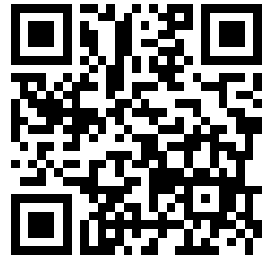

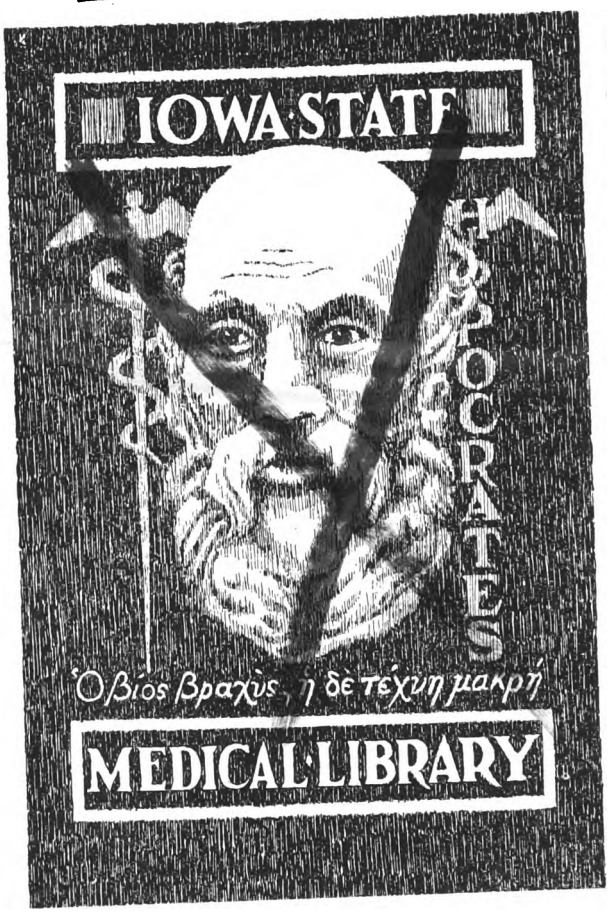

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HAZARDS OF HYPERTHERM TREATMENT

JOHN WALLACE
M B, B SC EDIN.
S. R. M. BUSHBY
B SC BRIST.
CAPTAINS RAMC

From the Army Blood Transfusion Service

HYPERTHERM treatment is increasingly used for resistant gonorrhœa and gonococcal arthritis. King (1942) has found that, combined with chemotherapy, it gives excellent results in gonorrhœa which does not respond to other forms of therapy. Similar reports come from Batchelor et al. (1942) in this country and Simpson et al. (1941) in America. On the other hand, such treatment, in which the body temperature is maintained at 106° F. for eight hours, imposes a severe strain (Neymann 1938). Bessemans and Thiry (1933), Ormond (1936) and Clark (1936) each report deaths following hypertherm pyrexia, and a report by the Council on Physical Therapy (1934) shows 29 deaths out of 4809 patients treated by hyperpyrexia produced by physical agents. The use of chemotherapy at the same time may impose further strain on a physiological system already working near the limits of tolerance.

Our object has been to investigate changes occurring in patients undergoing hypertherm treatment, to ascertain whether chemotherapy increases the risks, and to discover any prophylactic or therapeutic means of eliminating or minimising the dangers inherent in the treatment.

Methods of Treatment and Investigation

The patients were suffering from resistant gonorrhœa; each had consented to hypertherm treatment, and had received a thorough routine clinical examination at which no abnormality was detected.

The routine practice in the hypertherm department was to give the patient a meal at 6 PM on the evening before treatment, and then to withhold food until treatment was complete the next evening. It was thought that even a cup of tea before treatment would increase the liability to vomit.

At 8 AM the patient was placed in the hypertherm cabinet, which had a temperature between 110° F. and 130° F. with an automatically controlled humidity of from 85% to 100%. In this cabinet, which encased the whole body except the head and face, his temperature reached 106·6° F. after 1–2 hours during which he had no fluid. When the temperature reached 106·6° F., 0·6% sodium chloride was given by mouth. The temperature was maintained at 106·6° F. for eight hours in the course of which the patient had drunk on the average 3 litres of 0·6% saline. Each man also received 50 c.cm. 50% glucose solution intravenously twice during treatment (usually at 11 AM and 3 PM). Oxygen was administered through the nasal type of BLB mask for two periods of a quarter of an hour each.

Skilled nursing attention was given to each patient to make him as comfortable as possible, to encourage and reassure him, and to observe the general condition. A sedative was given to restless patients, and the dose was repeated if required.

Our hæmatological and biochemical investigations were performed on samples of venous blood.

A glass standard Sahli hæmoglobinometer was used for hæmoglobin readings, which were taken half an hour after being set up (experimental error ± 2%). Blood-counts were performed with a standard hæmocytometer (experimental error ± 5%). The hæmatocrit figure was estimated by centrifuging blood in a Wintrobe tube at 1800 r.p.m until a constant reading was obtained (experimental error ± 1%). Non-protein nitrogen, plasma chlorides, CO_2 content of plasma, blood-sugar, and plasma bilirubin were estimated by the methods of Peters and van Slyke (1932). Serum proteins were estimated by the direct refractometric method using a Zeiss dipping refractometer (Siebenmann 1937). Liver function was assessed by the intravenous hippuric acid test (Quick 1936). Sulphathiazole levels in the blood were estimated by the method of Hynes (1940).

Observations

SERIES A

A series of 175 cases was treated in the hypertherm department, according to the routine just described, before our own investigation began. The following clinical observations were noted by the department staff working under the direction of Lieut.-Colonel A. J. King.

Clinical feature	*Cases presenting feature*	*% of total*
No untoward reaction	78	44·6
Vomiting	55	31·4
Jaundice	26	14·8
Circulatory collapse	31	17·7
Incontinence of fæces	9	5·2
Deaths	2	1·2

Vomiting was observed during treatment and for periods up to 48 hours afterwards; it was particularly evident in cases which developed clinical jaundice. Icterus became obvious 24–96 hours after treatment, and persisted a few days. The patients who became jaundiced showed bile pigments in the urine; there was sometimes constipation but the stool was not altered.

Circulatory collapse was seen towards the end of treatment or usually within the first 6 hours after it. The patient was pale, cold and perspiring. The blood-pressure fell; the pulse was weak and rapid or almost imperceptible. Respiration-rate was much increased, and breathing was shallow. Vomiting was sometimes copious, and incontinence of fæces was a feature. This collapse might persist 48 hours. The two fatal cases developed circulatory collapse after treatment, and death was preceded by convulsions.

SERIES B

We studied 7 cases during the routine treatment. The main hæmatological and biochemical data are shown in tables I(A) and I(B). In case 3 the patient became obstreperous after one hour and no results are recorded.

Hæmatological findings.—All cases showed hæmodilution as judged by hæmoglobin, hæmatocrit and red-cell counts. This fall was observed after the first hour of treatment, but in case 5, which showed marked dilution, it was progressive throughout treatment.

All cases had a polymorph leucocytosis and an increase in mononuclears. Two (nos. 4 and 6) showed a rise in the lymphocyte count, while the other four showed a fall. In nos. 2 and 7 the fall is greater than can be accounted for by simple hæmodilution.

The blood returns towards pre-treatment figures within 24 hours, but hæmodilution may not disappear for 3 or 4 days.

Biochemical finding.—Plasma proteins always fell; in cases 4 and 7 the fall is greater than can be accounted for by simple dilution. Normal levels were regained in a few days, but plasma proteins were restored more slowly than the hæmoglobin. Non-protein nitrogen rose in every case. The rise was sometimes greater after 24 hours, but all cases show a return to the pre-treatment level after 3 days. The carbon dioxide content of the plasma was reduced in every case except no. 6 in which treatment caused no alteration. Plasma chlorides fell during treatment, or within 24 hours. Blood-sugar levels showed no significant change. Serum bilirubin always rose; in cases 2, 4 and 5 clinical icterus was observed. Patient no. 4, who had a higher level than any of the others initially, had had a full session of hypertherm treatment only 8 days previously. On the 6th day after treatment the three cases examined still showed a serum bilirubin above the initial level.

Urinary chlorides remained within normal limits apart from case 2 in which they almost disappeared from the 2nd to 5th day after treatment. This patient developed clinical icterus, and had vomiting.

Clinical features.—All cases showed mental changes. These varied from drowsiness or stupor to restlessness and excitement; the same patient might present both features at different periods of treatment. Mental disturbance was greatest towards the end of treatment, but was observed in case 3 within the first hour. Patients became disorientated, and apparently insensitive since some had burns which normally would certainly have given rise to pain. During the restless phase some became violent, sang bawdy songs, and shouted abusive language. It was impossible to reason with patients. This picture was characteristic of cerebral anoxia.

TABLE I (A) SERIES B.—HÆMATOLOGICAL FINDINGS IMMEDIATELY BEFORE (BEF) AND IMMEDIATELY AFTER (AFT) HYPERTHERM TREATMENT

Case	Hæmatocrit		Hæmoglobin		Red cells (thousands per c.mm.)		White cells (per c.mm.)		
	Bef.	Aft.	Bef.	Aft.	Bef.	Aft.	—	Bef.	Aft.
1	45·5	45	117	115	5·6	5·4	P	4300	9800
							L	2800	2400
							M	200	250
							E	70	120
2	47	45	120	114	5·2	5·0	P	2700	9400
							L	2100	1400
							M	150	700
							E	50	120
4	47	44	108	104	5·5	5·2	P	3600	7600
							L	1400	2100
							M	100	300
							E	100	
5	53	43	126	112	5·8	5·4	P	3500	10000
							L	2300	2000
							M	200	700
							E	60	250
6	38	35	87	83	4·5	4·2	P	5100	9600
							L	1900	2200
							M	300	500
							E	70	120
7	46	44	118	112	5·8	5·2	P	4700	8300
							L	2400	1400
							M	400	800
							E		

P = polymorphs; M = monocytes;
L = lymphocytes; E = eosinophils.

Cyanosis was a constant feature. It always appeared within the first hour and persisted. Usually vasodilatation was evident, but in case 7 (described below) pallor was a striking feature during the last hour of treatment. The respiratory rate was usually 30–40 per minute during treatment, but in case 7 it reached 48.

The pulse-rates varied from 120 to 160. The pulse volume was good throughout, but case 7 showed a weak pulse soon after treatment ended. The systolic blood-pressure rose within the first hour; the diastolic pressure either remained the same or rose slightly, so the pulse-pressure was increased. The BP during the latter half of treatment returned to its initial level, which was maintained until after treatment, when it usually fell to a low but safe level around 100 mm. Hg. In case 7 however this fall resulted in circulatory collapse. The postural response of the BP on sitting sharply upright was maintained after treatment in all except case 7 which showed the following response:—

Before treatment ...	140/95	150/100
After treatment	90/70	60/50

CASE 7.—A healthy airman aged 22. His clinical course was similar to the other cases, except that his breathing was shallow and rapid, reaching a maximum of 48 per min. Cyanosis was present; he had been restless during the first hour but settled down to a quieter and drowsy state until about 2 hours before the end of the 8-hour period, when he again became very restless and was given a sedative. He again became drowsy and remained listless until the end of the treatment. During the last hour he became pale, but circulatory collapse had not then developed.

After removal from the cabinet he was very listless; he remained cyanosed; his breathing was rapid and shallow; and he vomited a small amount of bile-stained fluid. Half an hour after treatment the BP was 90/70, the pulse-rate 130 and of poor volume. An hour after treatment the BP was still 90/70, the pulse 136 and feeble while respirations were 40 and shallow. The skin was cold and pale, but there was no sweating. The temperature was falling, but the fall was slower than in previous cases. At this stage the foot of the bed was raised and oxygen in high concentration was administered through a BLB mask.

The BP 2½ hours after the end of treatment was 80/70; the pulse was 150 and almost imperceptible; the respirations were 36 and very irregular; the skin was cold, pale, cyanosed and moist. The temperature had fallen to 100° F. The patient was drowsy and appeared unaware of what was happening. He complained of nausea and became incontinent of fæces.

One litre of plasma was then infused rapidly with careful attention to any signs of developing cardiac failure; but no untoward reactions occurred. The following results were observed:—

	Hb.	Hæmatocrit	Plasma proteins (g./100 c.cm.)	BP
Before infusion ..	112	45	7·3	80/70
5 min. after infusion	110	44·5	7·3	100/80

Carbon dioxide (7%) and oxygen in high concentration were continued after the infusion; the colour improved, the pulse slowed and improved in volume, and the breathing became regular and slower. Five hours after the end of treatment the BP was 90/65, the pulse 90, and respirations 26. The colour was good and the patient warmer. The improvement was maintained.

SERIES C

In the next 11 cases studied the routine was modified. A high concentration of oxygen was administered throughout treatment through a nasal BLB mask, and 7% CO_2 was added whenever breathing became rapid or shallow. Oxygen and 7% CO_2 was continued for an hour after treatment. On the morning of treatment the patient was given 50 grammes glucose at 6 AM and tea and toast for breakfast. During treatment 2% glucose was administered in the saline drinks, so that by encouraging all patients to drink at least four litres another 80 g. glucose was given. An additional 8 g. sodium chloride was given by mouth on the day before and on the day after treatment. No sedative was administered during treatment.

The main data for this series (cases 8 to 18) are shown in tables II (A) and II (B). The results are similar to those in series B, the main points being: (1) a transient hæmodilution and polymorph leucocytosis; (2) a transient rise in non-protein nitrogen; (3) a fall in CO_2-content of plasma during treatment; (4) less

TABLE I (B) SERIES B.—BIOCHEMICAL FINDINGS BEFORE AND AFTER HYPERTHERM TREATMENT

Case	NON-PROTEIN NITROGEN (mg./100 c.cm.)			PLASMA CO_2 (vol. %)		PLASMA CHLORIDES (mg./100 c.cm.)			BLOOD-SUGAR (mg./100 c.cm.)		SERUM BILIRUBIN (mg./100 c.cm.)					PLASMA PROTEINS (g./100 c.cm.)		TOTAL URINARY sodium chloride (g./24 hr.)				
	Imm. bef.	Imm. aft.	24 hr. aft.	Imm. bef.	Imm. aft.	Imm. bef.	Imm. aft.	24 hr aft.	Imm. bef.	Imm. aft.	Imm. bef.	Imm. aft.	24 hr aft.	72 hr aft.	6days aft.	Imm. bef.	Imm. aft.	Day bef.	Day of tt.	2nd day aft.	4th day aft.	6th day aft.
1	36	42	44	65	55	620	590	..	95	95	0·1	0·4	0·8	..	..	7·8	7·6	..	4·7	..	..	..
2	37	38	..	65	50	580	540	560	88	100	0·1	0·8	2·5	3·5	1·6	7·9	7·2	7·6	12·6	0·4	0·2	4·2
4	40	43	40	57	50	560	565	530	82	97	0·4	1·8	2·6	0·2	..	7·9	6·6	8·1	10·4	..	..	..
5	35	43	37	67	53	590	620	550	100	79	0·1	0·8	2·6	0·2	..	8·2	7·0	9·1	4·9	..	..	..
6	30	31	35	59	59	580	570	570	89	105	0·1	0·6	0·6	0·6	0·6	9·0	8·3	3·6	4·9	..	..	..
7	36	37	38	61	50*	580	570	560	80	108	0·1	0·8	1·0	0·8	0·3	8·2	7·3	10·8	10·1	3·5	4·3	..

Imm. = immediately. * CO_2 content of plasma during circulatory collapse fell to 38 volumes %.

tendency for plasma and urinary chlorides to fall during and after treatment; and (5) a constant rise in serum bilirubin was demonstrable within 4 hours of the start of treatment; in cases 11 and 16 clinical icterus was observed, and it is again noteworthy that patient no. 14, who showed a high initial bilirubin level and a doubtful clinical jaundice, had had a hypertherm session 10 days previously. The only case examined on the 6th day after treatment showed a serum bilirubin higher than the initial level.

The patients were more coöperative than in series B; stupor and marked restlessness were not seen apart from case 17 who refused to use the BLB mask and had signs of cerebral anoxia. Cyanosis was not the prominent feature it was in series B, but it did appear, particularly in patients who did not tolerate the mask well. The respiratory rate was usually 30–40 during treatment; any tendency of the breathing to become more rapid and shallow was checked by the addition of 7% CO_2 to the oxygen.

Pulse-rates varied during treatment from 110 to 140, and the volume was good throughout. The rates were slower than in series A and B. BP readings were similar to those in series B, but no patient developed circulatory collapse. The postural response of the BP on sitting upright was maintained after treatment.

SERIES D

An additional 42 cases were treated as in series C. No special investigations were undertaken, but particular attention was paid to the circulatory state and to jaundice. Circulatory collapse did not develop in any case in this series—in sharp contrast to series A and B. The pulse-rates varied on the average during treatment from 110 to 136, being similar to the pulse-rates in series C, and slower than those in series A and B. Definite clinical jaundice developed in 3 cases, while 3 others were regarded as equivocal clinical jaundice. Vomiting was uncommon, which was a striking difference from series A.

SERIES E

Cases 19–37 were treated as in series C, but also had premedication with sulphathiazole. Three doses of 2·0 g. each were given at 10 PM, 2 AM and 6 AM, before hypertherm treatment at 8 AM. Cases 33 to 37 received additional chlorides (table III B) The results, as shown in table III (A and B), are similar to those in series C, but certain points are noteworthy:—

Serum bilirubin.—There was a constant rise, apart from case 28, in which hypertherm treatment lasted only 1½ hours and there was no increase. In cases 25, 34 and 35 clinical jaundice developed, while cases 20, 31 and 36 had an equivocal clinical jaundice.

Hippuric acid test.—The normal excretion figures for the intravenous test range from 0·70 to 0·95 g. benzoic acid.

TABLE II (A) SERIES C.—HÆMATOLOGICAL FINDINGS IMMEDIATELY BEFORE AND IMMEDIATELY AFTER HYPERTHERM TREATMENT

Case	Hæmatocrit		Hæmoglobin		Red cells (thousands per c.mm.)		White cells (per c.mm.)		
	Bef.	Aft.	Bef.	Aft.	Bef.	Aft.	—	Bef.	Aft.
8	46	44	110	106	5·4	5·1	P L M	2800 2400 400	8600 2800 450
9	58	52	144	132	6·5	5·7	P L M	4900 2400 300	10100 3300 300
10	47·5	43	118	105	5·7	5·2	P L M	5500 3000 250	9000 1900 300
11	44	39	108	93	5·8	5·3	P L M	3500 1300 300	9800 3000 400
12	45	44·5	117	116					
13	44	43	112	109					
14	53	41	128	105					
15	50·5	45	109	100					
16	50	46	132	120					
17	50·5	44·5	130	118					
18	46	41	128	114					

P = polymorphs
L = lymphocytes
M = monocytes

In all the eight cases examined the results suggest a considerable reduction in liver function.

Chlorides.—Of the five cases receiving abundant chlorides two (nos. 34, 35) developed clinical jaundice and one (no. 36) equivocal clinical jaundice. Of the control cases one developed doubtful clinical jaundice.

