Reassuring ministerial statements have been made before in the House of Commons but the milk has not arrived. The responsibility for this state of things is a grave one in time of war and the question of cutting out costs of distribution by establishing milk depôts where customers can call for milk and get

it at a cheap rate is being considered. But if something is not done effectively very soon the Ministry will have to consider nationalisation of the milk-supply, which would take it out of the distributors' hands.

FROM THE PRESS GALLERY

Civil Defence

In reviewing the Government's plans for civil defence Sir JOHN ANDERSON, Home Secretary, said in the House of Commons on June 12 that the issue of equipment was now for practical purposes complete, with reserves. They had issued 60,000,000 respirators of all kinds, 3,000,000 steel helmets, 1,500,000 oilskin suits, more than a hundred thousand stirrup pumps, and 350,000,000 sand-bags. He had declined to cut down civil-defence personnel with undue haste but as a result of a review a revised establishment had been issued which should prove adequate. The total A.R.P. establishment, paid and unpaid, was to be nearly 1,000,000, of which 180,000 were whole-time and paid. So far as whole-time personnel was concerned the Government might have to make use of their compulsory powers. The total number of persons for whom shelter had been provided by local authorities and employers was 20,000,000. The Government did not set out to provide shelter for all. They were going to concentrate on the crowded and most vulnerable areas and they expected those in a position to do so to provide domestic shelters for themselves. We had now to reckon not merely with the risk of bombing attack, but with the new menace of invasion. In the arrangements necessary to provide the fullest possible protection against these new threats the regional organisation established under the A.R.P. scheme would prove invaluable.

Evacuation and Hospital Services

Mr. MALCOLM MACDONALD, Minister of Health, in opening a debate in the House of Commons on June 13, first referred to evacuation and said that the Government had decided against compulsion except possibly in the comparatively small areas where it might be necessary for military reasons. If the Government had compelled evacuation and some evacuees had been killed, they would have assumed heavy responsibilities. Turning to the hospital services, Mr. MacDonald said that the great system evolved by the Ministry of Health to look after both civilian and military casualties was now receiving its first real test. In the last fortnight they had received from Dunkirk and other parts of the front several thousand military casualties which had been distributed over more than 50 hospitals in different parts of the country. In general the arrangements had worked satisfactorily, in spite of some inevitable hitches and mistakes. Mr. Colville, who until recently had been Secretary of State for Scotland, accompanied by Mr. Rock Carling, adviser to the Ministry of Health on casualty services, and Mr. Bearn, principal supply officer to the Ministry, had gone to visit the various regions to watch the hospital system at work. The terms of reference of this commission were unlimited.

Sir FRANCIS FREMANTLE said that in 1938–39, when they had to decide whether to expand the military hospitals as in the last war, and similarly to expand the civil hospitals for casualties which they could not estimate in advance, the Government were right in deciding to have a system based on the civil authorities under the local authorities. The only exceptions were a few military hospitals and one or two of the standing hospitals of the Royal Navy and the Royal Air Force. But there were certain definite disadvantages about this arrangement which had come out in the last six or seven months. Since a considerable number of military patients came into the hospitals they had to have a military registrar and a great deal of military discipline. That had introduced a difficult division of authority. Representations had been made that it would be a great advantage if the senior medical staff of these hospitals were given definite military rank, status and uniform so that they might be recognised. Apart from this division of authority, complications had been introduced into our hospital system which tended to create difficulty and delay. Patients back from the front had not had the advantage of up-to-date treatment, and their convalescence had therefore been delayed. By up-to-date methods he meant physical massage, surgical manipulation, electric treatment of joints, short-wave diathermy, active convalescence and occupational therapy. Equipment had been lacking in many hospitals, and the difficulty arose not so much from the lack of provision by the Ministry of Health as from the fact that they had offered services and payments to local hospitals which had not been able to accept the offers and start a department for this kind of treatment. He wished to know why many specialists engaged in this work in hospitals all over the country were not being employed.

Sir ERNEST GRAHAM-LITTLE said that the conduct of the emergency medical services in London had been perhaps the most criticised of the measures carried out by the Ministry of Health in the last nine months. The unprecedented step of taking over the staffs and personnel of the London voluntary hospitals for full-time service under the jurisdiction of the Ministry of Health immediately destroyed the whole system of hospital practice, and created an exceedingly dangerous position with regard to the treatment of the civilian population. As late as last April in St. Bartholomew's Hospital out of 780 beds only 145 were being used for civilians. The scheme was based on the fallacious conception that the best treatment for war casualties could be found not in London but on the periphery ten or twenty miles out. Dr. Trueta, the Spanish surgeon, had made the point that anything but immediate attention on the site to air-raid injuries was useless. It had been found that immediate attention was required unless 40 or 50 per cent. of the casualties were to be fatal. At a hospital inspected by Sir E. Graham-Little, instead of the skilled personnel to receive the casualties advised by Dr. Trueta, the doctors who would sort out casualties consisted of three junior medical officers of the status of a registrar, none of whom had any surgical experience. The idea of transporting wounded persons was all wrong and he hoped it would be abandoned. The question of first-aid posts should be reviewed, and precautions taken to see that no casualty was regarded as trivial until it had been pronounced upon by experienced workers.

Captain ELLISTON said he found general agreement that the emergency medical scheme had achieved a reasonable measure of success, and this was because the Minister had wisely coöperated closely with the British Medical Association. He asked the Minister for an assurance that medical personnel were being used to the best advantage. Physio-medical treatment of war injuries had largely developed since the last war, and it was very desirable that it should be available for both military and industrial casualties.

Miss HORSBRUGH, parliamentary secretary to the Ministry of Health, replying to the debate, paid a high tribute to the work done in the hospitals during the recent disembarkation from Dunkirk. An officer of the French medical service had asked her to thank the Government and the people of this country for the way in which the French and Allied wounded had been received and looked after. An advisory committee had been set up on the subject of physiotherapy. It must be remembered, she said, that first-aid posts for air-raid casualties were liable to be bombed, and it might not be possible to get transport to them. They must be able to set up first-aid posts at other places. Surgical personnel and equipment must be mobile. It would be a disaster if they had too many expert surgeons in places where in time of an air-raid it might be impossible for them to reach casualties. They had succeeded in staffing up to full capacity all the hospitals which were receiving casualties.

QUESTION TIME

Unsafe Milk

Mr. DAVID ADAMS asked the Minister of Health whether he was aware that tubercle bacilli and other pathogenic organisms found in untreated, non-designated milk rendered it unsafe for human consumption; and what remedial measures he proposed.—Mr. MALCOLM MACDONALD replied: I am aware of the problems presented by the liability of milk to infection, and, recognising the value of pasteurisation as a protection against such risks, I am considering what action I can take to secure the best results from its use. The hon. member will appreciate the practical difficulties, particularly those of securing further pasteurising plant, involved in present circumstances, but I can assure him that, when conditions permit, I should not hesitate to seek any powers that might be necessary and capable of general application to secure the adequate protection of the public health.

Mr. DAVID ADAMS asked the Parliamentary Secretary to the Ministry of Food the quantity of non-designated milk supplied by the Milk Marketing Board as food during the last 12 months, and the approximate quantity of the same pasteurised before being marketed to the public.—Mr. BOOTHBY replied: While I feel that it is not in the national interest to give information relating to milk production in this country, I may tell my hon. friend that 45 per cent. of the milk produced during the last twelve months was designated milk. The amount of milk which is pasteurised varies very extensively from town to town and detailed figures are not available.

Rural Sanitary Services

Sir GIFFORD FOX asked the Minister of Health whether, in view of the increased pressure on accommodation in rural districts, he would instruct all medical officers of health to watch carefully the question of the provision of adequate sanitary arrangements, especially since those existing are only intended for the use and accommodation of the population in peace-time.—Mr. MACDONALD replied: Local authorities have already been asked to bear these matters in mind in connexion with their billeting arrangements.

Danger of Water Pollution

Sir IRVING ALBERY asked the Minister if he had considered the reports submitted by the Gravesend and Milton Water Works Company, showing the danger of pollution to the water supply arising out of sewerage disposal of the military camp at Northumberland Bottom; and, in view of the urgency of this matter, what action was being taken.—Mr. MACDONALD replied: I have had under consideration the representations made by the company. Representatives of the War Office and of the company are about to confer as to the action required, and I have arranged for my officers to take part in the discussion.

Badges for Blood Donors

Mr. SUTCLIFFE asked the Minister whether he would consider the issue of a badge which could be worn by all blood donors at the present time, to indicate this form of public service.—Mr. MACDONALD: I fully recognise the value of the public service rendered by blood donors but I do not consider that the issue of a badge is required in this case. There are many forms of national service for which badges are not issued.

Special Diets for Invalids

Mr. G. GRIFFITHS asked the Parliamentary Secretary to the Ministry of Food whether the food rationing (special diets) advisory committee of the Medical Research Council had given any further advice on the effect of rationing in special invalid cases.—Mr. R. BOOTHBY replied: The committee have recommended extra sugar rations should be allowed to those suffering from spontaneous hypoglycæmia and extra meat rations in exchange for the butter ration to those suffering from steatorrhœa (cœliac disease and tropical sprue). The necessary arrangements will be made as soon as possible.

Colonial Research

Mr. M. P. PRICE asked the Under-Secretary of State for the Colonies when it was proposed to set up the colonial research advisory committee; how it was proposed to recruit its members; and what were to be its precise powers and functions.—Mr. G. HALL replied: The Minister is unable to say how soon circumstances will permit of the committee being set up. As has already been announced, Lord Hailey has consented to serve as chairman of the committee. No other appointments to it have yet been made. The general functions of the committee have been described in the paper already laid before Parliament and there is nothing that I could usefully add at this stage.

Visits to Soldiers in Hospital

Mr. DAGGAR asked the Secretary of State for War if he would state the amount of financial assistance given to wives and other members of the family who desired to visit soldiers who had been wounded in the war.—Mr. EDEN replied: Free travelling is admissible for two persons to visit a soldier who is dangerously ill in the United Kingdom, the Channel Islands, the Isle of Man, Eire or France. Visits to France have necessarily been discontinued in present circumstances, but will be resumed when conditions permit. If the wounded soldier is not dangerously ill, half-fare concessions are available for visits in this country by his wife and children under 16 years of age if he is married, or by his parents, brothers and sisters if he is unmarried. The British Red Cross Society have been good enough to provide guides and accommodation free of charge for relatives who visit France, and are considering the provision of similar facilities at home.

An Unsubstantiated Claim

Mr. KEELING asked the Home Secretary whether he had seen the advertisements appealing specially to women, of Benin products, claiming that they were a protection against mustard and other liquid gases if applied beforehand and an antidote if applied after contamination and that leading authorities were agreed as to their vital importance; and whether these products had been examined with a view to prohibiting advertisements making false claims.—Sir JOHN ANDERSON replied: Yes, Sir, and the matter has already been receiving the careful attention of my department. A sample of the cream mentioned in the advertisement has been tested by my expert advisers, and it was found that the claims made for it could not be substantiated. The claims made in the advertisement are unwarranted, and, in fact, tests show that this product is not so good as bleach paste for treating the human skin after contamination with liquid mustard gas. I am considering what is the best method of keeping a check on the publication of advertisements making claims in respect of A.R.P. devices or methods of treatment.

The Lancet 100 Years Ago

June 20, 1840, *p.* 459.

From a leading article.

THE presence of Father MATHEW among the drunken population of London should be preceded by that of Friend AQUA PURA, that the reformed people may at least have clean water to fall back upon, when the gin-puncheon is struck from beneath their feet. To exchange beer and spirits for the undisguisedly filthy liquor which the Water Companies squirt into our glasses and tea-pots, is unlikely with those who reflect—though few entertain the thought—that the untinctured beverage is saturated with living animals and dead mud,—"water" (says Mr. GLAZIER) "that comes from the Thames, wherein all the privies, water closets, and drains from all the houses go. That," he adds, "cannot be such water as the people of London ought to drink, and do drink, again and again."

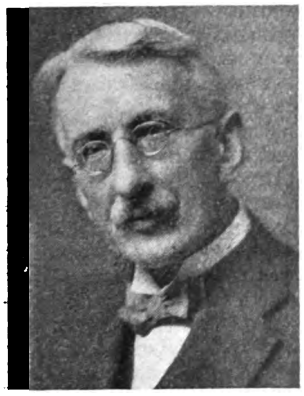
The second addendum to the British Pharmacopœia, 1932, was published on June 14, 1940, and became official on that date.

OBITUARY

ROBERT FORTESCUE FOX

M.D. LOND., F.R.C.P., F.R.MET.S.

Dr. Fortescue Fox, who died in London last Saturday in his 82nd year, will be remembered as a physician who was not content with partial recovery for his patients. He could not bear that soldiers should leave hospital with stiffened limbs or joints, and he was the guiding spirit in founding the Enham colony to prevent this. He could not bear to see rheumatic people crippled or in pain when persistent care might renew their efficiency and comfort, and again he was the leading spirit in starting the Red Cross clinic in Peto Place, London. To achieve this purpose, he had profound belief in the efficacy of natural agents, using them at first empirically and later working out by controlled observation the basis of their action. And he was something of a medical fundamentalist, inheriting from an unbroken line of Quaker doctors of six generations, not only his medical outlook, but a tenacity of purpose and independence of thought which left a trail of fruitful endeavour for others to carry on. All his six brothers were doctors and two of his six children entered the medical profession. Dr. Iris Fox died in 1926 of a post-mortem infection after having made her mark as a pathologist at the Royal Free. Dr. T. F. Fox joined the staff of THE LANCET in 1925 and is now on active service.



Youngest of the seven sons of Joseph John Fox, surgeon, of Stoke Newington, and Sarah Angell Allen, R. F. Fox was born in 1858 and brought up in a scholarly home, where the boys helped with their father's surgery and learnt their mathematics and Latin from him in his leisure hours. Like all his brothers, he entered on a medical career; and, despite myopia, delicate health and reticent manner, was an exceptionally successful student at the London Hospital. After qualifying with a university gold medal he was house physician to Sir Andrew Clark, but developed signs of tuberculosis and was dispatched as ship's surgeon on a voyage to China. About this time Clark was asked to find a doctor for Strathpeffer Spa in Ross-shire, and little knowing to what it would lead Fox accepted the nomination and set off to seek his fortune in the far north. The choice proved happy, for he gained in strength and saw Strathpeffer develop from a village with a few crofters to a climatic station with 10,000 patients every summer among whom his evident ability, and his genuine care for his patients, brought him a large practice. He stayed in the Highlands twenty-five years; but latterly he spent the winters in studying foreign spas, bringing back the idea of the peat bath, and began to work in London as a general physician. In 1905 he left Scotland and returned to his own city, where he went on working to the end of his life. He had married a daughter of the Rev. W. S. McDougall.

During the last war, Dr. Fox continually and successfully insisted on the value of physical treatment, including various kinds of baths and massage, for minimising the effects of war injuries. Working at the Alexandra Clinic for officers, and later at Shepherd's Bush, he modified the *eau courante* bath of French physicians to the "whirlpool" now widely used, and he helped to introduce the sedative pool to British medicine. This experience was summarised in his "Physical Remedies for Disabled Soldiers," and later in the more comprehensive "Principles and Practice of Medical Hydrology"; he also wrote "Causation and Treatment of Chronic Rheumatism" jointly with Dr. van Breemen of Amsterdam. From therapeutic methods he was led on to consider the fuller restoration of function, and he saw more clearly than others that treatment ought to be associated with training—that is to say, with re-education for work and for life. This association was the intended basis of the village centres movement, which planned to restore the efficiency of ex-soldiers and later meet the needs of industry for more efficient convalescence after accidents. At the end of the last war, in which he lost one of his sons, Fox gave all his thoughts and energy to realising this policy, and a start was made with Enham Village Centre near Andover, of which for a year he was whole-time medical director.

The development of British spas, and specialisation in their function, was another of his abiding interests. For very many years he edited the health resorts' section of the "Medical Directory," and he continued the editorship when this was expanded into the handbook of the British Health Resorts Association, which he had helped to found. Latterly he was impressed by the need to put "the seaside" on a more scientific basis by collecting accurate data about the action of wind, weather and water on the children exposed to them in hundreds of thousands every year. Unfortunately the present war has interfered with the programme of his new Committee for Research on Delicate Children at the Seaside, just as it has interfered with the two international organisations for which he was largely responsible—the International Society of Medical Hydrology and the *Ligue internationale contre le rhumatisme.* To these various public movements, and particularly to the *Archives of Medical Hydrology,* which he long edited, he gave a devotion which other men reserve for business or sport. He could write vividly and succinctly, and though committee work and appeals wearied him almost intolerably, he never spared himself so long as he felt he could do something to forward an important principle or a useful end.

Few men have tried harder to break down the national barriers that hinder the mission of medicine, and though he was little of a linguist, Fox won the affectionate respect of colleagues in the many countries—from the U.S.S.R. to Portugal—where the international society which he had founded held its annual meetings. When recently some of these colleagues turned into refugees he did his utmost to mitigate their sufferings, spending sleepless nights on the problem of finding them work or a harbour. Further afield, he associated himself with the work in Syria of the Lebanon Hospital for Mental Diseases, of which, like his brother, the late Dr. Hingston Fox, he was long the London chairman.

He was perhaps a better judge of ideas than of men; but his readiness to believe the best of them was part of the sympathy that made him good at treatment. Having this sympathy, he took trouble over

the details that make the difference between comfort and discomfort and sometimes between life and death, and he shifted his patients' burdens on to his own shoulders. Diagnosis, he might have said, is not enough; and he was interested in disease because it attacks people—not in people because they are attacked by disease. Hence came his preoccupation with the social aspects of medicine—the restoration of the convalescent to health, the mitigation of chronic disabilities like rheumatism to which little attention was paid because it seldom causes death. But anyone who concerns himself with social movements is doomed to many disappointments, and Fox had the uncomfortable mental life of the idealist who is always coming up against—not so much hard facts as hard-headed men and women who have no use for general principles and no faith in a better world. In eighty years he had acquired much wisdom and much skill in compromise; but the old man was still unable to avert all the knocks that came to the carroty-haired sanguine boy who still lived inside him. He was never quite a man of the world, and he would have neutralised his usefulness if he had been content to become one. Too often he felt the loneliness of the prophet whose words are unheeded or misunderstood, and it was fortunate for him that until his last few years he had wide interests outside medicine—in archæology, poetry and travel. Even in his 82nd year he was happily still a gardener, and happily still retained his farmhouse garden on the Sussex coast.

His poems were published anonymously under the title "Time and the Timeless."

ALFRED RICHARD DENIS PATTISON

M.B. DURH., F.R.C.S.

A. R. D. Pattison was the pioneer of neurological surgery in north-eastern England: his untimely death on June 7, at the age of thirty-seven, is a disaster to the district. He was also taking an increasingly prominent place in the rather small company of British neurological surgeons, and can ill be spared from their ranks, especially in war-time. He had recently completed the organisation of a centre for head injuries at an E.M.S. hospital, and was distressed that illness prevented him from tackling the work when the convoys arrived. He leaves a wife and young son.

Pattison was educated at Clifton House School, Durham School and Durham University. At the university he was awarded the Gibb Scholarship in pathology and the Rutherford Morison Travelling Scholarship in surgery. He qualified M.B. in 1929. A visit to Berlin followed and he was appointed in turn medical officer and surgical registrar at the Royal Victoria Infirmary in Newcastle. In 1931 he obtained his F.R.C.S. Pattison was among the last of Harvey Cushing's pupils at the Peter Bent Brigham Hospital, where he spent a year as surgical assistant. He was a faithful though not slavish follower of his master: the example of Cushing was seen in his meticulous records, duly illustrated by drawings and photographs, and in his careful pathological investigations of every specimen. He took a special interest in the diagnosis and treatment of intracranial aneurysms; and in 1937 in his Hunterian lecture on pituitary basophilism and again in our own columns he recorded his success in treating some cases by implantation of radon in the gland.

After these wanderjahre the wisdom and foresight of the Newcastle municipal authorities enabled him to establish a neurosurgical department at the Newcastle General Hospital, and this was the main centre of his activities, though he carried on similar work at the Sunderland Municipal Hospital. The work of these clinics had developed on a large scale, and practically all operations on brain tumours and allied conditions were placed in his hands by transfer of patients from the other hospitals of the area. He sacrificed all other work, which would have been much more lucrative, to devote himself to his chosen specialty.

F. J. N. writes: Pattison was undoubtedly a man of brilliant intellect. He had a remarkable memory: his recollection of patients, and the details of their cases though seen long before, often astonished his friends. He read widely in several languages. In recent years his work was interrupted by devastating attacks of asthma, but he was never discouraged and in spite of delicate health he carried through prolonged and exhausting operations with supreme skill and a high measure of success. It was often pathetic and always inspiring to see his determination and courage in such difficult circumstances. He travelled widely to neurosurgical centres and owed special allegiance to Olivecrona in Stockholm and Jefferson in Manchester.

THOMAS GEORGE DOUGHTY BONAR

M.D., M.S. LOND., F.R.C.S.E.

Mr. Bonar died suddenly on June 7 at the age of 44. He qualified from Guy's Hospital in 1919 and after holding a number of house-appointments was surgical registrar and obstetrical registrar and tutor there. He was an able teacher and gained a considerable reputation for getting borderline cases past the examiners. He had a singularly tidy mind, though he cared little for tidiness of person, and he could hold the student's attention without effort. He just missed being appointed to the honorary staff at Guy's but was able to continue the teaching side of his work at the London School of Clinical Medicine, where he was subdean. His association with the Seamen's Hospital at Greenwich, with which the school is linked, began in 1928, when he was appointed assistant surgeon. In the same year he was promoted to surgeon with charge of outpatients, and he held the two positions until his death. He also played his part in the administration of the hospital, and in the non-medical activities of the Seamen's Hospital Society. For some years he had been surgeon to the Evelina Hospital for Children. His technical skill and versatility were of a high order, and he never spared himself even when a recurring duodenal ulcer made caution essential. He had lately spent a heavy week working with casualties from the B.E.F., and it is likely that this precipitated his death.

LADY TATA MEMORIAL GRANTS.—The trustees of the Lady Tata memorial fund will, if circumstances permit, make the following awards for research in blood diseases with special reference to leukæmia, in the academic year beginning on Oct. 1, 1940:

Grants for research expenses: Dr. M. P. J. Guérin (Paris); Prof. Karl Jármai (Budapest); Prof. E. L. Opie and Dr. Jacob Furth (New York); and Dr. A. H. T. Robb-Smith (Oxford).

Part-time personal grant and grant for research expenses: Dr. Werner Jacobson (Cambridge).

LETTERS TO THE EDITOR

A.R.P.: WHERE THE G.P. COMES IN

SIR,—In these very anxious times your leading article on general practitioners and air-raid precautions is very interesting. I would like to point out that the Halifax A.R.P. casualty services scheme (set up on the outbreak of war) provides for the attendance of certain general practitioners (not otherwise engaged at first-aid posts or hospitals) at the scenes of air-raid disasters. Such a provision is not officially recognised, nevertheless we decided to put it into operation. The advantages of having doctors at the scenes of disaster are too obvious to need cataloguing.

I am, Sir, yours faithfully,

GEORGE C. F. ROE,
Medical Officer of Health, Halifax.

SIR,—Your leader is timely. The G.P.s in each ward of a city or town should be correlated to the casualty service. Each should be provided with an armlet marked C.M.O. (civil medical officer) and a card of authority signed by the M.O.H. to show any M.O. of a unit and the incident officer. The M.O. of a mobile unit, though not possessing legal authority to commandeer a house, could no doubt in most cases get one. It appears necessary to have more such powers by either M.O. of a mobile unit or the incident officer. If more mobile units were taken up from the outset it would have saved a lot of money in altering schools for aid posts and would have been cheaper in staff requirements. These posts are, like "fixed" aid posts, equipped with Thomas splints, but the Government's policy is to direct first-aiders only to tie one limb to another in fractures of the lower limb. As the mortality from fractured thigh has been reduced from 70 to 25 per cent. by the aid of a Thomas splint, and it only takes five minutes to put this fracture in a previously prepared Thomas splint, it seems desirable that the Government's teaching (through its surgical adviser) should be ignored.

I am, Sir, yours faithfully,

A.R.P., M.O.

X-RAY FLYING SQUADS

SIR,—Dr. Graham Hodgson has rightly called attention to the economy of mobile X-ray sets which he states cost but a fraction of the cost of modern standard units. He further states that the latter are not required in 80 per cent. of war casualties. I would go further and say that the modern 30 M.A. portable ward unit is eminently satisfactory in 100 per cent. With such a unit, housed in a room of a large unfurnished hospital, without even a chair or table, I recently demonstrated its efficiency in dealing with a large convoy. Many of the patients were radiographed lying on brown paper spread over the rough builder's floor, others more seriously injured on the trolleys. Even with these crude facilities the work was so expeditiously and efficiently performed that a steady flow of cases passed to the theatre and the loss of the surgeon's time was reduced to the minimum.

The procedure adopted was as follows. The wounded men were examined by the surgeons who decided which needed immediate attention. These men were sent to the theatre via the X-ray department. Here the wounds were inspected by the radiologist and such radiographs taken as were deemed essential to show the position and extent of fractures and the presence of foreign bodies. Any of the latter which showed evidence of anaerobic infection (and they formed a large percentage), or where it was thought the surgeon would wish to extract the foreign body, were accurately localised with the patient placed in the most favourable position for operation (rough localisation in the aggregate wastes the surgeon's time). The wet films with my full report of these features were then passed on to the theatre. Over 200 films per day were turned out in this manner by our team of 4 (one engaged in recording, &c., one in developing, one in arranging patients, &c., and the radiologist).

This I believe to be the constitution of the ideal X-ray flying squad which, with a mobile 30 M.A. unit, could rapidly be brought to meet all the requirements of the emergency service of any large hospital. In this emergency work the radiologist must himself see all the patients, direct the radiography, and report on the films immediately. Under these conditions the services of trained radiographers are not essential, for within an hour or so the radiologist can direct any intelligent workers to perform the accessory duties quite efficiently.

With the possibility of damage to electric supply it is to be regretted that the cheaper portable units such as were supplied to us by the War Office in 1914–18 have not been made available. They would have given excellent service and better radiography at a still less cost than the present mobile units.

I am, Sir, yours faithfully,

Edgbaston, Birmingham. JAMES F. BRAILSFORD.

SIR,—There seems to be a prevalent idea that the manufacturing resources of the British X-ray industry will be insufficient for war requirements. In actual fact the various firms manufacturing X-ray apparatus in this country are not so fully occupied and in some cases have actually been able to accept orders for other work of national importance. The only difficulty has arisen from the fact that there have been delays in some instances in placing orders until the apparatus is urgently required. We can say quite definitely that the manufacturing capacity for X-ray equipment in Great Britain is abundantly equal to all demands made upon it for war requirements.

We are, Sir, yours faithfully,

WATSON AND SONS, LTD.,
SCHALL AND SON, LTD.,
London. NEWTON AND WRIGHT, LTD.

THE LATENT PERIOD IN CARCINOGENESIS

SIR,—In your annotation on June 8 (p. 1054) you state that "from none of the descriptions of late results of tarring or painting of pure substances has there emerged any peculiarity either local or general of cell or tissue response in the latent period." Perhaps the observations made by myself on mice treated with various carcinogenic hydrocarbons (*J. Path. Bact.* 1938, **46**, 495) have escaped your notice.

It was shown that while the early squamous hyperplasia of the epidermis is not specific for carcinogens characteristic changes develop later in the deeper tissues. Of these, the first to be found is an alteration in the texture of the superficial part of the dermis, fine-fibred, non-refractile collagen replacing the normal coarser refractile fibres. This change, which is associated with passive congestion of the subcutis and followed by alteration in the texture of the elastic

tissue, gradually extends to involve the whole thickness of the dermis. With the more potent carcinogens —e.g., methylcholanthrene—the change is present throughout the treated zone of skin; with weak carcinogens it may be focal in distribution, and it is of interest that in such cases the early tumours are related to foci of altered dermis. In many cases two further changes are found beneath young tumours, namely, fibrosis of the subcutis and defects in the elastic tissue of the dermis.

The experiments were controlled by observations on mice treated with non-carcinogenic chemically-related hydrocarbons, and with various non-carcinogenic skin irritants, and in the few cases where such agents produce changes resembling the characteristic "precancerous" process there was evidence of inflammation in the form of considerable leucocytic infiltration of the tissues, which is not a feature of the carcinogenic reaction.

At the time when the paper cited was written systematic observations had been made with six carcinogenic hydrocarbons. Since then further carcinogens have been studied, and it appears that the more rapidly a given hydrocarbon produces these changes the more potent is its carcinogenicity. It therefore seems justifiable to suppose that they are of specific importance in relation to carcinogenesis.

I am, Sir, yours faithfully,

School of Medicine, Leeds. JOHN W. ORR.

SULPHATHIAZOLE

SIR,—Dr. W. R. Thrower states in his letter of May 18 that sulphathiazole "was first prepared in the research laboratories of Messrs. May & Baker early in 1938." I do not know whether this sentence should be interpreted as a claim to priority of preparation, but in fact sulphathiazole was prepared independently, and possibly at an earlier date, in the laboratories of the Society of Chemical Industry in Basle (Ciba), Switzerland. A detailed description of the manufacture of sulphathiazoles was filed with the Swiss patent office on Sept. 16, 1938, and patents have already been granted to the society in France, Palestine and Belgium. Early in 1940 the compound was placed on the market in Switzerland under the trade name Ciba 3714.

Although American reports have drawn particular attention to the use of sulphathiazole in staphylococcal infections, preliminary clinical investigations in this country tend to confirm Gsell's[1] conclusions that Ciba 3714 is also superior to sulphapyridine in possessing an equally satisfactory action against pneumococcal, gonococcal, and meningococcal infections, while causing fewer side actions and above all little or no gastric disturbance.

The relatively low concentration of sulphathiazole sometimes found in body fluids, to which reference is made in your leading article of May 11, was also mentioned by a speaker at the Royal Society of Medicine this week. Oesterheld,[2] of the Ciba laboratories, refers in a recent paper to the unexpected difficulties which have occurred in the estimation of sulphathiazole by Marshall's method, particularly in urine, and indicates possible sources of error which may result in values that are much too low. He gives in detail a new and simple colorimetric method which has been found in Switzerland to give accurate results.

I am, Sir, yours faithfully,

Ciba Laboratories, Horsham. N. HOWARD JONES.

1. Gsell, O. *Schweiz. med. Wschr.* 1940, **70**, 342.
2. Oesterheld, G. *Ibid.* p. 459.

TREATMENT OF CEREBROSPINAL FEVER

SIR,—Dr. Lloyd Hughes and Dr. Harwood are interested in my reasons for suggesting that sulphapyridine as against sulphanilamide is the drug of first choice in the treatment of meningococcal disease. They are based upon: (1) experimental work with meningococcal infections in mice; (2) personal experience with each of those drugs used singly and also in combination in cases of cerebrospinal fever. Experimental evidence is admittedly neither extensive nor strikingly in favour of sulphapyridine, although it distinctly tends in that direction. Protocols published by Whitby (*Lancet*, 1938, **2**, 1095) indicate for sulphapyridine a slightly greater activity against meningococci, and by Maegraith (*Brit. med. J.* 1938, **2**, 985) a slightly more successful inhibition of growth of meningococci, as compared with sulphanilamide. The experiments of Powell and Chen (*J. Pharmacol.* 1939, **67**, 79) also suggested the same slight superiority of sulphapyridine, although the difference in potency of the two drugs was not considered by the authors sufficient to be significant.

My personal experience of a difference in effectiveness of these drugs is mainly derived from the early period of chemotherapy when sulphanilamide was being tried in meningococcal meningitis in various dosages. I then learned that a low initial dosage of sulphanilamide might fail to save patients who, according to all subsequent experience, would most probably have recovered on larger doses. Since then, I have always been careful in using sulphanilamide to employ the high daily dosage of 3 grammes in infants graded to 9 g. in adults during the initial period of two to three days. On the other hand, although I have usually employed the same dosage for sulphapyridine, there have been quite a number of cases in which much smaller doses of this drug were given without any apparent diminution of the usual rapidly curative effect. Sulphapyridine is therefore the drug of first choice because with it a greater latitude of dosage appears to be permissible, and this constitutes, in the varying circumstances of practice, an important factor of safety.

The importance of the dosage interval has, of course, been generally recognised since Marshall's early work on absorption and excretion of the drug. The four-hourly interval is employed in the first three days, and thereafter four- to six-hourly intervals according to convenience.

May I add that in the rapid evolution of the chemotherapy of this disease a further change is already foreshadowed. Experimental evidence shows that sulphathiazole (M. & B. 760 or Ciba 3714) is at least as potent in meningococcal infections as sulphapyridine. Clinical evidence is so far limited, but 7 cases, including 5 children, have been treated with success in Switzerland. I have used the new drug in 16 cases of meningococcal meningitis, usually but not always after two or three preliminary doses of sulphapyridine, and have been impressed with the rapid improvement in the clinical condition and the very rapid clearing of the c.s.f. The great advantage of this drug is the relative absence of nausea, vomiting and depression, and there is also practically no cyanosis. The cases on which it has been used so far have been only moderately severe, but the sodium solution is available for intravenous injection in severe acute cases. If further experience confirms these early findings sulphathiazole may yet become the drug of choice in cerebrospinal fever.

I am, Sir, yours faithfully,

H. STANLEY BANKS.

Park Hospital, Hither Green, S.E.13.

A CALL FOR HELP

SIR,—The Ladies' Guild of the Royal Medical Benevolent Fund beg to place before your readers the need for help in money, clothing and personal service in their work of assisting widows and children who are beneficiaries of the fund. There are large numbers of those who through age and infirmity require regular money grants; to them our failure would mean destitution. Many subsisting on meagre incomes require gifts of coal, clothing and invalid comforts—all beyond their own resources. There are widows left suddenly with families in the critical stages of education; if we can help them the family may become self-supporting, otherwise they are overwhelmed and sink into extreme poverty.