Clinical features.—Cyanosis and other features of anoxia were not abolished by continuous administration of oxygen and CO_2, but they were less prominent than in series B. One case (no. 28) did show signs of cerebral anoxia, and treatment was stopped after 1½ hours at 106·6° F.

There was no evidence of circulatory collapse, and the postural response of the BP on sitting sharply upright was maintained. Vomiting was uncommon, and never interfered with oral administration of fluid in quantities large enough to prevent dehydration.

Circulation-rate as judged by the dehydrocholic acid arm-to-tongue circulation time showed a rapid circulation at various stages during treatment. The most rapid circulation time observed was 5 seconds and the slowest 10 seconds.

Serial electrocardiographic tracings taken before and immediately after treatment provided no evidence of myocardial stress.

TABLE II (B) SERIES C.—BIOCHEMICAL FINDINGS BEFORE AND AFTER HYPERTHERM TREATMENT

Case	NON-PROTEIN NITROGEN (mg./100 c.cm.)			PLASMA CO_2 (vols. %)		PLASMA CHLORIDES (mg./100 c.cm.)			BLOOD-SUGAR (mg./100 c.cm.)		SERUM BILIRUBIN (mg./100 c.cm.)					PLASMA PROTEINS (g./100 c.cm.)		TOTAL URINARY Sodium chloride (g./24 hr.)			
	Imm. bef.	Imm. aft.	24 hr. aft.	Imm. bef.	Imm. aft.	Imm. bef.	Imm. aft.	24 hr. aft.	Imm. bef.	Imm. aft.	Imm. bef.	Imm. aft.	24 hr. aft.	72 hr. aft.	6 days aft.	Imm. bef.	Imm. aft.	Day bef.	Day of tt.	2nd day aft.	4th day aft.	6th day aft.
8	29	33	38	65	50	585	605	580	103	118	0·1	0·4	1·4	1·6	0·6	7·6	7·2	8·7	5·5	6·1	2·5	..
9	35	37	29	61	54	600	585	610	105	115	0·1	0·4	1·0	0·2	..	8·6	7·0	9·3	9·5	4·4	2·7	7·0
10	27	36	33	59	50	585	595	540	98	95	0·1	0·3	0·6	0·2	..	8·0	7·0	6·4	5·6	2·2	..	..
11	30	35	30	70	58	600	550	570	110	87	0·1	0·4	1·4	3·0	..	7·5	7·0	7·7	7·6	4·9	2·4	6·8
12	27	37	30	62	50	575	555	585	95	105	0·1	0·2	0·6	1·4	..	7·5	7·2	7·0	7·3	5·3	6·6	..
13	29	34	33	66	52	585	590	575	98	110	0·1	0·2	0·6	1·4	..	8·4	8·0	8·4	8·6	6·1	7·0	..
14	31	36	29	65	52	560	590	555	82	110	0·8	1·0	2·0	..	..	8·6	6·8	9·9	3·7	5·5	6·3	..
15	34	42	34	61	49	615	620	575	78	112	0·1	0·3	0·6	..	..	7·6	6·3	4·1	5·7	6·6	4·9	..
16	29	35	33	63	48	590	585	585	78	95	0·2	0·6	2·8	..	..	7·7	7·0	9·4	12·0	11·8	7·9	..
17	28	42	34	62	48	590	560	620	98	125	0·1	0·5	1·0	..	..	8·1	6·9	14·2	3·8	6·0	..	..
18	28	37	38	62	52	620	560	550	82	128	0·1	0·6	1·2	..	..	7·7	6·8	10·1	7·0	4·8	..	..

Premedication with 6·0 g. sulphathiazole apparently produced no changes beyond those caused by hypertherm treatment alone.

Discussion

The most prominent and constant observations were anoxia and bilirubinæmia.

ANOXIA

Cyanosis and other features of anoxia have often been noted during exposure to high temperatures, but the cause is uncertain. Hartman (1937) has shown that the arterial and venous oxygen and CO_2 content of the blood is reduced in hyperpyrexia, and recommends oxygen therapy in hypertherm treatment. On the other hand Looney and Borkovic (1942) claim that there is no reduction in the oxygen content in fever treatment, and that therefore oxygen therapy is irrational. The latter workers have noted however a significant fall in the mean CO_2 levels of both arterial and venous blood.

The present results indicate that oxygen and CO_2 therapy has the following effects: (1) improved colour; (2) slower pulse-rate; (3) improved general condition; (4) less vomiting; (5) avoidance of circulatory collapse. After continuous oxygen therapy was introduced, over 70 cases were treated without any evidence of circulatory collapse. Administration of oxygen and CO_2 for at least an hour after treatment seems important, because the circulatory collapse commonly occurs after treatment, and in the only case of collapse (no. 7) studied in detail the CO_2 content of plasma was much reduced.

Cyanosis and other features of anoxia in lesser degree persist, however, in spite of continuous oxygen therapy. In the absence of any myocardial failure this suggests either a vast increase in oxygen consumption, or the presence of a histotoxic type of anoxia due to actual cellular damage by high temperatures. These possibilities could not be explored in our investigation.

The method of administering oxygen was important. The ordinary nasal BLB mask proved unsatisfactory at first, because of non-coöperation by the patients. The importance of preliminary practice with the mask was then realised, and this was carried out on the day before treatment. The nursing staff must pay constant attention to the administration of oxygen, and encourage the patient. An oronasal mask was inconvenient because of the difficulty in giving fluids and the additional sense of claustrophobia. Another objection to the ordinary nasal BLB mask is the small capacity of the rebreathing bag. In many patients the tidal air was increased and exceeded the capacity of the bag. This difficulty was overcome by fixing a larger bag.

BILIRUBINÆMIA

This was seen in all patients except the one treated for only 1½ hours. The increased pigment appears to be of hepatic origin; there is no alteration in the stool even in the cases of clinical jaundice, and the fall in hæmoglobin and red-cell count is evidently a pure dilution, since there is rapid recovery to the pre-treatment level without the reticulocytosis that accompanies hæmolysis. In addition there is impairment of hepatic function as judged by the intravenous hippuric acid test.

Little attention seems to have been paid to jaundice following hypertherm treatment, and it has been claimed in some American hypertherm clinics (personal communication) that jaundice will never develop if sufficient chlorides are administered, because jaundice is an index of chloride deficiency. We are well aware of chloride deficiency resulting from vomiting associated with jaundice—a feature observed in case 2, but we do not know that lack of chlorides ever causes jaundice. Cases in series E proved that abundance of chlorides will not prevent it.

Series A, B and C showed that jaundice may develop any time from 24 to 96 hours after treatment, the bilirubinæmia being progressive and persistent. The cause of the liver damage was not ascertained. Continuous oxygen therapy did not prevent or lessen the bilirubinæmia; but it did not wholly prevent anoxia and the liver damage might therefore be due either to anoxia or to the direct effect of high temperatures. Its importance lies in the possible development of permanent damage, particularly in cases requiring repeated treatment (e.g., gonococcal arthritis). Pre-

TABLE III (B) SERIES E.—FINDINGS BEFORE AND AFTER HYPERTHERM TREATMENT IN CONTROLS (28–32) AND IN CASES RECEIVING ABUNDANT CHLORIDES* (33–37)

Case	Plasma chlorides (mg./100 c.cm.)			Urinary NaCl (g./24 hr.)			Serum Bilirubin (mg./100 c.cm.)			Hippuric acid test (g. excreted)	
	Imm. bef.	Imm. aft.	24hr aft.	Day bef.	Day of tt.	2nd day aft.	Imm. bef.	Imm. aft.	24hr aft.	Imm. bef.	24hr aft.
28	550	550	540	9·2	5·5	4·6	0·1	0·1	0·1	..	..
29	530	540	530	7·7	7·7	5·2	0·1	0·2	0·4	0·854	0·373
30	530	550	530	5·6	4·8	8·7	0·1	0·8	0·8	0·796	0·334
31	575	550	540	11·8	9·7	6·3	0·1	0·8	1·6	0·710	0·400
32	560	565	540	16·4	14·8	7·8	0·1	1·2	1·6	0·755	0·557
33	550	550	545	18·4	17·0	9·3	0·1	0·2	0·8	..	..
34	530	595	575	8·6	16·0	13·8	0·1	0·6	4·8	0·815	0·386
35	560	560	540	8·5	13·8	9·9	0·1	0·8	4·0	0·941	0·443
36	525	560	535	12·8	16·5	12·2	0·1	1·2	2·0	0·761	0·475
37	550	560	540	14·6	15·4	11·2	0·1	0·6	1·2	0·808	0·590

* In addition to the routine amount, the patient had one litre of normal saline intravenously (a) just before treatment, (b) just after treatment, and (c) 24 hr. after treatment.

TABLE III (A) SERIES E.—BIOCHEMICAL AND HÆMATOLOGICAL FINDINGS BEFORE AND AFTER HYPERTHERM TREATMENT

Case	Non-protein nitrogen (mg./100 c.cm.)			Sulphathiazole (mg./100 c.cm.)		Plasma chlorides (mg./100 c.cm.)			Serum bilirubin (mg./100 c.cm.)			Plasma proteins (g./100 c.cm.)		Hæmoglobin		White cells (per c.mm.)	
	Imm. bef.	Imm. aft.	24 hr. aft.	Imm. bef.	Imm. aft.	Imm. bef.	Imm. aft.	24 hr. aft.	Imm. bef.	Imm. aft.	24 hr. aft.	Imm. bef.	Imm. aft.	Imm. bef.	Imm. aft.	Imm. bef.	Imm. aft.
19	35	42	38	2·3	0·4	580	600	585	0·1	0·3	0·8	7·8	6·4	126	100	6800	11000
20	29	36	34	1·8	0·7	555	560	540	0·1	0·8	2·0	8·2	6·3	122	100	7400	13,600
21	31	40	38	1·4	0·3	575	590	580	0·1	0·3	0·6	8·3	7·3	104	86	8800	14,400
22	38	39	40	3·2	0·6	560	575	565	0·1	0·2	0·6	7·3	6·2	105	85	6200	7000
23	28	35	30	1·8	0·7	550	540	540	0·1	0·4	1·2	7·7	7·5	112	110	5200	11,400
24	27	27	28	5·5	0·9	540	575	580	0·1	0·4	0·8	8·0	7·4	85	79	9400	14,000
25	32	31	40	1·2	0·5	575	550	520	0·1	0·4	4·0	8·3	7·6	114	112	6400	11,000
26	30	27	32	1·2	0·3	540	550	560	0·1	0·4	1·8	8·4	7·7	116	110	7600	12,800
27	26	29	30	1·9	0·4	550	610	585	0·1	0·2	1·2	8·3	7·2	120	108	6800	11,600

vention was attempted in series C, D and E by allowing ood and giving additional glucose before treatment Dunlop, Davidson and McNee 1942). The failure of his measure may have been due to inadequate dosage, nd in future much larger amounts of glucose will be iven for two days before and for two days after reatment.

The effect of additional protein in preventing liver damage as recommended by Whipple (1942), was not nvestigated, but it was noteworthy that in cases 4, 7, 15 and 25 the fall in plasma protein was greater than an be explained by pure dilution, and restoration of his plasma-protein level was slower than restoration of hæmoglobin and red-cell counts. It is also interesting that the only case (no. 7) which received additional protein in the form of plasma intravenously did not show any rise in serum bilirubin in spite of severe anoxia and circulatory collapse.

The serum-bilirubin level should be estimated, and if possible an intravenous hippuric acid test should be performed before any patient has further hypertherm treatments.

CIRCULATORY COLLAPSE

The striking difference between series A and B on the one hand, and series C, D and E on the other is the absence of circulatory collapse in the latter group. The improvement appears to be attributable to continuous oxygen therapy.

There are three main possible reasons for this circulatory collapse: (i) reduction in the volume of circulating blood as in dehydration; (ii) myocardial failure; and (iii) failure of respiratory and vasomotor centres.

There has been no evidence of reduction in the volume of blood in circulation; in fact hæmodilution was often observed, probably compensating for the increase in the vascular bed through vasodilatation. Hæmoconcentration, which is a feature of circulatory collapse in dehydration (Nadal et al. 1941) and is described as a constant effect of hypertherm treatment (Neymann 1938), was not seen in the present series, since enough fluid and salt were given by mouth to prevent dehydration, weight loss, and the circulatory collapse due to dehydration.

Nor was there any evidence of myocardial failure in the cases studied. Venous pressure appears to be raised in most cases from early in treatment, but this rise is associated with the vasodilatation, and not with other features of cardiac failure. Electrocardiography reveals no evidence of myocardial damage, and the circulation time is rapid. Further, case 7 which developed circulatory collapse shows no ill effect from rapid infusion of plasma which will produce circulatory overloading in a patient with collapse due to myocardial failure.

The absence of circulatory collapse since the introduction of continuous oxygen therapy, particularly combined with CO_2 at intervals during and after treatment, suggests that the circulatory collapse previously seen was a failure of respiratory and vasomotor centres. Case 7 during circulatory collapse had a big reduction in the plasma CO_2. The improvement in this case started with the rapid infusion of plasma which caused a transient rise in the volume of circulating blood above normal and a rise in the BP. This infused plasma in a man who had not suffered acute reduction in circulating blood-volume was rapidly lost from the circulation (Sharpey-Schafer and Wallace 1942), but the clinical improvement was maintained by administration of CO_2 in addition to oxygen. Particular attention was paid to the rate and depth of breathing in these patients, and when a man breathing pure oxygen showed shallow rapid breathing then 7% CO_2 and oxygen was substituted for pure oxygen, with much improvement in respiratory function. Because of this danger of respiratory failure, sedatives were contra-indicated.

RENAL IMPAIRMENT

Most cases showed a small transient rise in non-protein nitrogen which always disappeared within three days. Urinary output was well maintained, and there were no abnormalities in the urine apart from bile pigments in cases developing jaundice. There was therefore no evidence of gross renal damage in the present series, but the report of Council on Physical Therapy (1934) records albuminuria as a complication of hyperpyrexia. More detailed studies of renal function following hypertherm treatment are required, because the kidneys are particularly sensitive to oxygen-lack (Tomb 1941). The danger of renal damage from hyperpyrexia is greatest where there is pre-existing renal impairment. Blatt et al. (1938) have shown that heat produced by electromagnetic induction slightly reduces the urea and creatinine clearances in subjects with renal disease. Similarly after a hæmorrhage of one litre of blood renal impairment is seen only in subjects with pre-existing renal disease (Wallace and Sharpey-Schafer 1941).

BLOOD CHANGES

Transient polymorph leucocytosis as a result of hyperpyrexia has been noted frequently (Simon 1936, Neymann 1938, Hargraves and Doan 1939). Its significance is uncertain. The transient hæmodilution observed probably represents an increase in blood-volume to compensate for the increase in vascular bed from vasodilatation. Such an increase has been noted by Bazett (1938) who has shown that the blood-volumes of healthy men in Philadelphia are 15 to 40% higher in summer than in winter.

DELAYED REACTIONS

The risk of permanent damage to the liver, particularly following repeated treatments at short intervals, has been emphasised. Some patients are listless or depressed for two or three days after treatment, but in the cases studied to date no permanent damage to the nervous system appears to have resulted from the anoxia or high temperatures. The risk of anoxia producing cerebral lesions has been noted especially in carbon-monoxide-poisoning (Price 1941) which occasionally causes severe amnesia and aphasia, which may not appear until several weeks after the poisoning. A clinical picture indistinguishable from hysteria and taking many months to clear up is more commonly seen in carbon-monoxide poisoning. That nervous lesions do actually result from hyperpyrexia has been noted. Stein (1936) describes bilateral pyramidal tract signs as an unusual complication of treatment by hyperthermy, while Stecher and Solomon (1936) report facial paralysis and aphasia developing after artificial fever.

INDICATIONS FOR TERMINATING TREATMENT

The treatment has considerable dangers, and it is desirable to reduce its length as far as is compatible with therapeutic results. There must be no sense of failure on the part of the nursing staff if it is found advisable to stop treatment early. The duration must be decided by the medical officer observing each case, but the following are suggested as indications for terminating treatment immediately:—

(1) Fall of systolic blood-pressure below 100 mm. Hg.
(2) Disorientation (e.g., failure to appreciate surroundings or time, or obvious failure to coöperate because of cerebral anoxia).
(3) Pulse-rate persistently over 160 per minute.
(4) Respiration-rate persistently over 50 per minute.
(5) Temperature of 107° F. for a quarter of an hour.
(6) Restlessness and violence.
(7) Coma.
(8) Pallor superimposed on cyanosis.
(9) Intolerance on part of patient. The restlessness of an intolerant patient adds greatly to the risks inherent in the treatment.
(10) Persistent vomiting.

Catarrhal infection and nasal obstruction should be regarded as contra-indications to treatment.

BEFORE AND AFTER HYPERTHERMY

Hypertherm treatment must be considered comparable to a surgical operation, and there should be careful preparation and after-care. The following measures are recommended:—

Before treatment.

(1) A thorough routine clinical examination by a medical specialist to exclude patients with cardiovascular, respiratory, renal or hepatic disease.
(2) The treatment should be carefully explained by the medical officer beforehand to prepare the patient for his physical and mental ordeal.

(3) Obviously unsound psychological types should be avoided. If such a person does accept treatment and becomes difficult, treatment should be immediately ended.
(4) Patients should have a liberal diet with large amounts of carbohydrate and possibly protein.
(5) Patients should practise using a BLB mask.

After treatment.

(1) The use of oxygen and CO_2 for at least an hour after treatment or until colour improves.
(2) Patients should be treated as cases of acute hepatitis, and kept warm in bed for at least three days or until jaundice has cleared.
(3) If a subsequent hypertherm session is considered, the liver function should be investigated.

Summary

1. Clinical observations are available in 254 cases undergoing hypertherm treatment at 106·6° F. for 8 hours. Of these, 37 were the subject of a detailed clinical, hæmatological and biochemical investigation.

2. The most constant and prominent features were the development of anoxia and of bilirubinæmia progressing to definite clinical jaundice in 37 cases. Hippuric acid tests for liver function showed a considerable reduction in this function.

3. Continuous oxygen and carbon-dioxide therapy lessens, though it does not abolish, the anoxia. It appears to prevent circulatory collapse. Vomiting was less frequent after its introduction.

4. Circulatory collapse is a failure of the vasomotor and respiratory centres, and is not due to a reduction in the volume of the circulating blood, or to myocardial failure. The use of morphine is contra-indicated.

5. Hypertherm treatment causes a transient polymorph leucocytosis, and a transient hæmodilution. There is a small transient rise in non-protein nitrogen, and a tendency for plasma chlorides and urinary chlorides to fall.

6. Indications for terminating treatment are proposed and recommendations are made for the care of the patient before and after hypertherm treatment.

7. Premedication with 6 grammes of sulphathiazole does not increase the hazards of hypertherm treatment.

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NEUROLOGICAL COMPLICATIONS OF SERUM AND VACCINE THERAPY

R. R. HUGHES, M D LPOOL, M R C P
MAJOR RAMC, MEDICAL SPECIALIST

ABNORMAL neurological findings after serum and vaccine therapy are well recognised, yet they are hardly mentioned in most of the standard English textbooks and little has been published about them here. With increased use of sera and vaccines during the war such conditions have become much commoner.