We are facing these difficult times with an excess of expenditure over income and with the prospect of reduced revenue and increased responsibilities, but if every woman connected with the profession would subscribe to the guild (the minimum subscription is 2*s.* 6*d.*) all demands could be met. Subscriptions should be sent to the hon. treasurer, Ladies' Guild of the R.M.B.F., Tavistock House (North), Tavistock Square, London, W.C.1. I am, Sir, yours faithfully,

LAETITIA N. HUTCHISON.

SOLDIER'S DOCTOR

SIR,—Like many others of my age I gave the best years of my life to being a soldier's doctor and loved the job. Who can forget those battalions in which commanding officers and adjutants came and went while doctor and quartermaster stayed on and on? We knew the officers and we knew the men. We saw the drafts arrive. We developed an uncanny skill in picking out at first sight the good from the bad: the new colonel with a big-game hunting reputation who would wangle a staff job within a few weeks, the quiet city clerk who would stick it to the end. No need to worry about a professional reputation or the quarterly panel cheque, we had only to keep the men fit and if they were sick or wounded to restore them as quickly as possible to their work. We saw men go down the line with simple flesh wounds, some to return within a few weeks, others to be lost for months in base hospitals or convalescent homes. Some of us worked in these base hospitals and out of it came the realisation that soldiers need proper soldiers' doctors. If a driver suffers a motor accident he will the more quickly regain his nerve if he drives again the next day. So it is with the soldiers. After the accidents of war one kind of hospital treatment will make him, another kind will mar him.

I raise this question to ask if the men now going into the R.A.M.C. are receiving the instruction and advice which will help them in their jobs, and also to ask if the E.M.S. civilian hospitals to which the wounded are now being sent are places in which their morale will be maintained or places in which their fears and weaknesses will be fostered in spite of themselves. Yesterday I saw a grocer's assistant who was shot in the forearm at the age of 18 in 1916. His battalion had not yet been in heavy action, so his medical officer supported his own wish that he should not go down the line. He carried on. Next year he was wounded through the lung at Bourlon Wood. There followed hæmoptysis and pleural infection which was treated in a hospital at Abbeville. Then two months in a hospital in England before going back to be in time for the March retreat. He was back to duty within four months of being wounded. That was good army doctoring. That man would now be sent to a civilian hospital and stay there under the care of a chest surgeon, but would he thus receive the quick encouragement to be back with his battalion?

The hospitalisation of soldiers is one of the most technical of medical problems. Mere skill in investigation and diagnosis is not sufficient. Ill chosen electrocardiography may breed D.A.H., and orthopædic specialists may foster hysterical palsies. I believe that specialists of this kind should never be in charge of soldiers' wards and that soldiers should be in proper soldiers' hospitals. Let the E.M.S. look after the hopelessly wounded soldiers, but the remainder should have the advantage of discipline and other kinds of skill. I am, Sir, yours faithfully,

PERTINAX.

Medical Diary

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1.
WEDNESDAY
Surgery—5.30 P.M., Mr. Kenneth Walker: Protection of the Soldier in Warfare. Lord Horder, Sir Charles Gordon-Watson, and Sir Harold Gillies will also speak.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W.12.
TUESDAY.—2.30 P.M., Sir Walter Langdon-Brown: ward clinic.
WEDNESDAY.—11.30 A.M., clinico-pathological conference (medical). 2 P.M., Mr. E. J. King, Ph.D.: Carbohydrate Metabolism and Diabetes. 3 P.M., clinico-pathological conference (surgical).
THURSDAY.—2 P.M., Dr. Duncan White: radiological conference.
FRIDAY.—2 P.M., clinico-pathological conference (gynæcological). 2.30 P.M., Mr. V. B. Green-Armytage: sterility clinic.
DAILY.—10 A.M.–4 P.M., medical clinics; surgical clinics and operations; obstetrical and gynæcological clinics and operations. 1.30–2 P.M., post-mortem demonstration.

FELLOWSHIP OF MEDICINE AND POSTGRADUATE MEDICAL ASSOCIATION, 1, Wimpole Street, W.1.
Brompton Hospital, S.W.3, TUES. and THURS., 6 P.M., M.R.C.P. course in chest diseases.

Births, Marriages and Deaths

BIRTHS

BEVAN.—On June 15, at Shrewsbury, the wife of Captain Edward Bevan, R.A.M.C., of Cambridge—a son.
BULMAN.—On June 9, at Cambridge, the wife of Lieutenant J. F. H. Bulman, R.A.M.C.—a daughter.
GOLDBY.—On June 12, in Adelaide, S. Australia, the wife of Dr. Frank Goldby—a son.
LAMB.—On June 12, at Weymouth, the wife of Surgeon Lieutenant F. H. Lamb, R.N.—a son.
SALAMAN.—On June 11, at Harpenden, the wife of Dr. Myer Head Salaman—a son.
SALKELD.—On June 14, at Bournemouth, the wife of Mr. Roy Salkeld, F.R.C.S.E.—a son.

MARRIAGES

BLAIR—LAMMOND.—On June 15, at Palmers Green, Robert Alexander Blair, M.B., to Olive Mabel Lammond.
DARKE—WILD.—On June 12, in London, Christopher Sydney Darke, M.D., M.R.C.P., to Margaret Annie Crossley Wild.

DEATHS

BIRD.—On June 13, at Basingstoke, Gerald Francis Bird, M.C., M.B. Camb., of Godalming, aged 61.
FOX.—On June 15, in London, Robert Fortescue Fox, M.D. Lond., F.R.C.P., F.R.Met.S.
MARSH.—On June 16, at Huntingdon, Jane Marsh, M.D. Brux., L.R.C.P.E.
NORRIS.—On June 8, at Hillingdon, Middlesex, William Perrin Norris, M.D. Melb., D.P.H., aged 73.
O'KINEALY.—On June 6, at Torquay, Frederick O'Kinealy, C.I.E., C.V.O., M.R.C.S., Lieut.-Colonel, I.M.S.
PRICE.—On June 10, at Plymouth, Francis Edward Price, F.R.C.S.E., aged 66.

MEDICAL NEWS

Royal College of Surgeons of England

AT a meeting of the council held on June 13 with Mr. Hugh Lett, the president, in the chair, it was decided to hold an additional final fellowship examination in February. Prof. G. Grey Turner was re-appointed as the representative of the college on the council of King's College, University of Durham.

It was reported that the Sir Gilbert Blane medal for 1940 had been awarded to Surgeon Lieut.-Commander P. K. Fraser, R.N., for his original work on superficial ringworm infections.

Diplomas of fellowship were granted to the following:

H. L. M. Roualle, C. H. Bliss, H. F. Anderson, T. McM. Boyle, Oswald Lloyd, W. D. Park, A. W. Bone, C. H. Tanner, G. P. Arden, J. C. Newbold, Kathleen M. Robinson, A. S. Aldis, P. M. Kelly, E. M. Evans, A. D. Le Vay, P. J. Mullafcroze, W. B. Waterfall, E. G. Dolton, Nicholas Vere-Hodge, M. H. Harmer, J. I. P. James, A. G. McPherson, N. J. Dhondy, V. K. Desai, G. G. Cooley, Hussein Abd-El-Aziz, Peter Berbrayer, Rex Blunden, A. K. Dutta Gupta, M. H. El Zeneiny, R. M. Fawzi, W. R. Gayton, Albert Gild, J. M. J. Jens, P. J. Kenny, D. H. Mackay, A. M. Minaisy, M. S. K. Rudd, M. L. A. Samie, K. C. Sarbadhikari, H. K. Sett, A. H. M. Sharkawi, B. K. Sheorey, John Swinney.

A licence in dental surgery was granted to K. R. Titford (Guy's Hospital), and diplomas in anæsthetics were granted, jointly with the Royal College of Physicians, to the following:

J. B. Bamford, Katharine Banks, J. F. J. Bereen, D. J. A. Brown, K. C. Brown, Samuel Carden, P. C. Conran, J. R. Dunn, R. A. Gordon, K. C. Grigor, F. R. Gusterson, W. E. Hadden, S. R. T. Headley, Elliott Isaacson, Mary K. W. Langston, J. D. Laycock, J. A. Lee, Samuel Mark, P. J. W. Mills, W. W. Mushin, E. A. Pask, L. M. Shorvon, M. R. W. Spacek, W. N. Taylor, K. B. Thornton, Joan Watts, and H. D. Wyse.

It was decided to recognise the posts of resident surgical officer and first and second house-surgeons at Ancoats Hospital, Manchester, for the six months' surgical practice required of candidates for the final fellowship examination.

The following examiners were elected for the ensuing year:

Dental Surgery—Surgical section: Mr. E. G. Slesinger, Mr. Reginald Vick, Mr. J. Basil Hume, Mr. L. E. C. Norbury, Mr. A. C. MacLeod, and Mr. A. J. Gardham.

Primary Fellowship—Anatomy: Mr. E. P. Stibbe, Prof. F. Wood Jones, Mr. A. M. A. Moore, Surgeon Rear-Admiral G. Gordon-Taylor. Physiology: Prof. D. T. Harris, Prof. A. St. G. J. Huggett, Prof. H. P. Gilding, and Prof. R. J. S. McDowall.

Diploma of L.R.C.P., M.R.C.S.—Elementary biology: Mr. A. E. Ellis, Mr. S. R. B. Pask, Mr. Wilfrid Rushton, D.Sc., and Dr. E. I. Jones. Anatomy: Prof. W. J. Hamilton, Prof. A. B. Appleton, and Mr. James Whillis. Physiology: Prof. D. T. Harris, and Prof. Hamilton Hartridge, F.R.S. Midwifery: Mr. J. St. G. Wilson, Mr. Leslie Williams, Mr. G. F. Gibberd, and Mr. Harold Taylor. Pathology: Prof. W. G. Barnard, Mr. D. H. Patey, Prof. W. D. Newcomb, and Mr. R. M. Handfield-Jones.

Diploma in Public Health—Part I: Prof. John Eyre. Part II: Dr. Charles Porter.

Diploma in Tropical Medicine and Hygiene—Dr. Hamilton Fairley, and Dr. Philip Manson-Bahr.

Diploma in Ophthalmic Medicine and Surgery—Part I: Mr. Affleck Greeves, and Mr. Frank Law. Part II: Mr. Adrian Caddy.

Diploma in Psychological Medicine—Surgeon-Captain Macdonald Critchley.

Diploma in Laryngology and Otology.—Part I: Mr. N. A. Jory, and Mr. Terence Cawthorne. Part II: Mr. Edward Carew-Shaw.

Diploma in Medical Radiology—Part I: Dr. H. T. Flint. Part II: Mr. G. F. Stebbing.

Diploma in Anæsthetics—Dr. A. S. Daly.

Diploma in Child Health—Dr. Alan Moncrieff, and Dr. Charles Harris.

Orthopædic Clinics in Scotland

Lord Craigmyle, addressing the Cripples' Welfare Association, said that Scotland lagged behind in her preparations for the treatment and welfare of cripples, particularly adults. They lacked the organisation and equipment for turning a crippled man who was a burden to himself and the community into a self-respecting and self-supporting citizen. If they could establish in every county an adult cripples' clinic with a group of doctors and others with orthopaedic training, they would receive official backing. He announced an anonymous gift of £500, the sole condition being that at least £100 should be allocated to the adult orthopaedic clinic which it was proposed to start in the Borders.

University of Cambridge

Dr. G. W. Harris and Dr. L. H. Aitken have been appointed demonstrators in anatomy for one year from Oct. 1.

Mr. Malcolm Donaldson has been appointed examiner in midwifery for part I of the Final M.B. examination this month instead of Mr. A. J. McNair, who is unable to act.

At recent examinations the following were successful:

FINAL EXAMINATION FOR M.B. DEGREE

Part I: Surgery, Midwifery and Gynæcology.—H. J. Anderson, O. B. Appleyard, W. D. Arthur, L. J. Bendit, R. G. Benians, A. P. Bentall, P. T. Boyle, B. N. Brooke, H. T. Calvert, H. D. L. Campion, R. L. Canney, O. Clarke, R. Crawford, P. J. Crowley, G. E. H. Enderby, G. G. France, R. Friedman, P. Haden, J. S. Hesketh, E. V. Hope, E. W. Hyde, D. M. Jackson, F. S. Jackson, T. E. Jones-Davies, R. K. I. Kennedy, D. Laing, J. J. Landon, J. M. Lipscomb, A. G. G. Long, I. B. Mackay, D. H. Manson-Bahr, P. F. Milling, H. V. Morgan, M. C. Mundle, W. H. Parkinson, J. F. Paxton, A. D. Payne, P. E. Perceval, F. T. G. Prunty, A. H. Rea, L. Read, S. R. Reynolds, R. D. S. Rhys-Lewis, T. W. Rowntree, R. A. Shooter, L. W. Smith, C. S. N. Swan, L. R. S. Taylor, R. M. Todd, D. N. White, C. F. H. Wiessner, J. M. Willcox, T. N. P. Wilton, C. H. Wood, F. J. Y. Wood, D. G. Wraith, N. G. Clegg, J. Gibbon Davies, P. G. Holman, E. Rhodes, and R. M. Stevenson.

General Medical Council

At a meeting of the executive committee of the council on May 27 it was reported that the following names had been restored to the Medical Register after non-penal removal:

Richard E. Grandy, Francis H. McKenna, William A. Malone, Henry J. Mathews, Isaac M. Sclare, Herbert J. Sheppard, William M. C. Smith, Andrew Thornton, Ruby E. Winning, James W. Wylie, and William L. Yell.

Irish Medical Union

At the annual meeting of the union held on June 6, Dr. Patrick MacCarvill, the outgoing president, in the chair, resolutions were carried offering the government the complete co-operation of the union in organising a national medical service to meet the present emergency, with the proviso that the union does not revoke any of its previous decisions. For some months the union has followed a policy of non-coöperation with the government because of their persistent neglect to remedy various grievances which the union had put forward. These claims are to be held in suspense.

Dr. D. F. MacCaisley, who was elected president of the union, has been vice-president for the last two years. He is a medical officer of the dispensary service at Crookstown, co. Cork, and a lecturer in therapeutics in University College, Cork. Dr. John P. Shanley, who was honorary secretary of the union for ten years after its establishment, has been elected vice-president.

Before the business meeting a scientific session was held, at which Dr. J. C. Flood gave an address on minor surgery in general practice. Dr. P. J. Keogh spoke on the same subject from the point of view of a throat surgeon, and was followed by Dr. P. A. M. FitzGerald. In the evening a very pleasant dinner was held at the Shelbourne Hotel, where some seventy members and guests sat down to table.

Appointments

CAMPBELL, CHARLES F., M.B., D.P.H., assistant tuberculosis officer and assistant resident medical officer at Rushden House Sanatorium, Northampton.

LA CROIX, J., M.D. Manitoba, surgical first assistant at the Royal Infirmary and Hospital, Sheffield.

O'CONNOR, MARGARET M., M.R.C.S., D.P.H., temporary assistant medical officer of health for Heston and Isleworth.

SPRINGFORD, W., M.B., surgical first assistant at the Royal Infirmary and Hospital, Sheffield.

TIBBLES, SYDNEY, L.R.C.P.E., hon. eye surgeon to the British War Refugees' Fund.

Examining Surgeon under the Factories Act 1937: Dr. W. E. F. DAVIDSON (Battle, Sussex).

NOTES, COMMENTS AND ABSTRACTS

BIRTH TRAUMA AMONG PRIMITIVE PEOPLES

By C. A. H. Watts, M.B. Durh., D.R.C.O.G.
SENIOR MEDICAL OFFICER, ETALANENI MISSION HOSPITAL, ZULULAND

Badly neglected cases of labour have almost entirely disappeared from obstetrical practice in England, where doctors are to be found in almost every village and transport to the nearest hospital is swift and easy. The position in rural Africa is very different. There doctors are rare beings and transport is always difficult if not impossible. As a student I often wondered what would happen to the persistent occipito-posterior if there was nobody to rotate the head and deliver the fœtus with forceps. My curiosity has been amply satisfied here in Africa. The cases of severe birth trauma here described show how nature is often capable of dealing with the situation in a way which was a surprise to me.

CASE-RECORDS

Case 1.—I had to drive eight miles on a rough track in my car and ride for an hour and a half on horseback to reach this patient. She was an unmarried Zulu girl of about eighteen. This was her first pregnancy and she had been in labour for a week. Her condition was shocking. She was quite exhausted and her face was cold and clammy. There was no pulse at her wrist, and her temperature was subnormal. The abdomen was grossly distended with tympanitic bowel, and tender. There were no fœtal heart-sounds. The vulva was covered with foul-smelling sloughs, and the scalp of the fœtus was distending the remnants of the labia. A little gentle traction on the scalp produced a stinking macerated fœtus together with the placenta and a large volume of foul urine. The whole birth canal appeared to be in the process of sloughing. Disproportion had apparently been overcome by collapse of the fœtal skull. There was no bleeding. It was difficult to define the pelvic organs, but it was clear that the urethra and posterior bladder wall had sloughed. As a placebo I left a supply of sulphanilamide tablets, and I gave the worst possible prognosis. Three months later the patient and her father turned up at the hospital outpatient department. The girl's general condition was good. Her complaints were pelvic pain and complete incontinence of urine. Her uterus was still palpable, and there was a tender swelling extending from it into the left iliac fossa. The vagina was much stenosed, and it was painful and difficult to introduce a single finger. The whole of the vulva and vagina was clothed with skin or mucous membrane, and I could not locate the vesicovaginal fistula, although urine could be seen coming out of the vaginal orifice. I felt that surgical intervention at this stage would be premature and in any case beyond my powers, so I dismissed the girl with a large bottle of a citrate mixture. Six months after her delivery she turned up again. She assured me the medicine had been most effective for after a fortnight the urinary incontinence had cleared up completely! She now wanted something to ease the persistent pelvic pain. The uterus was still enlarged and tender. The vaginal stenosis had progressed, and now even a finger could not be inserted. There had been no return of menstruation.

Case 2.—This patient was admitted to hospital when she had been in labour for at least seven days. Her pulse although feeble was only 76, and the temperature was normal. She looked very toxic and ill. Her abdomen was distended with resonant bowel. The scalp was showing at the vulva, and there was a fearful smell of putrefaction. Under light anæsthesia an attempt was made to apply forceps, but the vagina was sloughing and did not allow the blades to be inserted. A firm grasp was taken of the scalp itself, and a good pull effected a delivery. The placenta followed immediately and there was no bleeding. The fœtus was macerated and stinking, and the whole vagina appeared to be sloughing. An examination five days later showed a complete absence of urethra and posterior bladder wall. The pubic bone lay bare and fæces were oozing into the vagina. Day after day large foul sloughs were reported to have come away. To everyone's surprise and distress the patient survived. She was sent home after 7½ weeks. She still had complete incontinence of urine, but fæces no longer appeared in the vagina. The pubic bone was bare, and large areas were still covered with granulations, but the discharge of sloughs had ceased. There was as yet no evidence of vaginal stenosis. During her convalescence she had two weeks of sulphanilamide treatment, and her temperature, while irregular, never rose above 101° F. and the maximum pulse-rate was 114.

Two points of interest arise from these cases. If the patient is strong enough to survive the ordeal of a seven-day labour she has had time to mobilise all her forces against infection, which is localised in the pelvis. Thus the prognosis is not as hopeless as it appears to be. In both cases I forecast an early death, and I was wrong. Secondly, when the birth trauma is extensive fibrosis is also extreme in the later stages. The shrinking of this cicatricial tissue is capable of healing a fistula, which it would have been most difficult to tackle by surgical methods. As a student I was led to believe that a vesicovaginal fistula never healed spontaneously, and that operative cure was difficult and not always crowned with success. Fairbairn in his textbook explains that the bladder fistulæ seen in England are nearly always due to instrumentation, and he points out that such an injury is not followed by the intense fibrosis which follows pressure necrosis. Thus the fistula which occurs in England will not tend to heal in the way it did in case 1, where shrinking of the fibrous tissue was clearly nature's method of effecting a cure.

Case 3.—This was a Zulu woman who was some 32 weeks on in her seventh pregnancy. On doing the routine pelvic examination I found she had an old complete tear of the perineum dating from her first labour, which had been difficult. To my surprise the patient said she had no trouble with her bowels, except after a purgative.

Case 4.—This was a Zulu woman of about 34 who was pregnant for the third time. The first labour had ended with a live child, after a difficult labour. She must have then had a complete tear of the perineum, because afterwards she suffered from fæcal incontinence. A second pregnancy quickly followed the first, ending in an easy birth. The incontinence of fæces continued for some months after this, but control gradually returned. When seen by me the patient appeared to have no anal sphincter, the vaginal orifice and anus appearing as one opening. An inch or so inside this cloaca a thin transverse septum divided the rectum from the upper reaches of the vagina. The patient claimed to have perfect control of the bowels, except after a dose of opening medicine.

It seems then that, given time, nature can produce some sort of neuromuscular control over the lower bowel, even when anatomically the continuity of both internal and external sphincters appears to have been destroyed.

Case 5.—A Zulu woman of about 30, who gave a history of a difficult first labour, producing a stillborn child. She fell pregnant again and was successfully delivered by cæsarean section. This was six years before her consultation with me. Her general condition was good. Her pelvis was small, with an external conjugate of only 6½ in. Fibrosis of the vagina made it impossible to measure the diameter of the diagonal conjugate. The vagina contained a constricting ring of fibrous tissue, which would only admit two fingers. The fœtus was in the right occipito-anterior position, and the head was freely movable above the brim. Was the cæsarean section performed for the small pelvis, or for the fibrosis?

I decided to wait and see what happened. The patient was allowed to come into labour, and the head soon slipped into the pelvis. An hour later it was on the perineum. The stricture did not appear to be an insuperable obstacle, and I thought it might be relieved by multiple incisions. I carried this out and applied forceps through the ring without difficulty. However, it became evident on the first pull that the stricture would not allow the head to pass. It is tantalising to see the fœtal head apparently all ready for an easy lift out and to realise that abdominal section is the only method of delivery. A cæsarean section was performed. Being an inexperienced surgeon I had to go through the upper uterine segment. However, good fortune was with me and the patient was discharged from the hospital with her baby three weeks later. Needless to say her convalescence was not entirely afebrile, but her temperature never rose above 100·4° F. and there were never any alarming symptoms.

Fibrosis is a friend when it causes a troublesome fistula to close up, but if the woman becomes pregnant again she presents a difficult obstetrical problem. The textbook says that a cæsarean section is essential in cases where there is undilatable atresia of the cervix and vagina. That sounds clear enough; but to one inexperienced in the strength of fibrosis it is difficult to assess the dilatability of a stricture.

CASE 6.—A Zulu woman aged about 30. She had a difficult first labour ending in a stillbirth. She then had two miscarriages, one at five months and the other at three months. Four years ago she had a difficult premature labour, producing a live 3 lb. baby which survived. She came to me about eight months on in pregnancy. She said she had had severe pelvic pain, and this was followed in the night by a slight hæmorrhage which had eased the pain. Abdominal examination showed the baby to be in the L.O.A. position, and the head was freely movable above the brim. Her external measurements were satisfactory, and beyond great tenderness little could be made out by the vagina. The blood-pressure was normal and there were no signs of toxæmia. I advised her to come at once to the hospital 15 miles away but no Zulu unless at death's door will consent to do that before the family have been consulted. She arrived at the hospital a week later in great pain, referred to the hypogastrium. The urine was normal and there was nothing abnormal on abdominal examination. No uterine contractions were felt. She was admitted for observation. That night bleeding started again, and once more the pain eased off. The next morning she was examined under anæsthesia. The vaginal vault was composed of hard fibrous tissue, and with difficulty a tiny pin-hole os was found in the region which should have been the right fornix. Of cervix there was none. The vagina itself was short, and the walls were thickened. The bleeding was slight, and I was unable to confirm or exclude a placenta prævia. I felt a cæsarean section on an eight-month fœtus was not justified; and I considered that if bleeding did occur it could easily be controlled through such a minute os. I was not left in doubt for long. The next day she came into labour; the head was soon deep in the pelvis, and there was no more bleeding. Four hours later the membranes ruptured. The vaginal examination which followed was very difficult, as the whole vagina appeared to be extremely tender. However, I could feel that the head was low and I could get one finger into the os. Three hours later the patient, who had been having good pains, was beginning to show signs of exhaustion. The fœtal heart was difficult to hear behind a loud souffle. A further vaginal examination showed no change in the os. A cæsarean section was therefore performed and an asphyxiated 3½ lb. fœtus was produced. It was resuscitated but died twelve hours later.

My explanation of this case is as follows. At her first labour the cervix probably sloughed off completely. She then suffered from incontinence of fæces for two further pregnancies. The increasing fibrosis permitted the fœtus to survive eight months in the fourth pregnancy, but the delivery was difficult. In the fifth pregnancy the fibrosis amounted to an undilatable atresia. When the so-called "painless" contractions of the uterus occurred towards the end of pregnancy they stretched the fibrous tissue in the region of the os and caused considerable pain. When the stretched part gave, as evidenced by antepartum bleeding, the pain disappeared.

MORAL

From these cases I have learned to have a great respect for fibrous tissue. If this is a result of serious birth trauma in the past a cæsarean section will probably be necessary. Intense vaginal tenderness which makes a thorough pelvic examination almost impossible without an anæsthetic is a symptom of such fibrosis.

These cases will remind practitioners in England of the bad old days. I offer my apologies to the expert accoucheur for the times when I fell short of the obstetrical ideal. It is not a good thing to do a cæsarean section after applying forceps, and one takes a risk in doing a pelvic examination on a case of antepartum hæmorrhage of unknown origin, but the medical Jack-of-all-trades who is isolated from the experts has to take risks.

MAKE-BELIEVE

TRAINING in first-aid may be very dull, especially for the trainer, but Capt. A. C. White (First-aid Competitions. Dale Reynolds. 1s.) has tried, in a short pamphlet to show how some of this boredom can be eliminated. At first glance his competitions seem to be formal and inelastic, but there may be room even for formal and inelastic training. No competition will ever be anything like as tough as the job that has to be done in real life. The object of competitions and of training must therefore be to develop team-work; bearing in mind that a team that is a snip to win a competition may come out bottom if a single member gets the German measles, unless they have been careful to practise with every member of the team in every place and to train at least one, and perhaps, two substitutes. It might even be well to practise with one or two men short, to allow for casualties. Formal training teaches the team to do the things that otherwise are forgotten; one of these is to summon the ambulance quickly, and another is to do good, careful clerical work. In the early days of the L.C.C. ambulances, complaints of delay were often made; usually it was found that no-one had summoned the ambulance. Careful clerical work saves endless trouble, even when it only means putting the surname first in block letters and entering the sex. It is a remarkable thing that if a couple have a surname that will also do for a given-name they will give a christian name to their progeny that will also do for a surname. The Smiths will name their children Bill or Bert; but an Anthony is likely to call his son Cyprian and his daughter Florence.

In the pamphlet Captain Knox does not take enough note of obstacles. In stretcher-drill the team should practise with a dummy at first, over every barrier that can be found; after that each member of the team should act in turn as the patient for such obstacles as gates, fences, ditches, or water-tanks. When advanced exercises are attempted, in which a stretcher has to be taken over a twelve-foot wall or from a second-story balcony, the dummy should come into his own again.

ROYAL COLLEGE OF SURGEONS IN IRELAND.—The annual elections of the college were held at the beginning of the month. Mr. Henry Stokes, senior surgeon to the Meath Hospital and vice-president since 1938, was elected to succeed Mr. William Doolin as president, and Mr. T. O. Graham succeeded as vice-president. Mr. Stokes is a grandson of William Stokes, the great Dublin physician, and Professor Boxwell, the present president of the Royal College of Physicians of Ireland, is another of his grandsons.

ADDRESSES AND ORIGINAL ARTICLES

SYNTHETIC VITAMIN K IN TREATMENT OF HYPOPROTHROMBINÆMIA

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During the past two years therapeutically active vitamin K has been obtained from biological materials, particularly alfalfa and fish-meal (Snell 1939). Extracts of these, administered either by mouth or intramuscularly, have proved effective in restoring prothrombin levels in the blood of patients with hypoprothrombinæmia. The response to intramuscular administration, however, has been unsatisfactory (Butt, Snell, and Osterberg 1939a), because the restoration of the prothrombin level is slow, and bleeding, when present, is not rapidly controlled. Since many patients with hypoprothrombinæmia bleed actively from the upper gastro-intestinal tract, and since the conditions leading to hypoprothrombinæmia are often associated with severe vomiting, the introduction of a potent and rapidly acting vitamin K analogue, which can be given parenterally, is of practical importance.

In September, 1939, a brief four years after the discovery of vitamin K by Dam (1935), Doisy and his associates (Binkley et al. 1939) demonstrated conclusively that the structure of vitamin K_1, the active principle in alfalfa, is represented by the formula 2-methyl, 3-phytyl-1, 4-naphthoquinone. This work confirmed the tentative suggestions published simultaneously by four independent groups of investigators (Almquist and Klose 1939a, Ansbacher and Fernholz 1939, Fiesser et al. 1939, MacCorquodale et al. 1939). Many compounds of the 1, 4-naphthoquinone series exhibit vitamin-K activity both in chicks (Almquist and Klose 1939a, Ansbacher and Fernholz 1939, Fieser et al. 1939, MacCorquodale et al. 1939) and in man (Butt, Snell, and Osterberg 1939b, Frank, Hurwitz, and Seligman 1939, Macfie, Bacharach, and Chance 1939). Of these, 2-methyl-1, 4-naphthoquinone is at present the most active compound known (Almquist and Klose 1939b); and, since its activity is approximately equal to that of natural vitamin K and it is relatively stable and easily manufactured, it has been proposed as a standard of reference for the assay of vitamin-K activity (Thayer et al. 1939). As with the other chemicals in this series, however, the solubility of this compound in water and aqueous solutions is minimal, and it is not readily applicable for intravenous use.

During the past three months we have had the opportunity of studying the vitamin-K activity of a water-soluble derivative of 2-methyl-1, 4-naphthoquinone, administered intravenously or intramuscularly to patients with hypoprothrombinæmia. This compound has been synthesised by Moore and Kirchmeyer (1940), who report that the material is prepared by treating 2-methyl-1, 4-naphthoquinone with sodium bisulphite in one to one or one to two molecular proportions. On a theoretical basis they assume that it is the sodium salt of 3-sulphonic acid of 2-methyl-1, 4-naphthoquinone or the 3-sulphonic acid of 2-methyl-1, 4-naphthohydroquinone. It is more stable than 2-methyl-1, 4-naphthoquinone and readily soluble in water. Each cubic centimetre of an isotonic solution containing this material, as used in our investigation, was the equivalent of 1 mg. of 2-methyl-1, 4-naphthoquinone by chick assay.[1] Our observations on the use of this compound have been made on 18 patients with a variety of conditions in which hypoprothrombinæmia was a feature. Estimations of the prothrombin content of the plasma were carried out according to the method of Quick et al. (1935), by which the time is determined in which the patient's plasma coagulates, after recalcification in the presence of an excess of thromboplastin, and a comparison is made with normal plasma treated in a similar manner.[2] Conversion of these times to blood-prothrombin percentages were made by reference to curves constructed according to the method of Kark and Lozner (1939). Blood-coagulation times were estimated according to the standard methods of Pohle and Taylor (1937), and bleeding-times by Duke's method.

RESPONSE TO THERAPY

Of the 18 patients 9 responded with a rapid rise in blood-prothrombin concentration after the administration of Moore and Kirchmeyer's compound (see table). In most of these cases a relapse followed the discontinuance of therapy, and the blood-prothrombin concentrations were again restored to normal by further treatment. In 3 patients there was active bleeding before therapy, and this was controlled within a few hours in all of them.

ILLUSTRATIVE CASE-RECORDS

Case 1.—Ulcerative colitis, ileostomy, rectal and wound hæmorrhage (fig. 1). A white housewife, aged 32, was admitted with ulcerative colitis of two years' standing. Her illness had been severe, with diarrhœa and fever. Ileostomy was performed on Dec. 1, 1939. During the next five days she continued to have diarrhœa. On the fifth day after the operation she had four bowel movements consisting of blood and blood-clot, and oozing of blood from the abdominal incision began. She was given a transfusion of 1000 c.cm. of blood.

After the transfusion we saw her for the first time because of continued hæmorrhage. The blood-prothrombin concentration was then approximately 20 per cent. (Quick prothrombin time 52 sec. against normal control of 25 sec.) She was immediately given 1 c.cm. of water-soluble synthetic vitamin K intravenously (equivalent to 1 mg. of 2-methyl-1, 4-naphthoquinone), and after an hour her blood-prothrombin concentration was unchanged. When her wound was examined some three hours later, the oozing had stopped.

Twenty-four hours after synthetic vitamin K had been given the blood-prothrombin concentration was 65 per cent. (Quick prothrombin time 31 sec.). That day there was a bloody discharge from the rectum but no further frank hæmorrhage. The next day her blood-prothrombin concentration was 95 per cent. (Quick prothrombin time 26 sec.). She had by now developed a hectic fever with diarrhœa. The blood-prothrombin concentration decreased gradually, and by Dec. 12, seven days after the injection of synthetic vitamin K, it was 40 per cent. That day she was given a further injection of 1 c.cm. of water-soluble synthetic vitamin K. Forty-eight hours later her blood-prothrombin concentration was 90 per cent., and it again dropped to 50 per cent. within three days, although there was clinical improvement.

On the 18th, six days after the second injection, she was given an injection of 2 c.cm. of water-soluble synthetic vitamin K intravenously, and two hours later her blood-prothrombin concentration had risen at least 20 per cent. Forty-eight hours later it had reached 100 per cent. (Quick prothrombin time 25 sec.). She showed a steady

1. It is now prepared so that 1 c.cm. of the solution is equivalent to 2 mg. of 2-methyl-1, 4-naphthoquinone.
2. Control prothrombin times in this study varied from 19 to 25 sec. with different batches of thromboplastin. For the sake of uniformity all Quick prothrombin times have been calculated so that 25 sec. represents 100 per cent. prothrombin.

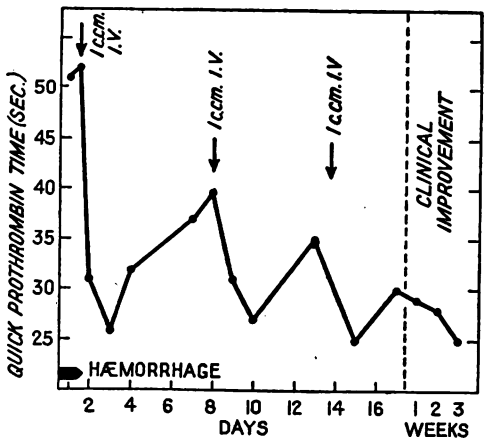

FIG. 1—Effect of intravenous injections of water-soluble synthetic vitamin K on the Quick prothrombin time of a patient (case 1) with ulcerative colitis. Ileostomy performed five days before the first injection.

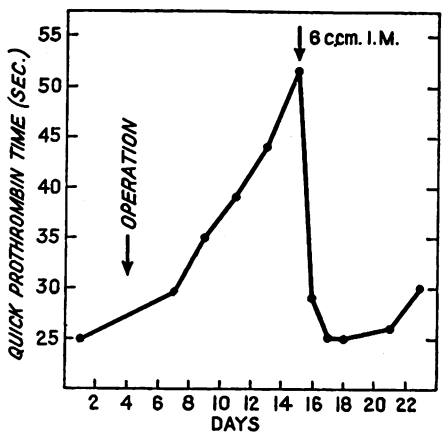

FIG. 2—Effect of intramuscular injection of water-soluble synthetic vitamin K on the Quick prothrombin time of a patient (case 2) with stricture of the common bile-duct and biliary fistula.

improvement clinically and, though her prothrombin concentration had fallen to 70 per cent. on the 21st, it had returned spontaneously to a normal level by Jan. 8, 1940.

CASE 2.—Stricture of the common bile-duct, wound, hæmorrhage (fig. 2). A white married housewife, aged 38, was readmitted on Dec. 25, 1939, with intermittent jaundice associated with pruritus and clay-coloured stools, following cholecystectomy in March, 1938. There was some tenderness over the operation scar. The icteric index was 20. Her bleeding-time was 2½ min. and clotting-time 5 min. Her blood-prothrombin concentration was 100 per cent. (Quick prothrombin time 25 sec.). On the 30th abdominal exploration revealed a long stricture of the common bile-duct, and a drainage-tube was inserted preparatory to a later plastic repair.

After this operation she drained bile freely but began to vomit six days later. During this time her blood-prothrombin concentration fell gradually, and by Jan. 10, eleven days after operation, it had fallen to 22 per cent. (Quick prothrombin time 52 sec.), and there was oozing of blood from the abdominal wound. Her bleeding-time was prolonged to 5 min. Her blood-coagulation time was 6 min. and her icteric index 10. She was given 6 c.cm. of water-soluble synthetic vitamin K intramuscularly, and within four hours oozing had stopped. Twenty-four hours later the bleeding-time was 2 min. 30 sec., the blood-coagulation time 5 min., and the blood-prothrombin concentration 75 per cent. (Quick prothrombin time 29 sec.). The blood-prothrombin concentration had reached 100 per cent. (Quick prothrombin time 25 sec.) twenty-four hours later. By this time her general condition had improved, although copious drainage of bile continued, and she maintained a high blood-prothrombin concentration thereafter until her discharge from hospital.

CASE 3.—Cholelithiasis, carcinoma of the ampulla of Vater, obstructive jaundice (fig. 3). A white female, aged 77, was admitted on Sept. 11, 1939, when an acute empyema of the gall-bladder was incised and drained. Drainage of bile through the wound continued, and her stools were clay-coloured throughout her stay in hospital. She was discharged on Oct. 9 with a biliary fistula and with obstruction of the common duct.

She was readmitted early in January, 1940. She had had persistent jaundice and drainage of bile through the abdominal wound. There were many bruises on both arms, especially at the sites of venepuncture and where her ear had been stabbed for bleeding-time estimations. The icteric index was 35, the blood-coagulation time 6 min., and the bleeding-time 3½ min. The blood-prothrombin concentration was 27 per cent. (Quick prothrombin time 50 sec.). She was given 2 c.cm. of water-soluble synthetic vitamin K intravenously that day, and within twenty-four hours her prothrombin concentration was 65 per cent. (Quick prothrombin time 31 sec.). At this time venepuncture and stab wounds of the ear left no bruises. The bleeding-time was 1½ min., and the coagulation time 4½ min. Forty-eight hours after the injection the blood-prothrombin concentration was 100 per cent. (Quick prothrombin time 25 sec.). The next day the prothrombin concentration had dropped to 65 per cent.

During the next week the prothrombin concentration fell gradually, and by Jan. 16, eleven days after the injection of synthetic vitamin K, it was 30 per cent. (Quick prothrombin time 49 sec.). A second intravenous injection of 6 c.cm. of water-soluble synthetic vitamin K raised the prothrombin concentration in six hours to 60 per cent. A normal concentration, however, was not obtained on this occasion, and a gradual fall was noted. On the 20th 2 c.cm. of water-soluble synthetic vitamin K given intramuscularly raised the blood-prothrombin concentration from 50 per cent. to 70 per cent. in twenty-four hours. After this she was given further intramuscular injections to maintain a blood-prothrombin concentration well above the critical level for bleeding as a preoperative prophylactic measure.

A laparotomy was performed on Feb. 1, and at operation the common duct was found to be much dilated. Its terminal portion was obliterated by a fungating carcinoma originating in the ampulla of Vater, and in the duct above the neoplasm was a large gall-stone. There was no bleeding during or after the operation, and her blood-prothrombin concentration remained high.

CASE 4.—Hæmorrhagic disease of the newborn. A full-term white male child, born of a healthy mother and delivered uneventfully on Jan. 25, 1940, had a severe epistaxis four days later. No other hæmorrhagic manifestations were observed. The blood-prothrombin concentration was approximately 10 per cent. (Quick prothrombin time 91 sec. against normal control 25 sec.). He was given 6 c.cm. of water-soluble synthetic vitamin K (equivalent to 6 mg. of 2-methyl-1, 4-naphthoquinone) intramuscularly, and the hæmorrhage ceased and did not recur. Twenty-four hours after injection the blood-prothrombin concentration was 100 per cent. (Quick prothrombin time 25 sec.). The mother's blood at this time showed a normal figure. She gave no history of dietary disturbance or deficiency disease before her delivery.

FAILURE TO RESPOND TO THERAPY

We have studied 12 patients with clinical evidence of hepatic disease with hypoprothrombinæmia who did not respond even to intensive parenteral administration of either the water-soluble synthetic vitamin K or the natural vitamin K obtained from alfalfa, supplemented in some instances by large doses of 2-methyl-1, 4-naphthoquinone by mouth. Of these 12 patients 6 with severe parenchymatous liver disease, either acute yellow atrophy or disseminated carcinomatosis, were treated intensively with injections of vitamin K: 3 with the water-soluble synthetic compound, and 3 with natural vitamin K. These patients appeared critically ill and had a prothrombin level in the blood which approached the hæmorrhagic threshold. No response in their blood-prothrombin level was noticed at any time, and all died within three weeks of admission to hospital. The second group comprised 6 patients with chronic disease of the liver, including Banti's syndrome and alcoholic cirrhosis. These patients maintained a

blood-prothrombin level which, although consistently below normal, did not reach a critical level for bleeding. As in the first group, these patients showed no response to any known form of vitamin-K therapy, even in three instances in which the diet was supplemented by 300 g. of whole liver a day. None of the patients in this group have died; nor have any shown clinical improvement.

ILLUSTRATIVE CASE-RECORDS

CASE 5.—Acute yellow atrophy of the liver (fig. 4). A retired liftman, aged 57, was admitted on Jan. 10, 1940, to the Evans Memorial Hospital with weakness and jaundice. In 1924 he had had a cholecystectomy in the Boston City Hospital. Six to seven weeks before admission he had had an acute upper respiratory infection followed by persistent malaise. He lost his appetite and had epigastric distress, and his urine was dark. His food tasted "brassy," and two days before admission he was jaundiced. He had had no chills or fever. There was no history of alcoholism or of taking drugs.

His temperature, pulse, and respiration were normal, he was deeply jaundiced, and his liver was enlarged to 4 cm. below the costal margin and was firm, smooth, and tender. His spleen was palpable at the costal margin. The urine contained albumin, bile, and an increased amount of urobilinogen, with a few red blood-cells and white blood-cells. The icteric index was over 100. The hæmoglobin was 84 per cent.; red blood-cells 4,280,000; white cells 5200, with 20 per cent. monocytes. The serum bilirubin was 22·9 mg. per 100 c.cm. The blood-prothrombin concentration was 29 per cent. (Quick prothrombin time 47 sec.).

The patient rapidly declined, with progressive drowsiness and vomiting despite therapy with glucose given intravenously. He was given 6 c.cm. of water-soluble synthetic vitamin K intravenously daily for four days and 6 mg. of 2-methyl-1,4-naphthoquinone by mouth as a supplement to parenteral therapy two days before death. His blood-prothrombin concentration dropped rapidly, and on the day before his death it was 5–10 per cent. (Quick prothrombin time 106 sec.). Autopsy confirmed the clinical diagnosis of acute yellow atrophy of the liver.

CASE 6.—Chronic alcoholism, cirrhosis of the liver, œsophageal varices (fig. 5). A housewife, aged 44, was admitted on Dec. 29, 1939, after vomiting two quarts of bright red blood. She gave a history of alcoholism for some years, during which she had partaken of a poor diet. She was anæmic; her liver, easily felt 6 cm. below the costal margin, was hard, irregular, and tender. Her spleen was firm and palpable at the costal margin. There were no dilated abdominal veins but hæmorrhoids were present. Hæmorrhage from œsophageal varices, associated with cirrhosis of the liver, was diagnosed.

She was given a blood-transfusion of 1000 c.cm. on admission, after which her blood-prothrombin concentration was 45 per cent. (Quick prothrombin time 38 sec.). Since blood-prothrombin level did not respond to a total of 8 c.cm. of water-soluble synthetic vitamin K given intravenously and to 12 mg. of 2-methyl-1,4-naphthoquinone given by mouth in divided doses over four days, she was given 300 g. of liver each day in addition to a high-carbohydrate diet. This was without effect, and ten days after the liver therapy was begun she was given in addition 10 mg. of 2-methyl-1,4-naphthoquinone by mouth each day. This treatment, together with the parenteral administration of 30 c.cm. of the water-soluble synthetic vitamin K in divided doses over six days was ineffective in restoring to normal the blood-prothrombin concentration, which fluctuated between 40 and 65 per cent. during her stay in hospital.

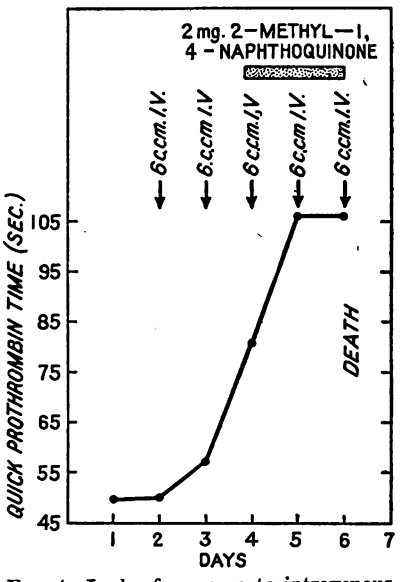

FIG. 4—Lack of response to intravenous injections of water-soluble synthetic vitamin K, supplemented by 2-methyl-1, 4-naphthoquinone given by mouth, in a patient (case 4) with acute yellow atrophy of the liver.

APPARENT TEMPORARY FAILURE OF RESPONSE ASSOCIATED WITH CHOLANGITIS

One of our patients with obstructive jaundice and hypoprothrombinæmia, while under observation, had an acute recrudescence of symptoms, with chills, high fever, and increased jaundice, suggesting cholangitis. At this time she was given 3 c.cm. of water-soluble synthetic vitamin K intravenously, with no demonstrable effect on the blood-prothrombin concentration. After a spontaneous remission of her acute symptoms further intravenous injections of 2 c.cm. of water-soluble synthetic vitamin K on two consecutive days restored her prothrombin level to normal. Laparotomy was successfully performed without bleeding. In this patient an exacerbation of liver disease apparently led to a failure to respond to intravenous injection of water-soluble synthetic vitamin K in the dosage given. This failure was temporary and may have been only relative, in that more massive dosage might have produced a response. An operation carried out during this refractory period might have led to uncontrollable hæmorrhage.

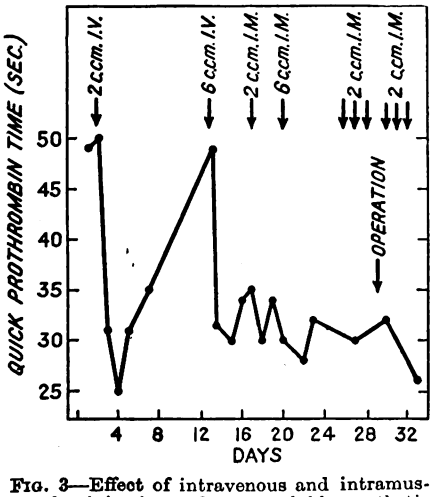

FIG. 3—Effect of intravenous and intramuscular injections of water-soluble synthetic vitamin K on the Quick prothrombin time of a patient (case 3) with cholelithiasis and obstructive jaundice.

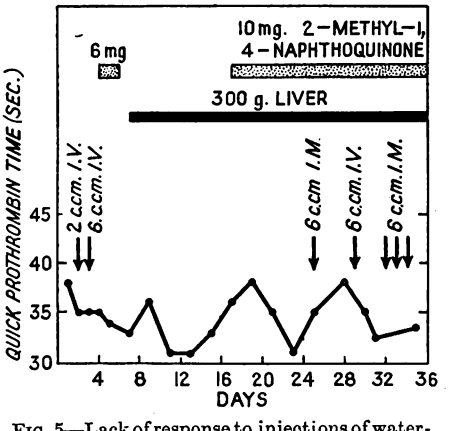

FIG. 5—Lack of response to injections of water-soluble synthetic vitamin K, supplemented by 2-methyl-1,4-naphthoquinone and whole liver given by mouth, in a patient (case 6) with cirrhosis of the liver.

DISCUSSION

Response to therapy.—In patients in whom there was no evidence of a severe hepatic lesion injection of water-soluble synthetic vitamin K restored the level of blood-prothrombin concentration to normal. This response was rapid and raised the blood-prothrombin concentration above the critical level for bleeding (Quick 1938) within a few hours.

For example, in idiopathic steatorrhœa (see table) intravenous administration of 1 c.cm. of the water-soluble compound, equivalent in activity to 1 mg. of 2-methyl-1, 4-naphthoquinone, produced a rise of 20 per cent. in the blood-prothrombin concentration within five hours, and 1 mg. of 2-methyl-1, 4-naphthoquinone given by mouth on another occasion did not produce such an effect until

EFFECT OF PARENTERAL ADMINISTRATION OF SYNTHETIC VITAMIN K ON THE QUICK PROTHROMBIN TIME IN HYPOPROTHROMBINÆMIA

A = Quick prothrombin time before therapy with synthetic vitamin K (sec.).
B = Dosage of synthetic vitamin K (c.cm.). Each c.cm. of water-soluble synthetic vitamin K is equivalent in vitamin-K activity to 1 mg. of 2-methyl-1, 4-naphthoquinone.
C = Time after start of therapy with synthetic vitamin K at which Quick prothrombin time was measured (hours).
D = Quick prothrombin time after therapy with synthetic vitamin K (sec.).

Case no.	Sex and age	Condition	A	B	C	D
1	F. 32	Ulcerative colitis, ileostomy	54	1 i.v.*	24	31
					48	26
			39	1 i.v.†	24	32
					48	29
			35	1 i.v.	24	30
					48	25
2	F. 38	Stenosis of the common bile-duct, biliary fistula	52	6 i.m.	24	29
					48	25
3	F. 77	Cholelithiasis, carcinoma of the ampulla of Vater, obstructive jaundice	50	2 i.v.‡	24	31
					48	25
			48	6 i.v.	6	32
					48	30
4	M. 4 days	Hæmorrhagic disease of the newborn	72	6 i.m.	24	25
7	F. 69	Stenosis of the common bile-duct, obstructive jaundice	47	1 i.v.§	48	25
			32	2 i.v.	72	26
8	F. 37	Cholecystitis, biliary fistula	39	6 i.v.	24	29
					48	25
9	F. 38	Cholecystitis cholelithiasis, cholangitis	38	2 i.v.	24	26
10	M. 62	Idiopathic steatorrhœa	62	1 i.v.	5	42
					19	29
11	F. 39	Cholelithiasis	62	6 i.v.	2	40
					3	36
					24	25

* Relapse in 5 days after injection.
† Relapse in 3 days after second injection.
‡ Relapse in 9 days after injection.
§ Relapse in 3 days after injection.
i.m. = intramuscular injection. i.v. = intravenous injection.

twelve hours had elapsed. This rapidity of action is further demonstrated by the cessation of hæmorrhage in cases 1 and 2 only four hours after parenteral administration of the water-soluble compound.

Intravenous administration of the water-soluble compound produced in most cases an initial rapid rise in blood-prothrombin concentration, which was succeeded by a more gradual increase. The blood-prothrombin concentration, however, did not become normal in most instances until forty-eight hours had elapsed. Further, the normal level was not maintained, and the prothrombin concentration began to fall within the succeeding twenty-four hours. This sequence of events was irrespective of dosage, which was 1–6 c.cm. of the water-soluble compound, equivalent to 1–6 mg. of 2-methyl-1,4-naphthoquinone. On the other hand, in case 2, where intramuscular administration of 6 c.cm. of the water-soluble compound was employed, the blood-prothrombin concentration became normal in forty-eight hours, and this level was maintained for several days. This suggests the possibility that, when the material is given intravenously, its concentration in the blood exceeds its renal threshold, and a large proportion of the compound may be rapidly excreted in the urine, a phenomenon common to other vitamins (Faulkner and Taylor 1938, Meiklejohn 1940). The retained portion is sufficient to raise the prothrombin level rapidly but insufficient to maintain a normal concentration for long. Intramuscular administration allows prolonged absorption of the material, which can maintain the blood prothrombin at a high level for several days. Because of this we feel that in patients with active hæmorrhage consequent on hypoprothrombinæmia the most satisfactory form of therapy is the combination of intravenous and intramuscular administration of the drug, so that the maximal advantage of each route of administration may be utilised in raising the prothrombin concentration of the blood rapidly and in maintaining it at a high level.

Failure of response to therapy.—Experimental investigations indicate that prothrombin is formed in the liver (Smith, Warner, and Brinkhaus 1937, Warren and Rhoads 1939), and it has been observed that patients with disease of the liver parenchyma associated with hypoprothrombinæmia have not responded to therapy with natural vitamin-K concentrates given either by mouth or intramuscularly (Quick 1938, Butt, Snell, and Osterberg 1939a). Warner, in a discussion on the paper of Butt et al., commented as follows: "... in patients with extensive hepatic damage a response to vitamin K therapy cannot be obtained because the injured liver is incapable of producing prothrombin." Our preliminary observations indicate that, whereas some patients with severe hepatic damage are apparently completely unable to produce prothrombin, a second group of patients with most severe or most chronic hepatic disease seem able to produce prothrombin constantly but in quantities insufficient to maintain a normal level in the blood. It is possible that the failure of response to the parenteral administration of vitamin K in these two groups of patients, as illustrated by cases 5 and 6, may be of some prognostic importance when considered along with the level at which the blood-prothrombin concentration is maintained.

Prophylaxis.—It is probable that in the future vitamin K or one of its analogues will be given as a routine before operation to patients suspected of having hypoprothrombinæmia. We wish to emphasise that the administration of therapeutic doses of vitamin K or its analogues before operation is not in itself a guarantee that the blood-prothrombin concentration will be raised to within normal limits. Indeed, in some patients with liver disease this is not accomplished. For this reason it is always necessary to determine the blood-prothrombin concentration before operation, even when vitamin K or one of its analogues has been given in amounts considered adequate. When the prothrombin level is low in spite of such treatment, blood-transfusion is then the only known therapeutic measure which can increase the prothrombin concentration of the blood.

No toxic effects were observed which were referable to parenteral administration of the water-soluble derivative of 2-methyl-1,4-naphthoquinone in the dosage given.

SUMMARY

A group of 18 patients with hypoprothrombinæmia were treated parenterally with a water-soluble derivative of 2-methyl-1,4-naphthoquinone (synthetic vitamin K). In 9 of these the lowered blood-prothrombin concentration was rapidly restored to a normal level by the administration of 1–6 c.cm. of a

solution of the material, equivalent to 1–6 mg. of 2-methyl-1,4-naphthoquinone. In 3 patients with hæmorrhage resulting from the lowered blood-prothrombin levels the bleeding was satisfactorily controlled within a few hours of intravenous or intramuscular administration of the material.

On the other hand, 12 patients with hypoprothrombinæmia associated with parenchymatous hepatic disease did not respond to intensive parenteral administration of either water-soluble synthetic vitamin K or natural vitamin K obtained from alfalfa, supplemented in some instances by large doses of 2-methyl-1,4-naphthoquinone and whole liver by mouth. It is suggested that this failure of response may have prognostic importance when considered along with the level at which the blood-prothrombin concentration is maintained in these patients.

We wish to thank the staff of the medical and surgical services of the Boston City Hospital for their most willing coöperation; Dr. George R. Minot and Dr. William B. Castle for their criticism and advice; Dr. R. C. Cochrane for permission to publish case 2; Dr. Chester S. Keefer for permission to publish case 5; and Messrs. Abbott Laboratories for supplying the synthetic preparation of vitamin K.

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STOMACH-ACHE

By A. J. C. Latchmore, M.S. Lond., F.R.C.S.
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A patient giving the history of some acute abdominal disorder often uses such expressions as "I thought at first it was due to something I had eaten" or "I thought it was just an ordinary stomach-ache." Pressed further about what is meant by an ordinary stomach-ache, as a rule he appears surprised that there should be any doubt about something which to him appears commonplace and definite. It is interesting that a phrase which has a fairly clear-cut meaning to the layman should mean so little to the doctor. The average medical man in such cases contents himself with excluding the well-known acute surgical conditions and beyond that often does not reach an exact diagnosis.

This "ordinary stomach-ache" has certain essential features: —

(1) There is fairly severe pain—so severe that, if one of these patients later develops an acute abdomen (in the surgical sense), the former attack is compared with the present pain.

(2) It is common, as is shown by the number of surgical patients who have experienced it and so attribute their present illness to a similar cause.

(3) It has a definite relation to food.

(4) It recovers spontaneously.

(5) The pain is felt right across the centre of the abdomen and is of the type that makes the patient "double up."

I suggest that the commonest cause of such pain is a colic of the small intestine, often due to the formation of a bolus, by which is meant the moulding together by peristalsis of semi-solid food into a compact mass, which may find difficulty in passing through the gut. A good example of this is seen in the figure, a bolus of segments of orange removed from the terminal ileum of an old edentulous woman (case 3) who had had intestinal obstruction for four days. My interest in this subject was first aroused by having to operate, within a year, on four cases of intestinal obstruction due to the impaction of food in the small intestine. Such cases are well known, and isolated instances are reported from time to time. Elliott (1932) reviewed the cases reported during the previous twenty-two years and gave the following statistics of the types of food which were most to blame.

Obstructing material	No. of cases	Obstructing material	No. of cases
Mushrooms	5	Grapes	2
Cherry stones	4	Poppy seeds	2
Beans	4	"Ammunition bread"	1
Figs	3	Sauerkraut	1
Oats	3	Gooseberries	1
Potatoes	2	Raisins	1
Apples, pears, and peas	2	Half an orange	1
Corn	2	Popcorn	1
		Bran	1

In five of these cases, however, the impaction took place in the colon. The term "ammunition bread" was applied to the coarse bread consumed in Germany during the later part of the last war. During this period there were many cases of intestinal obstruction due to the husks of oats in Germany and Russia. My cases were due to coco-nut in two and to monkey-nuts and orange in the others. Interesting as these were as rare cases of intestinal obstruction, it was in the investigation of the previous and almost identical attacks which two of these patients had experienced that it became apparent that a mechanism was here at work which was common and easy to understand, of which, however, I had never previously realised the significance.

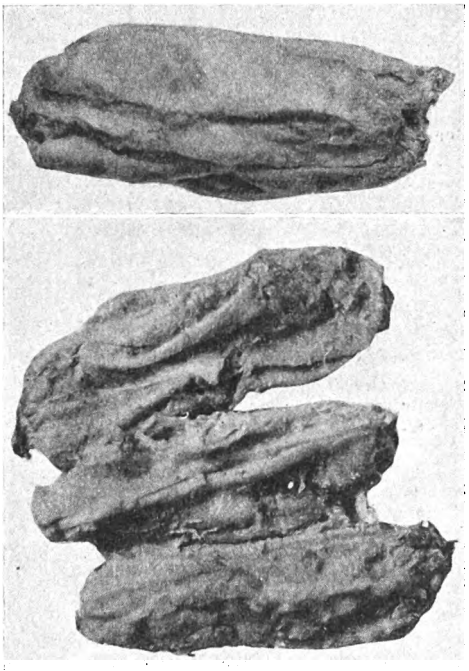
Having seen the gross changes produced by complete impaction of indigestible food, it was easy for me to understand how the excitation of excessive peristalsis by the formation of a bolus caused the minor cases of colic. To emphasise how this pain is produced I suggest that it be called "bolus colic." I believe that this simple cause of intestinal colic has not received sufficient recognition. For instance, Cope (1935) mentions the part played by tainted food in causing intestinal colic but says nothing about those indigestible foods which in the ordinary case are essentially to blame.

CASE-RECORDS

Case 1.—A boot repairer, aged 33, ate monkey-nuts one evening and woke at 6 A.M. with severe central abdominal pain, which continued all day and was accompanied by vomiting. He was admitted to the Leeds General Infirmary that evening with acute tenderness in the right lower abdomen and was thought to be a typical case of acute obstructive appendicitis. The fact that he had had two similar but less severe attacks earlier in the year was thought to substantiate this diagnosis.

At operation clear free fluid was found in the abdomen, and the terminal loop of small intestine was found to be packed tight with hundreds of hard objects, which felt like small faceted gall-stones. The mesentery of the

loop and of the ileocæcal angle showed hæmorrhages and œdema. The hard objects, which proved to be improperly chewed monkey-nuts, were firmly impacted and could not be moved onwards in a mass by pressure. Singly, however, portions of nut could be pushed through the ileocæcal valve; but, after this had been persisted in for some time, the number remaining in the intestine seemed hardly to have diminished, and therefore enterotomy was performed, the nuts were removed, and the intestine was sutured.



A bolus which caused intestinal obstruction by impaction in the terminal ileum (case 3). It consists of the segments of an orange moulded together by peristalsis: (*a*) as removed at operation; (*b*) dissected to show segments. (Actual size.)

Uneventful recovery followed. Both of his previous attacks had definitely followed the eating of coco-nut macaroons.

CASE 2.—A female typist, aged 21, complained of colicky central abdominal pain. She gave a history of having taken a great liking for sugared almonds; during the week before the onset of the pain she had eaten, chiefly at the office and instead of meals (she was missing her meals because of the "indigestion"), ¾ lb. of these nuts. The pains had begun on Sept. 15, 1938, and were typical of colic of the small intestine. They had continued mildly for five days. On the fifth evening she ate a quarter of a coco-nut and had had only a drink before going to bed. The next morning she had had only a cup of tea for breakfast, and during the morning, again on an empty stomach, she had eaten more of the coconut. After that her pains suddenly increased in intensity, and, though she ate some lunch, she vomited it immediately. The pains became progressively worse, with the result that she was admitted to hospital.

On examination her abdomen was distended, with generalised tenderness but little rigidity. No definite diagnosis was made, but immediate operation was advised. At operation the abdomen was found to contain a considerable quantity of clear free fluid, and a dilated loop of lower jejunum immediately presented itself. The loop felt solid and heavy and was intensely congested and its mesentery was œdematous. It contained an impacted solid mass, which was causing obstruction, the distal gut, being collapsed. The mass felt pultaceous with many hard pieces in it; it could be broken up by the fingers through the intestinal wall and the pieces then easily pushed down the gut. It was decided that it was unnecessary to do anything further, and the abdomen was closed after appendicectomy. The patient, however, made an uneventful recovery.

Closer investigation of the history revealed that she had had two milder attacks five months and three months previously. The first attack could not be explained; but the second attack started at 5 P.M. with central colicky abdominal pain after she had eaten a considerable quantity of tinned peaches and cream at luncheon. The pains continued all evening but did not cause vomiting. They eased at 1 A.M., after which she slept and returned to the office next morning.

CASE 3.—A married woman, aged 57, had suffered from colicky abdominal pain and vomiting for four days. The pains had begun on the evening of Nov. 24, 1938, and continued in spasms all that night and next morning, when she first vomited. The pains continued, being worse and followed by vomiting, whenever the patient ate anything. Her bowels had not acted since two days before the onset of the pain, and castor oil was taken without result. On the 26th she visited her doctor and was given medicine. On the 27th the spasms of pain and vomiting still continued, and she noticed for the first time distension of the abdomen.

On examination in hospital on the 28th she was found to be an ill woman with a pulse-rate of 124 and a bowl of fæcal-smelling vomit at the bedside. The abdomen was only slightly distended, and some tenderness was present, but the splashing and tinkling which can usually be heard over dilated coils of obstructed small intestine were absent. This was thought so unusual that some doubt was felt about the diagnosis.

Laparotomy was performed immediately and revealed only a moderate dilatation of the small intestine; but a mass was found impacted in the lower ileum. Enterotomy proved the mass to be the segments of an orange (from which the juice had been squeezed by the patient's edentulous gums) all neatly moulded together to form an oval lump about 2½ in. × 1 in. (see figure). She had eaten the orange on the afternoon of the day on which the pains began. Uneventful recovery followed.

CASE 4.—A schoolboy, aged 8, was admitted as a case of acute appendicitis on July 18, 1939. For two days he had suffered from colicky abdominal pain with repeated vomiting, and his doctor had found a lump in the right iliac fossa.

A moderately tender but soft lump was found in the right iliac fossa, with no evidence of peritonitis. This lump felt unlike an appendix abscess, being definitely softer and less tender. We were just considering the diagnosis, when it came to light that the boy had eaten the greater part of a coco-nut two days earlier. This immediately made the diagnosis clear, and it was thought that the lump was the terminal ileum distended and packed tight with coco-nut. Since the obstruction was low down, and the impaction having been very tight in the previous cases, it was decided to operate.

At laparotomy free fluid was found in the abdomen. The lump that we had felt was found to be the terminal 7 in. of ileum, distended to 1¼ in. in diameter and solid with coco-nut. Enterotomy was performed, and uneventful recovery followed.

The foregoing cases have certain features in common:—

(1) The eating of food which resists the action of the digestive juices sufficiently long to travel down the small intestine in semi-solid or solid form.

(2) The fact that this food was eaten alone on an empty stomach and, being the only contents of the small intestine, was squeezed together into a bolus which found difficulty in passing through the gut.

(3) Inefficient mastication due either to inadequate teeth, as in case 3, or to bolting the food through hurry, excitement, or a ravenous appetite.

(4) The site of impaction in three out of the four cases and in most of the cases reported by others is the terminal ileum. Two factors are probably responsible: the narrowing of the intestine from above downwards, especially at the ileo-cæcal valve, and the absorption of fluid as the contents travel downwards.

In the following three cases the same mechanism was clearly at work, but all the patients recovered spontaneously.

CASE 5.—A medical student ate about a third of a coconut at 7.30 P.M. after having had an ordinary tea at about 5 o'clock. At 2.30 A.M. he was awakened by severe pain in the left hypochondrium, which gradually radiated over the whole of the abdomen but was definitely more on the left side than on the right. It was acute, caused him to double up, and was definitely intermittent. After about an hour he vomited without relief.

His doctor was immediately sent for and suggested that the pain was due to the coco-nut. He advised the patient to drink a quantity of hot water, and at about 4.30 A.M. all the coco-nut was vomited in one mass, which was described as "boat-shaped" and measuring about 2½ in. × 1½ in.

The patient had had an intussusception at the age of six months and had been liable to attacks of colic since his teens. One attack had been due to eating roasted peanuts, but he did not attribute the others to any particular food. The left-sided pain and the vomiting of the bolus suggest that the obstruction had taken place in the jejunum.

CASE 6.—A child, aged 2 years, was seized with colicky abdominal pain in the night, and the parents sent for the doctor at 6 A.M. There was no localised abdominal tenderness, the pulse and temperature were normal, the tongue was clean, and there was no diarrhœa. The parents said that the child had "bolted" an apple on the previous day. The doctor decided that no immediate treatment was necessary, and he saw the child again at 11 A.M. In the meantime a bulky stool had been passed in which pieces of apple could be clearly recognised, and the child's pain had ceased.

This is an illuminating case of what is called "green-apple colic," which is often explained as being due to the acid in the sour green fruit which upsets the intestine. The presence of hard bits of apple in the first stool passed after the attack make it more probable that it is the hardness of unripe fruits, rather than the sourness, that is responsible for the pain.

CASE 7.—A girl, aged 19, ate 1 lb. of cherries. At 11 P.M. her doctor was called in, and to him the case resembled one of intestinal obstruction. There was vomiting, with colicky abdominal pain, and the girl looked ill, but in view of the history of eating the cherries, her doctor did not send her into hospital, and the next morning she passed a motion containing cherry skins and stones.

CONCLUSION

The reputation gained by castor oil in the treatment of acute abdominal pains is so well established in the mind of the layman that the efforts of the medical profession to dislodge it have as yet proved unavailing. This means that for every acute appendix in which the onset of peritonitis has been precipitated by castor oil many undiagnosed pains have been cured.