Complications were first noted about 50 years ago; for a time the cause was uncertain but the relationship with serum treatment was finally recognised by Thaon in 1910. Since then, many cases have been reported, at first in France, more recently in America and other countries, commonly under the title of "serum neuritis." The literature has been reviewed by several authors, among them Kennedy (1929), Allen (1931) who analysed the 42 cases recorded up to that date, Roger and Poursines (1932), Young (1932), Doyle (1933), Vogel (1935), and Bennett (1939). Bennett stated that of about 115 cases 70 had been described in French journals, 29 in English, and 10 in German. Under present conditions I have been able to find only 3 examples reported in this country.

Dyke (1918) records the case of a gunner who developed paralysis and wasting of the deltoid, supraspinatus and infraspinatus muscles after injections of antitetanic serum; the reaction of degeneration was present.

Allen (1931) records the case of a man who after antiscarlatinal serum developed first an urticarial rash, fever and pains in the limbs, and then wasting of the deltoid, supraspinatus and infraspinatus muscles, winging of the right scapula and sensory loss over the right deltoid area.

Richardson (1942) describes 9 cases of serratus magnus palsy seen in soldiers in the United Kingdom; one of these was given antitetanic serum into the right upper arm and 6 days later developed, first, a generalised urticaria lasting 2 days, and then right deltoid, supraspinatus and infraspinatus weakness with winging of the left scapula and a left serratus magnus weakness.

Spillane (1943) described a series of 46 cases of upper brachial plexus neuritis in the MEF with clinical features resembling serum neuritis. Cases obviously associated with injections into the upper arm had been excluded.

CLINICAL FEATURES

Allen (1931) classes cases of serum neuritis into four groups.

1. *Radicular type.*—About half the cases fall into this group; 5–10 days after the injection of serum an attack of serum sickness occurs and severe pains across one or both shoulders develop a few days later, followed by weakness, and in time wasting, of the muscles of one or both arms. The muscles most often affected are the deltoid, spinati, serratus magnus, biceps brachialis group and triceps; the trapezius, rhomboids, pectoralis major, supinators and extensors of the wrist are less often involved. Sensory changes are slight or absent.

2. *Neuritic type.*—The attack of serum sickness is followed by pains in the distribution of the affected peripheral nerve, paralysis developing suddenly about 24–48 hours later. The musculospiral nerve is most commonly affected.

3. *Polyneuritic type.*—Serum sickness is followed by an attack of acute generalised peripheral neuritis.

4. *Central type.*—The serum reaction is followed by evidence of cerebral involvement, usually papilloedema accompanied in some cases by a meningeal reaction or focal cerebral lesion.

While neuritis can be caused by a variety of sera, it is most commonly precipitated by tetanus antitoxin. Young (1932) states that of 50 cases, 21 followed administration of antitetanic serum, 12 antipneumococcal serum, 5 antimeningococcal serum, 4 antiscarlatinal serum, 4 antidiphtheritic serum, 2 TAB vaccine, 1 *Staphylococcus aureus* vaccine and 1 antituberculous serum.

Since Allen's paper appeared further manifestations of serum neuritis have been reported.

French (1938) observed a case where following scarlet-fever antitoxin the patient developed paresis of the muscles

of both shoulders and paralysis of the right recurrent laryngeal and left phrenic nerves. Cutter (1936) refers to a schoolboy who developed bilateral nerve deafness after injection of 26,500 units of tetanus antitoxin. Young (1932) describes a case of serum neuritis with right nerve deafness, possibly due to serum disease. He also records 5 cases of meningococcal meningitis in which a serum reaction was followed by convulsions, meningeal irritation, coma and irregular pulse and respirations. Wilkinson (1937) reports the first case of neuritis to follow injection of alum-precipitated toxoid.

CASE-HISTORIES

The following 3 cases of serum neuritis were seen at military hospitals in England within a year.

CASE 1.—A lance-sergeant, aged 31. On April 27, 1943, while on active service in North Africa, he sustained a small superficial wound in the region of the left patella. Next day 3000 units of tetanus antitoxin was injected into the muscles behind the left knee-joint. On May 6 he had a temperature of 99° F., his left leg swelled and an irritable rash appeared extending from the left knee to the ankle region; this was treated with calamine lotion and subsided in a few days. About 2 days later severe aching pains began across both shoulders, he was unable to raise his arms and was forced to bend his head down to shave; after a fortnight the pain in the right shoulder subsided, but that on the left persisted for nearly 3 months. With the onset of pain, weakness of the shoulder muscles was also noticed; it progressed for 14 days and began to improve as the muscle pains subsided; but by the time he arrived in England on Aug. 1 improvement was considerable, and by December, 1943, his right arm had completely recovered though some weakness persisted on the left side.

On Dec. 14 the left deltoid muscle was grossly wasted and completely paralysed; there was considerable weakness of the right serratus magnus with winging of the right scapula; slight winging of the left scapula and slight wasting of the supraspinatus and infraspinatus muscles on both sides. An ill-defined area of analgesia was present over the lower part of the left deltoid muscle. No other abnormalities.

Electrical reactions: all muscles of the shoulder-girdle were normal except the left deltoid, which showed reaction of degeneration (RD) in the anterior and middle fibres and partial RD in the posterior fibres and also the right serratus magnus which showed slightly reduced faradic response. Movements of the diaphragm were found to be normal on screening; blood Wassermann reaction negative. Feb. 4, 1944; condition unchanged.

This history is typical of the "radicular" type of neuritis described by Allen; the patient developed an urticarial rash 8 days after an injection of tetanus antitoxin, followed 2 days later by pains in the shoulders and paralysis of muscles supplied by the 5th and 6th cervical roots. The rash was confined to the limb into which the serum was injected; a similarly localised rash was described by Kennedy (1929).

CASE 2.—Second-lieutenant, aged 22. On May 30, 1943, he fell from his motor-bicycle, sustaining a very dirty cut on the left index finger; he was given 3000 units of tetanus antitoxin and the wound was dressed. On June 4 he felt rather unwell and had generalised aching pains in the joints; next day he noticed swelling and tenderness of both submaxillary and mastoid lymph-glands, and about the same time developed severe aching pains across the shoulders and neck which radiated down both arms to the wrists. After 24 hours the pain gradually improved and it continued to do so for 2 weeks or more. On the 7th–8th day after the accident he developed an urticarial rash which lasted for 48 hours. As the muscle pains improved, about 3 weeks after the accident, he noticed weakness and wasting of the muscles of both shoulders.

On Sept. 17, 1943, there were gross wasting and weakness of the spinati on the left side and to a much less extent on the right; the upper part of the trapezius was severely affected on the left side but probably unaffected on the right; the right serratus magnus was totally paralysed, the left one had good power although it was probably a little subnormal; both levatores anguli scapuli were very weak; there was ¾ in. wasting of the left upper arm. The tendon jerks were sluggish in both arms, particularly the left triceps jerk which was only just present. A small area of impairment to pin-prick was present along the outer border of the right forearm. No other abnormality.

Electrical reactions: the left supraspinatus did not respond to faradism, the right supraspinatus and the infraspinatus on both sides responded only weakly to faradism; the electrical reactions were otherwise normal. Movements of the diaphragm, normal on screening; X-ray examination of the cervical spine, no abnormality.

On Jan. 3, 1944: considerable recovery of the right serratus magnus; condition otherwise unchanged.

This again is a typical history of neuritis of the radicular type. The patient developed an urticarial rash 7 or 8 days after an injection of tetanus antitoxin. Here however the neuralgic pain and paralysis began a day or two before the onset of the rash. In these two patients considerable residual paralysis remained 9 months and 7 months after the original injection. Increased protein and cells in the cerebrospinal fluid have been described in cases of serum neuritis; these two patients were seen so long after the acute phase had ceased that lumbar puncture was not considered worth while.

CASE 3.—Private, aged 38. From Dec. 5, 1942, he had a series of injections of tetanus toxoid and TAB vaccine, ending with an intramuscular injection of 1 c.cm. of tetanus toxoid on Jan. 12, 1943. He had no urticarial rash or other evidence of serum sickness. On the evening of Jan. 22 his speech was rather thick and the left side of his face weak. Next morning his left arm was stiff, powerless and numb, and by Jan. 25 he was also having difficulty in using his left leg. On examination in hospital on Jan. 26 he was euphoric, rather emotional and easily moved to tears. His speech was thick, slurring and slightly nasal, there were irregular nystagmoid movements of the eyes on looking to right and left and a well-marked left hemiparesis with exaggerated tendon jerks, diminished skin reflexes and a doubtful left extensor toe. Coördination was normal in the right arm and leg and sensation was normal. No other abnormality was found in his nervous system. Lungs, cardiovascular system and abdomen were all clinically normal. Skull X-ray and CSF, normal. Wassermann reaction, blood and CSF, negative. His condition gradually improved and when discharged from hospital a month later he could walk without assistance though there was still a slight hemiparesis and speech was still impaired. Replying to an inquiry in April, 1944, he stated that he still had difficulty with speech and weakness of the left arm and leg although he was now working at a civilian job.

When I first saw this case I was not aware that neurological lesions of this type could result from vaccine injection and thought the patient had had a first, rather atypical, attack of disseminated sclerosis (though I could not then entirely exclude the possibility of a vascular lesion or tumour). On reconsideration, however, serum neuritis of the central type seems a more likely explanation of his condition, and in view of the time relationship more probably the result of tetanus toxoid rather than of TAB vaccine. Before his present illness the patient had been quite well except for occasional attacks of dizziness lasting up to 15 minutes—probably not of neurological significance.

On referring to the records of all cases of peripheral neuritis admitted to the hospital during the past two years, 3 further cases of serum neuritis were discovered.

CASE 4.—Driver, aged 35. On Oct. 8, 1943, he developed acute gonococcal urethritis. Admitted to hospital on Oct. 12 and during the next 3 days was given 15 grammes of sulphathiazole. On Oct. 17 he had an intravenous injection of TAB vaccine, 30 millions; during the next 24 hours his temperature rose to 103° F. but he had no joint swellings, skin rash or other evidence of serum sickness. He returned to duty on Oct. 23. He was quite well until the morning of Oct. 27 when he awakened with weakness of the right wrist. On examination he was found to have wrist-drop due to a right musculospiral palsy, complete except for triceps and supinator longus. No other abnormality was found in his nervous system and he was otherwise quite well except for slight chronic bronchitis. The condition gradually improved and recovery was complete after 10 weeks.

This cannot be regarded as an unequivocal case of serum neuritis. Occasionally one sees neuritis develop during administration of one of the sulphonamide group of drugs; I have seen wrist-drop during administration of 'Uleron' but this has always been bilateral, and I have never come across any such complication of

treatment with sulphathiazole. Also, this complication would be more likely when much larger doses were being used and during administration of the drug, not 12 days after it ceased. Garvey, Jones and Warren (1940) reported 6 cases of peripheral neuritis developing 10–16 days after pyrexial therapy induced by mechanical means, but the syndrome they describe bears no resemblance to that of the above case. Again, a musculospiral palsy present on rising in the morning is not uncommon from local pressure, but it usually follows a drinking bout on the previous day. There is no alcoholic history in this case, and I feel that in view of the onset of the paralysis 10 days after an injection of TAB vaccine it can be regarded as a probable case of serum neuritis.

CASE 5.—A private, aged 26, was given intramuscular injections of TAB vaccine, 0·5 c.cm. and tetanus toxoid 1 c.cm. on Jan. 16, and TAB vaccine 1 c.cm. on Jan. 31, 1942. There was no urticarial rash or other manifestation of serum sickness. A fortnight after the second injection he developed neuralgic pains in the region of both deltoids and weakness of the muscles of the left shoulder. On admission to hospital on March 31 he had weakness and wasting of the left deltoid and infraspinatus; abduction was lost and external rotation at the shoulder was very weak. There was some tenderness on pressure over the insertion of the deltoid and analgesia over the cutaneous distribution of the left circumflex nerve. Trapezius, serratus magnus, biceps and triceps were all normal. No other abnormality was found in his nervous system. On July 13 power in the affected muscles had increased and the sensory disturbance had disappeared. His unit medical officer reported that on March 9, 1944, he was still complaining of pain in the left shoulder and weakness and wasting of the left deltoid was still present. It is of interest that this patient was given a further injection of TAB vaccine and tetanus toxoid on Feb. 18, 1944, without any untoward reaction.

This again is an example of neuritis of the radicular type and may have been due to either the tetanus toxoid or the TAB vaccine; in view of the time of onset the latter seems the more probable. A similar case where neuritis followed the second dose of vaccine during antityphoid inoculation has been described by Kennedy (1929).

CASE 6.—A sapper, aged 27, on Aug. 1, 1942, was given an intramuscular injection of 0·5 c.cm. of TAB vaccine and 1 c.cm. of tetanus toxoid. There was no urticarial rash or other evidence of serum reaction. On Aug. 3 he had an operation for left inguinal hernia under ether anæsthesia. About Aug. 11 he developed severe aching pains in the right shoulder which radiated down the arm to the fingertips; 3 days later his muscles became so weak that he was unable to raise his right arm. In January, 1943, he had winging of the right scapula and was unable to raise the arm above shoulder level; he also had weakness and wasting of the right deltoid, trapezius and infraspinatus. There was hysterical impairment to pinprick over the right arm and the right side of the face and trunk down to the level of the 10th dorsal segment and also over the whole of the right foot up to the ankle level. Last March the patient wrote that he still had a good deal of pain in the shoulder; the arm was weak and he was still unable to raise it above the shoulder.

This is another example of serum neuritis of the radicular type, with extensive hysterical sensory disturbance. Though an operation and administration of an anæsthetic a few days after inoculation complicate the picture, there is no reason to suppose that either was the cause of his neurological condition. Humphrey and McClelland (1944) have described neuritis following the use of 'Trilene' as an anæsthetic, but the clinical picture is quite different from the above case. There is no record that trilene was used here, and so far as I am aware no such complication of ether anæsthesia has been reported.

Young (1932) says that paralyses following TAB vaccine injection are generally unaccompanied by serum disease, are relatively gradual in onset, and "do not necessarily show a predilection for the upper extremities." It is not uncommon to meet with cases of peripheral neuritis among soldiers beginning 3 or 4 weeks after a tetanus toxoid or TAB inoculation. Whether the vaccine has precipitated the onset of neuritis or whether the association is purely accidental is as yet undecided.

PATHOGENESIS

It has been suggested that neuritis in these cases may result from a direct toxic action of serum or vaccine on the nervous tissue; also (in the radicular type) that muscular wasting is secondary to arthritis of the shoulder-joint. Most workers, however, agree that it is due to allergic œdema of the central nervous system or of a peripheral nerve in some part of its course (Kennedy 1929, Young 1932, Kraus and Chaney 1937, Allen 1931). Reports of neurological upset following allergic manifestations (other than serum sickness) are not unusual.

Kennedy (1926, 1936) reported 5 such cases with symptoms such as convulsions, hemiplegia, optic neuritis, and signs of cerebellar disturbance. Clarke (1939) observed 3 cases of epilepsy of allergic origin, and Vaughan and Hawke (1930–31) described the case of a medical student who developed bilateral ulnar palsy, meningismus and other neurological syndromes at various times. In this country Mackay (1932) and Campbell and Allison (1932) have reported neuritis following recurrent attacks of urticaria. Winkelman and Moore (1941) in a brief survey have pointed out that migraine, epilepsy, cerebral hemiplegias and monoplegias, neuritis and Menière's syndrome have all occasionally proved to be allergic. Many different allergens have been implicated, including milk, eggs, tomatoes and even bee venom (Ross 1938–39).

Selective involvement of the nerves arising from the 5th and 6th cervical roots following allergic upset other than serum sickness must be very rare.

Zeckel (1939) states that after an injection of 10 c.cm. of sterile milk into the right buttock a man aged 21 developed slight fever, followed by pains in the right shoulder and later by wasting of the deltoid, spinati and serratus magnus on the right side. I have come across no other published case.

When one considers that the Erb-Duchenne syndrome, either complete or incomplete, develops in about half the cases of serum neuritis, it seems probable that there must be some factor besides the allergic one, which determines that the lesion should commonly be in the cervical cord or the nerves derived from it. Serum sickness does not invariably precede the onset of serum neuritis: it occurred in only 2 of the 6 cases here recorded, and Young (1932) says it was absent in about a quarter of the 50 cases he reviewed.

During recent years several types of peripheral neuritis have been noted among civilians, and also among military personnel both at home and abroad, the ætiology of which is obscure. These have been attributed to a virus infection, but whether such infections can primarily involve the peripheral nerves to produce lesions of this nature is still uncertain.

Cases of acute generalised peripheral neuritis of the type now thought to be of virus origin have been recorded since the beginning of the century.

Guillain, Barre and Strohl (1916) reported 2 cases and described the syndrome as characterised by motor disturbance, loss of tendon jerks with preservation of the cutaneous reflexes, paræsthesias with slight disturbance of objective sensibility, tenderness on pressure of the muscles, little change in the electrical reactions of the nerves or muscles and rise of albumin in the CSF with no increase of cells. Gordon Holmes (1917) reported 12 cases, and Bradford, Bashford and Wilson (1918) recorded a further series, though this group differed in some ways from those previously noted. Since the last war cases have been recorded in all parts of the world, and the condition is now often referred to as the Guillain-Barre syndrome. Gilpin, Moersch and Kernohan (1936), Guillain (1936), Barber (1940) and many others have suggested that it may be due to a virus infection.

The only series in which the presence of a virus may have been demonstrated was that of Bradford, Bashford and Wilson (1918) who managed to convey the infection to monkeys by inoculation with an emulsion of spinal cord; this work has apparently never been confirmed.

A second type of neuritis often seen at military neurological clinics involves a single peripheral nerve. The lesion, either complete or incomplete, develops in a few hours; for example, a man on parade may become unable to hold his rifle because of wrist-drop. In some it has been present on rising in the morning and in others it has developed while they were in bed with "influenza." Various peripheral nerves may be involved, but most

ommonly, though, the musculospiral and external opliteal.

Lately a good deal of attention has been given to neuritis of nerves supplying the muscles of the shoulder-girdle. This is clinically indistinguishable from the radicular variety of neuritis following serum injection; the patient develops aching pains in the shoulder and a few days later paresis or paralysis of shoulder muscles is noted. Recovery may be rapid, but the condition often persists with gross wasting of the affected muscles. Cases have been reported by Wyburn-Mason (1941), Richardson (1942), Burnard and Fox (1942) and Spillane (1943). A recent military publication (*Notes on Nervous Diseases and Head Injuries in Middle East*, 1943) suggests that this condition is due to infection with a neurotropic virus.