What type of abdominal pain is such treatment likely to cure? First, since castor oil acts on the intestine only, the origin of such pain is certain to be intestinal. Secondly, it will cure only those pains which are due to irritation of the gut by substances which can be evacuated as a result of its use. It is clear that in cases of colic due to enteritis the use of castor oil may be valuable, but in bolus colic its action demands further thought. If solid contents are squeezed into a bolus by peristalsis, castor oil may merely tighten the impaction and produce complete obstruction. Alternatively, it may effect a dramatic cure by causing the ejection of the bolus into the cæcum. What happens will depend on the local circumstances, the bulk and consistence of the obstructing mass to be moved, and the amount of diluting fluid. I therefore suggest that, although castor oil will undoubtedly cure some cases of bolus colic, its use is hazardous, and that it is wiser to administer fluids by mouth liberally in the hope that the bolus may thereby be disintegrated.

In the diagnosis of cases of acute abdominal pain more attention should be paid to the patient's statement that it followed the eating of some particular food. When this information is not spontaneously given, specific inquiries should be made to eliminate the types of food mentioned in this article.

If a bolus can produce colic in normal intestines, it is far more likely to do so in a small intestine narrowed by disease or angulated or pressed on by bands. To produce colic a fairly severe degree of mechanical block must be present; lesser degrees of impaction both in normal and in hampered intestines are also likely to produce symptoms.

SUMMARY

A common cause of "ordinary stomach-ache" is a bolus colic of the small intestine.

Bolus colic is due to excessive peristalsis induced by the temporary impaction of a solid mass of food in the small intestine. Such masses may consist of recognisable pieces of solid food, but are usually due to the moulding together by peristalsis of semi-solid and relatively indigestible food.

In four cases the bolus of indigestible food became so tightly impacted as to necessitate urgent operation. In three others acute abdominal pain, which recovered spontaneously, was clearly due to bolus colic.

I wish to thank the honorary surgical staff of the General Infirmary at Leeds for permission to treat and publish these cases, and Dr. R. C. N. Shires and Dr. W. H. Bean for the accounts of cases 6 and 7.

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AIR-BORNE STREPTOCOCCAL INFECTION FOLLOWING INFLUENZA

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DEPUTY MEDICAL SUPERINTENDENT OF THE HOSPITAL

EPIDEMIOLOGICAL evidence must often be circumstantial. In particular, attempts to trace the source and mode of spread in any outbreak of infection depend on the accumulation of different pieces of evidence which in the aggregate suggest one particular source and one particular vehicle of spread. The data collected from the following outbreak of secondary streptococcal infection among men recovering from influenza point to an aerial spread of the infecting streptococcus.

CLINICAL NOTES

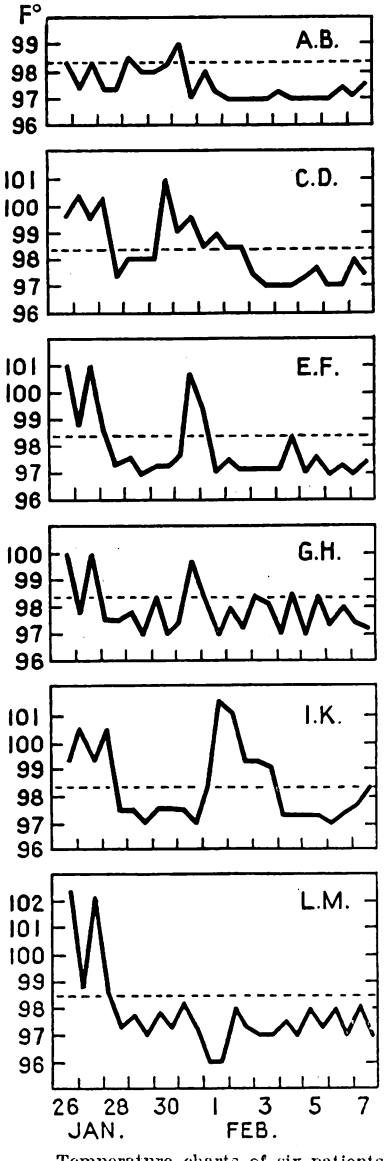
Eleven soldiers, whose illnesses began between Jan. 21 and Jan. 25, were admitted on Jan. 26 to two small and similar wards, each of 6542 cu. ft. capacity, six soldiers in ward 1 and five in ward 2. All gave a history of general malaise with headache or backache and tracheitis, and all except A. B. had pyrexia on admission, temperatures ranging between 100° and 102° F. By the evening of the third day in hospital all temperatures had settled to normal, and by the fourth or fifth day the men were feeling much better. However, in ward 1 the temperature of C. D. rose on the fifth day to 101° F. and was accompanied by fresh pain in the throat and chest with some shivering. His fauces were acutely congested. On the next day E. F., G. H., and I. K. in the same ward developed pyrexia with similar

symptoms, and on the evening of that day a scarlatiniform rash spread over the trunk and limbs of I. K. who was confirmed clinically and by Dick and Schultz-Charlton tests to have scarlet fever. The five other patients gave negative reactions to the Dick test. The secondary pyrexia settled in two days, and all the patients made an uneventful recovery. The danger, however, of such secondary infection to patients recovering from influenza was tragically demonstrated in the 1918 pandemic. The mildness of the attacks in the present instance was probably due to the good resistance of healthy men. A typical case-record is given below, and the temperature charts of all six patients are appended (see figure). There was no instance of secondary pyrexia or of fresh symptoms among the five men in ward 2.

TYPICAL CASE-RECORD

C. D., aged 28, admitted to hospital on Jan. 26, 1940, with general malaise, pains in the back and frequent dry cough since the 24th. On admission his general condition was good; patient complained of aching in back and limbs; cough frequent; pain in the throat and some pain on swallowing. Fauces showed considerable congestion but no exudate. Slight symptoms of coryza.

Jan. 27: cough troublesome, fauces congested, patient slept poorly, pains in back and knees, chest clear. Jan. 29: some improvement, patient slept better, symptoms less. Jan. 30: worse; throat more painful; patient complains of pain in chest at left base, shivers down spine, feverish; fauces show more congestion, chest a few coarse râles especially on left side. Feb. 4: pain easier, cough less troublesome, patient feels better, fauces still very congested. Feb. 8: much improved, chest clear, fauces clear, slight cough still remaining. Feb. 14: cough now only slight, fauces normal. Patient discharged on the 21st.



Temperature charts of six patients with influenza, of whom four (C. D., E. F., G. H., and I. K.) acquired a secondary streptococcal infection.

BACTERIOLOGY

All eleven men on the third day after admission had nose and throat swabs bacteriologically examined for hæmolytic streptococci, pneumococci, and *Hæmophilus influenzæ*. Only one patient, G. H., in ward 1 had some hæmolytic streptococci in the nose, and two patients in ward 2 had scanty hæmolytic streptococci in the throat. However, one man, A. B., in ward 1 had a particularly severe cough with blood-stained sputum, which gave a practically pure culture of *Streptococcus pyogenes* type I. After identification and removal of the case of scarlet fever, in which the infecting streptococcus was also of type I, nose and throat swabs were taken on Feb. 5 from the remaining five men in ward 1 and from the five men in ward 2. Three of the men (C. D., G. H., and L. M.) in ward 1 had hæmolytic streptococci in the throat and/or nose, and two (A. B. and E. F.) had not. L. M., who did not develop secondary pyrexia, had hæmolytic streptococci in the nose only. Only one patient—one of those originally positive—in ward 2 had scanty hæmolytic streptococci in his throat. Repeat swabs three days later from the two negative cases (A. B. and E. F.) in ward 1 were positive; and, when all five patients were swabbed a week later on Feb. 12, all except L. M. had hæmolytic streptococci in the throat, and three had also positive nasal cultures. From all the patients in ward 1 the streptococcus isolated was serologically of type I.

When the first swabbing after the secondary infection showed that most of the patients in ward 1 had hæmolytic streptococci in the throat and/or nose, blood-agar petri plates were exposed in the ward to find if the infecting streptococcus was present in the air. Three plates exposed on Feb. 6 for two hours (7–9 A.M., when bed-making and sweeping and dusting were being done) gave a total of 90 colonies of hæmolytic streptococci, and random samplings of these colonies were all *Strep. pyogenes* type I. A week later (Feb. 13) three plates exposed for an hour (8–9 A.M.) in the infected ward and three in the adjacent ward which housed the other influenza patients yielded respectively 16 and 2 colonies of hæmolytic streptococci. The latter could not be serologically identified. Nose and throat swabs from the nursing and domestic staff, who were common to both wards, were all negative for hæmolytic streptococci on two separate occasions.

AEROSOL FOR AERIAL DISINFECTION

The presence of large numbers of the infecting streptococcus in the atmosphere of ward 1 and in the noses of the patients and the absence of any nurse-carrier pointed to an air-borne infection. Moreover, the presence of the streptococcus in the air of the ward was possibly responsible for the persistence of the positive nasal cultures, for the finding of hæmolytic streptococci in nasal swabs is in our experience and that of others (Straker et al. 1939) very rare. Indeed, we have come to regard the presence of hæmolytic streptococci in the nose as a sign, in the absence of local infection, of aerial pollution with that organism. Since the carrier condition was persisting despite the general well-being of the patients and local applications of "blue paint," it was decided to attempt the sterilisation of the atmosphere with an aerosol, a finely atomised antiseptic in air (Pulvertaft et al. 1939). André (Components) Ltd. supplied a Phantomyst model C 1 atomiser, and the ward was treated on two successive days (Feb. 16 and 17) with an antiseptic mixture called Aeryl 1*, the machine being run for 10 min. and the sterilising effect tested after a further 20 min. Three blood-agar plates were exposed for an hour in the ward before and after each treatment, and the results are summarised in table I. Despite a concentration by volume of only 1 part in 10 million of antiseptic to air, there was after each test an appreciable reduction both of hæmolytic streptococci and other organisms, which mostly comprised *Staphylococcus albus* and pigmented cocci. Table I also exemplifies the greater concentration of bacteria in the air after sweeping and dusting in the morning than in the quieter afternoon. Nose and throat swabs were taken before the first and after the second treatment from the five influenza patients and from a convalescent patient who had been admitted to the ward on Feb. 7 with a staphylococcal infection of the nose. The results are given in table II, which shows that four of the six patients had positive nasal

* Resorcinol is the principal germicide in this preparation.

TABLE I—EFFECT OF AEROSOL ON THE BACTERIAL CONTENT OF THE AIR OF THE WARD

Tests	Aerosol bactericide employed	Time of action (min.)	Concentration, vol. of air / vol. of liq.	Organism	No. of colonies before and after aerosol: Before	After
1st: 2–2.30 P.M. Feb. 16	Aeryl 1	20	10,588,000	Hm. st.	6	2
				Others	616	275
2nd: 8.30–9 A.M. Feb. 17	,,	20	10,588,000	Hm. st.	9	1
				Others	Unc.	240

Hm. st. = Hæmolytic streptococcus. Unc. = uncountable.

cultures before the aerosol was used, whereas after treatment only one nasal swab was positive, and that came from a man with a pathological lesion of his nose. Two days later this patient's nasal culture was still positive, and one other patient had scanty hæmolytic streptococci in his nose.

EPIDEMIOLOGY

The suggested sequence of events in this little outbreak are these. One patient in a ward accommodating six men with clinical influenza has a streptococcal infection of the upper respiratory tract. The infecting streptococcus, *Strep. pyogenes* type I, which commonly causes scarlet fever, is sprayed into the air by frequent coughing and, when it reaches an effective concentration, sets up secondary streptococcal infection (including a case of scarlet fever) in all but one of the remaining five patients. The spread of infection is facilitated by the susceptible state of the upper respiratory tract of patients recovering from influenza, by overcrowding, and by inadequate natural ventilation. Besides the blackout at night, windows were not kept as open during the day as they might have been, because the outbreak took place during a very cold spell of weather. The secondarily infected patients pollute the air of the ward still more, till most of them become, by inhalation, nasal carriers of the infecting organism. Attempts to disinfect the atmosphere with aerosol reduce the numbers of streptococci in the air and allow the natural sterilising mechanism of the nasal mucosa to get rid of the inhaled streptococci.

TABLE II—RESULTS OF NOSE AND THROAT SWABS TAKEN BEFORE AND AFTER TREATMENT OF THE WARD WITH AEROSOL

Patient ..		A. B.	C. D.	E. F.	G. H.	L. M.	N. P.*
Feb. 16	Nose	−	+	−	++	++	++
	Throat	+	+	+	++	−	−
Feb. 18	Nose	−	−	−	−	−	+
	Throat	−	++	−	+	−	−

\+ = Some colonies of hæmolytic streptococcus.
++ = Numerous colonies of hæmolytic streptococcus.
* This patient was convalescing from a staphylococcal infection of the nose.

That the outbreak was air-borne and not spread by droplet infection or by fomites is suggested by the following facts:—

(1) The patients became infected almost simultaneously, which indicates a source equally available to all; in this respect the air seems to be the natural medium for the carriage of respiratory pathogens, as water or milk is for intestinal pathogens.

(2) The patients were all confined to bed at the time of the secondary outbreak; hence direct spread from patient to patient was impossible. The patient nearest to the originally infected man was the only one who did not develop a clinical infection, although he became a nasal carrier. None of the attendant nursing staff was proved to be a carrier of the infecting streptococcus; hence spread by carrier to patient seems unlikely. This is further supported by the finding that none of the equally susceptible influenza patients in the adjacent ward became affected, although they were being attended by the same medical, nursing, and domestic staff.

(3) The infecting streptococcus was abundantly present in the air of the ward in which the outbreak took place and absent from that of the adjacent ward.

SUMMARY

An outbreak of streptococcal infection among a group of men recovering from influenza is believed on bacteriological and epidemiological evidence to have been aerially spread. The use of aerosol to disinfect the air of the ward seemed to help the patients to get rid of the infecting streptococcus from nose and throat.

We are indebted to Dr. H. Neisser for help with the serological typing of the streptococci.

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SULPHAMETHYLTHIAZOLE IN EXPERIMENTAL STAPHYLOCOCCAL INFECTIONS

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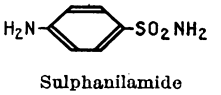
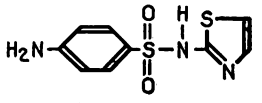
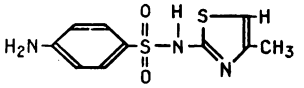
THE treatment of *Staphylococcus aureus* infections in man with sulphanilamide and its derivatives has been disappointing; therefore reports of compounds efficient in these infections are of interest. The new drugs are provisionally named sulphathiazole and sulphamethylthiazole; the formulæ show their relation to the parent sulphanilamide.



Sulphanilamide



Sulphathiazole



Sulphamethylthiazole

Some of the properties of these drugs have already been discussed (Long 1940, THE LANCET, 1940). It is known that sulphamethylthiazole disappears more rapidly than sulphapyridine from the blood of mice, and it is said that in mice a dose of 1 g. of sulphamethylthiazole per kg. of body-weight causes a maximal concentration of 15 mg. per 100 c.cm. of blood in four hours. Daily doses of 1·5 g. per kg. of body-weight given by mouth for fifteen days produced no ill effects in mice, and a daily dose of 5 g. caused toxic symptoms in ten days. Toxic effects, as judged by otherwise unaccountable loss of weight of the mice, were not observed in the present work.

The new drugs have been tried on a wide range of organisms by McKee and colleagues (1939), Barlow and Homburger (1939), and others, but the chief interest lies in their therapeutic effect against staphylococcal infections. For this reason it was decided to test the small available supply of sulphamethylthiazole solely against staphylococcal infections in mice. Mice were infected by the intraperitoneal, intravenous, and subcutaneous routes, and the drug was given by mouth. The strain of *S. aureus* used in all experiments was recovered from the blood-

TABLE I—ACTION OF SULPHAMETHYLTHIAZOLE IN INTRAPERITONEAL STAPHYLOCOCCAL INFECTIONS

No. of mice	Drug	Dose of drug in mg.		Mice surviving 21 days
		Single	Total	
8	None	—	—	2
8	Sulphapyridine	10	200	3
8	,,	20	400	4
8	Sulphamethylthiazole	10	200	3
8	,,	20	400	5

stream of a patient who died of pyæmia, and it showed the commonly accepted criteria of a pathogenic strain. Early attempts to kill mice by intraperitoneal injection of this strain were not always successful, but repeated mouse passage increased its virulence. The susceptibility of mice to infection with staphylococci is known to be highly variable and must always be reckoned with in experiments of this kind. The organisms for injection were grown on agar slopes for twelve to eighteen hours at 37° C., washed thrice in nutrient broth to remove toxin, and finally suspended in saline, the suspension containing 1000–1500 million cocci per c.cm. Young mice weighing 18–25 g. were used in all experiments.

INTRAPERITONEAL INFECTIONS

In a preliminary test 16 mice were given about 1000 million living washed staphylococci intraperitoneally, and 8 of them were treated with 10 mg. of sulphamethylthiazole in milk by mouth, half an hour and six hours after injection, thereafter twice daily for four days, and then once daily till the fifteenth day. At the end of twenty-one days 4 of the treated mice and 2 control animals were alive. The survivors were killed on the twenty-second day, and at autopsy *S. aureus* was recovered either from abscesses in the kidneys or other organs or from the bloodstream in both of the surviving controls and in 3 of the treated mice. Similar experimental conditions were repeated with five sets of mice (table I), the dose of sulphamethylthiazole being 0·5 and 1·0 g. per kg. of body-weight, while mice similarly injected but treated with sulphapyridine served as further controls. All the mice received 1000 million staphylococci intraperitoneally.

Of the mice surviving twenty-one days 1 control, 3 treated with sulphapyridine, and 3 treated with sulphamethylthiazole showed no evidence of staphylococcal infection at autopsy. The experiments were thought to show that both sulphapyridine and sulphamethylthiazole had some beneficial effect. The large inoculum of organisms required to produce even relatively uniform results and the survival of control animals, though common in experimental work on staphylococcal infections in mice, were disquieting, and the use of an adjuvant to invasion, such as mucin, was considered. Whitby (1938) was able to kill 3 out of 6 mice with only 150 staphylococci, and the advantages of a small infecting dose are many. It was thought best, however, to try another route of infection because of unfamiliarity with the use of mucin, whose action is imperfectly understood. By giving the organisms intravenously (a method employed by many American workers) a smaller dose was required and more constant results were obtained.

INTRAVENOUS INFECTIONS

With the same organism 0·2 c.cm. of a washed saline suspension containing roughly 400 million cocci was injected into the tail veins of mice. This dose usually caused pyæmia, abscesses being concentrated mostly in the kidneys and less often in the liver, spleen, and joints. As with other routes of infection, however, a few mice died within twenty-four to forty-eight hours, often before abscesses had time to form. Sulphamethylthiazole was given in milk by mouth at the same times as before (table II).

S. aureus was recovered in all mice dying before the twenty-first day from abscesses either in the kidney or elsewhere, and no appreciable difference in the number or size of abscesses or evidence of healing was found in the mice treated with sulphamethylthiazole. Autopsies on the mice living for twenty-two days showed that 2 receiving the higher dose and 1 the smaller dose of sulphamethylthiazole had no abscesses, and *S. aureus* was not recovered on culture. Since sulphamethylthiazole is rapidly excreted from the blood of mice, it was incorporated in their food and milk to secure a more uniform concentration in the blood. A 1 per cent. and a 1·5 per cent. addition of sulphamethylthiazole to the diet of two groups of 10 mice was expected to give a fairly constant intake of the drug, because the mice fed regularly both day and night. At the end of the tenth day 7 of each treated group of 10 mice were alive, and on the twenty-second day 1 control, 5 on the 1 per cent. diet, and 4 on the 1·5 per cent. diet were still alive.

TABLE II—ACTION OF SULPHAMETHYLTHIAZOLE IN INTRAVENOUS STAPHYLOCOCCAL INFECTIONS

No. of mice	Drug	Dose in mg.		Mice surviving (days)			
		Single	Total	1	5	12	21
10	None	—	—	8	6	4	1
10	Sulphamethylthiazole	10	200	10	8	5	3
10	,,	20	400	10	9	6	5

A comparison of the different sulphonamides now used in staphylococcal infections is shown in table III. The injections were made intravenously, and the drugs were suspended in milk and given by mouth.

In only 1 mouse (treated with sulphamethylthiazole in the diet) was the organism not recovered at autopsy. These experiments suggest that both sulphapyridine and sulphamethylthiazole protect mice from early death by staphylococcal infections, and that in the doses used they have more effect than the other drugs, given in the same doses under similar conditions, in prolonging the life of mice. The relative values of the various compounds cannot, however, be adequately compared in experiments such as these, which have no check on the absorption, optimal dosage, and concentration in the blood of the various drugs.

SKIN LESIONS

The last group of experiments was made to find out whether sulphamethylthiazole would affect experimental staphylococcal lesions of the skin. For this purpose 4 rabbits were given 0·2 c.cm. of a washed staphylococcal suspension containing 200–300 million organisms into the shaved skin of each flank according to the method described by Downie (1937). Sulphamethylthiazole 1 g. in suspension was given by mouth to 2 of the rabbits, the first dose two hours before injection and the second six hours later. The treated rabbits were given 6·0 g. of sulphamethylthiazole in all, treatment being stopped on the fifth day. All the lesions healed in about the same time, the last abscess to heal being in a treated animal.

Because of the chronicity of the lesions and for reasons of economy an attempt was made to cause similar lesions on the skin of mice. The original strain of staphylococcus proved satisfactory and was accordingly used. With subcutaneous or intradermal injection thorough washing of the organisms is important, because preformed toxins may induce large areas of necrosis within twenty-four hours with little immediate inflammation and slow separation of sloughs. When the organisms were washed, abscesses were formed, and necrosis developed slowly and was less than with unwashed cultures. Control experiments with washed heat-killed staphylococci caused neither necrosis nor abscesses. On the day before

injection the bellies and flanks of the mice were shaved so that accidental abrasions of the skin were avoided, and for the test lesions 0·05 c.cm. of a saline suspension containing about 75 million washed staphylococci was injected under the skin of the lateral part of the belly. The mice were watched daily, care being taken to ensure that the bedding in all cages was clean and dry to prevent secondary infections.

After twelve hours there was usually slight reddening and œdema at the site of injection and after forty-eight hours definite abscess formation. The lesions increased in size for four or five days, when they were commonly 0·5–0·75 cm. in diameter and the central area of the abscess was beginning to separate, leaving a shallow ulcer. The usual time for the lesion to heal in untreated mice was ten to fifteen days. Histological examination of the lesions on the fourth day showed necrosis of the skin and subcutaneous tissues and intense cellular reaction, with clumps of staphylococci mostly in the necrotic areas but invading all the tissues down to the muscle layer, which was the site of œdema and inflammation. Cultures made from the floors of many of the ulcers or from the exudate after scabs had formed gave growths of *S. aureus* to within four days of healing.

Treatment was not begun in this series until two days after inoculation, when well-developed abscesses were present. It was continued for ten days, the drugs being suspended in milk and given by mouth, except when incorporated in the diet, and all lesions were unprotected (table IV).

By cultural methods there was no evidence that the staphylococci disappeared more rapidly from any one group of lesions. Besides the ordinary controls for this experiment a number of mice were infected with hæmolytic streptococci, and many of them developed localised lesions. Several of these animals, however, died from a spreading streptococcal infection within

TABLE III—ACTIONS OF DIFFERENT SULPHONAMIDES IN INTRAVENOUS STAPHYLOCOCCAL INFECTIONS

No. of mice	Drug	Dose in mg.		Mice surviving (days)			
		Single	Total	1	5	12	21
6	Control	—	—	6	4	2	0
6	Sulphanilamide	20	400	4	2	2	1
6	Ulcron	20	400	5	3	2	2
6	Sulphapyridine	20	400	6	5	4	3
6	Sulphamethylthiazole	20	400	6	6	5	3
6	Sulphamethylthiazole	1% in diet		6	5	4	4

forty-eight hours, while most of those treated with sulphanilamide survived. The lesions in the surviving treated animals healed more quickly than in those not treated; and, though the number of mice was small, there was some evidence that streptococcal skin lesions in mice could be favourably influenced by sulphanilamide therapy. In contrast, staphylococcal lesions in all treated mice healed within the period which had been found to be normal for untreated animals. The treatment did not seem to affect either the extent, nature or healing of the lesions, or the degree of invasion of the tissues.

COMMENTS

In these experiments about 200 mice were studied, a number inadequate for chemotherapeutic trial, and the results obtained must therefore lead mainly to impressions. Of the mice infected both by the intraperitoneal and intravenous routes and treated with sulphapyridine or with sulphamethylthiazole about half lived for twenty-one days. Many of those surviving this length of time harboured the infecting organism, and some still had abscesses in the kidneys. Treatment for only fifteen days may not have been sufficient, but it is fairly characteristic of the sulphonamide drugs that when they act they do so quickly.

Some of the results obtained compare unfavourably with those of several experienced workers. Domagk (1937), who infected mice with intraperitoneal injections of a broth-culture of staphylococci, obtained satisfactory results with Ulcron when the mice were watched for less than a week, and Whitby's (1938) results with sulphapyridine are better than those reported here. From the present work, however, it seems that both sulphapyridine and sulphamethylthiazole prevented many of the early deaths in

TABLE IV—ACTION OF SULPHAMETHYLTHIAZOLE ON STAPHYLOCOCCAL LESIONS OF THE SKIN

No. of mice	Drug	Dose in mg.		Average day of healing
		Single	Total	
12	—	—	—	14
12	Sulphapyridine	20	220	15
12	Sulphamethylthiazole	20	220	14
12	,,	1% in diet		12

staphylococcal infections of mice, and it is probable that both drugs are less efficient after abscesses have begun to form.

None of the sulphonamide drugs is particularly active in the presence of pus, and the experiments with skin abscesses may indicate that sulphamethylthiazole does not completely overcome this difficulty. Barlow and Homburger (1939) believe that sulphamethylthiazole prevents the development or allows the healing of staphylococcal abscesses in a significant number of mice suffering from pyæmia. In one of the experiments quoted by these workers all 10 control mice died, while 9 of the mice treated with sulphamethylthiazole survived, and at autopsy the abscesses were fewer in the treated group than in the controls. The implication that fewer abscesses indicates efficient therapy may be difficult to maintain when there is great variation in abscess formation in untreated mice.

Herrell and Brown (1939) found that better protection could be obtained in staphylococcal infections of mice by sulphamethylthiazole than by sulphapyridine, and this impression may be true; but there is yet little evidence that sulphamethylthiazole is as specific for staphylococcal infections as other sulphonamide compounds are for pneumococcal or for streptococcal infections.

SUMMARY

About half the number of mice infected with staphylococci by the intraperitoneal and intravenous routes survived twenty-one days when treated for fifteen days with sulphamethylthiazole. Sulphapyridine under similar conditions was only slightly less effective. Many of the treated mice still harboured *S. aureus* in the kidneys or other organs after twenty-one days.

Neither sulphamethylthiazole nor sulphapyridine given by mouth affected the course of experimental staphylococcal lesions of the skin of mice.

I wish to thank Prof. John Cruickshank for his help and advice; and the research department of the Maltbie Chemical Co. for the sulphamethylthiazole.

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THE SEDIMENTIN INDEX

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[*Introduction.*—I must apologise for having to introduce the word "logarithm" into this article. I know that the mere sight of the word is enough to deter any but the most stout-hearted from reading on. All the same it is the simplest and shortest method of describing a certain relationship between two sets of figures. To take a homely example: If, for every kick you give the policeman, your sentence is doubled, trebled, or worse still multiplied by 10, you find that the earlier kicks have cost you less than the final one, and you need logarithms in order to calculate from your final sentence how many kicks got home (in case you have lost count).

For S_2 (your final sentence) = S_1 (your original sentence $\times 10^n$ (where n = number of kicks)
or $\log S_2 = \log S_1 + n\log 10$.
Then suppose you arbitrarily disregard $\log S_1$ and make $\log 10 = 1$ unit.
Then $\log S_2 = n$ units.
In other words, by taking the logarithm of your final sentence you get the number of arbitrary kickage units: similarly, as will shortly appear, by taking the logarithm of the maximal velocity of sedimenting blood you get the number of arbitrary sedimentin units. It sounds fishy, but it is all right.]

FOR the past twelve months I have recorded, at the monthly blood-sedimentation test of every patient, not only the number of millimetres the upper corpuscular layer has fallen in a 200 mm. tube at the end of the first and second hours but also the fall observed every ten minutes for two and sometimes two and a half hours from the moment the column of blood was set up. (The tubes are watched by my typist, who has only to glance up from her work at these intervals to record how the various tubes in the rack are getting on. Blood samples which sediment very slowly are inspected again four or five hours later so that their maximum velocity may be checked over a longer period and ascertained to the nearest quarter millimetre per hundred minutes.) In every instance these ten-minute readings are plotted on a time-distance graph, as described by Cutler, and the curves obtained have similar characteristics (fig. 1). First, there is a period of acceleration while the individual corpuscles are agglutinating into clumps (0–A). As the radii of these clumps increase, so does their rate of fall. Then the fully grown clumps fall for a while uniformly at a maximal velocity (A–B). Finally, their "free fall" is more and more obstructed by "packing" in the lower part of the tube and their speed progressively slowed (B–C). The middle period—the period of maximal velocity when the clumps are falling in accordance with Stoke's law at a uniform rate proportional to the square of their radius (A–B)—is the important period. From this part of the curve can easily be calculated the maximal velocity in millimetres per hundred minutes. The logarithm of this maximal velocity per hundred minutes I call the sedimentin index of the blood; for I have demonstrated previously (*Tubercle*, June, 1939), by simple experiments involving the increasing dilution of blood plasma, that the logarithm of the maximal velocity is directly proportional to the concentration of "sedimentin" (a generic term for fibrinogen, serum globulin, and any other substances in the plasma which cause corpuscles to clump). Each additional unit of sedimentin causes the previous maximal velocity to be multiplied by ten.

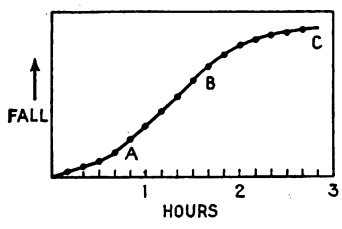


FIG. 1—Sedimentation-rate measured at ten-min. intervals.

The sedimentin index gives the quantity of sedimentin in the blood sample as a whole, and is unaffected by any variation in the red-cell count. To many this will be a startling piece of news, for Fahreus and many subsequent observers have argued fallaciously that variations in the cell volume affect sedimentation-rate. But they have invariably rendered their blood samples anæmic or hyperæmic by the addition or subtraction of plasma, and this has, of course, increased or decreased the sedimentation index of the samples. Had they kept the plasma volume constant and varied the cell volume by replacing portions with equal portions of inert saline-citrate solution, they would have found within very wide limits that the samples all sediment at exactly the same rate (vide *op. cit.* experiment No. VII). There is no occasion for "correction of cell volume" although it can be done by anyone anxious to think in terms of "plasma-sedimentin" instead of "blood-sedimentin"; but nobody performs this operation when determining "blood-sugar," "blood-urea" or "blood-chlorides," so why "correct" for blood-sedimentation?

What advantage is gained by this method over the ordinary one-hour reading? First, the sedimentin index gives a quantitative measurement of the cause underlying varying sedimentation-rates (although in arbitrary units, it is true); whereas the one-hour reading is the measurement of an effect which, as will be shown presently, bears no simple relationship to the cause. To use a simple analogy, the sedimentin index is the temperature of an oven, and the one-hour reading is the degree to which the cakes are cooked. There is a large range of temperature variation below the one at which the dough shows the slightest response, and another large range above the one which chars it completely. A glance at fig. 2 will explain what I mean. In it I have plotted the sedimentin index of some 700 samples of blood against their first-hour readings, and through their midst I have described a mean curve as far as I dare. First, there is a great deal of scatter fairly uniformly distributed about the mean curve from its origin to its loose end at 2·0 units. Considerable variations in the first-hour readings may not mean any corresponding variation in the sedimentin index. For instance, 1·0 unit of sedimentin may concur with any first-hour reading between 1·25 and 4 mm., 1·5 units with 9–15 mm., and 2·0 units with 45–55 mm.

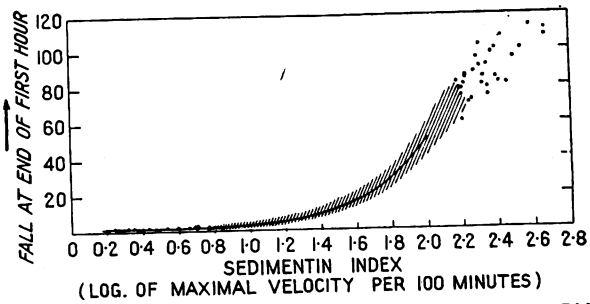


FIG. 2—Mean curve of values of sedimentin index of some 700 samples of blood plotted against their first-hour readings. The shaded area represents where the readings are so numerous that they cannot be shown separately on this scale.

CAUSES OF SCATTER

There are two main causes of scatter: variations in temperature and variations in delay. Had all these tests been performed at exactly the same room temperature the scatter would have been much smaller. In a cold room the clumping process is slower than in a warm room; the period of maximal velocity therefore is reached later, and so the first-hour reading is smaller. The maximal velocity, on the

other hand, is unaffected by changes in room temperature. Delay between withdrawing the blood from the vein and setting it up in its column causes a much increased first-hour reading, for during this delay the corpuscles are aggregating into clumps, and, when the tube is finally set up, the maximal velocity is reached earlier.

This was brought home to me very forcibly when one of my patients, who, two days after showing his usual one-hour reading of 30 mm., went up to London for a consultation. A sedimentation test was performed and gave a reading of 46 mm. in an hour. On his return two days later it again showed its usual 30 mm. On investigation I found that in London the blood was withdrawn in a west-end consulting-room and transported through the streets to a hospital pathological department, where possibly it had to wait its turn. By the time it was put up in its tube the fully grown clumps were ready to sediment at their maximal velocity from the start. A test carried out in these circumstances is not only valueless, but also dangerously misleading. Yet, had the maximal velocity (and hence the sedimentin index) been determined, it would have been found identical with those recorded at the sanatorium two days before and two days after the jaunt.

SIGNIFICANCE OF THE MEAN CURVE

Assuming that the tests are all carried out with uniform technique and in uniform conditions, it will be seen from the mean-curve (fig. 2) that considerable variations in a low sedimentin index make but little difference to the one-hour reading—e.g., an increase from 0·6 to 1·0 unit increases the one-hour reading from 2 mm. to 3 mm.—whereas the same variation at higher concentrations makes the one-hour reading leap upwards—e.g., an increase from 1·6 to 2·0 units increases the one-hour reading from 15½ mm. to 52 mm.). This would account for the apparent anomaly that, when a healthy control (with a very low sedimentin index) develops a mild catarrhal infection, his one-hour reading is unaffected or at most increased by a millimetre or two ; whereas, when a consumptive (already with a high sedimentin index) catches a similar cold, his first-hour reading rockets upwards, to the dismay and secret misgivings of his medical attendants, who fear lest it may have " brought on a relapse."

My mean curve fizzles out at a point corresponding to 2·0 units (and 52 mm. in the first hour), because after that point the scatter becomes hopelessly wild. In that neighbourhood " packing " begins to affect the one-hour reading in a highly irresponsible manner, and all correlation is lost. No one-hour reading of more than 60 mm. is of any value, except to indicate that " the patient is pretty ill," and no variations in a series of these higher readings bear any sort of quantitative relationship to variations in the disease processes. A one-hour reading of 111 mm. in a 200 mm. tube may be caused equally well by sedimentin index of 2·30 or 2·665.

PRACTICAL APPLICATIONS

Diagnosis of health.—What is a " normal " first-hour reading ? No authorities seem to agree on this point. Most writers say that anything over 8 mm. is abnormal, but some bid as high as 10 mm. for a male and 12 mm. for a female. (By the way, why do a few women show an exalted blood-sedimentation rate during their menses, whereas most women are entirely unaffected ?) My personal opinion is that it is extremely dangerous to exonerate any blood on the evidence of the first-hour reading, even when it is as low as 2 mm., for that figure may correspond with any sedimentin index between 0·3 and 0·9 unit. In my series of controls (healthy porters and wrongly convicted suspects) the sedimentin index has invariably been less than 0·5 unit, although on occasion the first-hour reading has been as high as 2½ mm. On the other hand, no sanatorium patient who is ambulant, fit, and on the eve of returning to work, and no ex-patient who has come up for an overhaul after having remained in good health and at work for a year, has ever shown so low a sedimentin index as 0·5 unit, although his first-hour reading may have been in the neighbourhood of 1 mm. So constant have been these findings that, whenever the local medical board refers a would-be recruit with an equivocal history and a puzzling radiogram for my opinion, I have no hesitation in saying of him, if his sedimentin index be below 0·5 unit : " This man has no active tuberculosis and has had none, at any rate, for the past twelve months."

A low sedimentin index is only useful in diagnosing good health ; the converse is not true. Any destruction of tissue will cause the sedimentin index to be raised to some extent until complete repair is effected. As has been stated above, a mild catarrhal infection will cause a transitory rise. Pregnancy invariably increases the index. The trauma from a surgical operation may raise the sedimentin index by 0·7 unit on the second day, 1·0 unit on the fourth day ; after which it slowly returns to its original figure by the end of a month or six weeks (fig. 3).

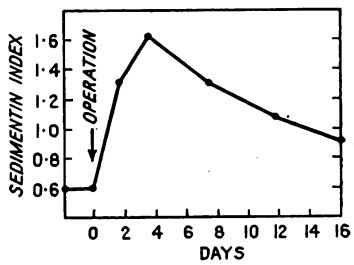


FIG. 3—Sedimentin index in a patient who underwent an operation for extrapleural pneumothorax, at which the parietal pleura was found to be too firmly adherent to the chest wall ; so the operation was abandoned without any trauma to the diseased lung.

Assessment of progress.—Variations in a series of monthly determinations of the sedimentin index are valuable data concerning the patient's progress and are far more trustworthy than variations in the first-hour reading. In pulmonary tuberculosis an increasing sedimentin index is often the earliest tangible evidence of deterioration in a patient's condition ; exacerbations of signs, symptoms, and radiological shadows may not appear until two or three weeks later. Meanwhile one has been warned and is on one's guard. A slow sustained increase in the sedimentin index suggests deterioration in the lung disease. Involvement of the pleura invariably brings about an abrupt heightening of the sedimentin index. In artificial-pneumothorax cases this may take place before the patient experiences any symptoms and while radiologically the artificial-pneumothorax cavity is still dry. The index is particularly useful in the case of patients who are severely infected and whose indices are more than 2·0 units and in the case of convalescents whose indices are below 1·5 units. Above and below these limits, as has been shown above, the one-hour reading may be grotesquely misleading.

Assessment of results of treatment.—The sedimentin index being a quantitative measure, lends itself to averages ; obviously to ascertain the average of several patients' one-hour readings is mathematically unsound. In fact, if two bloods (of the same blood-group) are mixed in equal proportions, the sedimentin index of the mixture will be the mean of the two individual sedimentin indices, whereas the resultant first-hour reading will not bear any ascertainable relationship to the separate first-hour readings. The efficacy of any treatment can be assessed by comparing the average in the sedimentin index improvement shown by the treated patients with that of the controls over the same period of time, as in the following example :

Recently we have been treating patients at Mundesley Sanatorium with insulin and a high-carbohydrate diet. They were unselected cases except for the fact that they were all losing weight or not regaining lost weight ; hence it is perfectly fair to take as controls all the other patients

in the sanatorium not so treated. The treated patients gain on an average 4·42 lb. of body-weight a month, compared with the controls' average of 1·344 lb. a month. They also seem to improve quicker than the controls. Their average improvement in sedimentin index is 0·078 unit a month, compared with 0·05 unit a month in the controls. Although these figures have not been subjected to the known formal analysis, they seem definitely to denote a causal relationship.

TECHNIQUE

The anticoagulant used is a 3·8 per cent. solution of sodium citrate in normal saline ; this solution is not only isotonic with blood plasma but also has the same specific gravity. Excess of this sterile solution is sucked into a 2 c.cm. syringe, the barrel of which is washed round with it. A needle is then fitted and all the solution ejected except 0·4 c.cm. Blood is drawn from an antecubital vein until the piston reaches the 2 c.cm. mark. The needle is withdrawn and a bubble of air sucked into the syringe, which is now inverted several times to allow free mixing of the blood and citrate solution. The mixture is ejected into a watch glass and sucked up into a 200 mm. Westergren tube within three or four minutes of withdrawal from the vein in the patient's room, and the exact time is noted. From now onwards the amount of fall every five or ten minutes is noted. The series of figures so obtained is plotted on a time-distance graph. The steepest part of the curve so obtained is produced in both directions, and from it the maximal velocity is calculated in mm. per 100 minutes. The logarithm of this figure is the sedimentin index.

For this estimation 200 mm. tubes are vastly to be preferred to those of 100 mm. or 50 mm. height, because the more rapidly sedimenting bloods in short columns have no time between the periods of agglutination and packing in which to attain their maximum velocity: the straight part (A–B fig. 1) is missing from the curves, which are thus diphasic in shape and give no clue as to what the maximum velocity might have been.

SUMMARY

The sedimentin index is the measurement in arbitrary units of those products of tissue destruction which when present in blood plasma cause an increase rate of erythrocyte sedimentation. It is equal to the logarithm of the maximum velocity of sedimentation expressed in millimetres per hundred minutes.

The sedimentin index is claimed to be of greater value than the orthodox one-hour Westergren reading in the diagnosis and management of cases of pulmonary tuberculosis.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE

SECTION OF PSYCHIATRY

AT a meeting of this section on June 11, with Prof. F. L. GOLLA, the president, in the chair, the rôle of

Observation Units

in local authorities' mental health services was discussed.

Dr. E. N. BUTLER said that at St. Francis Hospital, Dulwich, many of the cases received reached the hospital through relieving officers and police. They included not only new admissions of psychoses, but former voluntary patients at mental hospitals who had while still unrecovered exercised their rights to depart, mental defectives displaying antisocial conduct, and epileptics. The usual procedure on admission was the three-day order, and in many cases the stay of the patient in hospital was extended by a fourteen-day order. During this period routine investigation, physical, psychological and social, took place, and in suitable cases, particularly those where the question of voluntary status arose, the services of a visiting consultant were sought. The needs of London were peculiar, and amongst other factors which rendered the continuation of observation units desirable was the fact that the demand on mental hospital accommodation exceeded the available vacancies. If the observation unit is to be abolished the alternative is direct admission to a mental hospital or to the admission villa of a mental hospital. It was urged that admission to a mental hospital should not take place without the fullest possible investigation, and this could not be achieved at a single examination. To enable this investigation to take place the unit should be associated with a general hospital, the services of specialists of all kinds should be rapidly available, and there should be a closer connexion between observation units, mental hospitals and teaching schools. More use should be made of the unique material of observation units for teaching and research, but treatment should not be undertaken except in a few clear-cut conditions.

Certification should only be resorted to in the last instance. Episodic disorders could readily be managed through their brief courses in an observation unit. Great care should be taken to avoid the certification of cases with remediable organic factors—e.g., operable cerebral tumour—although behaviour would often be the guiding principle. Bromide intoxication and disordered conduct arising from indulgence in the cruder forms of alcohol are common complications on admission.

Dr. Butler deplored the use of drugs to secure quiescence and held the use of the padded room where necessary, as well as the toleration of a certain amount of noise to be preferable.

Dr. IAN SKOTTOWE, while recognising that there might be problems which were peculiar to London, cited examples of 15 boroughs and counties in which the average number of mental-hospital admissions through public-assistance institutions was as low as 12 per cent. He urged that if this represented the residue of cases of such difficulty that preliminary observation was necessary, the services of mental-hospital physicians should be made available in a consultative capacity so that quick clinical decisions might replace the cumbersome and more costly alternative of preliminary and sometimes prolonged observation. The neuroses were best dealt with as outpatients ; as for the psychoses, a delay in the provision of mental-hospital treatment was a denial of treatment, because full and adequate treatment could only be provided by the ordinary mental hospital. Investigation was treatment, and the two were inseparable partners. Wholesale routine investigations which might upset the sensitive early case should not be embarked upon except as part of a carefully planned scheme of treatment from the outset. There did not seem any reason why these should not take place at the mental hospital, but it was admitted that the mental hospitals must continue to improve their medical and architectural standards so that no reasonable exception could be taken to the admission into them of even the most sensitive case, and the facilities for treatment should be capable of dealing with any case in the psychiatric field. He regretted that special hospitals such as the Maudsley were excluded from the discussion. He thought it was possible to make a case for the pure research type of unit associated with a teaching hospital which would receive specially selected cases, but the utility of such units was strictly limited because cases of gross conduct disorder must be excluded, and they could not, therefore, be used as routine filters for all new psychiatric cases. He thought that the conditions in the admission unit of the modern mental hospital, even with the use of prolonged narcosis,

were preferable to those which Dr. Butler had described as existing in an observation unit.

Mr. R. H. CURTIS, chief officer of the L.C.C. mental hospitals department, approved of the development of observation units for London because the specialisation of the mental hospitals under the L.C.C. resulted in a tendency for a particular type of case to be sent to a particular hospital, and also because of the lack of mental-hospital beds. Endeavours were being made to secure liaison between the observation units and the mental hospitals by seconding medical officers from the mental hospitals for duty in observation units, and by providing the services of senior members of mental-hospital staffs as consultants at the observation units. There might be circumstances in the provinces which point to the need for a closer liaison between the reception unit and the mental hospital proper, but the special needs of London did not point in that direction. Suitable nurses for observation units were difficult to obtain.

Dr. LETITIA FAIRFIELD said she agreed and disagreed with all that had been said already, and took a mid-position. Dr. Skottowe had not appreciated the difficulties of London, and Dr. Butler had not fully appreciated the value of early mental-hospital treatment. In the past the condition of observation wards had been incredible. There had been 19 of them of 6 beds and upwards in London (the number was now reduced to 5 observation units) and at one time they had been a generation behind the other medical work of the old guardians. She recalled that doctors have limited statutory powers, and reminded the meeting of the important position of the magistrate who had the right of calling to his aid any medical man. While many magistrates did this, it was impracticable for home consultative services to be rendered universal in London. There had been a general policy that psychotics should not be sent to clinics for early treatment, which should be reserved for those of less disordered conduct. All mental hospitals were not as good as Dr. Skottowe made out. Due regard should be had to the antagonistic public attitude towards certification. Certification should not take place if treatment by any other means was possible. She hoped observation wards would be retained and improved and brought into the main-stream of psychiatry.

Dr. J. B. S. LEWIS said that observation wards were essential for London, but recalled cases of patients who on admission to the mental hospital stated that they preferred the conditions there to those from which they had come. He deplored the subterfuges sometimes employed in taking patients to mental hospitals.

Dr. T. P. REES said that after hearing what had been said he thought one might consider abolishing all mental hospitals and treating all patients in observation wards !

Dr. A. A. W. PETRIE summing up from the chair (after the departure of Professor Golla), said the key to the situation was the prejudice which existed against mental hospitals. The reason for the prejudice was the mixing of acute and chronic cases. He would like to see observation wards spread in the direction of the continental and American psychopathic hospitals, but he would like to make available the services of those who know the work, so that mental-hospital staffs did not simply become the custodians of the chronic cases and thereby themselves deteriorate. He would like to see big centres associated with university clinics for early cases, organised on a regional basis with the closest possible liaison with laboratory and other research facilities. One of the troubles with such hospitals would be that the patients could not be kept long enough. He said that a B.M.A. report was shortly to be published on the subject. He thought admission units of mental hospitals might be situated half to one mile away from the main building, and that they should have the closest liaison with the regional psychopathic hospital.

Dr. BUTLER in his reply thought it was unjustifiable to deprecate the conditions in observation units, as they were being improved. He still deplored certification without adequate time for investigation. He thought observation units would be very useful for teaching, because the cases there were as seen by the general practitioner. He recognised the importance of nursing and the need for doubly trained staff. He, too, deplored subterfuge in taking the patients to a mental hospital.

REVIEWS OF BOOKS

Surgery of the Hand

By MARC ISELIN, M.D., surgeon to the American Hospital, Paris. London: J. and A. Churchill. 1940. Pp. 348. 21*s*.

THE French edition of this book was commended in these columns last year (*Lancet*, 1939, **2**, 885) and it is pleasing to see it translated into English, for it is one of the best of the books on this important subject. The first chapters are taken up with a study of wounds, and Dr. Iselin clearly points out that only a strict attention to the care of wounds will reduce the number of infections. No minor operation is sufficient to deal with a lacerated hand, but only a properly staged and carefully carried out débridement, with suture reserved for ideal cases. He recognises the value of immediate skin grafting and placing the hand in the position of function from the start. He never uses straight splints. He explains the treatment of wounds complicated by fractures and makes some important observations on the use of toxin and anatoxin in the prevention of tetanus, on the treatment of foreign bodies, and on trophic and painful lesions. He does not advise suturing damaged tendons at once. He discusses the different varieties of infections, with special attention to bone and joint lesions, and describes some excellent incisions for tendon-sheath infections. The final section deals with closed fractures and dislocations, and there is a particularly useful chapter on assessment of incapacity. Altogether the book is a mine of practical information.

Soldier's Heart and Effort Syndrome

(2nd ed.) By Sir THOMAS LEWIS, F.R.S. London: Shaw and Sons. 1940. Pp. 103. 8*s*. 6*d*.

THE unsolved problem of the effort syndrome is once more with us and, unless the Services are to be depleted of men through unnecessary invaliding and the country to be involved in expense on account of avoidable pensions, the modern generation of medical officers must be fully acquainted with its practical aspects. A new edition of Sir Thomas Lewis's little book is therefore doubly welcome. Written with the clarity and conviction which we have come to expect from the director of clinical research at University College Hospital, and based almost entirely upon his own experience at Colchester and Hampstead during the last war, it presents a vivid picture of the syndrome, its diagnosis and its treatment. The book has also immediate value as a guide to the detection of heart disease and the final chapter on medical reports on discharged soldiers outlines the difficulties in assessing disability due to heart disease. No doubt the psychiatrist will be far from satisfied with what little is said about the ætiology of the syndrome. Wisely,

for the purpose of a manual such as this, Lewis restricts himself to a discussion of the main precipitating and associated factors. The space devoted to "heart strain" is evidence of the archaic views on this subject still widely held. Here and there brevity may mislead. It is a pity that the importance of scoliosis in causing displacement of the apex-beat has not been stressed and aortic incompetence should be diagnosed long before it has reached the stage of causing a water-hammer pulse. Hypertension in relation to the diagnosis of heart disease is discussed without mention of diastolic pressure. But these omissions do not detract appreciably from the value of a book which should be in the hands of members of recruiting boards, and of every medical officer in the Services and connected with the Ministry of Pensions.

Introduction to Biochemistry

(2nd ed.) By W. R. FEARON, Sc.D., M.B., F.I.C., fellow of Trinity College, Dublin. London: William Heinemann. 1940. Pp. 475. 17*s.* 6*d.*

THIS textbook has been thoroughly revised with special additions to the sections on solutions and colloidal systems, steroids, pigments, tissue respiration and internal environment. The book is divided into two parts, the first of 62 pages on elements and inorganic compounds and the second of almost 400 pages on organic compounds. In part 1 a difficult and dry subject is made interesting, and the author has succeeded in collecting together material widely scattered and difficult of access, such as the biology of calcium, iron, potassium, sodium and copper. In part 2 the text adheres to the orthodox presentation of carbohydrates, proteins and lipides. Chapters on vitamins, alimentary digestion and intermediate metabolism follow. In the section on excretion the chemical analysis of urine is fully discussed but the less accurate method of urea estimation by the hypobromite method is described in detail, while only mention is made of the decomposition by urease. Hormones are fully dealt with, but the last chapter on blood and tissue fluid would be improved by fuller treatment. The book as a whole, however, will give the student an excellent introduction to its subject, it is packed with information, up to date, and very readable.

Le débit cardiaque: études expérimentales et cliniques

By JEAN LEQUIME, assistant in the University of Brussels. Paris: Masson et Cie. 1940. Pp. 223. $0.90.

UNDER the inspiring leadership of Govaerts and Heymans the Belgian school of physiology has added a great deal to our knowledge of the circulatory system both in health and disease. This monograph is a typical product of the school—a record of personal observations carefully carried out and reported and correlated with the relevant literature. Dr. Lequime prefers the acetylene method of Grollman to any of the many modifications of the original Fick method, because of its simplicity and greater accuracy. The conditions in which he has investigated the cardiac output include certain congenital lesions of the heart, hyper- and hypo-thyroidism, hypertension, paroxysmal tachycardia, auricular flutter and fibrillation, heart-block and congestive heart failure. There is also an interesting report of the alterations in cardiac output that follow the ingestion of water or normal saline, either of which in healthy subjects increase the output irrespective of whether diuresis occurs or not. Dr. Lequime suggests that the demonstration of a lowered partial pressure of CO_2 in the venous blood in the pulmonary circulation is of value in the clinical diagnosis of such congenital lesions of the heart as an interventricular septal defect or a patent ductus arteriosus.

Manual for Diabetic Patients

By W. D. SANSUM, M.D., chief of the staff of the Sansum Clinic, Santa Barbara, California; A. E. KOEHLER, M.D., member of the staff of the clinic; and RUTH BOWDEN, B.S., dietitian of the clinic. London: Macmillan and Co. Pp. 227. 17*s.*

MOST diabetic clinics of any magnitude produce a manual for their patients, and now Dr. Sansum and his colleagues have followed the fashion. Dr. Sansum was the first to break away from low-carbohydrate, high-fat diets to the more liberal ones relatively generous in carbohydrate that are now widely used, at least for insulin cases. It is therefore interesting to see whether some years' experience has led him to modify his views. He prefers to call his diets not high-carbohydrate but adequate-carbohydrate diets. He does not seem to have increased them to the very high level of some other workers, for those he sets out here contain 150–300 grammes of carbohydrate per day, with an average of 200 g. Fat is not greatly restricted, some 100 g. of fat and a similar amount of protein being given, so that the supplies of calories are liberal and under-nutrition is avoided. Dr. Sansum has therefore hardly modified his original diets as years have gone on, and he claims that his patients are well satisfied with them and maintain good general health. In other respects the book covers the usual ground of diabetic primers adequately and clearly. The metabolism of foodstuffs and insulin treatment are included as well as diet, and the urine tests are admirably demonstrated in coloured plates.

Dental Mechanics for Students

By J. OSBORNE, L.D.S. Birm., lecturer and demonstrator in dental prosthetics, University of Sheffield. London: John Bale. 1940. Pp. 253. 12*s.* 6*d.*

MUCH patient labour has been usefully expended on this book, which should give the dental student a concise introduction to his subject during his first two years' work, and the practitioner a valuable reference book. The purpose of the book is mainly "mechanical," so that some mention must be made of crowns and bridges, but the caveat regarding dead teeth is not sufficiently emphatic. Nothing is so discouraging to the student as the subsequent discovery that former methods have to be unlearned or discarded, and today informed medical and dental opinion abhors dead teeth. The central consideration governing all dental devices and treatment is the general health of the patient. The final chapter on splints for fracture is not comprehensive enough. In war or peace it is an important subject of stimulating interest to students. The treatment of cleft palate outlined seems out of date and surprisingly despondent. The clear illustrations, so vital to a work of this kind, leave nothing to be desired.

Fisiopatología del Hepato-Colédoco-Colangiografía Operatoria

By PABLO L. MIRIZZI, professor of clinical surgery in the faculty of Medicine of Cordoba. Buenos Aires: El Ateneo. Pp. 282.

THE investigation of the biliary apparatus by immediate cholangiography was first brought before the profession by Professor Mirizzi at the Argentine Congress of Surgery in 1931. This work is largely an anatomico-functional study based on the observations which the author has made by this method in his clinic in Cordoba.

Operative cholangiography consists of slowly inject-

ing a few cubic centimetres of Lipiodol into either the gall-bladder, the cystic duct or the common duct while these structures are exposed at operation. Radiograms are then taken on the operating table, quickly developed, and studied right away. With suitable apparatus, including a special operating table of Mirizzi's own design, and proper organisation, only ten minutes, it is stated, need be added to the operating time, but for correct and rapid work a trained team is essential. The great practical value of the method appears to be in the detection of pathological conditions of the common or hepatic ducts which are not accessible to palpation, but it has also enabled Mirizzi to study that troublesome group of cases in which reoperation has been necessary after cholecystectomy. These investigations have led him to the conclusion that painful sequelæ, if not due to overlooked or recurrent stones, are probably the result of distension of the biliary tree caused by a functional or anatomical obstruction of the lower third of the common duct. This conclusion prompted a close study of the neuromuscular control of the biliary ducts and incidentally has resulted in the coining of new terms such as "spastic sphincteritis" and "Odditis." Functional disturbances will not explain all the sequelæ that are met with, and we find descriptions of "stenosing pancreatitis" as well as the admission that calculi can cause fibrous strictures. As a result of his studies the author suggests that cholecystitis is always complicated by some pathological condition of the common duct, which may be either an anatomical change or a functional imbalance. In his studies of the control of the biliary tree Mirizzi shows that he is firmly convinced of the reality not only of the sphincter of Oddi but of similar mechanisms which control the cystic duct and the common hepatic duct. In a chapter on the anomalies of the biliary passages he depicts some which are certainly not usually recognised but which were demonstrated by cholangiography. The last chapter brings out the errors which may arise in carrying out the method by references to cases under Mirizzi's own care.

PUBLIC HEALTH

London School-children getting Healthier

ONE of the last reports issued by Sir Frederick Menzies[1] showed the striking change that has taken place in the physique of London school-children in the last quarter of a century. In 1938 they were on the average 2 in. taller and 7½–8 lb. heavier than in 1905–12. Though social surveys in London and elsewhere have revealed the difficulties of the wage-earner in adequately maintaining a family of more than three children,[2] there is no doubt that London children are materially better clothed, housed and fed than their parents. Martin,[3] using figures given by the L.C.C. and the Registrar-General, has tried to measure the consequent improvement in child health. The task is not so easy as it seems, for changing definitions and standards of diagnosis often complicate the picture. For instance, the rise in the proportion of school entrants found to be in need of treatment for various defects may well be due to a more stringent supervision to-day and a different standard in the conditions held to need attention. The improvement in survival-rates is, however, clear-cut. In 1901–10, of each 100 London children born 76 males and 78 females survived to the age of fifteen; in 1930–32 the corresponding figures were 88 and 90. Mortality, too, has declined most in the poorer boroughs, so that the undesirable contrasts that still remain are on a decidedly lower scale than in the days before the last war. The bulk of the conditions that need attention are, it seems, defective teeth and defects of the nose and throat. Only a little more than half the children entering school are recorded as having sound teeth, and more detailed observations suggest that this is an overstatement. There has been little change in this figure between 1911–14 and 1930–35, except in older children, whose teeth have distinctly improved. A fifth of the entries have defects of the nose and throat, and again there is little improvement at this stage of life though decided progress at ages eight and twelve. Similar improvement is noted in the vision of the school population and there has been a decreasing incidence in defects of the heart and lungs and in rickets. In 1911–14 the latter was noted in 3 per cent. of the boys and in 1·6 per cent. of the girls entering school, against 0·9 and 0·5 per cent. in 1930–35. The proportion of children described as clean at medical inspection has risen from 80 to 97 per cent., while the average number of fresh cases of ringworm per year has fallen from 3770 in 1914–16 to 247 in 1933–36. On the other hand, the incidence of scabies has not responded to the measures taken against it and appears to have risen considerably. Road accidents form a serious offset to the successful efforts made to reduce sickness and disability and to produce a healthy citizen, for the number of children thus killed or injured is almost 2½ times as many as thirty years ago. The scale can be judged by the figures for the Metropolitan Police District (a larger area than the L.C.C., of course) in which, in the five years 1930–34, 1264 children under fifteen were killed and over 53,000 injured. An increase in the more serious heart impairments sufficient to incapacitate children from attending ordinary school, and in rheumatism as a cause of chronic invalidity, may be due only to changing standards of observation and care. In spite of such difficulties of interpretation, these figures, brought usefully together, generally confirm quantitatively what common observation would suggest qualitatively—namely, that London's children are getting healthier.

1. See *Lancet*, May 4, 1940, p. 841.
2. Family Allowances, London, 1940.
3. Martin, W. J. *Ann. Eugen.* April, 1940, p. 18.

Points from Annual Reports

Dr. E. E. Marcus Milligan in his school medical report for *Glossop* for 1939 compares the incidence of defects per 1000 children discovered in a routine inspection there with the incidence for England and Wales, taken from Sir Arthur McNalty's Health of the School Child for 1938. The comparison shows departures from general findings which seem to be explicable only by differences in standards. Thus, 36 per 1000 children in Glossop are considered to require treatment for defective sight, in England and Wales 74. In Glossop 8 children per 1000 required treatment for throat and nose diseases, in England and Wales 67. On the other hand, organic heart disease requiring treatment is twice, defective speech four times, and nervous disease two and a half times as frequent in Glossop as in the country as a whole.

Dr. Milligan also discusses the value of functional tests in estimating nutrition. Two of the tests he uses are: pull as measured by the dynamometer, and time in seconds during which the child can hang from a horizontal bar. Dr. Milligan considers that for boys the pull should be at least 1·7 times the body-weight. He gives the records of 193 boys from which it appears that 16 fell below this level. This test, which is widely used, has the advantage that it is not influenced by age but its value in assessment is uncertain. The horizontal bar test gives irregular results which are somewhat curious. In Dr. Milligan's series the time varied between 55 and 240 sec. This test is comparable with the breath-holding test which was one of the first endurance tests used and, like it, is probably much influenced by training. We agree with Dr. Milligan that functional tests are valuable

for estimating condition though their sensitiveness to temporary trivial interferences with health makes their interpretation difficult. The only factor in the assessment of nutrition which agrees with clinical assessment is weight over height, but the agreement is more apparent than real.

Norfolk is a purely agricultural county, and, apart from Norwich which is outside the administrative county, contains but one town of any size—King's Lynn with 23,538 inhabitants. Though the fourth largest county in area it is one of the most sparsely populated, having but one person to four acres. Between the census of 1931 and mid-1938 the population increased by 6677, which is not far from the excess of births over deaths, so the population is now about stationary. For centuries Norfolk has been famous for the longevity of its inhabitants, and though statistics do not fully support its claim, it is a most healthy county. In 1938 its birth-rate was 14·93, crude death-rate 11·65, infantile mortality 39·08 and maternal mortality 1·98. In that year 619 deaths were caused by cancer and 138 by tuberculosis. Of the 3793 deaths during the year, 1552 were of persons aged 75 and above. Of the 2445 deaths of persons over 65 years of age—two-thirds of all deaths—383 were caused by cancer and only 12 by tuberculosis, whereas of the 1348 deaths in persons under 65 years of age 236 were caused by cancer and 126 by tuberculosis. During the five years 1934–38 there were 61 notifications of ophthalmia neonatorum, but no impairment of vision resulted therefrom. In 1938 four deaths were attributed to syphilis, ten to general paralysis and tabes, and four to aneurysm, all over 45 years of age, except two of the nervous disease group in the age period 15–25. On the blind register there are 615 names, only 17 of which are of persons under 21 years of age and only one under five years of age. But 96 out of 615 had become blind before they were 20 years old. During 1938 the venereal-disease clinics dealt with 55 new cases of syphilis and 95 cases of gonorrhœa. These facts suggest that the prevalence of venereal disease in Norfolk is low and declining and gives one explanation of the favourable health record of the county. The population in mid-1938 was 325,580.

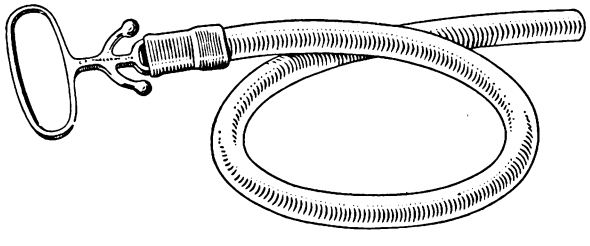
The report for *Derbyshire* by Dr. W. M. Ash was the first school report for a county for 1939 to be published. Particular interest attaches to the school medical work of Derbyshire because formerly it had the highest tonsils and adenoids removal-rate in the country but in 1939 it had one of the lowest. In 1930 the number of operations performed upon Derbyshire school-children was 4058; in 1939 it was 90. Parts of Derbyshire are receiving authorities under the evacuation scheme, but the county council was not the receiving authority, so what Dr. Ash says about the cleanliness of the received children is as free from bias as possible. The received children came from the county boroughs of Birmingham, Manchester and Derby and their standard of freedom from nits and vermin was far below that of the children of the receiving households. The evacuees numbered about 10,500 and of these 1302 were reported to have had nits and 479 to be actually verminous. As in most reception areas, there was no great difficulty in getting the children clean, but Dr. Ash asks the pertinent question—why if we could get them clean could they not have been got clean in the towns from which they were evacuated? He questions the reality of the teaching of hygiene in elementary schools. All the children's parents of today and in many cases their grandparents have been under a system of education which claims to put health and cleanliness as its primary function. Judging from results the system, especially in the great towns, is a failure.

NEW INVENTIONS

TOURNIQUET FOR ALL PURPOSES

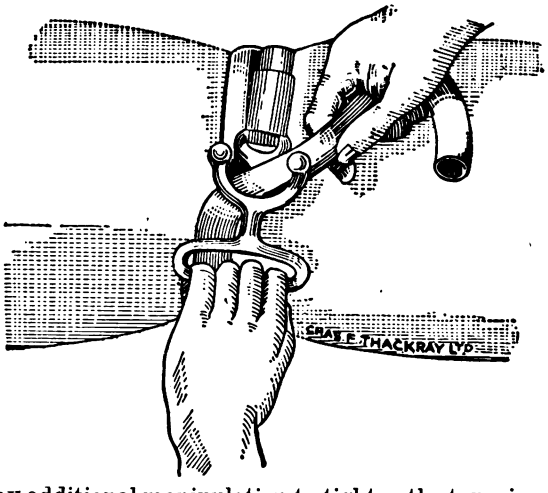
THE anchor type of tourniquet known as Samway's pattern depends for its efficiency on the elasticity of the rubber tubing, which, after it has been fixed round the limb, is secured to the wings of an anchor-shaped metal holder. The rubber tubing used is often too thin or too hard, thus causing unnecessary injury to the tissues. The worst feature in the single Samway, however, is the difficulty of holding the wings of the anchor till the rubber is fixed. Similarly, in the double anchor pattern the wings are too small to admit two fingers comfortably, and at the same time to provide a sufficient grip while the rubber tubing is being stretched and fixed.

In an attempt to overcome these difficulties I have designed a new tourniquet. It has a cork-screw handle large enough to admit four fingers, fitted



to a single Samway's anchor tourniquet the wings of which have been slightly lengthened, with $\frac{11}{16}$ in. diameter soft rubber tubing.

In fixing the tourniquet the rubber tubing should first be applied to the wing of the anchor distal to whichever hand is used to fix the rubber in the tourniquet. The fixing hand should be crossed over to grasp the free end of the tubing, which is then pulled up and then down into the wings of the anchor,



any additional manipulation to tighten the tourniquet being carried out by the handle during this process. Owing to the softness of the tubing it lies flat on the limb when fixed.

This tourniquet can be applied easily and rapidly because of the leverage obtained through the grip of the handle. It is seldom necessary to pass the tubing round the limb more than once, so that the likelihood of injuring the limb is much reduced. The handle of the tourniquet also facilitates its removal, particularly during an operation where sterilised sheets, mackintoshes and so on are covering the injured limb.

The instrument has been made for me by Messrs. Chas. F. Thackray Ltd., 10, Park Street, Leeds, 1, who have registered the design (No. 838091).