The similarity between the radicular, neuritic and polyneuritic forms of serum neuritis and the above types of "virus" neuritis is striking, and I suggest that for the time being these two types of neuritis should be regarded as being of the same group. It seems possible that "serum" and "virus" neuritis will prove to have the same cause. Virus infection is by far the most plausible explanation of them yet advanced. Often the neuritis begins a few days after a mild febrile attack. Again it may develop in a patient recovering from another infection; the body may well be more susceptible at such a time and also after a vaccine or serum injection. Warren, Carpenter and Boak (1940) reported that after pyrexial therapy by physical methods 190 patients (46% of those treated) developed herpes febrilis, and Garvey, Jones and Warren (1940) have recorded 6 cases in which generalised peripheral neuritis developed 10–16 days after artificial fever.

If serum neuritis is of virus origin it may perhaps be conveyed by the needle or syringe used for immunisation. The number of cases makes it urgently necessary to inquire further into the cause.

SUMMARY

Six cases are reported in which neurological complications followed serum or vaccine therapy in military patients.

Serum neuritis resembles those forms of peripheral neuritis in which at present a virus cause is suspected. Further investigation of the ætiology of these conditions is urgently required.

I wish to thank Colonel W. H. O'Riordan for permission to publish cases 4, 5 and 6, and Major S. Nevin and Major G. S. Hall (Command neurologists) for permission to publish the other cases.

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CLOTTED HÆMOTHORAX

R. W. LUSH
B M OXFD
CAPTAIN RAMC

J. C. NICHOLSON
M B MANC., D A
CAPTAIN RAMC

C. R. STEVENSON
M B NZ
MAJOR RAMC

W. F. NICHOLSON
M CHIR, M D CAMB., F R C S
MAJOR RAMC

From a Chest Team, CMF

IN a review of penetrating chest wounds from the Middle East, Nicholson and Scadding [1] reported clotting in 6% of their hæmothorax cases. Further experience has shown that the condition is commoner. Of 426 hæmothoraces seen in the last 18 months, 44 (10%) were clotted, confirmed at operation. Even this must represent rather less than the true incidence of the condition, as it is usual to leave small clots to absorb spontaneously. The apparent increase in recent months is almost certainly due to improved diagnosis.

PATHOGENESIS

There is no evidence that infection favours clotting. Half the clots were infected and half sterile. There are two distinct types. In the commoner, a fibrinohæmothorax, the pleural cavity is divided into many loculi by webs of fibrin which enclose the fluid blood. Each loculus may contain only a little blood; so such a collection can never be aspirated completely. Moreover, some loculi may be infected, others remaining sterile for a long time. The fibrin clot is relatively acellular; microscopical section shows homogenous fibrin. In the rarer type the pleural cavity is filled with blood clot similar in all respects to a hæmatoma in other parts of the body; sometimes there is an anterior loculus of serum, which has separated from the hæmatoma and formed a serous clot. In both types infection alters the appearances, loculi of pus being present in the former and liquefaction of areas occurring in the hæmatoma.

DIAGNOSIS

Physical signs are similar to those of fluid; this is usual in the fibrinohæmothorax. In the hæmatoma, however, consolidation is often suggested, since the clot conducts sounds from the underlying lung very well. But in the clotted hæmothorax the signs of consolidation remain remarkably constant; there is not the recession in the affected area that would be expected in consolidation due to a pulmonary hæmatoma; nor, as a rule, is there any sputum. Provided the condition is remembered, there is little difficulty in its recognition.

The final diagnosis depends on a difficult or failed aspiration, repeated in several spaces. With clinical signs of a hæmothorax, but aspiration yielding little or nothing, a clotted hæmothorax can be diagnosed. In the fibrinohæmothorax aspiration is usually possible at first, but smaller amounts of fluid are withdrawn each time till only a few cubic centimetres are obtained when 500 c.cm. or more would be expected. By using a syringe in preference to a Potain's aspirator for these difficult cases, the end of the needle can be freed from fibrin by returning a little of the fluid into the chest each time the flow stops, thus displacing the ball-valve of fibrin which keeps blocking the needle. In this way aspiration may sometimes continue successfully, but usually subsequent X-ray examination shows that many loculi remain untapped. The character of the fluid is often an indication of the state of the pleural cavity; it may contain small clots fine enough to come through a wide-bore needle. In the hæmatoma, aspiration is often entirely unsuccessful, and any fluid obtained is likely to be pale yellow serum, which suggests that the bulk of the hæmothorax has clotted. The needle can sometimes be felt to impinge on a solid which is the clot.

In the fibrinohæmothorax the radiographic appearances are diagnostic. There are multiple fluid loculi, though some of the "levels" are corrugated, owing to fibrin floating on the surface of the blood. In the hæmatoma, radiography shows a dense opacity, extending up towards the axilla; there may be areas of translucency with air and fluid encysted within the main opacity.

1. Nicholson, W. F. and Scadding, J. G. *Lancet*, 1944, i, 299.

Figs. 1 and 2 show a multilocular fibrinohæmothorax, 2 months after injury. This patient became increasingly difficult to aspirate and continued to have low-grade fever. There was no infection. He improved rapidly after the clot was evacuated. Fig. 3 shows a clotted hæmothorax 3 weeks after injury; here aspiration was unsuccessful. Fig. 4 shows the same case 3 weeks after evacuation of the clot and decortication.

INDICATIONS FOR OPERATION

An intrapleural clot may be absorbed spontaneously, and in the absence of long-continued fever it has been our practice to leave small basal clots. Massive clots, on the contrary, are absorbed only slowly, a process which leaves considerable pleural thickening; there are exceptional cases in which there is little restriction of movement or radiological evidence of thickened pleura 6 months later, but with conservative treatment so many have a protracted convalescence and final disability that there is a strong case for early removal of all massive clots. This is strengthened by the fact that half of them are infected, such infection often being loculated. Too often with conservative treatment the patient is mildly febrile, only to form a total empyema in 4–6 weeks, by which time the chest is already "frozen" with thickened pleura and a chronic empyema results.

Without operation a few cases will certainly settle, but they require long treatment. If by operation the lung can expand more rapidly and the risk of infection can be reduced, then the saving in hospital treatment will be considerable. Evacuation of the clot will remove an excellent culture medium; if a chemotherapeutic agent such as penicillin is substituted for it, the risk of infection is still further reduced. Our early cases in which the hæmatoma was evacuated were disappointing in that the lung was still slow to expand; in later cases we have combined decortication with evacuation of the clot with gratifying results.

Good reasons for operation are:—

1. *A large clot.* X rays showing involvement of more than a third of a hemithorax with no clearing on serial radiography.
2. *Persistent fever*, often 99–100°. The patient feels well, but the fever does not settle after 2–3 weeks' conservative treatment. This usually indicates a low-grade infection.
3. *Marked loculation* in a fibrinohæmothorax, where aspiration is unsuccessful.
4. *Clot with a retained foreign body*, a frequent source of infection. The foreign body, if intrapulmonary, does not demand surgery unless it is large (1 × 2 cm. or over); but smaller intrapleural foreign bodies should be removed since this type causes most infection.

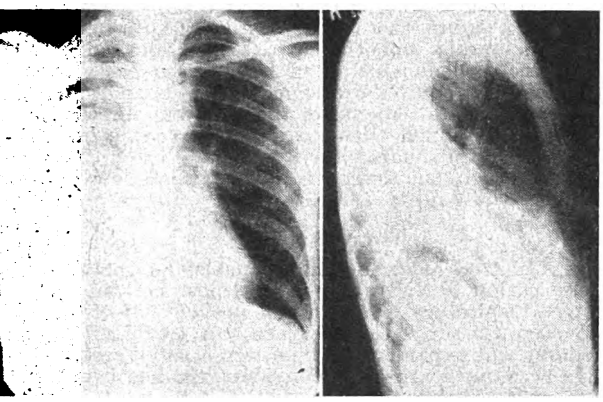
OPERATION

If the upper lobe is expanded it is advisable to wait 2–3 weeks till adhesions are strong enough to prevent it collapsing. At first we always waited 3 weeks, but we have found adhesions quite strong after a fortnight. If

TABLE I—EVACUATION OF CLOT WITHOUT DECORTICATION

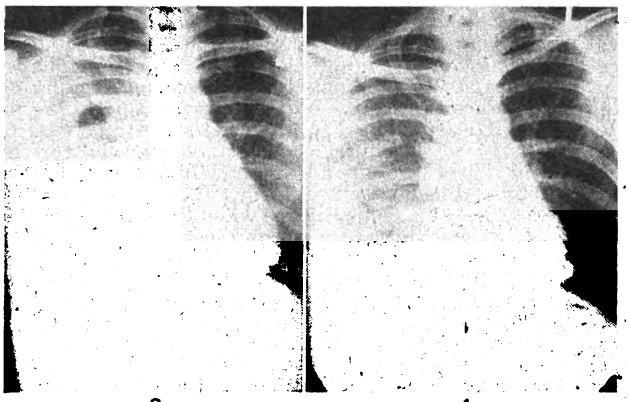
Case	Wounded	Aspirations (large or small)	FB	Infection	Clot	Time since wounding	Operation	Penicillin	Empyema	Drainage	Result
1	Oct. 24, 42	1 l. 5 s.	Yes	Nil	Large	8 wks.	E & D (rib-resect.)	No	Yes	12 wks.	Fever settled after op.
2	May 9, 43	2 l. 3 s.	Nil	*B. coli* and *Staph. aureus*	Large	4 wks.	Ditto	No	Yes	12 wks. +	Unknown.
3	Apr. 6, 43	2 s.	Nil	Friedlander	Large	3 wks.	Ditto	No	Yes	16 wks. +	Slow conval.
4	Apr. 7, 43	2 s. 4 nil.	Nil	Friedlander	Large	3 wks.	Ditto	No	Yes	6 wks.	Good movement.
5	Mar. 17, 43	1 l. 3 s.	Yes	*Staph. aureus*	Basal	8 wks.	Ditto	No	Yes	8 wks. +	Unknown.
6	Apr. 6, 43	7 nil	Yes	Nil	Large	3 wks.	Ditto	No	Yes	6 wks.	Good movement.
7	May 13, 43	2 l. 5 s.	Nil	*Staph. aureus* and *B. subtilis*	Basal	6 wks.	Ditto	No	Yes	8 wks. +	Small empyema when evacuated.
8	Apr. 3, 43	2 l. 2 s.	Nil	*Staph. aureus* and fusiform	Basal	4 wks.	Ditto	No	Yes	26 wks.	Slow conval.
9	July 10, 43	2 l. 3 s.	Nil	*Staph. aureus, Strep. hæm.*	Large	3 wks.	E & ID	No	? No	10 days	Unknown.
10	Aug. 7, 43	1 l. 5 s.	Nil	Nil	Basal	2 wks.	Ditto	No	Yes	2 wks. +	Ditto
11	July 27, 43	3 s. 2 nil.	Yes	*Strep. hæm.*	Basal	4 wks.	Ditto	No	No	5 days	Good.
12	Aug. 9, 43	1 l. 1 s.	Yes	*Staph. aureus*	Basal	2 wks.	Evac., no D.	No	No	..	Small basal clot with FB.
13	July 29, 43	1 l. 3 s.	Nil	*Strep. hæm.*	Basal	3 wks.	E & ID	No	Yes	2 wks +	Subs. rib-resect.
14	Sept. 16, 43	5 l. 3 s.	Yes	Pneumococci, *Staph. aureus*	Large	4 wks.	Ditto	No	Yes	5 wks.	Subs. rib-resect. died septicæmia.
15	Sept. 2, 43	5 l. 1 s.	Yes	Nil	Large	3 wks.	E & ID partial decortication to find FB	No	Yes	6 wks. +	Subs. rib-resect.
16	Oct. 5, 43	2 l. 4 s.	Yes	*Staph. aureus*	Basal	3 wks.	E. no D.	No	No	..	Well in 12 wks.
17	Oct. 3, 43	5 l. 1 s.	Nil	Nil	Basal	3 wks.	E. & ID	No	No	2 days	Conval. 2 wks.
18	Nov. 14, 43	1 l. 2 s.	Yes	Nil	Large	6 days	Ditto	Yes	No	5 days	Good movement 4 wks.
19	Jan. 19, 44	1 l. 2 nil	Nil	Nil	Large	2 wks.	Ditto	Yes	No	5 days	*Strep. viridans* infection. Aspiration, penicillin. No empyema in 4 wks.
20	Dec. 12, 43	4 s.	Yes	*Strep. hæm.*	Basal	3 wks.	E. & ID	No	Yes	6 wks. +	Rib-resect.
21	Jan. 31, 44	2 s.	Nil	Ditto	Basal	2 wks.	Ditto	Yes	No	3 days	Good movement 4 wks.
22	Feb. 18, 44	1 s.	Yes	*B. coli*	Basal	2 wks.	Ditto	Yes	No	3 days	Good movement 2 wks.
23	Jan. 23, 44	1 l. 1 s.	Nil	Nil	Basal	2 wks.	Ditto	Yes	No	3 days	Residual effusion. No empyema 6 wks.
24	Jan. 23, 44	3 s.	Nil	Nil	Basal	10 days	Ditto	Yes	No	4 days	Good movement 3 wks.

FB = foreign body. E = evacuation. D = drainage. ID = intercostal drainage.



1 2

Figs. 1 and 2.—Multilocular fibrinohæmothorax 2 months after injury.



3 4

Fig. 3.—Clotted hæmothorax 3 weeks after injury.
Fig. 4.—Same case 3 weeks after evacuation of clot and decortication.

the whole lung is collapsed, there is no reason to delay operation once the clot has been diagnosed. In our earlier cases we were content to evacuate the clot and pick all the loose fibrin from the surface of the lung. The lung was then inflated, but rarely expanded appreciably. These operations were never done before the 3rd week and there was then a thick layer of fibrin over the lung. This was mistaken for thickened pleura and no attempt was made to remove it, for fear of all the recorded complications of decortication. Once, however, in a hunt for a foreign body, this fibrin barrier was incised, and with some surprise we found beneath it a normal shiny visceral pleura. This led to a successful attempt to peel off the fibrin layer, and the subsequent expansion of the lobe on inflation was most pleasing.

This operation, which is termed a decortication, is simply a stripping of the fibrin layer deposited on the visceral pleura. This layer is often sufficiently thick after 2 weeks to prevent expansion of the lung with positive pressure; after it is removed the lung is easily inflated. When the fibrin layer is stripped from the lung there is oozing from the visceral pleura, but this has always stopped as soon as the lung is expanded. Oozing is more troublesome, however, when the fibrin is stripped from the parietes, particularly from the diaphragm; usually, therefore, little effort is made to remove the parietal fibrin except to free the diaphragm in the costophrenic recess. The essential step is to free the lung and to get it expanded; then, when adhesions form, as they certainly will, the lung is no longer bound down by adhesions under an organising hæmothorax, but fully expanded.

It is essential to have positive-pressure anæsthesia available, and desirable that the pressure should be recorded manometrically. We have used a pneumothorax manometer connected to the anæsthetic apparatus. Cyclopropane, with 'Pentothal' induction, has been the anæsthetic employed. In many chests a long intercostal incision along the 6th interspace gives ample access; in more rigid chests the resection of an inch of the 6th rib at the angle improves the exposure, but in most cases rib-resection is unnecessary. On opening the thorax the clot or loculated fibrinohæmothorax is disclosed, and the first

TABLE II—CLOTTED HÆMOTHORAX TREATED BY EVACUATION AND DECORTICATION WITH INTERCOSTAL DRAINAGE

Case	Wounded	Aspirations (large or small)	FB	Infection	Clot	Time since wounding	Penicillin at op.	Empyema	Drainage	Result
25	Feb. 20, 44	4 s.	Nil	Gram.-pos. bac.	Basal	2 wks.	Yes	No	3 days	Clear in 3 wks.
26	Jan. 21, 44	1 s.	Nil	*Staph. aureus*	Large	3 wks.	Yes	No	3 days	Ditto
27	Feb. 23, 44	3 l. 2 nil	Yes	Nil	Basal	2 wks.	Yes	No	5 days	Nearly clear in 3 wk
28	Feb. 3, 44	2 l. 1 nil	Yes	*B. coli*	Large	3 wks.	Yes	No	8 days	Small effusion clearing in 3 wks.
29	Feb. 7, 44	1 l. 1 nil	Nil	*Staph. aureus*	Large	2 wks.	Yes	No	5 days	Clear in 3 wks.
30	Feb. 16, 44	1 s. 2 nil	Yes	*Strep. hæm.*	Large	2 wks.	Yes	No	3 days	Ditto
31	Feb. 18, 44	2 nil	Nil	Nil	Basal	3 wks.	Yes	No	5 days	Ditto
32	Feb. 20, 44	1 s.	Nil	Gram-pos. bac.	Basal	3 wks.	Yes	No	5 days	Clear in 2 wks.
33	Dec. 30, 43	1 l. 3 s.	Yes	Nil	Basal	5 wks.	Yes	No	5 days	Nearly clear in 3 wks.
34	Jan. 9, 44	1 l. 1 s.	Yes	Nil	Basal	3 wks.	Yes	No	4 days	Nearly clear in 4 wks.
35	Jan. 21, 44	1 l. 2 s.	Yes	Nil	Basal	2 wks.	Yes	No	3 days	Clear in 3 wks.
36	Feb. 23, 44	1 l. 3 s.	Yes	Nil	Basal	3 wks	Yes	Yes	1 mth.	Late pyocyaneus, small empyema. Rib. resect. Evac. still draining.
37	Mar. 3, 44	4 l. 2 s.	Nil	Nil	Large	4 wks.	Yes	No	3 days	Small pocket after 3 wks. No infection.
38	Feb. 12, 44	1 l. 1 s.	Yes	Nil	Basal	4 wks.	Yes	No	5 days	Clear in 4 wks.
39	Mar. 2, 44	3 l. 2 s.	Yes	Nil	Large	3 wks.	Yes	No	5 days	Small effusion 1 month later. (Small FB was not removed.) Afebrile.
40	Mar. 7, 44	3 l. 1 s.	Nil	Nil	Large	2 wks.	Yes	No	4 days	Nearly clear in 3 wks.
41	Apr. 2, 44	1 l. 2 s.	Yes	Nil	Basal	3 wks.	Yes	No	3 days	Clearing after 3 wks.
42	Mar. 14, 44	2 l. 3 s.	Nil	Nil	Basal	5 wks.	Yes	No	3 days	Clear in 2 wks.
43	Apr. 10, 44	3 l. 2 s.	Yes	Nil	Total	2 wks.	Yes	?No	2 days	Too early to assess result.
44	Apr. 11, 44	6 l. 1 s.	Yes	Nil	Total	2 wks.	Yes	?No	4 days	Ditto
45	Apr. 12, 44	2 l. 4 s.	Yes	Nil	Total	3 wks.	Yes	?No	2 days	Ditto

step is to evacuate it all without freeing any adhesions which may be holding the lung out. The lung is then seen in varying degrees of collapse—the most usual being an atelectatic lower and middle lobe, with a partial collapse of the upper lobe, the hæmothorax cavity extending up to the apex posteriorly. When pressure up to 25 cm. of water is applied by the anæsthetist, in any case of more than 3 weeks' duration it is most unusual for the collapsed lobes to expand appreciably, for they are bound by a dense sheet of fibrin. This is often dense even after 2 weeks, being thicker when the hæmothorax is infected. With care, this fibrin sheet is incised and a plane of cleavage between it and a shiny visceral pleura becomes apparent. Thereafter it is often surprisingly easy to strip the whole sheet away from a lobe by blunt dissection with sponge or finger. In recent cases considerable oozing may occur which should not delay the operation; it will stop as soon as the lobe is expanded. In older cases, especially if infected, there may be more difficulty in stripping the fibrin, which is often adherent over areas of damaged lung. It is important, therefore, to visualise the track of the missile so that these areas may be left unstripped; otherwise the lung is sometimes torn at the site of a recent scar.