L. DOUGAL CALLANDER, M.D. Edin.

IN ENGLAND NOW

A running commentary from our Peripatetic Correspondents

WHEN war came last September and a sort of overwhelming migratory urge seized many people, compelling them to get into flocks, to assume strange plumage, to be busy in preparation for fight or flight, it did not spare me. Torn by it from the steadied ways of peace, I found I could not get into the services, so I went to sea in the Merchant Navy née Mercantile Marine, and have sojourned there very pleasantly for the last eight months. During that time my ship has brought back over a quarter of a million dead sheep, many thousand tons of priceless butter and much else besides, and a band of young men from the Dominions who have come home to fight for the cradle of their race as instinctively as one raises one's arm to ward off a blow—a glorious band of happy, humorous, tolerant warriors who make the Knights of the Round Table look anæmic psychopaths. My main concern has been for my own crew, two or three hundred fibres, making a shred, in that life-line that connects this country with her food-supply; a group of ordinary British folk, moulded by their sea life; a neglected body of men enjoying a new popularity because the public has rediscovered they are essential to the maintenance of its belly-girth. Well, what of them? They are ordinary men, but they are being subjected to no ordinary strain, and one ventures to prophesy that this is going to increase. Shuttered port-holes and foul air at night, darkened decks, double watches, quick turn-rounds in port, these among many other things are straining these invaluable sons of ours. The almost cloistered calm of the convoy, the regularity of the run through troubled waters, the punctual delivery of your daily bread, are not attained without penance.

What can we do for them? A hell of a lot. It is hard to criticise the Mercantile Marine management in generalisations, for there is no uniformity; there are good companies and bad companies, and some of the good ones are bad in parts. But all the crews' quarters could be vastly improved; they are always much worse than even third-class passenger accommodation. Feeding could be bettered; in many ships the food is over-caloried and under-vitaminised. Why in the name of Demos on a passenger ship should fruit and fresh greenstuff be looked upon as a necessity for the passenger and an unheard-of luxury for the crew? And why when the ship is in port for a time should the crew not be fed on fresh food? Just now merchant seamen are being deservedly well paid, but man does not live by bread alone, even wholemeal bread. Much more might be done for their recreation—books, games, places to play them in. The Board of Trade has been a niggardly Victorian guardian to these men, imperfectly insisting on a bare minimum. Its knowledge of vitamins is culled from Captain Cook and it has not yet heard of sulphonamide. Take heed, O ye who sit in high places, for these men will shortly be your saviours.

* * *

Going out last February in a crowded ship we had quite a lot of infectious diseases on board, an ordinary "sangfroid," a streptococcal sore throat, and the real genuine filter-passing flu. With impotent detachment I watched their passage from cabin-mate to cabin-mate, from table to table, from bridge-four to bridge-four. But the curious thing was this: most people got all three, but not at the same time—they would get one after the other, very often with a few days' freedom in between. Are we to suppose that these performers on our tissues will accommodate themselves to each other, form an orchestra, and give us next winter the devil's symphony as they did in the pandemic of 1918?

Another infectious disease we had was rubella. Four independent cases moved among their susceptible fellow passengers during their infectious period and did not come to me until they were obviously maculate. I prophesied an epidemic, and the Captain, who loathed taking it, seized the opportunity to cancel church service. We were running south and crossed the tropics during the time the secondary cases should have been incubating. In fact there were only two, both atypical: one a cabin contact who had the adenitis without any spots, the other my hospital attendant, who got the adenitis severely, had a fine crop of spots round his pudic girdle, the only part of him that was not sunburnt, and consequently looked like Mowgli in a tiger skin. I take it the explanation of our not getting a secondary wave is that these viruses are extraordinarily susceptible to change of temperature; I'm told plant viruses are too. Not that rubella doesn't flourish in the tropics—they had a bad outbreak in Norfolk Island. It must be the change of temperature. I wonder if this carcinoma refrigerating treatment depends on that change too.

* * *

Gustave came to us from Norway, with a piece of shrapnel in his lung and a hæmothorax. He was all in, and when a few hours later I explained to him that I must give him a prick with a needle in the chest he started to whimper like a baby:

"Faut pas me faire de mal, faut pas me faire de mal."

"Rien qu'une petite piqûre, mon vieux, tu ne sentiras rien de plus."

"Faut pas me faire de mal, faut pas me faire de mal."

But as soon as it was all over, he suddenly stopped whimpering, and in a brave voice he said, "Merci, docteur." A couple of nights' sleep made a world of difference, and it was time to repeat the paracentesis. In civil life Gustave was a theatre orderly in a hospital, and he wanted to know just what was the damage to his lung. Would he get better? Yes? Very well, then, one could go ahead.

"Faut guérir aussitôt que possible. Alors, il faut souffrir pour guérir."

As he winced at the introduction of the anæsthetising needle, he said quietly, almost as if to himself, "Il faut des hommes en France, vous savez; faut guérir, faut souffrir pour guérir."

Marcel, a swarthy little fellow from the Mediterranean littoral, also came to us from the snows of Norway. He was a type you might well meet in the more squalid quarters of Marseilles; but now he had a large sucking wound of the chest, with a heavily infected hæmothorax. At first he reminded me of a wounded animal, who might snarl painfully at anyone who threatened to come near and touch him; but he was so tired and at the end of his tether that his suspicion showed only in his eyes—large puzzled eyes, seemingly distrustful of friend and enemy alike. Then he would slip back into semi-unconsciousness, moaning from time to time, "Maman, maman," and sometimes "J'ai soif." Poor little Marcel, crying out in pain "I thirst"; nowadays they drive the pieces of iron into the pierced flesh with all the ingenuity of twenty more centuries of scientific achievement. It was a week ago that he was admitted to hospital, and he is improving. He looks at me gravely nowadays and says, "Ça va un petit peu mieux"; but he has not yet managed a smile for any of us.

* * *

It is curious that railway companies should now be obliterating the names of their stations in honour of our parachute guests, when passengers have been complaining for years that they were illegible. Signposts are a different thing, for they have lately become really informative. A letter in the *Times* suggests that our secret weapon against the parachutist is the inability of any English rural, however cöoperative, to give clear topographical instructions. But in relying on these natural advantages we are surely missing an opportunity for ingenuity. Should

not our police stations, for example, be conspicuously labelled "Bierhalle"? Why not some placards at each barracks saying, "You may leave your parachute here"? What about "Auskunftbureau" or "Man spricht deutsch" at the headquarters of the L.D.V.? Our charwoman, however, would rely on roadside stalls bearing assorted sausages liberally filled with rat-poison.

* * *

I have been making hay while the sun shines—literally, I mean—and a very satisfying occupation it is. Turning hay with a "pick" or raking it into heaps provides exercise of just the right degree of strenuousness for a hot day. If suitably clad, in a pair of slippers, bathing trunks and a panama hat, one sweats gently and continuously without ever becoming wringing wet or exhausted. Moreover, haymaking engenders a thirst that the townsman might envy. This year we have had not only sun but also a light breeze and, as my gardener says, the hay makes itself. When rick-building starts is the psychological moment at which to recollect an urgent appointment. The heavy job of hoisting hay should be left to others less busy than the doctor, unless, of course, he is a skilled builder of ricks, in which case he can stand aloft deftly arranging the hay handed up to him by the poor serfs below.

* * *

"One for sorrow, two for mirth——" There are too many magpies about this year. For weeks now I have been encountering daily a motley procession of single birds and have been at some pains to salute them all. The other day, for the first time this year, I saw a pair and felt all the better for it. When I reached home I learnt that Italy had entered the war. Yesterday, when driving along a lane I noticed a pair of peewits screaming overhead as they wheeled drunkenly to and fro. Then, on the road in front of me, I espied their brood of fledglings quietly sunning themselves and refusing to be intimidated by the approach of my car. As they would not make way for me I had to stop, get out and lift them into the hedge.

* * *

My first companion in parashooting was a sardonic cowman. "Dear mother," he kept repeating, "I'm cold. You would take a job without any pay—that's what my wife said. When I get home at two o'clock I'll wake her up! Let's move on a bit. Here, hold me rifle while I climb the fence, I don't want to tear me new coat. . . . I shall have to get another job soon. Up at five every day and no holidays. But a change is as good as a holiday; I've only been here two months."

The next night on duty I was out with the commandant's butler, a travelled man. "My present wife's a Swiss, but I buried my late wife in Yonkers." So we compared memories of America, and the combined nostalgia of Rockefeller Fellowship and millionaire's butlerdom floated over the misty vale. "Not really a military job this, sir," he said as we parted, "more of a night watchman's." On the way home across the dewy fields the world was glorious; the chickens were delighted to be let out so early, and the garden was green and lovely in the early sun. One had the impression that God was in his Heaven, and all well with the world. Not so an hour and a half later, at the red-eyed furred-tongued awakening, stretching of weary muscles, scraping of stubbly chin, blare of radio news.

My third mate said: "Children are such *frightful* snobs. I heard a boy at school ask my ten-year-old what his father was. 'Oh, he's a farmer,' said Philip. 'At least, he was a soldier, and then a tea planter, and now he's a farmer. *And* we had our own polo ponies.'"

The Military Cross has been awarded to Lieut. J. G. Lord, R.A.M.C. When one of our anti-tank guns was in action near his aid post engaging advancing enemy tanks, he attended to each casualty at the gun position as it occurred under heavy fire.

WITH THE B.E.F.

MEDICUS, M.P., IN FRANCE

THE B.E.F. in France suffered just in the same way as we did in Great Britain from the influenza and german measles epidemics during last winter. They were for the most part in comfortable quarters and their conditions as to hospitalisation and treatment were probably better than those in some of the less well-equipped or organised places in this country. But after the winter the total sickness was small and before the German offensive casualties from battle in a large part of the B.E.F. were nil. But there were other casualties. These were the results of motor, often motor-cycle, accidents and of football. Those two causes will have filled a good many pages of casualty returns.

Illnesses were not very numerous. There were the usual acute troubles, such as appendicitis, and some cases of men placed by medical boards in a higher category than their condition justified and having to be returned to home depôts. Cerebrospinal fever claimed some victims but it was definitely not related to overcrowding. The infection appears to have been brought from Great Britain and the distribution of French cases who had contracted the disease supported this presumption. Whether cerebrospinal fever will increase among the refugees remains to be seen, but the congestion in many areas is certainly great. The course of the cerebrospinal epidemic was quite definite and had four periods. In the first period there were some cases of the fulminating type and some which were sent to French hospitals. The case-mortality reached 16·3 per cent. The next group of cases of about the same total number were milder in type and the case-mortality was 3·3 per cent. The third group, much smaller in total number, had a case-mortality of 3 per cent. The best lot of all, a very small group, had a case-mortality of nil. The total cases were under 400. All were treated with M. & B. 693.

Up to the time of the German offensive there were no other serious infections at all. Dysentery and enteric disorders were negligible. Skin infections, if not negligible, were very few compared with those in the last war and the duration of treatment was also less. There were a few cases of meningococcal septicæmia of very mild type with slight rise of temperature which cleared up at once with M. & B. 693. An active bacteriological look-out was kept for this disease of which the symptoms were headache but no special feeling of illness, with spots on the trunk, limbs and soles of the feet.

Only one case of tetanus was recorded—a man injured in the face by abrasions caused by the explosion of a tin of petrol. He was sent to a C.C.S. on the day of the accident and discharged fit ten days later from a base hospital in France. Two days after discharge he was readmitted to hospital with tetanus and was treated with intravenous injections of tetanus antitoxin. This man was one of the few who had not been immunised with tetanus toxoid and at the time of the accident he was not given an A.T.S. injection. Nevertheless he recovered and was duly discharged to duty.

This B.E.F., whose retreat and evacuation from Dunkirk have made a splendid record for all time, were men of fine physique—a considerable proportion of them were militiamen—and it may be as much due to their physical fitness as to chemotherapy that their wounds have not gone septic as they did in the last war.

THE LANCET

LONDON: SATURDAY, JUNE 29, 1940

SPARING THE WORKER AND SPEEDING THE WORK

GIVEN the machines and the material all the rest that matters about output is human. The Minister of Labour, choosing the simplest and most effective way of sparing his workers, has decided that the machines shall never be idle but that the men shall relieve each other in such a way that their hours will be reduced to something like peace-time level. In addition, a relief crew, working at a different machine daily, will be able to release the normal crew of each machine for a periodical day of rest. This can only be done by drafting in extra labour. He plans, too, that juvenile workers shall return at once to the statutory five-day week of 44–48 hours, but that they shall be relieved for two days a week by women who will thus get a preliminary training in factory work which will prove valuable as increasing numbers are drafted into industry. Any increased cost of labour would be offset by keeping the machines running for a seven-day week and thus reducing overhead expenses.

A factory and welfare advisory board has been set up to consider welfare questions both inside and outside the factories and is enlisting all works doctors in the country into a national service, thus giving them a new status in the works and making them an accepted part of the management. To apply our knowledge of the functions of the human body at work is clearly part of the management of labour, and it is in the interest of industry to take medicine into full partnership. Only by providing a reasonable standard of health supervision in factories can the management tackle the problems of industrial fatigue and ill-health at their onset, or prevent them from arising. The Industrial Health Research Board for years has been collecting data on these problems, and it is encouraging to know that the board is represented on the advisory body to the Minister. Thanks to its research, the physiologist has shown that work may be made lighter by the adoption of easy posture and correct methods. The experimental psychologist has well-founded suggestions for better arrangement of work to suit the reactions of the average worker, for the avoidance of boredom at repetitive work, for the detection of the "accident prone" and for better methods of vocational selection and training. Enlightened organisations employing large numbers of workers have found that it pays them to appoint a whole-time medical staff, not only for the effect these services have in keeping down the figures of sickness absence, but also for their value to management in other ways. Without infringing the prerogatives of the general practitioners, on whose panels the workers are distributed, an efficient medical service can greatly benefit the health—and therefore the producing power—of factory workers. Problems of lighting and ventilation are already being considered by the advisory board. Billeting, communal feeding and the provision of day nurseries come under the Ministry of Health and the Ministry of Food, and will have to be organised through the departments concerned. Billeting is a ticklish problem where labour is suddenly being increased; the local authorities are being asked to coöperate and to appeal to local organisations for the use of church or concert halls which might well be used for the purpose. Women working in the factories will not be able to carry on the ordinary duties of the housewife, so plans are being made to arrange communal feeding for the workers in areas outside the factories; possibly fleets of omnibuses will be used to transport them to and from their meals. Mobile canteens may also be of service. Day nurseries for the children of women at work will have to be established, again well outside the factory area so that they do not become a target, and the local authorities have been asked to plan accordingly. Local labour-supply committees will be set up in growing areas—twenty are already being formed—consisting of a chief labour supply officer and two assistants, the local factory inspector and a chief welfare officer, who will be an official of the Ministry of Labour. The chief welfare officer will be responsible for coördinating local activities involving labour supply and welfare outside the factory. Much of the work will fall on the local organisations, which are on the spot and know the needs and facilities of the district. It is suggested that in each district a subcommittee of representatives of local organisations should be formed which would be attached to the local labour supply committee to advise and help the chief welfare officer. To link up local work with the work of the ministries it is proposed that a central consultative council should be formed, under the chairmanship of Lady CYNTHIA COLVILLE, to provide a channel through which the various local organisations can approach the minister and through which he can seek their advice. The organisation of welfare inside the factories can be achieved through the Government departments, but outside the factories it will be coördinated by the consultative council.

Insurance doctors in the affected areas will, of course, continue their services to factory workers on their panels, but the great influx of labour may prove too much even for the stoutest-hearted now that assistants are difficult to come by. No plan has so far been formulated by the ministry for dealing with this problem. Air-raid precautions, too, in these industrial areas will have to be expanded to meet the growing need. In factories which normally employ a full-time medical officer it has so far been the practice to place air-raid precautions under his control.

BOLUS COLIC

FOR so long an organ the small intestine takes up surprisingly little space in the textbooks of medicine. The stomach and the first part of the duodenum above it, and the colon below, with their cancers and their ulcers and their all-too-frequent functional disturbances, seem to cause vastly more ill health than the intervening two or three yards (six or seven in the dead) of tubing. This is fortunate for the physician, since the stomach and the colon are more accessible to his rubber tubes and scopes and other means of study; and fortunate for the layman, for both the doctors and the advertisers leave him blissfully ignorant of the most important stretch of his alimentary tract; he buys no jejunum powders, submits to no massage of his ileum, and develops no neurosis in respect of his small intestine. Even when that organ is driven by unsuitable content or external restraint to cry out with pain he complains of a "stomach-ache," like the patients Mr. LATCHMORE quotes on another page, or at most of the richer and more accurate "belly-ache." Nevertheless, the small intestine deserves more consideration than the doctor is inclined to give it. A few years ago Sir EDMUND SPRIGGS made it the subject of a clinical lecture,[1] in which he drew special attention to those cases of chronic partial small-intestine obstruction due to postoperative or postinflammatory bands and adhesions. Such cases are difficult to recognise clinically. They often complain of intermittent mid-abdominal colicky pains, culminating in borborygmi, sometimes associated with nausea and vomiting, and in the severer cases with abdominal distension. A history of that kind, following an abdominal operation or an old tuberculous peritonitis, strongly suggests that the small intestine is contending against mechanical constraint; but only radiology, and careful and skilled radiology at that, can establish the diagnosis by demonstrating that some coil of the small intestine is fixed in the abdomen and distended. Too often vague continued dragging pain in some part of the abdomen is attributed to "adhesions," on insufficient evidence. Too often, also, a further operation is undertaken to relieve symptoms by dividing such adhesions. This can hardly be justifiable unless the evidence, preferably radiological, of partial obstruction is clear, and even then it is by no means certain to bring relief. SPRIGGS has shown how medical management, including a soft milky diet, high in fat content but free from coarse indigestible residue, will bring comfort to many patients; it should certainly be fully tried before surgical attack is considered.

It is not only in patients with constricting adhesions, or with organic narrowings of the intestine such as were left by the old Murphy's button anastomosis, that coarse food will cause obstructive symptoms. Acute obstruction can occur in the normal intestine, if coarse enough indigestible material is swallowed, unmixed with softer pabulum. In 1932 ELLIOT [2] reviewed 36 examples of this, due to a wide variety of ingesta. Mr. LATCHMORE adds 7 cases of his own, and suggests the name "bolus colic" for them. They were due to the eating of coco-nut, monkey-nuts, orange or the like, usually without other food and after a period of fasting. Recurring colicky pains in the middle of the abdomen, with vomiting, were the chief symptoms, lasting sometimes for days. Some abdominal distension was found, and one patient at least was distinctly ill-looking, with a pulse-rate of 124. Mr. LATCHMORE does not mention fever in any of them. Tenderness, and even a palpable mass, in the right iliac fossa were often found, suggesting acute appendicitis, but peritonitic rigidity of the abdominal wall was lacking. In the 4 cases operated on the offending food was found compressed into a firm mass, arrested usually in the lowermost part of the ileum a short distance from the cæcum. The intestine was dilated above it and collapsed below. This is the situation in which it is common for a large gall-stone which has entered the intestine through a cholecyst-duodenal fistula to become impacted. ALVAREZ [3] has remarked that at this point the peristaltic "rush waves," which are largely responsible for propelling the contents of the small intestine, are prone to die out, and that the last foot or two of the ileum is normally much more sluggish than the rest. In this region too, but not elsewhere in the small intestine, the radiologist often sees compact masses of barium temporarily held up. The site of impaction, then, of boluses of undigested coarse food may be determined not by any anatomical narrowing but by physiological factors: in the lowest ileum the maximum absorption of water from the intestinal content has already occurred, and the propulsive activity of the intestinal wall is at its minimum.

The practical considerations that Mr. LATCHMORE stresses are two. First, when colic, vomiting and abdominal distension suggest acute small intestine obstruction find out whether the patient has eaten nuts, oranges or the like on an empty stomach. Secondly, when such is the case, be cautious over giving castor oil, but try to loosen and disintegrate the mass by giving large amounts of fluid by mouth; if these are not retained and the patient becomes dehydrated and ill operation becomes necessary. To these we should add a recommendation to empty the colon by an enema, which SPRIGGS has observed will often relieve the distress of a distended small bowel; and a query as to whether spinal anæsthesia, by interrupting the sympathetic nerve impulses to the small intestine, might allow it to overcome its own difficulty. Mr. LATCHMORE goes on to suggest that the familiar "green-apple colic" may be bolus colic of a minor degree, due to the packing of pieces of apple into a formidable mass rather than to chemical or mechanical irritation of the mucosa by discrete pieces. If so it becomes a question whether copious fluids by mouth, perhaps with some magnesium sulphate and an enema, might not be better treatment for this condition than the traditional castor oil.

1. *Lpool med.-chir. J.* 1937, **45**, 159.
2. Elliot, A. H. *Amer. J. med. Sci.* 1932, **184**, 85.
3. Alvarez, W. C. An Introduction to Gastro-enterology. London: William Heinemann (Medical Books). 1940. Pp. 778. 42s.

A TALK WITH THE PATIENT

AMONG the subtle distinctions which the psychiatrist is forced to make, none is more obtrusive than that between form and content. He must constantly bear in mind the difference between what the patient says and how he says it. WEBER [1] has pointed out that undue attention to the patient's actual words may paradoxically bring the psychiatrist to doubt, and even to reverse, an initial diagnosis which was correct. It may turn out, for example, that what appeared to be a delusion is in fact a perfectly justifiable belief, but the manner in which the patient brings it forward and defends it remains essentially delusional. If only the content of the conversation is considered, as may happen after one has become accustomed to the patient's behaviour and style, a mistake may be made that will be avoided if at the initial interview the psychiatrist relies on his total impression. The distinction is of fundamental importance when methods of investigation in psycho-analysis are in question. The technique of psycho-analysis has from the beginning emphasised content. It began indeed as a protest against that formal psychiatry and neurology which aimed at eliminating the incidental personal features which are embodied in the content of speech and behaviour. FREUD has related how in his early studies of aphasia he felt that the formal disturbance was all he could hope to elucidate; his subsequent life-work was to falsify that pessimism. The most striking modern instance of research into form in psychiatry is that of the phenomenologists, who in Heidelberg a decade ago made minute studies of the abstracted disturbance of thought in schizophrenia. Their method, which was based on the patient's introspection and account of his subjective experiences—that is, on the content of certain of his utterances—shows vividly how subtle can be the distinction between form and content, how intimate the connexion between them.

It is not only in psychiatry that this distinction needs to be recognised; ultimately it is the distinction between the symptoms of a disease and the complaints of a sick individual. In psychiatry, however, it is inescapable and obvious. Psychiatry, as KRAEPELIN fashioned it, paid attention to the disease process, with its formal manifestations. What was important was not that John Doe believed that his wife was committing adultery with Richard Roe but that he had a delusion of jealousy; everything peculiar to him, to his wife and this situation was to be regarded as evidence for that cardinal fact of morbid jealousy, rather than as the essence of the fact, without which it was an empty abstract statement for a textbook. The psychiatry of the present day walks precariously along the tightrope between preoccupation with form and preoccupation with content—often exhibited as a preoccupation with diagnosis on the one side and with interpretation and understanding on the other. Clearly both are necessary. The ordering of data so complex as those with which psychiatry deals demands that there should be a measure of abstraction and an emphasis upon the form of any anomaly. The variety of human behaviour and circumstances demands also that too rigid a scheme should be avoided and that the richness of individual content should receive full consideration. Throughout medicine we must study diseases as well as treat and study sick people. And it is not possible to consider content for long without being driven to consider form, just as form without regard to content becomes a sterile concept, which is as much as to say that no disease ever runs "true to type" and no patient ever shows all the formal phenomena recited in the textbook.

1. Weber, A. *Schweiz. med. Wschr.* May 18, 1940, p. 429.

ANNOTATIONS

ROYAL MEDICAL BENEVOLENT FUND

DURING nine months of war the fund has been hard put to it to carry on its work. Subscriptions and donations have fallen by £735, but owing to many urgent appeals, the committee had to spend £558 in excess of income. Those whom the fund assists often live within such a narrow margin that the mere cost of blackout materials has been a heavy drain and in many cases friends and relatives who had previously given help have been too hard pressed to continue it. To reduce expenses the committee has rented cheaper quarters and released three members out of a staff of five for national service. The chairman, Sir D'Arcy Power, asks subscribers to increase their donations, if only by a small amount. Last week we published a letter from Lady Hutchison asking, on behalf of the ladies' guild, help in money, clothing and personal service for widows and children dependent on the fund. She suggested that if every woman connected with the profession would subscribe—and the minimum subscription is 2*s.* 6*d.*—all demands could be met. The new address of the fund is 1, Balliol House, Manor Fields, London, S.W.15.

PLACENTAL BLOOD FOR TRANSFUSION

ATTENTION has again been drawn to the use of placental blood for transfusion by Meredith Heyl,[1] who describes his experience with a placental blood bank at the Kensington Hospital for Women in Philadelphia. His conclusions agree with those of Halbrecht,[2] whose series in Palestine was larger than Heyl's. The method of collection, preservation and storage was described in these columns last year by Howkins and Brewer,[3] who were sceptical of the scope of placental blood and drew attention to a 22 per cent. contamination-rate in their own series, using a more searching bacteriological control than other workers who have investigated this question. Heyl found severe reactions in 3 out of 32 transfusions given. Although he scouts the possibility of his blood bank containing infected bottles, these reactions, consisting of rigors and high fever, are somewhat disconcerting. His method of controlling infection is to culture every tenth flask at random—had he cultured the other nine

1. Heyl, W. M. *Amer. J. Obstet. Gynec.* April, 1940, p. 679.
2. Halbrecht, J. *Lancet*, 1939, **1**, 202.
3. Howkins, J. and Brewer, H. F. *Ibid*, p. 132.

he might have spared his three patients the unpleasant consequences which they suffered. The catchment area for placental blood, the recently delivered birth-canal, is and always must be a bacteriologically dirty place, no matter what aseptic and antiseptic precautions are taken. It is therefore reasonable to demand that before this potentially infected blood is used it should be submitted to close scrutiny. Furthermore, the yield of blood is small, averaging between 50 and 100 c.cm., so that the issue becomes one of much ado about little. This is not the time to neglect any possible new source of a vital war commodity, but when we have at our disposal a safer and many times more plentiful supply from the voluntary adult donor, it is obvious where our choice must lie.

WHY DO CELLS DIVIDE?

So much is known about how a cell divides that our ignorance of why it divides is apt to be overlooked. There is probably no single answer that applies to every type of cell. Even if it is agreed that when it has attained a certain size a cell divides and multiplies, one must inquire whether external or internal causes make it swell to this size, and whether the causes act by stimulation or by removal of some restraint. In approaching this question from a theoretical standpoint most minds unconsciously assume that, whether delivered from within or without, the cell requires a prod. Nevertheless, in their attitude towards the cause of multiplication of tumour cells a great many authorities imply, if they do not actually state, that all cells would continually go on dividing if they were not subject to some restraint. Either attitude is reasonable but it is as well to be clear about one's assumptions. Explants of tumour tissue begin to grow in vitro after a very short or even no latent period, and Doljanski and Hoffmann [1] regard this as evidence of the unique position of tumour tissue with regard to the growth-inhibiting mechanism of the organism. No better evidence of the failure of the body to inhibit growth can possibly be obtained than that afforded by the behaviour of the tumour and its metastases in their natural abode. This failure, however, tells one nothing of the cause of the perpetual division of the tumour cell. The fact that growth starts without delay in tissue culture makes the untutored suspect that these cells carry a ready-made stimulus within them, whereas normal and embryonic cells must wait for one to be engendered, and that this positive stimulus is as little restrained by the culture medium as it is by the body.

BACTERICIDAL ORGANISMS FROM SOIL

THE American College of Physicians has bestowed the Johns Phillips Memorial Award on Dr. René J. Dubos for his work on bactericidal organisms. Dubos began by looking for an organism which would attack the polysaccharide capsule of type III pneumococci, the constitution of the capsule varying with the type of the pneumococcus. Since these polysaccharides resemble the hemicelluloses it seemed most likely that such organisms would be found amongst rotting plant cells. Various kinds of soils, farm manure, leaf mould and composts were examined and the organism was finally run to earth in the cranberry bogs of New Jersey. It was a gram-negative spore-forming rod-shaped bacillus to which the name "Bacillus S III" was given. The organism was very specific, having no action on the polysaccharides of other types of pneumococcus. Dubos then obtained an enzyme also able to decompose the capsular polysaccharide of type III pneumococcus. This he did by growing the organism in a mineral medium in which the sole source of carbon was the polysaccharide; the organism was thus compelled to produce the enzyme before it could utilise the polysaccharide—it was starved into forming the enzyme. Dubos was able to concentrate this enzyme without loss of activity, and the concentrated enzyme protected mice and monkeys against pneumococcus type III, but not against types I or II. In further experiments Dubos treated a sample of mixed earth with suspensions of various living gram-positive cocci for two years, and from this earth he isolated a gram-positive, spore-forming bacillus which was capable of lysing gram-positive cocci. Pneumococci of all types, staphylococci, and α, β and γ hæmolytic streptococci all underwent lysis. Meningococci, gonococci and other gram-negative cocci were not attacked. Autolysis of the susceptible organisms rapidly took place, yielding a soluble factor which was completely separable from the cell detritus. In addition to causing lysis of gram-positive cocci this soluble factor was bactericidal towards the same organisms and inhibited their growth. It was heat labile. By means of acetic acid it could be precipitated between pH 4·2 and 4·4 and redissolution of this precipitate in neutral media gave a solution having the same power of lysis as the original solution. It was possible to concentrate the soluble factor, and this factor protected mice against streptococci and pneumococci of all the types tested (I, II, III, V and VIII). A very concentrated preparation has been called by Dubos "gramacidin." The chemical nature of these substances remains obscure, but Dubos has shown that gramacidin is not a protein. The fact that this soluble factor acts only on gram-positive cocci suggests that its action has something in common with that of Gram's stain. There is clearly a promising field for inquiry here.

1. Doljanski, L. and Hoffman, R. S. *Nature*, June 1, 1940, p. 587.

PHYSIOLOGY OF THE ADRENAL CORTEX

THE adrenal cortex is one of the fields for research where the biochemist has been able to direct the efforts of the physiologist and pharmacologist into the most fruitful channels. The successful outcome of the long struggle to relieve cortical insufficiency with extracts was a prelude to theoretical chaos. The importance attributed to the gland in the metabolism of carbohydrate waxed, waned and was finally vindicated. The muscular weakness of Addison's disease was translated into terms of the response of muscles to stimulation. The function of the adrenal in regulating the balance of sodium and potassium ions in the blood was placed beyond all doubt, and other functions in connexion with growth, renal function and resistance to stress were more or less firmly established. Which of these is the real function of the gland? Do all the disturbances that follow its removal spring from a single cause, or does the gland actually perform several functions? So long as the only way of assessing the potency of an extract was by its ability to postpone death these questions could not be answered, but a recent symposium by members of the staff of the Mayo Clinic [1] shows that more precise methods have carried us a long way towards a solution.

Now that some twenty crystalline compounds of similar structure have been prepared as a result of work on extracts of the gland, it has become clear that they exhibit the various types of activity in different degrees. It may be presumed, therefore, that the gland normally produces not one but several hormones. Corticosterone, dehydrocorticosterone, and others which carry an oxygen atom in a certain position in the common molecular framework, are most active in

1. Mason, H. L., Sprague, R. G., Wells, B. B., Kendall, E. C. Proc. Staff Meetings Mayo Clin., May 8, 1940, pp. 289–304.

enabling the animal to produce carbohydrate from protein, and in this way maintain the hepatic store of glycogen. The same set of compounds seems responsible for the maintenance of muscular power, though this property has not yet been found associated with an increase in the store of muscle glycogen. The substance desoxycorticosterone, lacking the oxygen atom just mentioned, has little effect in carbohydrate metabolism but a marked action on the salt balance, so much so that it may actually depress the serum potassium to a concentration at which muscular paralysis occurs. An adrenalectomised animal, if not exposed to stress, will survive apparently normally if the action of these two sets of compounds is simulated by providing a diet low in potassium but high in sodium and glucose. Thus the immediate cause of death after adrenalectomy has been traced, even though the compounds concerned may exhibit other physiological activities. There remains an amorphous fraction of the extract, which may be freed from these compounds but which is yet more potent weight for weight in its own way than are they in theirs. It also influences the distribution of inorganic ions and water and appears to be necessary for normal renal function.

It is impossible to say what may be the specific effects of compounds awaiting discovery or investigation. Evidently the minimum necessary for the maintenance of life is now known, but the adrenal probably has other functions, the cessation of which is not necessarily fatal, at all events for a long period. Its association with the gonads has not been deeply probed, for the well-known signs of virilism in women with adrenal tumours may represent a perversion rather than an excess of secretion. The adrenal compounds are closely related chemically to the sex hormones. The relation of the glands to stress is of present interest. It seems certain that resistance to toxic substances, to cold and to oxygen lack is lowered after adrenalectomy even during replacement therapy. Apart from the possibilities of cortical extract, and more particularly the cheaper synthetic hormone, in the treatment of shock,[2] it is tempting to speculate whether adrenal cortical exhaustion has anything to do with the cumulative ill effects of repeated exposure to strain, for instance, the short daily exposure of aeroplane crews to mild degrees of oxygen lack.[3]

THE SEDIMENTIN INDEX

ON another page Dr. George Day describes a modification of the ordinary sedimentation-rate measurements which he calls the "sedimentin index." This index is not merely a figure derived from a special method of measuring the sedimentation rate but is also a measure of the sedimentation-producing substances ("sedimentin") in the blood. The index must obviously be based on experimental observations, so that the evaluation of Day's method must depend on the correctness of his experimental deductions and on the evidence that his index is more informative than the ordinary S.R. figure. Few will have the opportunity of verifying his experimental work, but many will be anxious to apply his results if their practical value can be established, for there can be little question of the need for an improvement on present methods. Those who have used these methods have been impressed by the uniformity between the condition of the patient and the rate of sedimentation. Yet there have been disturbing instances where a patient with, say, a cavity in the lung and tubercle bacilli in the sputum has given a S.R. of only a few millimetres. The ways of measuring the S.R. may be divided into those (such as Westergren's) in which a column of citrated blood is observed for a fixed time and the ratio of plasma to total blood is noted at the end of this time; and those (such as Cutler's) in which the sedimenting blood is observed at short intervals with the object of plotting graphically the relation between the time of sedimentation and the distance through which the cells have fallen. Day's method belongs to the latter class, but he goes a step further than Cutler, who drew his deductions regarding the clinical value of the S.R. only from the general shape of the curve and the amount of sedimentation at the end of the period of observation. Day's index measures the maximum rate of sedimentation during a 2 to 2½ hour period of 10-minute readings. The important experimental features of his technique are, first, that in normal subjects the sedimentin index has not been found to exceed 0·5, whereas in quiescent tuberculous subjects it has not been found as low as 0·5. Secondly, that the sedimentin index, unlike the S.R., is unaffected by temperature changes. Thirdly, that the maximum rate of sedimentation of any blood during a 2 to 2½ hour period is a more reliable measure of the state of the blood as regards sedimentation-producing substances than is the amount of sedimentation in a specified time. And lastly, that the maximum rate of sedimentation of two mixed bloods is the geometrical mean of the maximum rates of sedimentation of the separate bloods. The choice of the actual mathematical form of the index follows from this last observation. The important factor being the maximum rate of sedimentation it is desirable, though not essential, to express this rate by values which can be added, subtracted or divided to obtain a mean. These processes can be applied to the logarithm of the actual maximum rate of sedimentation, though not to the rate itself. The logarithm is therefore used as the index. The actual sedimentin index is thus the logarithm of the number of millimetres of sedimentation which would have occurred in 100 minutes at the maximum rate of sedimentation observed during a 2 to 2½ hour period. If Day's experimental findings are accepted his index clearly has much to commend it, but it will have to face the natural reluctance of workers to change from the method to which they are accustomed.