Decortication is easiest between the 3rd and 4th week; the fibrin layer is firm enough to be grasped readily with the lung forceps, but not yet so adherent that its separation is difficult. Earlier operations, however, should not be avoided, although there may be more oozing; for not infrequently we have found that simple incision of the fibrin sheath will free the lung in the early days. The latest operations were performed 5 weeks after the injury in a sterile clot and after 8 weeks in an empyema. In the former the stripping was easy, in the latter it was becoming difficult. Although the degree of fibrosis varies so much, as a general rule decortication is not easy after 2 months and whenever possible should be done before the end of the 1st month.

When the lung has been freed, it is expanded by the anæsthetist. If any fistula has been made it is now apparent and the lung must be oversewn. Apart from running a finger around the costophrenic sulcus to free the diaphragm, no further stripping is required. The parietal fibrin sheet is better left in situ, since quite severe oozing may follow its removal. An intercostal drain is now placed in a dependent position, or in a frank pyothorax a suitable piece of rib is resected. The pleural cavity is closed, leaving in it 30,000 units of sodium penicillin in 50 c.cm. of saline. When the last stitches are being inserted the anæsthetist expands the lung once more, the air from the pleural cavity being blown off into a water-sealed drainage bottle. When no more bubbles appear in the bottle, the drainage-tube is clipped off, the clip being removed after 12 hours so that the penicillin exerts its maximum effect during the immediate postoperative period. 'Proctocaine' is injected into the intercostal bundles of the wound to reduce postoperative pain.

The intercostal tube is allowed to drain till the drainage decreases to 1 to 2 oz. daily; this is usually on the 3rd or 4th day. It is then removed. Sometimes aspiration is necessary a few days later, but this is not the rule. In septic cases the drain is retained; if a rib has not been resected this is done after 2 weeks, and if all goes well the result is a small basal empyema cavity which soon heals.

RESULTS

When assessing the results of intervention in the clotted hæmothorax it is well to have in the background a picture of the results of conservative treatment—slow convalescence at the best and a chronic empyema in the infected case. In 24 simple evacuations of the clot without decortication there was 1 death 6 weeks later from staphylococcal septicæmia. This clot was infected before operation, and the septicæmia did not develop till the 3rd postoperative week; it cannot, therefore, be directly attributed to the intervention. The duration of drainage of the cavity in each case is given in table I. As will be seen, in the early cases a rib-resection was usual; later an intercostal drain only was employed.

We have performed 21 decortications for a clotted hæmothorax and 16 for an empyema. Although in many cases expansion and healing is quicker in the empyema, the results are not so uniformly satisfactory as in the clotted hæmothorax without gross infection. In the latter group there has been no fatality, and (as table II shows) a smooth convalescence followed in each case, except one in which a small *B. pyocyaneus* empyema subsequently required drainage. There is no doubt that in these patients removal of the clot with expansion of the lung, combined with local chemotherapy, decreases the chance of ultimate infection. Quite often the fibrin stripped from the lung yields organisms on culture, although the fluid is sterile.

CONCLUSION

In a clotted hæmothorax evacuation of the clot and decortication is the quickest and most certain way to restore respiratory function and prevent infection. At one step the operation removes an excellent culture medium and expands the lung. In a small series there have been no deaths and convalescence has been much more rapid than with conservative treatment. In the empyemas, several of which were associated with retained foreign bodies and bronchopleural fistulæ, the results have not always been so good, but this type of case is associated with a high mortality and morbidity.

Major (now Lieut.-Colonel) E. H. Rink was our anæsthetist in the Middle East, and it is a pleasure to thank him for his help and advice in the earlier part of our work.

SONNE DYSENTERY TREATED WITH SULPHAGUANIDINE

W. H. OSBORN, MB BIRM. SURGEON LIEUT.-COMM. RNVR
R. N. JONES, MRCS SURGEON LIEUT. RNVR

DYSENTERY recently broke out in a naval officers' training establishment. The building is a hotel taken over by the Navy, and, including the staff, about 250 people are living in it.

The officers taking the course are divided into four groups, each staying a month; every week one group leaves and a new one arrives. On the first day of the outbreak there were 9 cases, on the second day 14 more, and on the third 20; in the next two weeks there were 21 and 7 respectively.

All presented much the same symptoms but the later cases showed less constitutional disturbance. The diarrhœa stools, which contained mucus but no blood, were preceded by 2–4 hours' fever and malaise. The temperature was only slightly raised and the pulse-rate was about 100. None of the 71 patients vomited. The diarrhœa was severe in the early cases and these required treatment in bed for two days. The symptoms never lasted more than two or three days, but varying intervals elapsed before negative stool cultures were obtained.

The diagnosis was made in all cases from stool cultures which were taken on the second and subsequent days of the outbreak, when it became obvious that something more than a mild food upset was occurring. The results of the first cultures were received on the fourth day of the outbreak, and showed the cause to be the Sonne bacillus. Positive cases were not allowed to leave the establishment until they had produced 3 negative stool specimens taken on consecutive days. The objective of treatment was to secure freedom from infection as soon as possible, so that restrictions on the movements of the affected officers could be relaxed—an important matter in view of large training commitments.

TREATMENT

Until the diagnosis was made the patients were treated as for gastro-enteritis, by a large dose of magnesium sulphate followed by a mixture containing bismuth and 'Chlorodyne.' On receipt of positive culture results they were given sulphaguanidine.

At first the dose was 18 grammes in 48 hours as recommended in the Medical Research Council's War Memorandum no. 10, and this was followed with 5 g. daily. Stool specimens were sent for culture on the third and subsequent days. The results with this dosage were unsatisfactory. The number of days before cultures became finally negative in cases treated at

first with these doses (but later with larger amounts) was as follows:—

Days of treatment	1	2	3	4	5	6	7	8	9	10	11	F/R
Cases	0	1	1	2	6	7	8	11	5	5	1	7

F/R = failed or relapsed.

One early case gave persistent positive results after eight days' treatment and was discharged to hospital; 6 others had relapses and were sent to hospital lest they should spread infection.

The dosage was therefore increased for new and old cases to 30 g. in 48 hours with 7·5 g. on the third and successive days. The results were:—

Days of treatment	1	2	3	4	5	F/R
Cases	0	3	6	6	1	1

Excluding the cases which relapsed, the average period of treatment required to obtain negative cultures for those treated on the larger doses was 4 days and for those on small doses 7–8 days.

To minimise toxic reactions, all patients were given at least 5 pints of fluid a day. No evidence of intolerance was discovered. The diarrhœa invariably ceased within two days and was replaced by a tendency to constipation which necessitated the use of aperients. The constipation was not limited to the period to be expected after severe diarrhœa, but persisted during the whole time the drug was being administered.

It is clear that sulphaguanidine is a satisfactory drug for treating Sonne dysentery but it should be used in larger doses than are at present recommended, since smaller doses tend to encourage ambulant cases and possible carriers. Though no suggestion of toxicity was observed in our cases, reported reactions to sulphaguanidine reviewed in *The Lancet* of March 18 (p. 378) make it necessary to keep a close watch on the patient during treatment.

SUMMARY

A group of 71 cases of Sonne dysentery were treated with sulphaguanidine. Of these, 47 treated with small doses and later with larger doses required an average of 7–8 days to become free of infection. Another 16 treated from the onset with the larger doses became free from infection in an average of 4 days. Only 8 cases were resistant.

Sulphaguanidine gave rise to no toxic symptoms but appeared to have a constipating effect.

We wish to express our appreciation to the Medical Director General of the Navy for permission to publish the series; and to Dr. C. Knight McDonald for so willingly investigating the many specimens forwarded to him.

SONNE DYSENTERY CARRIERS TREATED WITH SUCCINYL SULPHATHIAZOLE

ANGUS E. BREWER, MRCS
CAPTAIN RAMC, PATHOLOGIST

IN an investigation carried out after an outbreak of Sonne dysentery in an Army unit it was found that in 16 out of 32 patients admitted to hospital the causal organism was still recoverable from the stools 1 to 3 weeks after all symptoms had ceased, and the patients were well again, a potential carrier-rate of 50%. Outbreaks of Sonne dysentery have recently increased in frequency and extent, and it seems probable that this is due to the high incidence of carriers who go unrecognised and who under war-time conditions of communal living are more liable to spread the disease. Recognition and treatment of carriers should greatly reduce the number of cases. The purpose of this paper is to show that the carrier state is easily recognisable by adequate bacteriological examination, and to illustrate a group successfully cleared by giving succinylsulphathiazole by mouth.

Details of the outbreak.—The disease began suddenly, with diarrhœa with small amounts of blood-flecked mucus, associated with nausea, vomiting and colic. Fever and malaise were moderate, lasting only for the first few hours. No attack lasted longer than 4 days, and 3 were over in 36 hours.

Notes are available for only the 16 cases giving positive cultures after full clinical recovery. Of these, 9 had sulphaguanidine in doses from 40 g. to 60 g. over 3–5 days. The remaining 7 had no treatment other than rest in bed, restricted diet, and bismuth and soda, salts, &c. Times taken for clinical recovery in both groups were the same, and gave an average of 3 days, so that sulphaguanidine does not appear to influence the course of the disease. This fact is supported by bacteriological experiments in vitro (see below) but does not agree with results given by Jamieson and others (1944) who stated that sulphaguanidine shortened the clinical course by an average of 2 days.

Bacteriological technique.—Cultures were made both from the fæces and from the rectal swabs taken through the proctoscope. (In all cases the rectal mucosa appeared normal.) In 2 cases (nos. 2 and 16) rectal swabs gave positive results where all fæcal specimens proved negative. Desoxycholate-citrate-agar plates were heavily plated and after 24 hr. incubation non-lactose-fermenting colonies were transferred to MacConkey bile-salt plates. Direct slide agglutinations were done on 24 hr. colonies from the MacConkey, and confirmation of suspicious colonies obtained from sugar fermentation and agglutination by Dreyer's technique. In every case agglutination was positive to a titre of 250 using the standard Army Pathological Services antiserum. Direct agglutination from the desoxycholate medium was not possible owing to the tackyness of the colonies, which were not emulsifiable. There were 13 positive cases on first culture, 1 on second and 2 on third. The remaining 16 negative cases had at least 4 negative results before being considered free.

TABLE I—BACTERIOLOGICAL RESULTS OF TREATMENT WITH SUCCINYLSULPHATHIAZOLE

Case	Duration of symptoms (days)	Treatment in acute stage	Days after clinical cure pos. result obtained	Exams. made before pos. result obtained	Length of follow-up after treatment (days)	Exams. during follow-up
1	2	..	10	1	6	3
2	1½	..	23	3	11	4
3	2	..	13	1	20	7
4	3	..	14	2	4*	..
	..	..	27	2	17	8
5	4	..	6	1	8	4
6	3	..	11	1	8	4
7	2	SG	8	1	6	3
8	1½	SG	11	1	13	4
9	1½	SG	9	1	8	4
10	4	SG	7	1	10	4
11	4	SG	8	1	9	4
12	4	SG	8	1	9	4
13	2	SG	7	1	8	4
14	4	SG	8	1	8	4
15	4	SG	8	1	9	4
16	4	..	20	1	10	4
Av.	3	..	11	1	10	4

SG Sulphaguanidine. * Then positive again.

Treatment with succinylsulphathiazole.—The patients were confined to bed, but in view of the very small amounts of succinylsulphathiazole absorbed this seems unnecessary. A low residue diet was given, and the succinyl tablets were crushed and given in milk. The initial dose was 4 g. (8 tablets) followed by 2 g. (4 tablets) four-hourly, omitting the 2 AM dose, making a total dosage of 44 g. over 5 days.

Results.—The bacteriological technique was the same as before treatment, both fæces and rectal swabs being examined. The number of days over which examinations were made, and the number of specimens examined in each case are given in table I, and present an average of 4 negative results over 10 days. In one case only (no. 4) was *B. sonnei* still isolated after treatment, the 2nd rectal swab taken being positive. In-vitro experiments showed the growth of this organism still to be inhibited by succinylsulphathiazole, so a further course of 44 g. over 5 days was given. After this, examinations made over 17 days were all negative.

EXPERIMENTS IN VITRO

To demonstrate the effect of succinylsulphathiazole and sulphaguanidine on the growth of *B. sonnei*, the following experiment was carried out.

To ordinary nutrient agar (without the routine addition of *para*-aminobenzoic acid) as supplied by the Army Pathological Service, sulphaguanidine and succinylsulphathiazole were added in amounts increasing from 100 mg. to 1000 mg.

per 100 c.cm. of agar, and after 30 minutes steaming plates were poured to a definite depth. The strength of the inoculum was also varied, serial dilutions in broth 1 in 10, 100, 1000 and 10,000 being made from a 24 hr. broth culture (3 c.cm.). Each plate was marked off in a series of small squares by grease pencil and the areas inoculated with a 1 mm. loopful of each dilution. At least 4 different cultures could be tested on each plate. Readings at 24, 48, and 72 hr. were set out in tables, an example of which is shown in table II. The figures indicate the number of colonies, plus being a heavy growth.

The cultures from cases which received initial treatment with sulphaguanidine and from those which had no sulphonamide treatment in the acute stage behaved identically. The following results were obtained.

Succinylsulphathiazole agar.—At 24 hr. incubation there was a definite reduction in the number of colonies and in their size as compared with the control plate until at 500 mg. per 100 c.cm agar growth was completely inhibited even at 1 in 10 dilution. After 48 hr. growth had extended up to the 800 mg. plate and the size of the colonies had increased. At 72 hr. growth was general.

Sulphaguanidine agar.—At 24 hr. there was no difference in the colonies as compared with the control plate, except for some decrease in the size of the colonies on plates with over 700 mg., and this disappeared at 48 hr.

TABLE II—NO. OF COLONIES OF *B. sonnei* FROM CASE I AFTER 24 HOURS INCUBATION ON AGAR CONTAINING INCREASING AMOUNTS OF SUCCINYLSULPHATHIAZOLE

Mg. of drug per 100 c.cm. agar	Dilutions				Mg. of drug per 100 c.cm. agar	
	1 in 10	100	1000	10,000		
Control	+	52	5	2		
100	No change except reduction in size of colony				600	
200					700	
300	70	16	0	0	800	No growth
400	9	3	0	0	900	
500	0	0	0	0	1000	

It would appear that succinylsulphathiazole in-vitro has a bacteriostatic effect on *B. sonnei* which is directly proportional to the amount of drug present and inversely proportional to the number of bacilli present. The effect is most marked for the first 24 hours of contact, and is apparently completely overcome by the bacilli after 72 hours.

ESTIMATIONS OF SUCCINYLSULPHATHIAZOLE

Examinations were made on two cases (table III).

Fæces.—Estimations were made at 24-hour intervals from the commencement of treatment. Since succinylsulphathiazole does not contain a free amino-group its direct estimation by the method of Bratton and Marshall was not possible. By boiling with 6% hydrochloric acid for half an hour it was hydrolysed to sulphathiazole, the amount of which was then estimated, and the result corrected by the molecular weight ratio of sulphathiazole and succinylsulphathiazole to read as mg. of the latter. In both cases the dose of 2 g. four-hourly gave a concentration of over 2% in the gut for 3 days. This is very much higher than that shown to have a bacteriostatic effect in vitro.

Urine.—The urine from each 24-hour period was saved, and the total sulphathiazole content estimated. In each case the total urinary excretion as sulphathiazole represented only about 1·75% of the total succinylsulphathiazole given.

Blood.—Specimens taken at the end of each 24-hour period showed only a trace of sulphathiazole present.

TABLE III—ESTIMATIONS OF SUCCINYLSULPHATHIAZOLE IN TWO CASES

Case 1

Time of taking specimen	Total dosage given at this time (g.)	G. of succinylsulphathiazole per 100 g. of fæces	Blood sulphathiazole	24 hr. urinary content sulphathiazole (mg.)
After 24 hr.	10	0·375	trace	2·6
,, 48 ,,	20	2·0	,,	121
,, 72 ,,	30	3·7	,,	180
,, 4 days	40	2·2	,,	140
,, 5 ,,	44	0·3	,,	61
1st day after treatment	..	0·01	—	3

Case 2

After 24 hr.	10	1·9	trace	9·6
,, 48 ,,	20	2·0	,,	100·8
,, 72 ,,	30	3·0	,,	160
,, 4 days	40	4·4	*ca.* 0·4 mg.	230
,, 5 ,,	44	0·45	trace	48
1st day after treatment	..	0·05	—	3

Experiments showed that succinylsulphathiazole has a bacteriostatic effect on *B. sonnei* directly proportional to the amount of drug present and inversely proportional to the number of bacilli present. Sulphaguanidine in vitro does not have this bacteriostatic effect.

Estimations of succinylsulphathiazole in the fæces showed a concentration of over 2% for 3 days with a daily dose of 10 g. If the blood sulphathiazole levels and total urinary sulphathiazole excretions can be taken as indications of the amount of succinylsulphathiazole absorbed then this amount is less than 2% of the total dose given.

SUMMARY

In 16 out of 32 cases of Sonne dysentery the causal organism was still recoverable from the stools 1 to 3 weeks after complete clinical cure. The culture medium used was desoxycholate-citrate-agar.

These cases were cleared by 44 g. of succinylsulphathiazole over 5 days, except for one case which needed two such courses.

I wish to thank Lieut.-Colonel Mann, RAMC, for facilities granted in the preparation of this paper, and Private Park, RAMC, for his help in the biochemistry.

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BONE-MARROW INFUSIONS FOR INFANTS

GERHARD BEHR, MRCS
ASSISTANT PATHOLOGIST, LABORATORIES OF PATHOLOGY AND PUBLIC HEALTH, LONDON

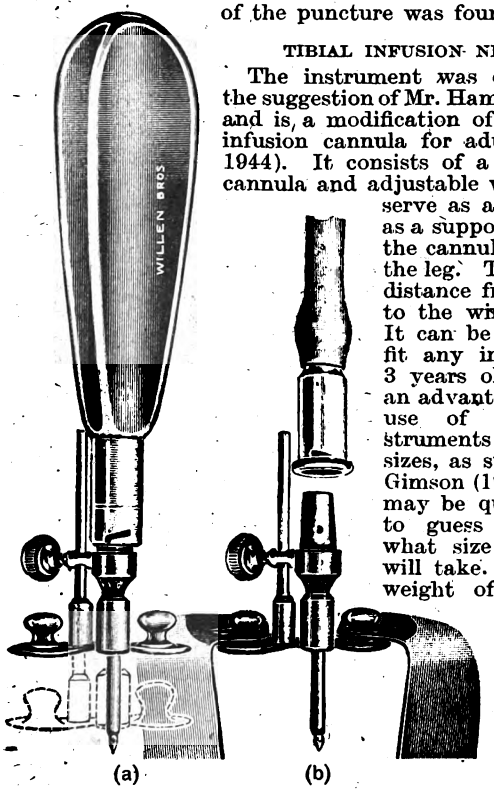
INFUSIONS into the medullary cavity of the sternum, femur and tibia were first described by Henning (1940) and Tocantins and O'Neill (1941). In three years' trial I have found the tibial route useful for infusions in infants. Its advantages over intravenous infusions are ease and speed in introducing the needle and its firm fixation.

True, the insertion of a needle into a vein is not a complicated procedure, but to keep a needle in a vein can be difficult: the infant is moved as little as possible and quite often it is fed on its back for fear of dislodging the needle. With the bone-marrow technique, on the other hand, the infant can be moved with perfect safety. I feel certain that the risk of osteomyelitis resulting from bone-marrow infusions is much less than the risk of otitis media developing in an infant fed on its back. I have used the method under the hardest test conditions, working in an overcrowded and understaffed emergency ward, and in over 60 infusions I had only 1 case of osteomyelitis, at the beginning of the series. The condition was due to leaving a sternal puncture needle in the tibia too long, and it cleared up quickly under surgical treatment.

Several types and sizes of needles have been tried.

1. The Witts or Salah sternal puncture needle is too long and heavy to be used in infants and becomes loose within 2 days.
2. A shorter and lighter needle of similar type was held in the leg firmly for 3–4 days.
3. The needle illustrated was still firmly held in the bone after 6 days, the longest infusion given.

Size 15 SWG was found best. Smaller needles become easily blocked or get bent during removal. No appreciable difference in the rate of healing of the puncture was found.



(a) (b)

(a) Trocar and cannula with wings in highest position; *(b)* cannula and adaptor, strap fixed to wings. (Full size.)

TIBIAL INFUSION NEEDLE

The instrument was designed at the suggestion of Mr. Hamilton Bailey and is a modification of his sternal infusion cannula for adults (Bailey 1944). It consists of a trocar and cannula and adjustable wings which serve as a guard and as a support by which the cannula is fixed to the leg. The maximal distance from the tip to the wings is $\frac{7}{10}$ in. It can be adjusted to fit any infant up to 3 years old. This is an advantage over the use of several instruments of different sizes, as suggested by Gimson (1944), since it may be quite difficult to guess before use what size the infant will take. The extra weight of the screw mechanism is borne by the wings and is therefore of no importance. A strap is supplied with the instrument to fit over the studs of the wings and round the leg. I have found a piece of button-holed elastic most suitable, but unfortunately it is now unobtainable.

TECHNIQUE OF INSERTION

Fixation of the leg.—A heavy foot and leg splint is convenient. It is made of 1 in. Cramer wire to reach a short distance above the knee. A cross-piece of 5 in. Cramer wire is fixed below the knee to prevent rotation of the leg, and a sausage-shaped bag filled with shot is bandaged between splint and padding. This makes the splint so heavy that the infant cannot move it. A small cradle made of 5 in. Cramer wire is tied to the cross-piece after insertion of the cannula, to protect it from the bedclothes. The other leg is tied loosely to the side of the cot.

Insertion of cannula.—The strap is placed between leg and splint opposite the tibial tuberosity, the leg bandaged to the splint at the knee, ankle and foot, and the skin over the tibia is cleaned. The trocar and cannula is inserted at the level of the tuberosity with the wings fixed at the highest position. It is pushed through the bone with a slow boring movement at right-angles to the surface of the bone. The subcutaneous surface of the tibia must be palpated and it is important that the instrument should be inserted exactly at right-angles to it and in the midline. Penetration of the bone will be felt clearly. The wings are then moved down to rest on the skin and screwed tight, the trocar is removed, and a 20 c.cm. syringe, partly filled with citrate or the infusion solution is attached quickly. A little red marrow is aspirated to make sure that the cannula is correctly placed within the marrow cavity. The solution is then injected and the infusion unit, which has been prepared in the usual way, free from bubbles, is linked to the cannula. When the drip has started a small dressing may be placed between wings and skin around the cannula. The wings are fixed over it and the strap is attached to the studs on the wings. The drip speed is now regulated. It will not do any harm if the fluid runs in rather quickly during the first few minutes. The cradle is now tied to the cross-piece of the splint across the cannula and the tubing is loosely fixed to it. If the cannula should become loose after a few days, fluid will ooze out around it and cause œdema of the skin. One should not leave the cannula in the leg if this happens, since it increases the danger of infection; but if the drip is still needed it should be inserted in the other leg. The same leg cannot be used again for some time, since fluid injected through a second puncture will leak out through the original one.

Amount of fluid and rate of infusion.—A minimum of 2½ fl. oz. per lb. body-weight should be given every 24 hours plus up to 1 fl. oz. per lb. to make up for the dehydration. The speeds of the drip are shown in the table. The numbers of drops apply to a drip-bulb that delivers 1 c.cm. in 16 drops.

Weight of infant	*Fluid given*	
Under 5 pounds	4 drachms per hour	= 4 drops per min.
„ 7½ „	8 „ „ „	= 6 „ „
„ 10 „	6 „ „ „	= 8 „ „
„ 15 „	12 „ „ „	= 12 „ „

Fluid charts can more easily be kept if the bottles are marked in the following way:

Strips of cardboard are marked in the amounts of fluid to be given per hour (e.g., in ½ oz. units for 5 lb. infants). These strips are fixed to the inverted bottles so that the zero line is opposite the fluid level. The time when the drip was started is written on the bottle with grease pencil, and one can easily see every hour if the fluid is delivered at the correct rate. When the dehydration has been overcome and the oral feeds are increased, the drip must of course be slowed, and a differently graduated cardboard strip is substituted.

I have used this method very successfully in infants from 1 day to 2 years old. Half-strength Hartmann's solution in 5% dextrose was most commonly used for dehydrated infants; 10 c.cm. of plasma per lb. body-weight was often added during the second day of the infusion. A few blood-transfusions were given by this route, but they tend to be rather slow and have to be given under pressure or the blood may be diluted.

I want to thank Mr. Hamilton Bailey for his interest; Dr. A. H. Bacon for his coöperation; and Mr. P. Regen, of Messrs. Willen Bros. 44, New Cavendish Street, W.1, who made the instrument, for his advice. A second model with fixed wings and a diagnostic model without wings have also been made.

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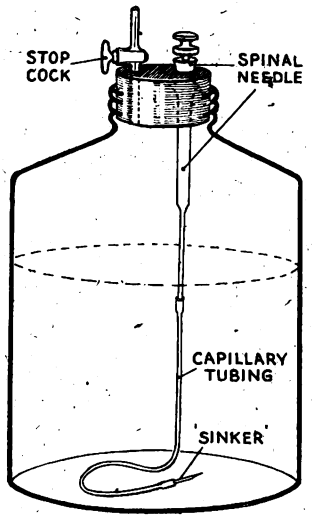
New Inventions

APPARATUS FOR PREPARING PENTOTHAL IN BULK

SINCE "D-day" the anæsthesia most used for the large number of operations carried out on battle casualties in this hospital has been 'Pentothal Sodium.' When 20–30 anæsthetics need to be given in a 10-hour shift in the theatre, time-saving methods and techniques assume great importance. Breaking a fresh ampoule for each anæsthetic in such circumstances is tedious and there is inevitably some wastage. Preparation in bulk was suggested in a short paper by S. Schotz (*Anesthesiology*, 1943, **4**, 642), who described the preparation of 5–6 g. at a time. He suggested that the same syringe should not be used twice owing to the risk of contaminating the solution.

The apparatus described here may be constructed from any suitable bottle obtainable from the dispensary (such as a 500 c.cm. 'Vacoliter,' 'Sterivac' or Woulfe's bottle) which has a rubber bung. The glass tube passing through the rubber bung of such a vessel was replaced by a wide-bore spinal

needle complete with stilette. Into another hole in the bung was inserted a metal stop-cock. A short length of capillary-bore rubber tubing was attached to the lower end of the spinal needle so that its distal end reached to the bottom of the vessel. Into the distal end of the capillary tube was inserted a short piece cut from the shaft of the spinal needle to act as a sinker. The apparatus was then filled with 500 c.cm of pyrogen-free distilled water and the whole sterilised in the autoclave. When the apparatus was required for use the bung was removed and 25 g. of pentothal added to the water.



Several of these bottles have been in service since the invasion of Normandy and have proved of great value. In use the vessel stands on any convenient corner of the trolley; when the stop-cock is open and the stilette withdrawn, the exact amount of pentothal required can be drawn up into a syringe. A boiled syringe is used and with its needle is carefully cleansed by repeated aspiration of sterile water between each case. Nothing further is done till the end of the session, after which the syringe is boiled ready for the next time. The stilette is replaced in the spinal needle and the stop-cock closed to prevent free circulation of air through the vessel. The main cause of the deterioration of pentothal is its breakdown into pentothal acid by the action of carbon dioxide or oxygen or both. The acid is insoluble and appears as a fine precipitate. Deterioration can thus be detected by the appearance of cloudiness in the solution.

The longest time a bulk solution has been in use is 16 days. In this time no loss of potency has been observed, and only the faintest cloudiness has appeared in the solution. All the anæsthesias conducted with the solution have been satisfactory at the time and post-operatively. A sample of the solution left over after 16 days remained sterile after a week's incubation. To demonstrate the bactericidal action of the solution, increasing dilutions were inoculated with pathogenic organisms and left at 37° C. for 18 hours. Cultivation at the end of this period gave the following findings—

Hæmolytic streptococci killed in dilution of		1/4
Hæmolytic staphylococci	„ „ „	„ 1/4
Ps. pyocyanea	„ „ „	„ 1/2
B. proteus	„	normal strength (5%)

The method adopted for cleansing the needle and syringe between cases—simple repeated washing through with sterile water—is thought to be preferable to the use of spirit, whose sterilising powers are doubtful. Washings of sterile water from a syringe used for the whole of a morning session in the theatre gave no growth of pathogenic organisms on 14 days' incubation.

My thanks are extended to Dr. C. W. Morley, pathologist to the EMS, for his advice and coöperation.

F. BARNETT MALLINSON, MRCS, DA

Reviews of Books

Jameson and Parkinson's Synopsis of Hygiene

(8th ed.) G. S. PARKINSON, MRCS, DPH, lieut.-colonel RAMC retd. With a section on *personal hygiene* by G. P. CROWDEN, OBE, D SC LOND., MRCP. (Churchill. Pp. 719. 25*s*.)

AN eighth edition since 1920, and the third since the outbreak of war, testifies the popularity of Jameson and Parkinson which is now the leading textbook of hygiene. This edition is the same size as the last, published in 1942, but has been brought fully up to date, space being found for important new matter by deleting some of the appendices. The book is intended primarily for students, so it avoids contentious matters as far as possible; but here and there it is rather too dogmatic, and there are a few minor errors, though these detract little from the high standard of the work. A chapter on personal hygiene, contributed by Dr. G. P. Crowden, deserves special mention; indeed, the whole tenor of the book is personal, conforming with the evolution of hygiene during this century. It begins with a summary of the white-paper, Cmd. 6502. A good index is supplemented by numerous references in the text. The chapter on the prevention and control of disease is the most important, and on the whole the best presented, though apart from cancer and goitre it is limited to the parasitic diseases. Epidemiology is defined as "the science of the mass phenomena of infectious diseases" or as "the natural history of infectious diseases." Most American and a growing number of British epidemiologists hold these definitions to be too restrictive. It is a sign of progress that the book must rapidly get out of date; future editions might be furnished with a pocket to carry an amending schedule to be published every alternate year.

Total War and the Human Mind

Major A. M. MEERLOO, MD, FRSM. (Allen and Unwin. Pp. 78. 5*s*.)

Major Meerloo is a Dutch psychiatrist who reflected on the psychological causes and consequences of this war while still in his own country, under German occupation. He observed around him the varied responses of his fellow citizens and of the invading soldiery to the stresses of a hateful situation, and he interpreted these mass reactions in the light of his knowledge of the psychopathology of sick individuals. In surprisingly lucid and idiomatic English he examines "psychological warfare" (including radio propaganda), the forces within ourselves making for a democratic or fascist way of life, the manifestations of fear, the sources of courage, mass delusions, and similar topics. He analyses the motives of German policy, and the spurious features of such a belief as that of purification through suffering, now popular in German writings. Like Lord Vansittart he fears the forgetfulness and the gullibility of the democratic peoples, faced with appeals from the cruel and the unjust for pity and justice. Dr. Meerloo deals with these matters diagnostically rather than therapeutically: he is content to point out dangers, and the psychological defects in mankind which are likely to hamper the construction of a more rational world, but he expressly refrains from putting forward plans for this construction. He advocates, however, three fundamental requisites; an international institute for war strategy, a statute on the fundamental rights of all human beings, and an organisation for effecting actively democratic education. Many readers will regard Dr. Meerloo's penetrating account of how people live and feel in an occupied country as the more valuable part of his libertarian book.

Textbook of Medical Treatment

(3rd ed.) Editors: D. M. DUNLOP, MD EDIN., FRCP; L. S. P. DAVIDSON, MD EDIN., FRCP; J. W. MCNEE, MD GLASG., FRCP. (Livingstone. Pp. 1218. 30*s*.)

AS a mirror of current therapeutic practice in this country the new edition of this now well-established textbook can be safely recommended. Practical in its outlook, it attempts to be selective as well as comprehensive, though—rightly in a book primarily intended for general practitioners and students—orthodoxy usually wins the day when opposed to innovation. The outstanding change in this edition is a new chapter on the sulphonamides, a model of its kind, concise, comprehensive, dogmatic and reliable. Other sections have been thoroughly revised, particularly those dealing with head injuries, blood-transfusion and oxygen therapy. A useful feature is the appendix giving the proprietary names of official preparations mentioned in the text. The section dealing with chronic rheumatic diseases perhaps is too discursive to be helpful, and that on tuberculous pleurisy with effusion is scarcely in line with current teaching. But the book as a whole is a reliable guide to the practitioner.

THE LANCET

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Incapacity for Work

THE white-papers on Full Employment, on Social Insurance, and on Workmen's Compensation—the last two of which are summarised on another page—offer the deserving British citizen a degree of security for his bread and other necessities that makes the repeal of the Corn Laws seem a minor reform. Disregarding any preconceived notion of state responsibility, an all-party Government has now accepted the obligation of meeting, where necessary, the basic material needs of every person (a novelty in extent) during the whole period prenatal to postmortal (a novelty in scope). It places on record its gratitude to Sir WILLIAM BEVERIDGE "for the great work which he did in preparing his comprehensive and imaginative report." The political leaders themselves and the anonymous civil servants behind them also deserve our thanks for the creative thinking and balanced judgments they have added to Sir WILLIAM'S work.

The old workmen's compensation scheme has been much criticised: its faults reflect the limitations of the technique of administration at the time it was started. Everyone—or almost everyone—will breathe more freely in the fresh atmosphere in which the new industrial insurance scheme is to be operated. Elimination of opposing financial interests, and avoidance of expensive litigation, will not only improve the standard of justice but (what is more important) will make it plain to the workman that justice is being done. The medical profession as a whole will be glad to escape the spectacle of groups of medical witnesses being set up against one another in court to testify what a particular workman, given the right spirit, could or could not do at some future date.

We must however strike a more cautious note in our welcome to the arrangements proposed for sickness and unemployment benefit. Hitherto a man slowly recovering capacity for work has been attracted towards recovery by the knowledge that his income will rise when he becomes fit, even if the work he can do is not available for him: in other words, the benefit payable during unemployment has been higher than the benefit payable during sickness. Even so, the administrators of sickness benefit, both in the Ministry of Health and in the approved societies, have from time to time sought to protect themselves from a rising ratio of claims by calling on insurance practitioners and medical referees to apply a more stringent standard of certification. The new proposals not only bring the rates of sickness benefit up to the new rate of unemployment benefit—a very proper standardisation—but also offer sickness benefit for three years as against unemployment benefit for thirty weeks or a little longer. The economic spur will now work in the opposite direction, for it will be a financial advantage to a recovering man to have his money written up against him as sickness benefit rather than unemployment benefit. Accordingly he will be tempted to plead for continuing incapacity certificates from his doctor, who will at the same time be exposed to increased pressure from Whitehall to resist all doubtful claims.

In an age when the demand for purely medical work will be greater than ever before it will be a loss to the community, as well as an embarrassment to the profession, if more instead of less attention has to be devoted to certification problems. We all know that when two medical referees of roughly equal skill are asked to examine any considerable group of persons whose incapacity for work is questioned, they are unlikely to arrive at the same opinion in every case; and we had hoped that the day had passed when administrators viewed statistics on their office desks as if the difference between incapacity and capacity was always the difference between black and white—rather than different shades of grey. While sickness funds and the unemployment fund were separately financed and separately administered, the drawing of arbitrary lines was unavoidable, but with the merging of funds and the unification of administration there should be opportunity for a new outlook. If sickness and unemployment benefit were the same in duration as well as in amount, the issue of a final certificate to a workman, with all the battles it may entail, would be unnecessary unless suitable work was available for him, since the money payable is to be the same in amount and is to come from the same fund. Moreover, there are countless instances where a convalescent patient could be benefited by taking up light work or part-time work, and to obtain this he ought to be able to present himself to the placing department without fear that the nature of his benefit will be changed to his disadvantage. "Rehabilitation," as Sir WILLIAM BEVERIDGE has put it, "is a continuous process by which disabled persons should be transferred from the state of being incapable under full medical care to the state of being producers and earners."

The Government "feel that sickness benefit of unlimited duration would be psychologically unwise and would tend to encourage those subject to recurrent periods of sickness to lapse into chronic invalidity." But the safeguard they suggest is a reduction, after three years, of only 4*s*. in the weekly rate of benefit, and possibly the professional psychologist might be able to suggest some safeguard of another kind that would be equally or more effective. We cannot help thinking that it is in any case "psychologically unwise" to continue the practice of labelling a man as quite unfit on one day and quite fit the next. To remove the thirty weeks' limit on unemployment benefit and continue sickness benefit at the full rate for an unlimited period would cost relatively little, and it would enable the social insurance office to base allowances on a unified test—e.g., that "the applicant has not, without just cause, failed to continue or to take up work for which he is medically suitable." If this should not be found feasible, it is still to be hoped that the Government will devise some method of viewing partial incapacity which relieves the claimant from the financial interest of keeping away from the employment exchange, and which relieves the doctor of an invidious form of certification.