£10 WORTH

A CORRESPONDENT suggests that when a medical board rejects a recruit there is an opportunity, which is now being missed, of making more use of its findings. This man served for four years in the last war and wanted to enlist in the pioneers. At the medical examination he was rejected, but he was not told on what grounds. Another applicant who accompanied him remarked that in civil life this examination would cost ten pounds, and our correspondent says that the King himself could have had no better attention than the board gave him, with four doctors to examine him and a fifth to review their findings. But, he observes, all this scrutiny is wasted. "If the referee doctor had given me a medical certificate detailing my weaknesses and a few words of advice, I should now be getting good medical treatment on specialists' advice; it would have cost the Government nothing and been worth £10 to me." The examiners can hardly be expected to advise rejected men upon treatment—the umpire who gives a batsman out is not encouraged to take him aside and teach him how to deal with that sort of ball another time—but when a rejected man wishes it a report on his condition might well be sent to his own doctor.

2. See *Lancet*, March 23, 1940, pp. 555 and 574.
3. Armstrong, H. G. Principles and Practice of Aviation Medicine, London. 1940.

DENTAL BOARD FINANCE

AT the recent session of the Dental Board of the United Kingdom Mr. E. L. Sheridan returned to the present financial difficulties of the board. Contrary to expectation they had had a number of disciplinary cases to deal with—a costly process as it meant calling a special committee and consulting legal advisors. And in another direction the board was not in a position to control its own expenditure, for even in war-time unqualified practice must be checked in order to safeguard the hardly won position of the registered dental practitioner. Halving the retention fee had brought down the board's income to about half; although these fees, whatever their amount, could hardly be popular they had been on the whole paid more punctually than ever before. A small income, Mr. Sheridan remarked, is no more easy to spend wisely than a large one; the board must cast a critical, if sympathetic, eye on any expansion of grant-aided services. If they erred now on the side of parsimony they might be better able, when peace is restored, to see how any available resources can most fruitfully be applied.

DEATH IN INFANTILE ECZEMA

ECZEMA is not generally looked upon as a fatal disease either by doctors or the public, but it has long been known that babies do occasionally die suddenly from it, and Twiston Davies[1] has lately drawn attention to the possibility by reporting three more examples. The reason for these sudden deaths is unexplained, though it seems possible that they have something in common with the deaths from extensive burns. They occur in cases of true infantile eczema during the first year of life, mostly in the spring; over-nourished infants are particularly susceptible, and all the reported cases have been in children taken away from their mothers, usually within a few days of admission to hospital. In Davies's cases death appeared to be due to respiratory failure, but no internal cause was found at the autopsy. The danger must be taken as a strong argument against taking infants with extensive eczema away from their mothers.

VAGINAL THRUSH

THRUSH is more than a local affection of the mouth, for it can give rise to epidemics of diarrhœa in infants which, especially when associated with broncho-pneumonia, may terminate fatally. The responsible organism, or group of organisms, commonly called *Oïdium albicans*, is a normal inhabitant of the bowel, skin, mouth and vagina, but it may become pathogenic under certain conditions, producing both local and general symptoms and varying in virulence and contagiousness. Liston and Cruickshank[2] have studied a consecutive series of 200 pregnant women with leucorrhœa, in 49 of whom thrush was the cause, as against 80 due to *Trichomonas vaginalis*. The main complaint of the patients with thrush was irritation, and seeing how often pruritus vulvæ brings women of all ages to the doctor this finding assumes real importance, especially since few cases had any visible manifestations of thrush on the skin. The classical manifestations of the skin infection, especially seen in diabetics, are vesiculo-pustules and ulcers with succulent edges and a mucoid discharge, but Liston and Cruickshank did not meet with a single instance of this clinical picture, though there was an erythemato-squamous eruption in one or two cases. The characteristic features of vaginal thrush are a discharge like butter-milk with yellowish-white patches on the vagina or cervix or in the introitus. A few cases in this series could only be diagnosed by examining films stained by Gram's method or with aqueous methylene-blue. The pH of the vaginal secretion in the patients with thrush averaged 4·8. The normal pH is 4·4 and in trichomoniasis it is 5·5, so that a slightly acid reaction is favourable to the growth of *Oïdium albicans* and seems to inhibit trichomonas. In thrush the vaginal epithelial cells are said to be well filled with glycogen, which can be demonstrated by the iodine test. Liston and Cruickshank do not make any suggestions for treatment, but apparently it is not practicable to discourage the organism by making its environment more alkaline, for they say that the reaction of the vaginal secretion is not easily altered for any length of time by the application of acids or alkalis.

1. Twiston Davies, J. H. *Brit. J. Derm.* June, 1940, p. 182.
2. Liston, W. G. and Cruickshank, L. G. *Edinb. med. J.* June, 1940, p. 369.

EXPENDITURE IN EMERGENCY HOSPITALS

THE Minister of Health is anxious to expedite the working of the Emergency Hospitals Scheme by removing some of the causes of delay in obtaining authority for reasonable expenditure. In a circular issued on June 22 the Ministry point out that hospital authorities need not obtain prior approval from the Ministry for non-capital expenditure, and they express the hope that local authorities have now established machinery for dealing promptly with urgent requests from E.M.S. hospitals, and that similar machinery has been set up in voluntary hospitals. Minor adaptations and improvements involving capital expenditure not exceeding £10 can be carried out at the discretion of the hospital authority, but the prior approval of the Ministry is required for major adaptations, except where the need is immediate, when hospitals must take the necessary steps on their own responsibility. Applications for the approval of expenditure, as well as for urgent demands for equipment, should in future be made to senior regional officers of the Ministry at regional headquarters, except in the London sectors where they should still be addressed to Whitehall. Where a hospital is in doubt as to adaptations or equipment required, the senior regional officer will arrange for officers to give advice and approval on the spot.

COMMITTEE ON THE TREATMENT OF WAR WOUNDS

THE Medical Research Council have appointed the following committee, including representatives of the Fighting Services and the Emergency Medical Service, to advise as to the application of the results of research to practice in the treatment of war wounds, and as to the need for new investigations. Sir Cuthbert S. Wallace (chairman), Mr. E. Rock Carling, Mr. C. H. S. Frankau, Prof. F. R. Fraser, Prof. G. E. Gask, Surgeon Rear-Admiral G. Gordon-Taylor, Colonel Sir Charles Gordon-Watson, Sir John C. J. Ledingham, Major-General H. Marrian Perry, Prof. R. S. Pilcher, Prof. J. Paterson Ross and Prof. W. W. C. Topley (secretary), with Dr. F. H. K. Green as assistant secretary.

Sir GEORGE BERRY, LL.D., M.B., consulting ophthalmic surgeon to Edinburgh Royal Infirmary and a former M.P. for the Scottish Universities, died at North Berwick on June 18.

We also regret to announce the death, on June 22, of Dr. PHYLLIS TOOKEY KERRIDGE, lecturer in physiology and biochemistry at University College, London.

SPECIAL ARTICLES

PHYSICAL TREATMENT

THE CASE FOR AUTONOMOUS CLINICS

BY R. FORTESCUE FOX, M.D., F.R.C.P.

[From 1914 to 1918 Dr. Fortescue Fox was joint hon. secretary with the late Dr. Campbell McClure of a War Disablement Committee[1] appointed by the section of balneology of the Royal Society of Medicine. This committee's recommendations were published in THE LANCET of March 3, 1917; they drew attention to the value of the skilful use of the whole group of natural and artificial physical remedies for the immediate relief of the milder forms of war disabilities and the more prolonged rehabilitation of those with more serious injuries. They concluded that physical treatment and vocational training are inseparable and that both are essential to the recovery of the disabled man. Dr. Fox, who died last week, wrote this article to recall what the committee was able to achieve in the last war, and in the hope that the lessons might prove useful in our present emergency. —ED. L.]

THE PROBLEM

MEMBERS of the War Disablement committee visited many physical treatment centres, at home and abroad, and sent reports to the War Office. Happily the Army Medical Department was represented on the committee and sympathetic to its aims. Two centres impressed the visitors particularly—the Port Villez centre in Normandy for Belgian wounded, and the Corps de Ré-éducation Physique at the Grand Palais in Paris.

Two tasks faced the authorities: to return soldiers to duty as healthy men in the shortest possible time; and to restore to reasonable health and capacity those no longer fit to carry arms. When the wounded were discharged from hospital—and sometimes they were kept there too long for their own good—it was customary, both in this country and abroad, to send them to convalescent camps in the country. Such camps, with a medical clinic and vocational training centre attached, seemed to give seriously disabled men the best chance of recovery; they were stimulated mentally and physically, their damaged limbs were educated afresh, they lived in an encouraging atmosphere and looked forward hopefully to fresh objectives. The committee studied the machinery of this all-round rehabilitation, and devised a technique for the management of medical and surgical cases.

REHABILITATION BY VOCATIONAL TRAINING

Many British hospitals introduced vocational training for convalescent patients in the wards. The Belgians divided vocational training into two stages, a preliminary stage in which the patient's interest was won and any natural bent discovered, and a second stage of serious instruction. In England, unfortunately, treatment and training came under two different ministries, and could not be carried out at the same centre, with the result that vocational training was often postponed until it was too late. There was, moreover, a serious shortage of trained personnel.

The committee were convinced that physical treatment and vocational training are inseparable, and both essential to the disabled man. They also saw that a specially trained staff was required; doctors and vocational instructors alike needed special experience in the work.

SIMULTANEOUS AND SUCCESSIVE METHODS OF TREATMENT

The common methods of physical treatment are familiar to everybody: massage, radiant heat, electrical treatment, the remedial use of climate and of the natural resources of spas. No single method of treatment can, or should, be advocated for the treatment of war injuries. The best results, the committee found, are obtained by combining different methods or by giving them in series as the needs of the patient demand. This combination was the outstanding feature of the committee's work. Used in this fluid way, physical treatment can be applied successfully in the early stages of an injury to prevent disablement, or later to relieve pain and swelling and to restore damaged function, not only in joints and muscles but in the circulation and—by a sedative effect—in the nervous system. Disappointing results are more commonly due to lack of this combination and to want of training in the therapist than to defects of the methods themselves. Accurate and reliable technique can only be learned by the study of patients under treatment. Large treatment centres, the committee felt, should be obliged to keep standard measurements of function and careful records.

A WIDENING SCOPE

It is estimated that more than 50,000 wounded men were treated free of charge at the British spas. Thanks also to the work of members of the committee, a small model clinic for 60–70 officers was opened at the Alexandra Therapeutic Institute in Great Portland Street in 1916, and subsequently taken over by the British Red Cross Society. Here periodical measurements of disability by arthrometers and dynamometers were introduced. A similar but much larger centre was later installed at the Special Surgical Hospital at Shepherd's Bush. Physical departments were also recommended at command depôts and convalescent camps, the first of which was set up at Heaton Park, near Manchester, others being established later at Cardiff, Netley, Tipperary, Bangor and Bellahouston. Though handicapped by lack of technique and personnel, all these departments gave valuable aid to great numbers of war patients. At Shepherd's Bush, an exclusively surgical hospital, 31,181 treatments were given in 1917–18, the first year.

NEW METHODS OF THE TIME

At the Alexandra Institute three new ways of using moist heat were devised and tried out. The first of these was the hyperthermal whirlpool bath for arm or leg, in which the water was not merely moving spirally but rose in temperature to the limit of comfortable toleration so that the limb was subjected to a more or less vigorous hyperthermal hydro-massage. The skin became scarlet, owing to the rapid increase in arterial circulation, pain, stiffness and swelling were greatly relieved, and the muscles put into excellent condition for massage and electrical treatment. Since those days various forms of whirlpool bath have been used freely for arthritic joints in the cold stage, and for defective peripheral circulation and spastic hypertension.

The sedative pool was the second method devised. The patient lay in water at a little below blood-heat, and a rippling movement was produced with compressed air. Many cases of disordered action of the heart, shock, nervous irritation and prolonged insomnia were treated successfully in this way. The drowsy patients were lifted from the bath to sleep in an adjoining room before going home.

1. The committee included Sir Lauder Brunton, Dr. S. D. Clippingdale, Dr. William Gordon of Exeter (president of the section), Dr. Tait McKenzie (Canada), Sir Frederick Trylor (president of the Royal College of Physicians and the Royal Society of Medicine), Mr. Wilfred Trotter, Sir Rickman Godlee, Dr. R. Ackerley, Dr. C. W. Buckley, Dr. Lauriston Shaw, Dr. Parkes Weber, Dr. Neville Wood, and Surgeon-General Sir Michael Russell (representing the War Office). Dr. Septimus Sutherland, the chairman, defrayed expenses.

The aeration bath, the third new method, was a brief stimulant for the whole body. The water was broken by air driven through it at high pressure, and the temperature, duration and after-treatment were precisely adjusted to suit the patient. It was a pleasant and invigorating way of treating circulatory defects and nervous fatigue as well as arthritis in middle and later life.

At Shepherd's Bush Dr. C. H. Sonntag made useful studies of the contrast bath—in which hot and cold water alternated—and of passive movement in the warm pool, called the manipulative bath. The paraffin wax bath also proved useful and popular for relieving tension in preparation for movement.

COMMENTS, 1940

One of the chief handicaps during the last war was the lack of trained personnel. Since that time radiation—luminous, thermal, ultraviolet and infra-red—radium, X-rays, electricity, manipulation and re-educational exercises have been widely and accurately used. Courses of instruction have been made available for nurses, and a diploma is given; systematic training has been given to attendants at spas. As a result, the technical skill of nurses and bath attendants has improved greatly and they are much better qualified to carry out physical treatment than their predecessors of 1914. Sometimes they are better acquainted with the methods than those prescribing them; and intelligent attendants, seeing their patients under treatment day by day, become good judges of favourable and unfavourable reactions which the doctor has no chance to observe. Moreover, since the last war an increasing number of skilled, certificated occupational therapists have qualified. A new order of non-medical physical assistants has come into being, to whom routine measurement and record-keeping can safely be entrusted.

A man whose damaged limb has been functionally re-educated can return to work and thus reduce the national cost in pensions. This applies as much to rheumatism and civil accidents as to war injuries, and the committee was impressed with the value of physical treatment from this point of view.

RECOMMENDATIONS

As in the last war, thousands of disabled men will be coming home; the full resources of systematic physical treatment should be at their disposal from the start. Delay at this stage will be harmful to men now being disabled. I suggest that:

1. A clinic should be set up in London at which all forms of war disablement can be classified and accurately measured in terms of function; and where the response of the different types of case to a short course of systematic physical treatment can be investigated.

Such a clinic could provide immediate treatment for patients from the metropolitan area with mild disabilities, most of whom could be discharged as fit for work after about six weeks' treatment. It could also serve as a clearing station for large numbers of more seriously disabled men, arriving from the front or referred from hospitals; after a few weeks' observation many of these could be passed on to appropriate centres in the country for treatment and training; those who needed further surgical care could be sent to orthopædic or other hospitals. A third large class, including rheumatic, cardio-vascular and nervous cases, should also be carefully classified and, after preliminary treatment at the clinic, referred to spas or special centres in the country.

2. Central clinics on the same lines should be set up in other large towns.

3. These large central clinics should be furnished with proper appliances for an approved system of combined and successive physical treatment, including local and general baths, both sedative and stimulant. The premises should be sufficiently roomy to accommodate large numbers of wounded and invalided men, and should be properly equipped with wheel-chairs and ample, well-warmed rest rooms.

4. Every clinic should be under expert medical direction, with a trained staff of physical assistants and occupational therapists. An agreed system of mensuration and record-keeping should be used in all of them. Special training for doctors and assistants should be made available at one or more of these central clinics, and opportunities should be given for research.

5. Subsidiary clinics for treatment and vocational training should be set up in country districts, and full use made of existing centres and spas.

6. The subsidiary clinics should not be duplicated or standardised. In many of them few and simple methods of treatment would suffice; the equipment chosen should depend on the types of case to be treated and the local facilities available.

7. All clinics should be under the direction of a central committee in London which would advise and help in organising new clinics and in the choice of methods and technique.

BUDAPEST

(FROM OUR OWN CORRESPONDENT)

GAS CONTAMINATION OF FOODSTUFFS

Dr. Albert Telbisz, in a lecture to the Royal Medical Society on the effect of war gases on food, said that in general gases penetrate deeper into foods containing much water, so that these are most easily rendered unsuitable for human consumption. Phosgene, which speedily disintegrates and becomes inactive, at the worst merely spoils the taste of the food. Real danger only lies in the consumption of food contaminated with mustard gas or with mixtures containing arsenic and chloropicrin, which are insoluble in water. The flesh of a recently slaughtered animal takes up much more mustard gas than cooled or frozen meat, and milk, owing to its fat content, may retain the gas in solution for a long time without it decomposing. Mustard gas can penetrate into an apple to a depth of 3–5 mm., but cannot pass through the skin of an orange or lemon. The gas penetrates quickly and deeply into the potato, and the flesh of contaminated apples or potatoes shows sharply delineated brown spots with a characteristic smell.

Gas-proofing methods for foodstuffs, Dr. Telbisz went on, are as yet undeveloped, and absolute safety can only be ensured by forbidding the consumption of contaminated water and destroying contaminated food. Water can be protected by keeping it in covered reservoirs or cisterns, and foods by wrapping them in waterproof paper or Cellophane or enclosing them in a waterproof case. These protective measures should always be adopted, for it is much easier to protect foods than to rid them of absorbed gases. Nevertheless, however careful one is, there may be instances in which food and drinking water has to be freed of gas. For food the simplest and cheapest way is by thorough ventilation, and meat and lard containing phosgene can be decontaminated by this method. If meat has been sprayed with mustard gas its surface should be washed with soda solution and the outer layer should be cut off to a depth of half an inch. Soaking the meat in a 3–5 per cent. solution of permanganate of potash, as has been suggested, is a doubtful way of freeing it from gas. Chlorinated lime or its watery solution is more effective, but this makes the meat smell. Fumigation has not proved effective, and if the whole surface of meat has been covered with liquid mustard gas it must be destroyed. If only the vapour of the gas has reached the meat thorough ventilation will suffice to make it edible.

PROPRIETARY DRUGS FOR WEIGHT REDUCTION

The sale of proprietary drugs for reducing weight, whatever their constituents, is now prohibited in Hungary by a law that came into force on May 1. Manufacturers and dealers have been warned that this regulation will be rigidly enforced in the interest of the public health.

INFLUENCE OF DIET ON URIC-ACID EXCRETION

Dr. Demeter Popa of Oradea, Transylvania, has studied the effect of various diets on uric-acid excretion. He concludes that the laws which govern the excretion of uric acid in healthy people do not apply under pathological conditions. The relationship between the ingestion of nucleoprotein and purin excretion still exists, but is much modified by the retention of purin bodies. The influence of disease quite overshadows that of diet, and Dr. Popa's diet tests gave very inconstant results. In cases of diabetes and obesity there was a definite purin retention, and when the ingestion of nucleoprotein was increased uric-acid excretion either did not rise at all or else its rise was insufficient or delayed. A carefully regulated milk and vegetable diet in such cases not only hindered the accumulation of uric acid but helped in the elimination of uric acid that had previously been retained. All human beings tend to retain uric acid if they take it in excess, so that everyone is predisposed to gout; food too rich in nucleoproteins converts this predisposition into an active pathological process.

LETTERS TO THE EDITOR

DEATH IN THE FIRST MONTH AND THE FIRST YEAR

SIR,—Prof. McNeil's articles focus attention on one of our most urgent social problems. There will be general agreement with what he has written, but there are certain aspects of the subject which have perhaps not been sufficiently emphasised. Prof. McNeil would have us concentrate our main effort against the hard core of neonatal death; but I feel that in Scotland, and in some parts of England where the infant mortality-rate is high, our first endeavour should be aimed at reducing the number of infant deaths occurring after the neonatal period. That this is likely to lead to a speedy reduction in the infant mortality-rate in these districts is shown by Prof. McNeil's figures while they also show that the neonatal death-rate presents a much more difficult problem to attack.

Prof. McNeil advocates the multiplication and improvement of our present organisations for infant welfare as the best means of reducing our infant death-rate. But it will be admitted that the primary cause of infant death after the neonatal period lies in bad hygiene—bad housing, ignorance of dieteties and most of all inefficient maternal care. It is against these that the attack should be launched. Improvement of the education of health visitors, child welfare medical officers and family doctors in the art of infant hygiene only touches the fringe of the problem. It is the great mass of parents who must be educated. This is not going to be done by sporadic visits of health visitors or doctors, or by inducing mothers to bring their infants to child welfare centres by offering free milk. The education must begin in the schools so that no mother can plead ignorance as an excuse for the deplorable condition of her children, while legislation should make it possible to penalise those who fail to maintain a reasonable standard of hygiene in their homes.

Without in any way deprecating the extension and improvement of our infant welfare services advocated by Prof. McNeil, I would enter a plea for a greatly extended and improved system of instruction in mothercraft. Let this be driven home by a numerous and efficient corps of social workers. But its foundations should be laid in our schools.

I am, Sir, yours faithfully,

Glasgow. GEOFFERY B. FLEMING.

SIR,—I think most of those who have personal experience will agree in general terms with the wisdom of Prof. McNeil's proposals and will have further suggestions to offer. It has, however, been evident to me for some years that there are certain fundamental problems to be solved before the details of tactics can be put into operation with reasonable hope of success; and I submit that, when international conditions become more normal again, it will be necessary (1) that the medical profession, acting through chosen authorities on the subject, should convince the lay world that further progress is likely to be slow unless much larger financial resources are made available, either from the state or from private sources; and (2) that closer coöperation should be developed between the public-health services and universities, medical schools and voluntary hospitals than exists at present.

Consider, for instance, the training of medical students in pædiatrics. I agree with Prof. McNeil that the course in this subject should be made wider and more practical, especially in those of its branches which are outside the range of general medicine—e.g., neonatal health and disease, prophylaxis in infancy, therapeutics in childhood, and the mental health of children; but to give this fuller training it would be necessary (*a*) to find stipends for the augmented teaching staff needed, because the private practice of pædiatrics will not support more than a few physicians in any one district; (*b*) to utilise the clinical facilities of the public-health services; and (*c*) to make some rearrangements in the medical curriculum.

In regard to (*b*) it may be hoped that public-health authorities will insist that some at least of their child welfare medical officers shall obtain the diploma in child health, because the holders of this diploma have successfully passed through a training which should entitle them to consideration as junior clinical lecturers in a university department of pædiatrics. Rearrangement of the medical curriculum for students is always full of difficulties but if, as I believe, it is fair to hold that the curriculum should offer to each student a thorough and practical training in the duties which general practitioners are commonly called upon to perform, I suggest that the chief clinical subjects set out in order of importance are medicine, obstetrics, pædiatrics and surgery, and the time allocated to the study of each of these subjects should bear a closer relationship to that order than holds at present.

I agree also with Prof. McNeil when he urges that the training of nurses and health visitors should be more thorough from the pædiatric point of view. This, too, will require close collaboration between the various organisations concerned, and also the expenditure of more money than at present.

It may be of interest to those specially concerned with the care of newly born infants to have the following figures from the reports of the Liverpool

Maternity Hospital during the period 1922–38 inclusive:—

Live births	24,905
Stillbirths	1,998
Deaths of newly born babies	740
Stillbirth-rate (per 1000 total births)	74·2
Newly born death-rate (per 1000 live births)	29·7

I am, Sir, yours faithfully,

Liverpool. NORMAN B. CAPON.

"PROVOCATION" TYPHOID

SIR,—The advisability of T.A.B. inoculation *during* an epidemic of enteric disease is once more attacked in your leader of June 15. The reason given is that "it is not without danger by inducing cases of severe 'provocation' typhoid among persons already incubating the disease." A study, however, of the records of so-called provoked cases shows that they are for the most part inadequately controlled. The fact that illness has followed inoculation is established, the special severity of the disease noted, and then without the evidence afforded by observation of uninoculated contacts and cases the assumption is made that both the infection and its gravity are the result of inoculation. One report only, that of Basten,[1] may suggest that the use of the vaccine has provoked the disease. In the Euskirchen epidemic one case of typhoid had been reported daily for a week before the inoculation; the day following inoculation this number rose to 16, sinking to roughly 1 a day for the next nine days, when the second inoculation was given, and 6 cases were reported on the day following, after which the daily case-rate sank again to 1 a day. How far these figures indicated provocation of the disease or merely a summation of the effects of inoculation malaise and prodromal symptoms accelerating diagnosis it is impossible to say. What was clear, however, was that while 14,343 persons were inoculated and 6905 remained uninoculated there occurred the same number of cases in each group; that is to say, there was double the incidence among the uninoculated and there was no evidence that the disease among the inoculated was either more severe in its course or more fatal in its outcome.

The most adequately controlled observations remain those of Ramsey[2] who demonstrated in an American outbreak that there was no provocation among inoculated contacts but an indication of protection that amounted to certain significance after three doses had been administered. For this reason in America[3] fear of provocation "has not been allowed to have too much weight" and the editorial quoted, referring to the controversy in the English journals after the Croydon epidemic of 1937, hoped the discussion would "for all time allay the fear of people over the 'negative phase' as far as typhoid fever is concerned," and welcomed the "very strong letter from Sir J. C. G. Ledingham who says flatly that he is in complete disagreement with the ideas" of the provocationists.

The animal experiments carried out by me and reported in your issue of Sept. 16, 1939, brought confirmation on these points. In a series of experiments on mice infected with mouse typhoid, and subsequently inoculated with a vaccine prepared from the same organism, no exacerbation of the disease could be observed. Of 216 white mice treated in this way, 28 per cent. were dead at the end of three weeks, while of 120 untreated controls 41 per cent. had died. Since the publication of this paper I have learnt from colleagues in Norway that inoculation during the course of epidemics is constantly performed and no harm observed.

I am, Sir, yours faithfully,

Lister Institute, Elstree, Herts. HARRY SCHÜTZE.

1. Basten, J. *Disch. med. Wschr.* 1920, p. 316.
2. Ramsey, G. H. *Amer. J. Hyg.* 1935, **21**, 664.
3. *Amer. J. publ. Hlth*, 1938, **28**, 378.

FOUADIN IN BILHARZIASIS

SIR,—The Colonial medical report for Southern Rhodesia, summarised in the *Journal of Tropical Medicine and Hygiene* for April 15, 1940, remarks that there is a tendency to employ antimony tartrate in place of Fouadin, and says that the general opinion of the local practitioners is that the relapse rate following a course of fouadin is significantly greater than after tartar emetic. The writer of the report says that in his experience fouadin has given relatively poor results in the treatment of the intestinal form of bilharziasis.

Since the introduction of fouadin for the treatment of bilharziasis little attempt has been made to reach the required total of antimony, reliance being placed rather on the compound itself. Dr. J. B. Christopherson regarded the necessary total dose as gr. 30 of tartar emetic, and this effected the destruction of the bulkier *Schistosomum mansoni* as well as the commoner *S. hæmatobium*. Reliance on physical signs has fostered the custom of administering a far lower total dose of the drug, the quantity of antimony in 45 c.cm. of fouadin being approximately half what is present in gr. 30 of tartar emetic. Investigations reported in the Egyptian ministry of public health report for 1936 have shown that the pyrocatechin constituent of fouadin produces symptoms quite distinct from those due to antimony, and that the compound sometimes gives rise to toxic effects rendering it unwise to employ so large a total as would be equivalent to gr. 30 of tartar emetic. Consideration of these factors will explain why apparent recurrence is sometimes reported where tartar emetic has been replaced by fouadin. There seems, however, to be good reason for the statement that in Anthiomaline the drug is present in such a combination that a smaller total dose suffices at any rate for cases infested with *S. hæmatobium* alone.

I am, Sir, yours faithfully,

Durban, South Africa. F. GORDON CAWSTON.

A.R.P.: WHERE THE G.P. COMES IN

SIR,—The last paragraph of your leader will have made many an older G.P. think furiously. For years the emergency work of general practice has been diverted from us into the hands of various specialists, and we have been left to exploit the stethoscope, the clinical thermometer and the prescription block. Is it with these that the G.P. "can usefully station himself at the ambulance loading point"? Many of us have had great experience as M.O.'s to V.A.D. detachments and as St. John Ambulance lecturers. Of these no doubt a fair proportion had valuable experience as, for example, anæsthetists in the last war. Most of us, perhaps, have got rusty, but we are still physically and mentally fit and feel that with a fortnight's intensive rubbing-up we could regain all our former efficiency. Why have we not been long ago offered the chance? Has no record been kept anywhere of our war service and our somewhat specialised experience? Why has not some official authority circularised us asking us to discuss these matters with the local M.O.H. or the nearest secretary of the War Emergency Committee? The only official circular I have ever filled in came to me about two years ago and

after filling it in I realised that I had never done anything in my life except "qualify."

The A.R.P. centres, at least in built-up areas, seem to be officered chiefly by men with honours degrees, men with heavy commitments in the way of hospital appointments and extensive practices. Could not some of us have worked with them with a view to deputising for them in case of their disablement by sickness or injury? The members of their units would then at least have had the chance of working under a deputy with whose methods and personality they were familiar. What is going to happen when these highly qualified doctors are wanted simultaneously at their hospitals and at the A.R.P. centres?

Finally—and this question is not original—why have steps not been taken to make every doctor's house, especially when near a warden's post, a completely equipped small dressing station? A competent surgeon of my acquaintance has been asked to form one of a stirrup-pump squad to deal with fires in adjoining houses. That may have been a perfectly proper suggestion, but what amazed my friend was the fact that the warden concerned seemed not in the least interested in the doctor's possible professional value in the warden's post a hundred yards away.

I am, Sir, yours faithfully,

EQUES SIT SEMPER ÆQUUS.

*** The writer is a suburban practitioner, aged 59. He thinks he is expressing the feelings of many other semi-retired doctors who are still vigorous. Surely it is time their services were utilised.—ED. L.

PARLIAMENT

ON THE FLOOR OF THE HOUSE

By MEDICUS, M.P.

THE vast arena of world-war, looked at from the floor of the House of Commons, takes on a more sombre colour from the tragedy of the surrender of France. Nations like symbolic figures move across the stage and the grim prospect of a Britain fighting as one vast fortress raises its powerful head. Yet the House goes on in dignity to debate the important issues of the time and to plan and prepare for what we have to do. This is a great hour for our country and for the British Empire, and out of the fire splendid things will be born. Now the watchword for the whole nation is to line up to the B.E.F. standards set at Calais and at Dunkirk. That spirit is of the imperishable things of man and it shall prevail.

FROM THE PRESS GALLERY

Scottish Health and Hospital Services

IN the House of Commons on June 18 Mr. Ernest Brown, Secretary of State for Scotland, in discussing the progress of the Emergency Hospital Service in Scotland, said that 25,000 casualty beds were now ready and another 6000 or more would be ready within two or three weeks. Some of the Scottish hospitals had already received service sick and wounded from overseas. Special units were being set up in certain hospitals for the treatment of special types of injury. These would include units for brain and thoracic surgery, and for ophthalmic or orthopædic and mental treatment as well as for occupational therapy. In addition they were providing facilities for physiotherapy at all important base hospitals. The value of these special units was very great, both in their positive results and in the consequent economy in personnel and equipment. Instructions were being given to all hospitals that appropriate cases should be transferred as soon as possible to the special unit. Recent appeals had stimulated the flow of nurses to the service. More nurses and nursing auxiliaries would be required for whole-time mobile service anywhere in the country, and women volunteers were needed for work in the wards and kitchens and generally in and about the hospitals. A hospitals advisory committee had been appointed under the chairmanship of Sir John Fraser. A number of eminent physicians and surgeons were giving their services as consultants without payment.

Turning to the general work of the Department of Health in Scotland, Mr. Brown said that despite all interruptions and difficulties, 19,170 houses were built in Scotland in 1939. In all, if they included 5980 houses built by private enterprise, the total output of houses in 1939 suitable for working-class people was 25,150. Of the houses under construction when war began 8676 were completed by March 31 this year. A good deal had been done to improve rural housing. The year 1939 was a healthy one in Scotland. The general death-rate was slightly higher than in 1938—12·9 per 1000 compared with 12·6—but the increase was mainly among the old people and there was a great saving of life among the young. The infant death-rate touched a new low record—69 per 1000. The maternal death-rate was the lowest recorded—4·3 per 1000 total births. In 1939 deaths from pregnancy and childbirth were 390, as compared with 432 in the previous year.

Mr. WOODBURN said there was still a lot of silly and obsolete prejudices among doctors over the question of the control of hospitals by laymen. Because a man had medical skill that did not necessarily mean that he had equal administrative skill. What was needed was coördination and the placing of hospitals so as to avoid carrying patients up and down the country to get to certain hospitals. The key man at air-raid posts was the doctor, yet it had taken him four months to get even second-hand gas masks supplied to some of the doctors in Edinburgh. Even now the doctors had no steel helmets. It was high time that some one was made responsible for seeing that these things were done.