Chemotherapy of Intestinal Infections

EXPERIENCE with sulphonamides in the past few years has confirmed their value in the treatment of bacillary dysentery and their failure to influence acute infections with the typhoid-salmonella group of organisms. Although chronic typhoid carriers are occasionally said to be freed from infection by these drugs after cholecystectomy has apparently failed,[1] the general view is that intestinal antiseptics such as sulphaguanidine and succinyl sulphathiazole have no effect on the persistent typhoid or paratyphoid carrier. On the other hand, sulphonamide therapy has been strikingly successful against bacillary dysentery both in military and civilian practice. In the Middle East sulphaguanidine was first used for the treatment of severe Shiga infections and for subacute cases of long duration. The clinical response was remarkable—abdominal pain and tenesmus were relieved in 1–2 days and stools returned to normal in 5–6 days. Similar results have lately been reported[2] from a United States naval base hospital in the South Pacific, where sulphaguanidine reduced the average period of invalidity to 24 days compared with 141 days in the 1914–18 war. Thus dysentery, although still a common infection among troops in subtropical regions, has ceased, like the venereal diseases, to be the heavy drain on man-power in the Services that it used to be. The present mild type of dysentery in the Middle East reported by SCADDING[3] is no doubt in part attributable to the good health of the troops and the high standard of sanitation maintained in the field, but, as BOYD[4] points out, much of the credit must go to the early and widespread use of sulphonamides. In the Army sulphaguanidine was at first given in massive amounts, but civilian experience suggests that less heroic doses—e.g., 3 g. four times a day until stools are normal—are effective in all but the most severe infections. Although sulphaguanidine as a rule produces no toxic complications, large doses such as 24 g. a day may result in high concentrations in the blood, and if the drug is continued for more than 8 days toxic rashes, mostly morbilliform, become common.[5] Because supplies of sulphaguanidine were limited and because it was argued that more easily absorbed sulphonamides might have advantages, sulphapyridine, sulphathiazole and even sulphanilamide[3] have been used with considerable success in the treatment of mild bacillary dysentery. The first two of these are decidedly toxic and being poorly soluble they readily crystallise out in the urine of a dehydrated patient with oliguria; these disadvantages must be offset against their undoubted efficiency. A more suitable preparation, because of its greater solubility and low toxicity, is sulphamezathine, but no reports on its use in dysentery have yet appeared.

Bacteriological cure of bacillary dysentery is as important for the community as clinical cure is for the individual, since the convalescent carrier probably plays a large part in disseminating the infection. Sulphaguanidine will usually effect bacteriological cure in Flexner infections, but the Sonne bacillus is more resistant, particularly if, as often happens with this mild infection, diarrhœal symptoms have ceased before chemotherapy can be begun so treatment is that of a convalescent carrier. SWYER[6] found that sulphapyridine was effective in obtaining early bacteriological cure in children with Sonne dysentery, while on another page OSBORN and JONES recommend intensive sulphaguanidine therapy (30 g. in 2 days, then 7·5 g. per day) for bacteriological cure of adults with the same infection. However, succinylsulphathiazole, with only 2·5% absorbed from the bowel, may prove to be the sulphonamide of choice for the treatment of convalescent dysentery carriers. Thus BREWER (p. 471) found that 14 of 15 Sonne carriers became bacteriologically negative after a course of 10 g. a day for 5 days, while the 15th case cleared up after a second course. Effectiveness as a bactericide against the resistant Sonne bacillus may depend on maintaining a sufficient concentration (0·5–1%) of the drug in the fæces.

Little has been heard of cholera as a war hazard among our troops in India and Burma, but Burma is an endemic centre for this infection and in spite of precautionary measures some cases are almost certain to arise in our forces there. It is therefore encouraging to know that good results are being obtained in the treatment of asiatic cholera with sulphaguanidine. HUANG,[7] in Kweilin, China, gave 3 g. as an initial dose, followed by 1 g. every two hours for six days and then 1 g. four-hourly for one to two days. Vomiting and diarrhœa diminished and muscular cramps disappeared after 3–4 hours. Within another few hours diarrhœa and vomiting almost ceased, urinary secretion returned and the patient was generally better. Stools became negative for *V. cholerœ* 8 hours after treatment was begun. Although this was only a small series of 22 patients, of whom 1 died, its results suggest that yet another disease of epidemic propensities is being brought under control by the combined efforts of chemist and biologist. Typhoid is the next nut that invites cracking, and the search for new and more effective sulphonamides against the typhoid-salmonella family still goes on.[8]

Return to Civilian Medicine

REDISTRIBUTION of man-power at the end of the war in Europe should allow many Service medical officers to come back to civil life. The Government's white-paper on demobilisation does not specifically mention the medical profession, but we shall not be far wrong in assuming that doctors and nurses will be released from the Forces as soon as their services are not required. Meanwhile we are able to give an indication of the schemes now being considered for giving demobilised doctors the kind of postgraduate training or experience to which many of them look forward.

To reassure anxious correspondents we mentioned some months ago that the deans of medical schools, in joint assembly, were considering what should be done for the ex-Service doctor; and their next meeting at the Ministry of Health this month will

1. Loewenthal, H. and Corfield, W. F. *Brit. med. J.* 1943, ii, 105.
2. Gudex, T. V., Fry, F. O. and Taylor, W. H. *Nav. med. Bull., Wash.* 1943, **41**, 1613.
3. Scadding, J. G. *Lancet*, 1944, i, 784.
4. Boyd, J. S. K. *Ibid*, July 15, 1944, p. 90.
5. Smith, H. G. *Brit. med. J.* 1944, i, 287.
6. Swyer, R. *Lancet*, 1943, ii, 71.
7. Huang, J. *J. Amer. med. Ass.* 1944, **125**, 23.
8. e.g., Schweinburg, F. B. and Yetwin, I. J. *New Engl. J. med.* 1944, **230**, 510.

show that much progress has been made. Their original proposal that the Services should give each released officer three months' leave, with pay, in which to fit himself for his new work, has proved unacceptable: postgraduate instruction for demobilised doctors will not in any way be the concern of the Service departments but will be arranged by the teaching schools, with help from central funds. It follows that no-one will be obliged to make use of the facilities offered; but undoubtedly many will want to do so among the large numbers released. These will fall into several different groups according to their status before they joined and their intentions for the future.

The first and biggest group consists of those who were recruited as "young practitioners" a year or less after they qualified. Nearly all of these will have held one house-appointment, but very few will have held more than two; and during their Service life few will have had much to do with the care of women, children and the aged. Everyone agrees that the need here is for at least three months' clinical work in hospital—perhaps with special instruction as well. Supposing for argument's sake that about half the "young practitioners" are released during the first year after the end of the German war, and that 3000 of these are willing to take a three-months' course, about 750 places would have to be found for them. Though a number of senior resident posts will become vacant as their holders are called up for Service, it is estimated that at most a couple of hundred places will be available in the normal hospital establishment and the EMS; so it will be necessary to ask a good many hospitals (both teaching and non-teaching) to fill the gap by finding board and lodging for ex-officers and giving them as much experience and tuition as they can. The doctor accepting a free residential course of this kind would be expected to perform clinical duties as if he were a house-officer; and costs incurred by the hospital in providing for him would be repaid by the Government, perhaps through the University Grants Committee. A central bureau could be set up to help him to find the right course at the right place.

Some of the "young practitioners" who mean to enter general practice will want to take a university degree before they do so, and these will mostly be hoping to spend six months or a year at a teaching hospital. Another and different group comprises those who were already training as specialists and consultants, or who now intend to do so. With this host of possible applicants in view the medical schools may well decide that special arrangements will have to be made if they are to provide the junior appointments that should be open to these men and women while they are studying for examinations. It is good to know that such arrangements are already being discussed. And there is also the question of individual finance: more even than members of the other groups, the future specialist will be asking: can I afford it? Obviously there are going to be many ex-Service doctors, especially those with families, who will need help if their potentialities are to be fully realised—as, in the interest of the nation, they must be. The machinery devised for supplying such help may be criticised because it contains a means test; but we must accept this as inevitable, and such a test is not improper when rightly used. Released doctors who cannot afford to be without professional income during a three-months' residential course at a hospital, or to embark on a year's study for a degree or on a long-continued apprenticeship to a specialty, will be able to apply to the Ministry of Labour for help under the Further Education and Training Scheme. This permits of assistance in respect of fees or maintenance, or in suitable cases the award of a fellowship covering several years.

The practitioners taken into the Services from general practice are perhaps half as numerous as those recruited in the year after qualification. They will form a large and influential group, but their need for instruction of any kind is obviously far less than that of their younger colleagues. It is thought, however, that some would welcome access to refresher courses, lasting a fortnight or more, either at the time of their release or a few months after their return to practice. Such courses could be held at non-teaching hospitals, which would be reimbursed for their cost. It is proposed that practitioners taking them should be asked to pay for their own board and lodging, but might later claim from the Ministry of Health their travelling expenses, a subsistence allowance, and a contribution towards the payment of a locum tenent. To our friends in Holland or Burma these suggestions for their future benefit may seem a little trivial. But they are signs of a determination that their needs shall in fact be met to the best of our ability.

Annotations

BONE-MARROW INFUSIONS FOR INFANTS

THE value of parenteral fluids for the dehydrated infant or young child is generally accepted. By their use the volume of fluid in the circulation, and hence in the tissues, can be restored in a short time. Practical details have been thoroughly studied in recent years, leading to the development of the "drip" apparatus. Intravenous infusions for infants, however, are hard to manage. The veins are small to start with, and kinking or spasm of the vein in those who are excessively shocked or dehydrated increases the practical difficulties; while thrombophlebitis may obliterate the vein completely. On another page, Dr. Behr adds that even if the needle is inserted into the vein without any difficulty, it may be not at all easy to keep it there, unless the child is still and lying in a position that favours an injection. There is, moreover, the general objection that the circulation may become overloaded, however skilful the operator may be at calculating the patient's needs. Development of the bone-marrow route for infants thus seems to have sound practical advantages. Janet Gimson [1] adapted Hamilton Bailey's sternal method for use by the tibial route, but she required four needles of different sizes. Behr has simplified things by using an adjustable needle, which gives him whatever length is necessary. After three years' trial he has found a method which combines ease and speed of introduction of the needle, with firm fixation.

The special indications for the bone-marrow route may be summarised under three main headings:

(*a*) When repeated transfusions are or are likely to be necessary—for example, in patients with hæmophilia or refractory anæmia.

(*b*) When all the usual venous sites have been used and parenteral fluid is still required. Relapsing severe diarrhœa in a young infant may produce this state.

1. *Brit. med. J.* 1944, i, 748.

(c) With shocked or premature infants in whom intravenous transfusion presents special difficulties and who must be disturbed as little as possible.

There is a real danger of infection of the bone-marrow, but Behr had only one example of this—successfully treated in his series of 60 cases. He thinks the risk less than that of otitis media in a baby lying on his back for any length of time. Any of the usual transfusion fluids can be given by the bone-marrow route, but blood needs extra pressure and the rate of flow is slow.

TOO MANY CARROTS

HUMAN blood-serum is normally more or less yellow through the presence of carotene and smaller amounts of xanthophyll. These pigments are derived mainly from green and yellow vegetables, but a small contribution may come from foodstuffs of animal origin, notably milk, butter and eggs. Although the carotenoid content of the serum varies widely in normal subjects, excessive yellowness is prevented by the conversion of most of the available carotene into colourless vitamin A, and by the disposal of xanthophyll in some way not yet known. Exceptionally high values for the serum carotene may however be attained in subjects who either eat unduly large amounts of vegetables or suffer from diseases which affect the metabolism of carotene. Coincident with the increased carotene content of the serum a yellow discoloration of the skin sometimes develops, at first on the soles of the feet and palms of the hands, but later over wider areas. This condition is known variously as "xanthosis cutis," "xanthoderma" or "carotenoderma." The term "carotenæmia" is also often used to imply that the carotene content of the serum has reached a level high enough to discolour the skin, but "hypercarotenæmia" would be a more accurate name.

During the war, shortage of some foodstuffs has often greatly increased the consumption of vegetables, and reports of hypercarotenæmia have been common. In Sweden, Palmen[1] tells how a baby just under two years was brought to the hospital because its skin was brilliantly yellow and the cause of the colouring was traced to an excessive consumption of rose hips. From the age of six months the baby had shown a special liking for hip soup, a traditional Swedish dish, which soon became the main constituent of every meal. At the age of a year it was taking about 10 pints a week, to the almost complete exclusion of milk. In spite of its unusual diet the child was healthy and normally developed, and the abnormal colouring disappeared after a more conventional diet had been given for two months. Palmen also describes a case of carotenoderma in a young Swedish vegetarian. After he had eaten 4–6 carrots daily, together with eggs, for about two months his whole skin became reddish yellow. As often happens the condition was diagnosed as jaundice, although inspection of the sclera, which is not discoloured in simple hypercarotenæmia, might have prevented this mistake. An even more lavish use of carrots in France has been reported by Bertin, Boulanger and Hureiz.[2] One of their patients ate 2 lb. daily and others ate ½ lb. at most meals. The most severe carotenoderma was seen in those patients who had eaten most carrots.

The question whether hypercarotenæmia is harmful cannot yet be answered with certainty. Sometimes, as when it accompanies diabetes, nephrosis or hypothyroidism, the patient may be severely ill, but the concurrent hypercarotenæmia cannot be held responsible for the gravity of the illness. In other cases carrots may have been used in excessive amounts either on account of shortage of other foods or through perverted taste. Discoloration of the skin may then be associated with debility and lassitude which are essentially due to semi-starvation. Josephs[3] has reported at least one case in which an excess of carrots appeared to be directly injurious. A man of 36, who had eaten large amounts of carrots for seven years with a diet sufficient to prevent any danger of starvation, suffered from a yellow skin and loss of weight. He lost both these symptoms when carrots were withdrawn from his diet. In regard to injury through excess of preformed vitamin A our knowledge is more definite. The vitamin itself is much more readily absorbed than carotene from the intestinal tract. Whereas with carotene a large proportion of the pigment always escapes absorption, with vitamin A none appears in the fæces unless doses hundreds of times greater than the physiological requirements are given. An equally ready transference of vitamin A is effected from the blood-plasma to the liver, so after a large dose any excess of vitamin in the plasma above a fairly well-defined "resting" level is rapidly removed. Symptoms of hypervitaminosis A, which are quite unlike those of hypercarotenæmia in humans, and include spontaneous fractures and severe internal hæmorrhage, may be produced in animals[4] by giving doses which are so great as to exceed the liver's powers of disposal.[5] In man hypervitaminosis A is extremely rare. Since Elizabethan times however explorers have known that polar bear liver is toxic, causing drowsiness, vomiting and peeling of the skin. Rodahl and Moore[6] have found that the liver is so rich in vitamin A that the toxicity may be due to hypervitaminosis. Josephs[3] has also reported a condition characterised by hepatomegaly, splenomegaly, hypoplastic anæmia, leucopenia and precocious skeletal development in a boy of 3 years who since the age of 3 months had taken about 100 times the normal daily dose of halibut oil. Most of the symptoms promptly departed when the oil was discontinued.

COMPLETE HEART BLOCK

BECAUSE of its association with Stokes-Adams disease, complete heart-block, though relatively rare, assumes an important position in practice. Of the patients attending the cardiographic department of Guy's Hospital during a 12-year period, Campbell[7] found that 0·6% had complete heart-block, and he has now analysed the findings in these 64 patients. The sex-incidence was predominantly male—51 men and 13 women. In spite of the fact that cases of congenital heart-block were not included in the series, 5 patients were under 40 years of age; but 54 were over 50 and there were 8 patients aged 70 or more. Only five of the cases were syphilitic and in none of these was there any evidence of aneurysm or gross aortic incompetence. In 56 cases the heart-block arose from myocardial disease, and 10 of these had hypertension, with blood-pressure over 160/100 mm. Hg, 17 gave a history of either angina pectoris or coronary thrombosis, and 6 had congestive heart-failure without hypertension or evidence of coronary disease. This leaves 23 cases in which, rather surprisingly, the only definite evidence of heart disease was enlargement of the heart, though many of these patients had thickened radial or retinal arteries as well as radiological evidence of atherosclerosis of the aorta. The heart-rate, based on an analysis of 30 of the patients, varied from under 24 per minute in one patient to 44 and over in two, the great majority being within the limits of 28–40 beats per minute, with an average for the whole group of 34·6 per minute. Considerable variation in rate was noted in individual patients, for instance 32–44 and 28–40 per minute in the two patients most carefully observed over a long period. The conventional teaching that there is little alteration in rate in response to exercise held true

1. Palmen, K. *Svenska Lakartidningen*, 1944. Abstracted by Swedish International Press Bureau.
2. Bertin, E., Boulanger, P, and Hureiz, C. *Pr. méd.* 1944, **52**, 2.
3. Josephs, H. W. *Amer. J. Dis. Child.* 1944, **67**, 33.
4. Moore, T. and Wang, Y. L. *Biochem. J.* 1943, **37**, *Proc.* viii.
5. Davies, A. W. and Moore, T. *Ibid*, 1934, **28**, 288.
6. Rodahl, K. and Moore, T. *Ibid*, 1934, **37**, 166.
7. Campbell, M. *Brit. Heart J.* 1944, **6**, 69.

in many cases, but there were quite a number in whom exercise produced considerable acceleration—e.g., 38–56, and 46–70 per minute. Apart from the 10 patients diagnosed as hypertensive, about half the cases had a high systolic pressure and a normal diastolic pressure (average 194/81 mm. Hg), while in the remainder systolic, diastolic and pulse pressures were all normal (average 137/73 mm. Hg). Practically a third of the cases showed a bundle-branch block in addition to complete heart-block. Although complete heart-block was the only grade of block recorded in 29 of the cases, fuller clinical investigation seemed to make it certain in only 15 of these that the complete block was established, the remainder of the series all showing varying grades of block. Stokes-Adams attacks occurred in half the cases. The expectation of life worked out at 4·6 years, the average period of survival for those who died being 2·5 years, while for the 16 still alive it was 6 years. The prognosis was considerably affected by the presence or absence of Stokes-Adams seizures, 80% of those with such attacks having died in the period of observation, compared with 50% of those who had not had them. An important practical point that emerges is that the patient who has not had a Stokes-Adams seizure in the first month or so of his heart-block is not likely to develop such attacks later. Somewhat unexpectedly, Campbell found that of the 10 patients without Stokes-Adams seizures known to be dead, only one died suddenly, the cause of death in the others being congestive heart-failure (3), left ventricular failure, cerebral hæmorrhage, bronchopneumonia, intestinal obstruction and unknown (1 each). Conversely, 14 of the 24 patients with a history of such seizures died suddenly; 3 died of heart-failure, and the cause of death in the remainder was unknown. In other words, the longer the period that elapses without a patient with heart-block developing Stokes-Adams seizures, the less likely is he to die suddenly. The only fallacy in these careful and important observations is probably unavoidable—that patients have not been seen often enough for us to follow the precise course of events.

INDIAN SCIENTISTS

WHEN the secretary of the Royal Society, Prof. A. V. Hill, MP, visited India last winter it was suggested that Indian scientific men should come to this country to establish closer relations between the many new scientific organisations in India and their counterparts here. The suggestion was cordially accepted, and a party of our Indian visitors is expected shortly. They are likely to stay in England about seven weeks, during which they will be the guests of HM Government and will go to important laboratories and institutions for industrial, medical and agricultural research. The seven members include Colonel S. L. Bhatia (deputy director-general of the Indian Medical Service), Sir Shanti Bhatnagar, FRS, Sir Jnan Chandra Ghosh, Prof. S. K. Mitra, and Prof. Megh Nad Saha, FRS; but Colonel Bhatia will arrive later than his colleagues. Inquiries about the arrangements may be addressed to the assistant secretary of the Royal Society, at Burlington House.