Food-supplies

In the House of Lords on June 19 Lord WOOLTON, Minister of Food, said that the policy of his department was to secure for this country a sufficient supply of food, either from overseas or through home production, to see that the food produced and imported was suitable for the high strain under which the population was going to live, to arrange for equitable distribution of the scarcer foods and to ensure that the price of food should be such that all sections of the public could buy it. The Ministry of Food was the sole importer of 85–90 per cent. of the food that came into this country and their import programme had been deliberately built up on food values. Total food imports were down by 12 per cent., but imports of calories were only down by 1 per cent. All stocks were adequate, and our stocks of the most essential foodstuffs would last for many weeks even if none came into the country. Always in his mind there had been the possibility of disruption of communications. During the last month there had probably been a greater movement of foodstuffs than ever before. In the last resort he had told the 17 divisional officers, the 1500 local officers, and all the traders that they were to use their own discretion. That, he hoped, would solve the problem of the civilian population whatever happened. With regard to provision for people who have been evacuated to places which were secret, they had stored iron rations which were to be used only in cases of great emergency. In addition they had provided in all the areas round about the large vulnerable centres of population other rations

which would be used in the event of crash evacuations. They had only introduced rationing where supplies were short or where they were vulnerable. The rationing of sugar was a sheer necessity, while the rationing of meat was a precautionary measure. In regard to milk, bread (flour), meat and bacon, the Ministry had asked the Treasury to come to their help in keeping prices down. The average increase in price had been only 8 per cent. Without the subsidy the price would have increased by 30 per cent. He had been trying to ensure that the £60,000,000 a year which the Treasury was spending on subsidising foods should go to the people who most needed it.

QUESTION TIME

Health and Welfare in Industry

Mr. JAMES GRIFFITHS asked the Parliamentary Secretary to the Ministry of Labour what measures were being taken, in the factories and workshops under his control, to care for the health and welfare of the young persons employed at these places; and, in particular, the increasing number of young women in employment.—Mr. R. ASSHETON replied: Detailed measures for the health and welfare of persons employed at factories are required under the Factory Acts. These are supplemented to a considerable extent by voluntary action by employers and others. The Minister is developing a special organisation, which includes a central factory and welfare advisory board,[1] for promoting, with the assistance of the factory inspectors and other local officers, further action for the welfare of the employees outside as well as inside the factory.

Mr. DAVID ADAMS asked the President of the Board of Education whether, in view of the heavy increase of the infant mortality-rates in industrial areas during the last war, he would take immediate steps to secure the setting-up of nursery-schools throughout the country.—Mr. H. RAMSBOTHAM replied: The Minister of Health is actively engaged, in consultation with the Minister of Labour, in considering the establishment of day nurseries in areas where large numbers of women are employed on industrial work of national importance. In view of the long hours for which the nurseries would have to be open and the need for providing for children under two years of age as well as those between two and five, the provision of day-nurseries would appear to be more appropriate than that of nursery-schools. It is hoped, however, that it will be practicable to provide some form of occupational training for the older children.

Mr. D. J. B. JOEL asked the Parliamentary Secretary to the Ministry of Food to what extent he was encouraging the provision of communal meals at factories and other places where large numbers of persons were employed, in view of the waste that could be avoided by such schemes.—Mr. BOOTHBY replied: The Minister welcomes the provision of communal meals at factories and other places where there are a large number of persons employed as a means of securing that the best and most economical use of available foodstuffs is made, and he has taken steps to facilitate the allocation of supplies for this purpose.

Diet of School-children

Mr. ADAMS asked the President of the Board of Education whether, in view of the policy of continuing private billeting, and of the fact that the feeding of children in private billets was one of the factors responsible for the breakdown of private billeting in the recent evacuation, he would arrange that all evacuated school-children should be communally fed by the reception authorities, thus securing to these children an adequate and well-balanced diet.—Mr. RAMSBOTHAM replied: In circular 1484 the Board of Education have already urged local education authorities for reception areas to consider the need for arranging for the communal feeding of evacuated children, and I propose to call their attention again to this matter in connexion with the further evacuation of children from the east coast towns and the metropolitan area. The billeting allowances paid to householders cover the provision of food, and many householders who are able and willing themselves to provide suitable meals for the evacuated children prefer to do so rather than to surrender part of the allowance in return for the provision of communal meals.

Mr. ADAMS asked the Parliamentary Secretary to the Ministry of Food whether, for purposes of meat rationing, school-meals centres of local authorities had been classed as catering establishments; whether he was aware that meat rations for school meals, already inadequate, had been reduced by a substantial percentage under this rationing; and what steps were proposed.—Mr. BOOTHBY replied: The answer to the first part of the question is yes. In regard to the second part, as catering establishments, school-meal centres have been permitted to serve meat meals without the surrender of a coupon being required but, in common with other catering establishments, they have been rationed in their supplies of meat by being limited to 60 per cent. of their normal amount.

Rations of Interned Civilians

Mr. G. GLEDHILL asked the Secretary of State for War if the various classes of internees were given rations on the civilian scale or whether they received the extra ration allowed to the services.—Mr. R. K. LAW replied: Interned civilians who are rationed in kind are fed on a scale approved by the medical authorities as suitable for the conditions under which they are living. The scale includes meat and sugar in quantities corresponding to the ordinary civilian ration. It does not include butter and bacon.

1. See *Lancet*, June 15, 1940, p. 1092.

Infectious Disease in England and Wales

DURING THE WEEK ENDED JUNE 8, 1940

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 852; whooping-cough, 608; diphtheria, 701; enteric fever, 59; measles (excluding rubella), 9257; pneumonia (primary or influenzal), 554; puerperal pyrexia, 156; cerebrospinal fever, 220; poliomyelitis, 10; polio-encephalitis, 1; encephalitis lethargica, 3; dysentery, 25; ophthalmia neonatorum, 95. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on June 7 was 679, made up of: scarlet fever, 138; diphtheria, 139; measles, 14; whooping-cough, 17; enteritis, 49; chicken-pox, 25; erysipelas, 26; mumps, 3; poliomyelitis, 1; dysentery, 2; cerebrospinal fever, 61; puerperal sepsis, 34; enteric fevers, 4; german measles, 14; other diseases (non-infectious), 69; not yet diagnosed, 83.

Deaths.—In 126 great towns, including London, there was no death from smallpox, 1 (0) from scarlet fever, 2 (1) from enteric fever, 2 (0) from whooping-cough, 6 (0) from measles, 22 (2) from diphtheria, 45 (11) from diarrhœa and enteritis under 2 years, and 14 (0) from influenza. The figures in parentheses are those for London itself.

Sheffield reported the second fatal case of enteric fever. There were 11 deaths from diarrhœa in Birmingham. Swansea reported 3 deaths from diphtheria.

The Lancet 100 Years Ago

June 27, 1840, pp. 512 and 486.

From the correspondence column.

Phrenitis, Hypochondriasis, and Co., have forwarded to us a petition, addressed to certain fashionable doctors who allow their footmen to make an alarming use of the knockers of houses in various parts of London, where the memorialists reside, announcing their arrival, not after the manner of grave and reflecting men, whose mission it is to allay suffering and excitability, but with the parade of inflated women of ton, whose motive is vanity, and whose call is a bore. The remedy lies with the patients, whose servants should be directed to tell the footmen of these Doctors Dulcamara to make less noise on the next occasion. Or the knocker should be tied, at the doctor's hour of visit, and the footman reduced to the indignity of the bell.

From an original article.

. . . your Journal is not the place for elaborate detail.

OBITUARY

JAMES KENNETH SUTHERLAND

M.B. EDIN., M.R.C.P.E., M.R.C.O.G.; CAPTAIN, R.A.M.C.

Captain J. K. Sutherland, who died in England on May 26 of wounds received while serving with the B.E.F. in Flanders, was 29 years of age. Born at Brynmawr in Breconshire he was educated at Taunton School and the University of Edinburgh, where he graduated M.B. with distinction in 1934. He held house-appointments at the Edinburgh Royal Infirmary, the Simpson Memorial Maternity Hospital and the Astley Ainslie Institution, and in 1936 he obtained the M.R.C.P.E. After a time as resident obstetrical officer at the Simpson he was appointed in 1938 first assistant in obstetrics and gynæcology at the British Postgraduate Medical School at Hammersmith. Of his work there Prof. James Young writes: "Sutherland came to us after a large and varied obstetrical experience in Edinburgh, and with his great natural ability, his sound judgment and his zeal he soon established for himself a high position among the staff and the students alike. He had in an especial degree the natural gifts that go to the making of a successful teacher. He was intelligent and thoughtful, he had a critical outlook and he had a buoyant and enthusiastic personality." Before war broke out Sutherland was engaged with Major R. J. Kellar on experimental and clinical investigations into the toxæmias of pregnancy. He also collaborated in a clinical investigation on stilbœstrol which was carried out on behalf of the Therapeutic Trials Committee of the Medical Research Council.

Sutherland was attached to the Royal Artillery (Territorial) as a medical officer, and was called up when war broke out. It is thought that he was the first R.A.M.C. officer to die from wounds received in action, and a friend from Edinburgh writes: "J. K. S.'s patients were always his first consideration and it was not surprising to learn that he received his fatal wound while on his way to help a wounded officer."

He married Dr. Joan Cunningham last September.

JESSIE BALSILLIE

M.B. ST. AND.

Dr. Balsillie died suddenly at Newcastle, on June 14, in her sixtieth year. She was born at St. Andrews and took her M.B. at that university in 1905. Later she practised at Burton-on-Trent for six years, until she was appointed as maternity and child welfare officer to Stoke-on-Trent. During her twenty-five years' service there she was associated with two local welfare centres from their beginning and was medical officer to the nursery school; the development of the maternity and child welfare service owed much to her. Lately she had been taking an active part in the work of the emergency medical service. Her pleasing personality and high professional reputation alike make her death a loss to the city.

MEDICAL NEWS

University of Oxford

On June 20 the degree of D.M. was conferred on R. G. MacGregor in absentia.

University of Cambridge

At recent examinations the following were successful:

FINAL EXAMINATION FOR M.B. DEGREE

Part II: Physic, Pathology, and Pharmacology.—H. J. Anderson, G. A. Ballance, R. G. Benians, L. B. G. Bennett, H. T. Calvert, J. A. Campbell, J. C. K. Campbell, R. L. Canney, G. K. F. Cohen, R. V. Dent, W. R. B. Dickinson, A. G. Farr, R. Friedman, G. S. Gladstone, S. C. Gold, T. S. S. Gregory, P. Haden, M. H. K. Haggie, R. T. Hastings-James, R. C. Howard, J. H. Humphrey, R. R. Hunter, R. C. Jack, P. G. Jeffries, E. E. Jones, J. H. Keesey, T. A. Kemp, J. D. Kidd, G. J. Laws, J. A. N. Lock, A. G. G. Long, B. C. H. Luker, D. H. Manson-Bahr, J. M. Marchant, R. S. Monro, H. V. Morgan, A. J. Moss-Blundell, J. M. Mungavin, B. F. H. Parker-Wood, J. F. Paxton, A. D. Payne, A. G. Porter, W. L. Price, J. M. Pullan, H. Rabinowitz, D. Scott, P. G. Seed, R. A. Shooter, J. F. Smith, L. W. Smith, N. Southwell, G. E. Spear, G. E. Stein, J. R. Tasker, L. R. S. Taylor, G. T. G. Thomas, R. M. Todd, P. D. Trevor Roper, C. H. C. Upjohn, H. H. Wolff, M. W. W. Wood, J. J. H. Beattie, M. K. Cole, J. Gibbon Davies, M. C. Simpson, and J. F. Thompson.

University of London

During the session 1940–41 the M.B. examination will be held in October and April instead of November and May. Entries must be received not later than Aug. 31 and Feb. 25.

The examination for the diploma in clinical pathology which was to have been held in October has been postponed until January. The last date for receiving entries will be Dec. 1.

Royal Society of Medicine

The combined summer meeting of the otological and laryngological sections of this society which was to have been held at Oxford on July 5 and 6 has been cancelled.

University of Bristol

At recent examinations the following candidates were successful:—

FINAL EXAMINATION FOR THE DEGREES OF M.B., CH.B.

T. J. Butler (with second-class honours), D. L. Bayley, R. G. Boyd, Philip Jacobs, Marjorie Organ, R. W. Orton, Patricia M. Simpson, J. J. de S. Snijman, Barbara F. Thomas, Joan Threadgold, G. H. Tovey, D. N. Walder, and Lawrence Willoughby.

Order of St. John of Jerusalem

The King has sanctioned the following promotions in and appointments to the Venerable Order of the Hospital of St. John of Jerusalem:—

As Knight.—Major-General E. W. C. Bradfield, I.M.S.; Sir Percival Horton-Smith Hartley, M.D.; and Lieut.-Colonel Gerald Eustace Peacock, M.R.C.P.

As Commander.—B. G. S. Belas, L.R.C.P.I.; Colonel A. J. van der Spuy, M.B.; Captain S. B. Turner, M.R.C.S.; and Lieut.-Colonel Wilfred Vickers, M.B.

As Officer.—A. P. Gibbons, M.B.; E. J. H. Budge, L.R.C.P.; W. A. Daley, M.D.; Captain R. V. Steele, M.B.; Colonel T. C. Boyd, M.R.C.P., I.M.S.; A. R. S. Vickers, M.B.; R. J. Coto, M.B.; E. C. Bradford, M.B.; J. E. Brereton, L.R.C.P.I.; G. P. Huws, M.B.; Tudor Williams, M.R.C.S.; and A. J. King, M.B.

L.C.C. Radiotherapy Units

Since the war the demands on the council's deep X-ray units at Lambeth and Hammersmith Hospitals have been greatly increased and for some time past the five tubes at the Lambeth unit have been in use for twelve hours a day. To provide additional facilities for the diagnosis and treatment of cancer it is proposed to supply two additional X-ray therapy tubes and generators to Hammersmith Hospital. An additional radiotherapist, an assistant physicist, two nurse radiographers and four deputy sisters will be needed to staff the enlarged unit. These proposals have been submitted to the Minister of Health. The National Radium Commission are willing to lend the council 500 mg. of radium for the new tubes.

Lister Institute

At a meeting of the council of the institute on June 21 Prof. C. R. Harington, F.R.S., was appointed one of its representatives on the governing body of the institute in place of the late Sir Arthur Harden.

Medical Insurance Agency

The annual report for 1939 adopted by the agency on June 20 records that up to the end of June, 1939, the new life business negotiated reached about 190 per cent. of the corresponding figure for 1938; and in sickness assurance the percentage was 250. The outbreak of war, and the disturbed conditions preceding the actual declaration, seriously affected all departments, but the new life business for the whole year showed an increase of 50 per cent. over 1938 in the London office, and 4 per cent. in the Edinburgh branch; the assurances thus effected were greater by £152,000 than the best previous record. The rebates granted to the members of the profession who did their insurance business through the agency were also the best on record. Nearly £5000 was saved to medical men and women in this way, while £2000 was voted to the Royal Medical Benevolent Fund, with £400 for the Ladies Guild; £500 to Epsom College, with £300 for the Sherman Bigg Fund; and smaller sums amounting to over £100 for other purposes.

International Standards for Antitoxins, Antisera and Tuberculin

The international standards for sera and other bacteriological products are held, on behalf of the Health Organisation of the League of Nations, by the State Serum Institute, Copenhagen, from which samples have hitherto been furnished to the laboratories, institutions and research workers requiring them in different countries. Now that this supply is interrupted the Medical Research Council have agreed to allow samples of the British standards for these products, held at the National Institute for Medical Research, Hampstead, to be sent out instead. The British standards in question are either part of the same materials as those kept in Copenhagen, or have been repeatedly checked by the British and Danish Institutes. The standards available are staphylococcus, diphtheria and tetanus antitoxin, gas-gangrene antitoxins (*perfringens, Vibrion septique, œdematiens,* and *histolyticus*); anti-dysentery serum (Shiga); antipneumococcus sera (types I and II); and old tuberculin. The National Institute can also supply a standard solution of diphtheria antitoxin for use in the flocculation test.

The stocks of these standards held at Hampstead are adequate to meet all demands, with the exception of the standards for antipneumococcus serum, types I and II, demands for which should be restricted to essential needs. In order to conserve the stocks of these standards laboratories are asked to establish local standards for these two antipneumococcus sera for routine testing.

Former recipients of the international standards who wish to be supplied from Hampstead should apply at once, stating which of the standards they require, and how many bottles in each case, to the Department of Biological Standards, National Institute for Medical Research, Hampstead, N.W.3.

National Council for Mental Hygiene

At its seventeenth annual general meeting on June 18 the council for Mental Hygiene passed a resolution approving the principle of its amalgamation with the Child Guidance Council and the Central Association for Mental Welfare, as recommended in the report of the Feversham Committee. The executive committee was authorised to investigate the matter with the two other bodies.

At a public meeting held afterwards Colonel J. R. Rees spoke on strategic planning for mental health and made constructive suggestions to maintain the morale of the population during the war. The press and the cinema could help; a mental hygiene film which has recently been produced from a scenario prepared by the council, dealing with the prevention and treatment of fear, would shortly be available for general release. Colonel Rees said that decentralisation should be aimed at, and local committees or groups should be encouraged, for propaganda would be more effective if impartial and disassociated from any organisation.

Medical Diary

Week beginning July 1

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1.
TUESDAY—5 P.M., annual meeting.

BRITISH POSTGRADUATE MEDICAL SCHOOL, Ducane Road, W. 12.
TUESDAY.—2.30 P.M., Sir Walter Langdon-Brown: ward clinic.
WEDNESDAY.—11.30 A.M., clinico-pathological conference (medical). 2 P.M., Prof. J. H. Dible: The Pathology of Fat Metabolism, I. 3 P.M., clinico-pathological conference (surgical).
THURSDAY.—2 P.M., Dr. Duncan White: radiological conference.
FRIDAY.—2 P.M., clinico-pathological conference (gynæcological). 2.30 P.M., Mr. V. B. Green-Armytage: sterility clinic.
DAILY.—10 A.M.–4 P.M., medical clinics; surgical clinics and operations; obstetrical and gynæcological clinics and operations. 1.30–2 P.M., post-mortem demonstration.

FELLOWSHIP OF MEDICINE AND POSTGRADUATE MEDICAL ASSOCIATION, 1, Wimpole Street, W. 1.
Royal Cancer Hospital, Fulham Road, S.W.3. MON., WED., and FRI., 10 A.M., F.R.C.S. (Final) clinical surgery course.

Appointments

ANDERSON, MARY R., M.B. Durh., D.C.H., temporary assistant school medical officer for the county of Durham.
*JOSCELYNE, MURIEL V., M.B. Brist., D.P.H., assistant school medical officer for Hertfordshire.
KING, J. F. L., M.B. Lond., anæsthetist at the Royal Waterloo Hospital for Children.
MANSFIELD, R., M.R.C.S., D.A., anæsthetist at the Royal Waterloo Hospital for Children.
O'DRISCOLL, M. P., M.B.N.U.I., temporary assistant resident medical officer at Forest Gate Hospital, West Ham.
THOMAS, C. J. S., M.R.C.S., D.P.H., deputy medical superintendent at the Northamptonshire County Mental Hospital, Berrywood.

* Recommended for appointment.

Births, Marriages and Deaths

BIRTHS

BARCLAY.—On June 24, at Dundee, the wife of Dr. Patrick Barclay, of Middlesbrough—a daughter.
NUTTALL-SMITH.—On June 23, at Oxford, the wife of Dr. John Nuttall-Smith—a daughter.
PHILLIPS.—On June 20, the wife of Captain W. J. E. Phillips, R.A.M.C., of Alfreton, Derbyshire—a son.
WALLACE.—On June 22, the wife of Dr. T. Wallace, of Long Ashton—a son.
WOODMAN.—On June 22, at Darlington, the wife of Dr. A. Woodman—a daughter.

MARRIAGES

AKEROYD—JEWSON.—On June 22, at Norwich, Alan Akeroyd, M.R.C.S., of Nottingham, to Brenda Jewson.
MARTIN—SOWELS.—On June 17, in Alderney, A. J. Martin, Lieutenant R.A.M.C., to Mary Violet Sowels.
HARRIS—GILL.—On June 20, at Bayswater, David W. T. Harris, M.R.C.S., to Anne Gill.
HATFIELD—HERFORD.—On June 20, at Gosport, Frank Edward Stafford Hatfield, M.B., Surgeon Lieutenant, R.N.V.R., to Sylvia Annette Meakin Herford, M.B., of Reading.
STURGEON—CLARK.—On June 22, at Surbiton, Alec Sturgeon, M.D., to Phylis Clark.

DEATHS

BERRY.—On June 18, at North Berwick, Sir George Andreas Berry, LL.D., M.B. Edin., F.R.C.S.E.
CARMICHAEL.—On June 19, at Putney, Donald Gordon Carmichael, M.B. Edin., late Lieut.-Colonel, R.A.M.C.
CONCANNON.—In June, 1940, killed in action in Belgium, John Noel Concannon, L.Med. Dubl., Major R.A.M.C.
KERRIDGE.—On June 22, Phyllis Margaret Tookey Kerridge, Ph.D. Lond., M.R.C.P.

SULPHATHIAZOLE.—Messrs. May and Baker inform us that they filed an application for a patent specifically covering the preparation of sulphathiazole on June 3, 1938.

ANALGESIC FOR CHILDREN.—Messrs. Allen and Hanburys suggest that an injection of morphine and scopolamine is suitable for the urgent relief of pain in child air-raid casualties. For this purpose they offer a sterile solution containing Alopon (total opium alkaloids) gr. $\frac{1}{6}$ and scopolamine gr. $\frac{1}{150}$ per c.cm. in 10 c.cm. rubber-capped vials. A table of suggested doses at various ages is printed on the label.

NOTES, COMMENTS AND ABSTRACTS

THE ESSENTIALS OF FIRST-AID

THE Ministry of Health has issued to all householders an excellent little pamphlet called First Aid in Brief. If anyone doubts its excellence let him try to re-write any part of it more clearly himself. "Be prepared to see severe wounds," it says. Very few people faint in an operating-theatre when they have anything to do—it is the onlooker under instruction who faints—but the layman will need to steel his heart when first he sees the shattered flesh of a modern bomb wound. Therefore, "Be courageous and keep your head." It is not generally known that the inner folds of a laundered towel are sterile until it is opened and that an emergency operation may be performed with these with a very good hope of avoiding sepsis. This piece of knowledge is applied in the pamplet's advice that we should all carry "several clean handkerchiefs or small towels" to act as first field dressings. The arrest of hæmorrhage is summarised in twenty lines, a triumph of brevity. The description of the improvised tourniquet is the only part that is not clear; but there is nothing harder to describe. It would be better to print the actual description in different type and to change the spacing so as to bring out the fact that the tourniquet must be tried if simple pressure through a pad fails. The warning not to give fluid to people hit in the belly is sound, and it might even be said to be risky to rinse the mouth out at this stage. Burns are dealt with by the negative instruction not to apply oil. This pre-Listerian treatment has died hard. Cold tea is the substitute recommended. For first-aid in the street this is unsuitable; but a corked bottle filled with a strong brew might be kept in every household. "Keep the patient lying down" is made to apply to all casualties. There is certainly one and probably a second exception to this—wounds of the belly and the chest. Instructions should be given to prop these persons up in the semi-erect position with their knees bent. The instructions to warm the patient in order to combat shock can be carried out in this position as readily as lying down.

SHAKESPEARE'S TWINS

SHAKESPEARE had twin children of his own—Hamnet, who died young, and Judith—and he wrote two plays about twins, which have led Dr. Groesbeck Walsh and Dr. Robert M. Pool of Alabama (*South. Med. Surg.* April, 1940) to speculate about his scientific knowledge of the subject. They have, perhaps, let their own scientific knowledge colour their reading of his text; and they have not made enough allowance for the conventions of the Elizabethan stage. They say that Shakespeare almost certainly knew that freemartins are sterile imperfect female cattle born twin with a male, and they suggest—cautiously, it is true—that he might have had some notion of this kind about Viola in Twelfth Night. Was she not quick, even eager to assume male attire? Was there a bisexual phase, avowed or concealed, in her personality? Was she perhaps not a complete female human being and was she aware of this state of affairs? This is what worries Dr. Walsh and Dr. Pool. What worried Shakespeare, of course, was that all his heroines were played by little boys. It was a favourite device of Elizabethan dramatists to put their girls into male attire—no doubt because boys look better as boys than as girls. Shakespeare makes use of the trick at least seven times, counting Jessica. The other ladies, though not twins and therefore not freemartins, changed their clothes with alacrity so that it might be argued that they too enjoyed bisexual personalities. In Viola's case, however, there is a little more evidence, the authors think. Viola says: "I'll serve this Duke: thou shalt present me as a eunuch to him." But after all, if Shakespeare had to make his boys plausible as girls, he also had to make his girls plausible as boys. Viola feared that the Duke, a noticing man, would observe that her damask cheek required no razor. And so he did. "For they shall yet belie thy happy years," said he, "that say thou art a man. Diana's lip is not more smooth and rubious." Dr. Walsh and Dr. Pool take this as evidence that the Duke's subconscious mind knew more about Viola than did his conscious mind—and probably they are right. But they are on less debatable ground when they quote Dromio—"Methinks thou art my glass and not my brother"—as evidence that Shakespeare knew about mirror imaging; though even here the remark may mean only that he felt as familiar with his brother's face as he did with his own. Shakespeare was such an admirable observer that he tempts us into believing him omniscient, but he was first and foremost a dramatist with an eye for a situation, and he knew what he was about. He used his knowledge as a cook uses thickening in gravy, but the structure of his plays was dramatic, not scientific.

THE G.P. IN AIR-RAIDS

Dr. R. H. Parry, medical officer of health for Bristol, has sent doctors in his area a copy of suggestions prepared by the local medical war committee which seem worthy of consideration throughout the country.

During and immediately after an air-raid any private medical practitioner not allotted for duty to a first-aid post or an E.M.S. hospital, unless attending to his private patients, should remain at his house or surgery or return there as soon as possible so as to be available to attend to any casualties that may come or be brought to him.

He should attend to all minor casualties and not direct them to first-aid posts which may be some distance away.

If an ambulance is required to remove casualties to hospital it can only be obtained by an air-raid warden, to whom the practitioner should apply. This precaution is necessary to prevent possible dislocation of the ambulance service by fifth columnists.

Practitioners not on duty with first-aid posts or at hospitals are advised not to try to proceed to the site of any damage unless specially summoned by the police or air-raid wardens. This would not apply to practitioners who find themselves by chance at or near the scene of damage by enemy aircraft.

All doctors are advised to lay in a stock of ointments, pastes, solutions and so on recommended in the official handbooks for the first-aid treatment of gas casualties.

ERGOT OF RYE

ERGOT, which was the subject of a recent statement by the Medical Research Council (*Lancet*, June 15, p. 1092), is one of the few drugs which have become very difficult to obtain from the countries of production. The scarcity of ergot is not due entirely to the war, although that is an important cause. The main producing countries are Spain, Portugal, Russia and Poland—to a lesser extent Germany and several mid-European countries. The varieties most esteemed because of their higher alkaloidal contents are the products of Spain and Portugal; before the war substantial quantities were imported from Poland which helped to make up for the deficiencies of the Spanish output, manifest during the civil war and ever since. Portugal with a succession of poor crops and bearing the brunt of the world demand has found it expedient to ration supplies to the consuming countries. Up to the early part of last year Russia was an important source of supply of ergot of low alkaloidal content, but it is understood that the U.S.S.R. now reserves its output for use in its own maternity hospitals. Since the war a little ergot has been received from Hungary, but its quality may be measured by the fact that the price it commands is about half that of the Spanish and Portuguese brand.

Experimental production of ergot is in progress in New South Wales and in several parts of the United States, but the output so far is not of commercial importance although, curiously enough, the U.S.P. of 1820 was the first official pharmacopœia to include a monograph on a drug which was in use by German peasants more than three centuries earlier. The M.R.C. statement puts the recent rise in the wholesale price of ergot at 300 per cent. Since the late war it has in fact risen quite 1000 per cent., from which it may be inferred that world production of ergot has failed to keep pace with world demand. Conditions favourable to the economic production of this fungus of rye grain are an abundance of the rye plant and a hot summer following a wet spring. Towards the end of next September it will be seen whether Spain has recovered her place as a supplier of ergot.

There was a sudden and substantial fall last week in the price quoted for ergot for prompt shipment from Portugal, dealers in London receiving offers at prices 30 per cent. below those quoted the week before. The reason for this sharp reduction appears to be that shippers in Portugal have decided to unload their stocks to make room for the new crop. It may fairly be inferred that abundant harvests of ergot are expected in Spain and Portugal, but although the immediate cause for anxiety about supplies in this country has thus been removed it is important to remember that imported ergot has to be paid for in foreign currency.

NEW X-RAY PLANT AT HORSHAM HOSPITAL

SOME friends of this hospital have lately given a new X-ray department to this hospital. Facilities for all kinds of radiological examination have been provided, and the plant is "shockproof." The high-tension generator is a 4-valve unit, giving outputs up to 500 mA. The switch-table incorporates all measuring instruments and provides the usual current and kilovoltage adjustments with dual control of both for screening. A pre-selector switch enables the operator to obtain automatically the required stabilised tube conditions without reference to the other controls, and by this means he may also select the tube focus. A "Neutronic" valve controlled time-switch is incorporated giving exposures down to 0·02 sec. A motor-driven tilting table is included, and this is designed to utilise a single "shockproof" tube for both recumbent and erect examination. The apparatus is complete with a ceiling-suspended fluorescent screen which may be removed entirely from the couch when not in use. A vertically mounted Potter Bucky diaphragm stand is installed beside the table and the same X-ray tube is also used with this. This radiographic stand incorporates a head-clamp for sinus work, but the Potter Bucky may also be turned horizontally for the convenient positioning of limbs and the examination of fractures.

The department is completed by the installation of a "shockproof" mobile ward unit, which has an output of 30 mA. and 90 kVp. The equipment has been made by Newton and Wright Ltd., of London.

HONEY VERSUS BACTERIA

IN an investigation into the antibacterial powers of honey M. Franco and L. Sartori (*Ann. Igiene*, May, 1940, p. 216) found that some samples exerted a bacteriostatic action on *Bacterium coli*, *Bact. typhosum*, *Bacillus dysenteriæ* Shiga, *Staphylococcus aureus*, and spores of *B. anthracis*. One sample gathered from a mixed crop of flowers was definitely bactericidal against *Staph. aureus*, *Bact. coli*, and *Bact. typhosum*. It might be thought, especially in view of the reports of the treatment of ulcers with sugar, that these antibacterial powers of honey are due to its sugar content, but the experimenters concocted an artificial honey with its different sugars in the right proportions and this had no such powers. Further, the antibacterial action gradually disappeared when the honey was exposed to direct sunlight; diffused daylight, however, apparently had no effect. It seemed likely that the antibacterial action was communicated to the honey by the bees, and bees were therefore dissected and filtrates prepared from different parts, such as head and thorax, intestines and honey-bags, and from regurgitated honey. The strongest antibacterial powers were shown by the regurgitated honey and by the intestinal filtrate (the intestines play no part in the elaboration of the honey); the filtrates from the honey-bags and the head and thorax were much weaker. Apparently, therefore, the bacteriostatic and bactericidal powers of honey are due to a substance not formed in the tissues of the bee but sucked in with the nectar and pollen of the flowers—an assumption supported by the fact that the antibacterial powers of different samples of honey varied with their source. For instance, honey from mixed flowers exerted a much more powerful action than honey from acacia or chestnut flowers.

A RETURN TO THE LAND

THE Pioneer Health Centre at Peckham, launched so hopefully five years ago, was compelled to close at the outbreak of war, partly from lack of support and partly because at that time it was believed that the building would be required for Government purposes. The centre existed chiefly to give club facilities and health services to the family as a unit, so that the war—by breaking up families—injured its very purpose. One valuable piece of active work is still surviving out of this woeful collapse of a promising venture: a small group of mothers and children have been received at Oakley House, Bromley, the home farm belonging to the centre, and the mothers, formerly used to the life of Peckham, are now running the farm. The change has been bred in them by personal experience. The annual report ("War and the Family." London: S. and A. M. Flutter, Ltd.) tells how "at first the young wife knows nothing—she is frightened of the cows, thinks all pigs are dirty, accepts water-supply and drainage as her natural inheritance, and the dustman as nature's scavenger of all surpluses. . . . Now, when the cows that they have learned to milk—these mothers who were so terrified of cows—have their calves, there is a proprietary feeling about it. The rubbish is jealously harvested as an invaluable food for the soil when composted; besides no germ must breed to contaminate the carefully handled milk. . . . Milking with their own children round the door waiting to drink the milk when it is ready; keeping the cowstalls clean, sterilising, making butter, digging, covering up the young bean seeds . . . all these things form the very substance of an education."

The children spend the day in a nursery school, which is carried on by two Montessori workers in a cottage adjacent to the farm, and the fathers come down at weekends, or when they are on leave, to lend a hand and visit their families. Twelve mothers have remained at the farm since the outbreak of war, each of whom pays a basic contribution of £1 a week for herself and her children; they work under a woman director of the farm and a house supervisor. In spite of the family contributions and the valiant efforts of the centre to raise funds, this experiment, too, must end in the coming autumn unless, as the report says, "something very unforeseen happens."

LONDON AND COUNTIES MEDICAL PROTECTION SOCIETY. At the annual meeting on June 19 it was stated that the council does not propose to issue this year its usual detailed report. The serious loss to the society in the death of Dr. C. M. Fegen was sympathetically noted as well as the death of two valued council members, Mr. A. T. Pitts and Dr. T. A. I. Howell. The profession is reminded that the public is very "compensation conscious" and no practitioner is immune from litigation, whether in private or public practice. A new scheme provides cover for members residing overseas on payment of an additional subscription. The work of the society has gone on without interruption at Victory House, Leicester Square, London, W.C.2.

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REFERENCES AND ABBREVIATIONS

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