THE ELDERLY PRIMIPARA

A WOMAN aged 35 or over must expect a more difficult time in her first childbirth than if she were ten or fifteen years younger. At her age toxæmias and fibroids are more common, and uterine inertia is always to be feared. Nathanson [1] has pointed out that inertia is nine times as common in the old as in the young. Breech presentation too presents a special problem. Kuder and Johnson [2] studied a series of 830 elderly primiparas treated at the Woman's Clinic of the New York Hospital. As was to be expected toxæmias appeared in a high proportion of their cases. Inquiring into the relationship between the expected date of delivery and the length and type of labour, they found that in the 85 patients delivered 15 or more days after the expected date labour lasted four hours longer than in those who started at about the appointed time, and six hours longer than in younger women. In nearly a third of the postmature group labour lasted more than thirty hours, compared with only 18% in the other elderly primiparas. Cæsarean section was more often resorted to in this postmature group and the infant mortality was high. Thus the infant mortality for the clinic as a whole was 3·7%, for the elderly primiparas 7·6%, and for those elderly primiparas who were fifteen or more days postmature 24%. It seems therefore that in the elderly primipara postmaturity carries a serious risk to the child. Nathanson's observation that occipito-posterior position is more often encountered in the elderly than in the young primipara is confirmed in this New York analysis. There is also a rise with age in predisposition to postpartum hæmorrhage and puerperal sepsis and in maternal mortality. There is little evidence to support the tradition that the older women bear the heaviest babies. But the size of the child is of special importance in the elderly primigravida, because a large baby may constitute a valid indication for cæsarean section. Other observers have noted that premature labour is common in the older woman. This complication was met with in 6% of the New York series. Walsh and Kuder [3] found that breech presentation is more common in the elderly primipara, that frank breeches are more frequent than the other varieties, and that the membranes rupture prematurely in some 40% of cases. Cæsarean section was performed in only 16 of their 55 cases of breech presentation in primiparas over 35, and in these no child was lost. Of the children delivered vaginally as breeches 7 did not survive. These recent papers suggest that whereas age itself, and even age associated with a breech presentation, is not a definite indication for cæsarean section, if any other adverse factor intervenes operation is usually required. Thus if the child is larger than normal and the head shows no sign of engaging at the onset of labour, if there is any degree of contracted pelvis, or fibroids, or indications of uterine inertia after a few hours of labour, then section may be performed without compunction. In the elderly primipara who is two or more weeks postmature cæsarean section should be seriously considered.

1. Nathanson, H. *Amer. J. Obstet. Gynec.* 1935, **30**, 159.
2. Kuder, K. and Johnson, D. G. *Ibid*, 1944, **47**, 794.
3. Walsh, J. W. and Kuder, K. *Ibid*, p. 541.

BRITAIN DISPLAYED ABROAD

"THE ordinary relations, the non-political, non-economic relations between peoples—the popular relations as they may be called—are nothing less than the life blood of any common civilisation." This sentence from the foreword of the report of the British Council for 1943–44 is the key to its activities, which are intended to promote "ordinary relations" with people abroad. It is not surprising to read of the "increasing extent to which medical work is permeating the programme of the overseas establishments, as shown, for example, in the lectures given on medical subjects, the proposed formation of an Anglo-Argentine Medical Centre at Buenos Aires and the local publication in Ankara of an edition in Turkish of *British Medical Bulletin*." In many and diverse ways the Council presents the labours and thoughts of the British to distant nations, and in view of its official backing we are glad to know that it feels that cultural relations should be reciprocal and that "no government should look with equanimity on the prospect after the war of international competition in the cultural field. Those in charge of cultural relations should bring messages of peace and good sense and that of each country should be complementary to the others."

The report is obtainable from 3, Hanover Street, London, W.1.

Special Articles

SOCIAL INSURANCE: GOVERNMENT'S PLAN

THE White Paper[1] proposes a scheme of national insurance, to include everybody.

Security in Health and Sickness

The population will be divided into six classes:

I—Employees.
II—Self-employed.
III—Housewives.
IV—Adults who do not earn.
V—Children.
VI—People over working age.

Those below working age will be provided for by family allowances; those of working age by insurance benefits; and those beyond working age by retirement pensions. The scheme will apply to large categories not hitherto covered by insurance: those living on earnings gained otherwise than by salary or wages, or on earnings above £420 a year or on private income; and those employed in professions or industries hitherto specially excepted.

Each insured person will pay a single weekly contribution for all benefits in the form of one stamp on a single document.

The scheme contemplates a working life up to 65 with inducements, in the form of a higher pension, to people to continue work beyond the age of 65. Training and rehabilitation will be offered to those who might otherwise have to give up work prematurely.

Contributions.—The rates of weekly contribution for persons over age 18 (covering for Class I the benefits under the Industrial Injury Insurance Scheme as well as the Social Insurance Scheme) will be:—

Adults	Class I			Class II	Class IV
	Insured person	Employer	Total		
	s. d.	s. d.	s. d.	s. d.	s. d.
Men	3 10	3 1	6 11	4 2	3 4
Women	3 0	2 5	5 5	3 6	2 8

Classes I, II and IV will contribute at rates related to the benefits provided for their particular class and for classes III and VI. Unemployment benefit will be restricted to persons in class I; and sickness and invalidity benefit to persons in classes I and II. Provision will be made for children by family allowances and for the old by retirement pensions. In the case of class I the stamp bought weekly will include also the contribution for insurance against industrial injury. The following table shows rates of contribution for boys and girls between the ages of 16 and 18:

Young persons	Class I			Class II	Class IV
	Insured person	Employer	Total		
	s. d.	s. d.	s. d.	s. d.	s. d.
Boys	2 5	2 1	4 6	2 9	2 2
Girls	2 0	1 7	3 7	2 5	1 10

Family Allowances.—Services in kind, including meals and milk at schools, will be extended; and a weekly cash allowance of 5*s.*, derived from taxation, will be introduced. For the purpose of family allowances the children to be taken into account are those below school-leaving age and those remaining at school above that age, until July 31 following their 16th birthday. Of such children the first will not be counted for an allowance, although when the parent is in receipt of benefit 5*s.* will be added to the benefit in respect of that child.

Two principles have been followed: first, that nothing should be done to remove from parents the responsibility of maintaining their children, and a second that it is in the national interest for the state to help parents to discharge that responsibility properly. The scheme does not aim at providing full maintenance for each child, but at contributing to the needs of families with children. Substantial benefit will be given in the form of school meals and milk. July 31 after the 16th birthday is a more convenient limiting date than the birthday itself because it fits in better with school-leaving arrangements.

No allowance will be paid for children residing in institutions, or for children for whom a local authority has assumed parental rights. But otherwise the allowance will go on being paid to parents while a child is in hospital, even though no charge will fall on the parents for his maintenance while he is there.

Orphan's Allowance.—For every child both of whose parents are dead, there will be a weekly allowance of 12*s.*, of which 5*s.* will come from taxation, and the balance of 7*s.* from Insurance Funds.

Sickness and Unemployment Benefit.—There will be a standard rate of benefit of 40*s.* a week for a married couple and 24*s.* for a single man or woman, with lower rates for those under 18. Both benefits will be limited in duration, but in different ways. Sickness benefit will end after three years of continuous disability, when invalidity benefit at the standard retirement pension rate will be substituted. Unemployment benefit will end after 30 weeks or a somewhat longer period in the case of those with a good employment record. (Periods covered by training allowance will not be taken into account.) After the end of either benefit, further contributions must be paid before an insured person can requalify for benefit. Benefit will be reduced when the contributor's insurance record does not comply with the prescribed contribution conditions.

Training Allowance.—Special allowances at a higher rate will be available to persons undergoing a course of approved training. The cost of training will be met from taxation, subject to a contribution from the Social Insurance Fund.

Sickness Benefit for the Self-Employed.—People working on their own account will not receive sickness benefit until after the first 4 weeks of any period of illness.

Dependant's Allowance.—An additional allowance—but only one—will be paid to those on single benefit (sickness, invalidity or unemployment) who have an adult dependant. It will be 16*s.* a week (15*s.* when added to invalidity benefit).

Retirement Pensions.—There will be a standard rate of retirement pension of 35*s.* for a married couple and 20*s.* for a single person. Pensions will be paid only to those who have retired, and will be reduced if more than 20*s.* weekly is earned during retirement. The minimum age of retirement will be 65 for men and 60 for women, but the joint pension will become payable when the husband qualifies, whatever the age of the wife, provided that if she is under 60 she is not gainfully occupied. Pensions will depend upon contributions paid during the working life of the applicant and will be reduced when the contribution record shows a deficiency. Those who postpone retirement beyond the age of 65 (or 60 for women) will, when they do retire, get pensions increased by 2*s.* a week (joint) and 1*s.* (single) for each year of work after pensionable age. Special arrangements will be made covering persons already pensioned or insured when the scheme comes into operation.

Married Women.—The provisions to meet the needs of married women in the event of the illness, unemployment, retirement or death of their husbands are described elsewhere. For childbirth, the following benefits (which will also be made available to unmarried women in all insurance classes) will be available:—

(i) a maternity grant of £4; and, in addition,
(ii) for gainfully occupied women, maternity benefit

1. Cmd. 6550. HMSO. 6*d.*

at the rate of 36*s*. a week for 13 weeks, provided that occupation is given up for that period; or

(iii) for women not eligible for maternity benefit, an attendant's allowance of £1 a week for 4 weeks.

These benefits will be subject to certain qualifying conditions. In addition there will be special provisions enabling married women to insure for a personal retirement pension of 20*s*. a week in lieu of their share in a joint retirement pension, and enabling employed married women earning more than 20*s*. a week to insure for:—

(i) sickness benefit (after the first 4 weeks if self-employed) at the rate of 16*s*. a week; and

(ii) unemployment benefit at the rate of 20*s*. a week.

If the woman is living apart from her husband and can get no support from him, these benefits will be at the rate of 24*s*. a week.

The main provision for widows will be:—

(i) A benefit of 36*s*. a week (with 5*s*. added for the first child, if the widow has one) for the first 13 weeks of widowhood. This will be payable to women widowed under 60 and to those widowed over that age whose husbands had not qualified for retirement pensions. It will, for the first 13 weeks, take the place of the benefits described below.

(ii) If there is a dependent child, a guardian's benefit of 24*s*. a week (with 5*s*. added for the first or only child).

(iii) A widow's pension of 20*s*. a week to widows who are 50 or over at the time when the husband dies or when the children cease to be dependent, provided that at least ten years have elapsed since the marriage.

These benefits will be at a reduced rate when the husband's contribution record shows a deficiency and will terminate on remarriage; guardian's benefit and widow's pension will be reduced for substantial earnings. There will be special provisions for women who are already receiving widows' pensions and for women who at the start of the new scheme are married to men already insured for widows' pensions.

Death Grant.—Death grant will be paid at the following rates according to the age at which the death occurs:—

	£		£
Under 3 years of age ..	6	Between 6 and 18 ..	15
Between 3 and 6 ..	10	Over 18	20

For persons over 65 at the beginning of the scheme, no grant will be paid, and for persons then between 55 and 65, the grant will be £10. No grant will be paid in respect of a child dying below the age of 10 who was born before the beginning of the scheme.

SUMMARY OF MAIN BENEFIT RATES

Category	Sickness benefit	Invalidity benefit	Unemployment benefit	Retirement pension
	s. d.	*s. d.*	*s. d.*	*s. d.*
Single man or woman ..	24 0	20 0	24 0	20 0
Married man with gainfully occupied wife				
Married man with wife not gainfully occupied	40 0	35 0	40 0	35 0
Married woman gainfully occupied ..	16 0	16 0	20 0	20 0
Dependant's allowance where payable ..	16 0	15 0	16 0	—

These weekly rates are increased by 5*s*. where the beneficiary has a single dependent child, or, if he has more than one such child, by 5*s*. in respect of the first child. Not more than one social insurance benefit or pension will be payable to an individual at any one time. When a war or industrial pensioner becomes eligible for a social insurance benefit, there will be some adjustment in the benefit payable.

Benefit while in Hospital.—The following benefits will be reduced by 10*s*. a week during maintenance in hospital after the first 28 days of such maintenance—sickness and invalidity benefit, maternity benefit, widow's benefit, guardian's benefit, widow's pension and retirement pension.

Under the new National Health Service treatment in hospital will be available to everyone without charge. Ordinary maintenance in hospital includes food, fuel and light which social insurance benefits are designed to cover: so that it is thought reasonable to reduce benefit while the recipient is in hospital.

ADMINISTRATION

A Ministry of Social Insurance will be set up which will be responsible for the whole of social insurance. The administration of assistance will be kept separate from the administration of insurance, though the Minister of Social Insurance will be responsible to Parliament for both.

National Assistance.—The present responsibilities of public assistance authorities for the payment of assistance in cash will be transferred entirely to the Assistance Board.

Approved Societies.—The Government have come to the conclusion that it is not practicable to retain approved societies either as independent financial units or as agents in the administration of the scheme.

Workmen's Compensation

The present system of workmen's compensation is unduly complicated, allowing too much scope for contention and thus retarding the workman's recovery. The Government hold that in future claims must be made on an independent authority, and settled by procedure less likely to cause friction.

Workmen's compensation will be treated as a social service, not as an employer's liability. The scheme will remain separate from the general social service scheme, however, because it differs in rates of benefit, bearing more resemblance to the war pensions schemes. It will cover everyone working under a contract of service or apprenticeship, except those under school-leaving age, and will apply to accidents arising out of and in the course of employment, and to specified industrial diseases. It will not be possible to contract out of it.

Liability will fall on a central fund out of which all benefits and administrative charges will be paid. This fund will be maintained by weekly stamp contributions from employers and workmen, and by a contribution from the Exchequer.

Weekly rates of contribution will be 6*d*. for men and 4*d*. for women, to be shared equally between employed and employer. For juveniles the rates will be half these. Benefits will not depend on a contribution qualification.

The Minister of Social Insurance will be in general charge of the scheme. An advisory committee or council will be set up on which workmen and employers will be equally represented to advise the Minister on policy and administration. Employers and workmen will also be equally represented on local appeal tribunals.

Claims will be dealt with by a pensions officer, but claimants will have right of appeal to local tribunals, and further rights of appeal to an industrial injury insurance commissioner, whose decision will be final.

For disablement, benefit will be at uniform rates, consisting first of an industrial injury allowance, payable while the man is incapacitated for work, and later—where the disablement is likely to be permanent or lengthy, of an industrial pension, supplemented by a special allowance if the man is unemployable. Allowances will be given for family responsibilities, and treatment allowances will be given if necessary.

The industrial pension will be based not on loss of earnings but on the degree of disablement, assessed by a medical board. The claimant, however, will have the right of appeal to a special tribunal. His pension will not be affected by his subsequent earnings; and he will not be able to commute his pension for a lump sum.

For minor disabilities final settlement will be by award or gratuity or a temporary allowance at a special rate, with or without a final gratuity. Where a worker is killed a pension will be paid to his widow, with an allowance for the first child. If the first child is orphaned by the death the rate of allowance will be higher. In appropriate circumstances a pension may be paid to one or both parents or to one adult dependant in the dead man's family. A temporary pension or benefit may be paid in other cases.

Reconstruction

THE IMAGE OF THINGS TO COME

TOWARDS the close of his address to the Westminster Hospital medical school on Tuesday last, Sir JOHN FRASER redeemed a promise he had made to himself when choosing homilies suitable for the opening of a new session, and looked for a brief moment at the future, at the image of things to come.

* * *

When the Government white-paper on a national health service was issued in February it expressed the intention "to bring the country's full resources to bear upon reducing ill health and promoting good health in all its citizens." You will agree, he said, that no finer sentiment could have been uttered, and it is not surprising that it has received universal approval. The ways and means by which the ideal is to be secured have not been worked out in detail, but the framework has been indicated, and it seems beyond doubt that in the early future a medical service complete and universal will be available for everyone irrespective of age, calling or position.

Much is still under discussion, but we have an assurance that the provisions—individual, institutional, technical—will be so complete and so fully integrated that no aspect of disease, whether preventive or curative, will be neglected. It is a splendid vision; most assuredly it will have the support and the approval of all who have the nation's welfare at heart, and, when differences of opinion have been adjusted so that the scheme comes into operation with the support and the goodwill of those concerned in its working, it may be that we shall witness a renaissance in the health and the well-being and the prosperity of our people.

When the scheme comes into operation it is certain to offer a considerable increase in the field of medical opportunities. On prewar figures the proportion of doctors to the population was roughly 1 to 1000; it is acknowledged that the provision is inadequate, a fact which is fully demonstrated in times of stress such as epidemics. Moreover, it relates to a situation in which the subvention is disjointed and to some extent selective. In the future, if the ideal is pursued, a very different state of affairs will arise; a medical service universal in range and complete in provision and details is a vast undertaking, and it is apparent that, if it is to operate adequately and efficiently, it will demand a considerable increase in the present number of medical personnel. The increase will apply to every section and department of medical activity; the expansion will be greater in some branches than in others, no doubt, but it may be assumed that the necessity for augmentation will arise in every sphere. In medicine there has never been an unemployment problem; taken all over the demand has exceeded the supply, and, if we read the omens aright, it appears that future demands will be so many and so heavy that for a time at least they will tax our resources to the uttermost. The potential liabilities of the future have been recognised, and consideration is being given to the means by which they can be met; but so far as you are concerned, the harvest promises to be plenteous, and—in the beginning at least—the labourers proportionately few. You will find full and ample employment in whatever sphere of medicine your interest may lie.

* * *

As to the effects which a comprehensive scheme is likely to have upon existing conditions, it is difficult to speak with assurance, because so much remains undecided. But certain consequences are likely. There will probably be a sharper distinction between different types of professional work than is the case at present. The specialist category will be more clearly defined, and inclusion in this group will necessitate the fulfilment of obligations which have not existed hitherto. In a national service specialist work will increase, and the number of those capable of undertaking the covenants will require to be augmented. Hitherto access to specialism has had its peculiar difficulties, one of the most significant being the expenses attendant upon training and the burdens of the lean years. Because of these the field has suffered limitation, and there are many men and women of outstanding ability to whom it has been denied on monetary considerations. If future plans respecting specialism are to operate in an adequate way, pecuniary barriers must be overcome, so that the arena is open to any who may show appropriate ability and inclination. Developments such as these will have repercussions on certain types of general practice. There are many who combine a certain amount of specialism with general practice; experience has shown that it can be a successful combination, and those who pursue it render valuable service to the community. My impression is that presently the ambit of specialism will be so clear cut that it will be difficult to pursue this combination system.

On the position which you will encounter if you enter general practice, perhaps I may be permitted to make one or two general observations. It is likely that work will proceed under more favourable conditions than are experienced today. It is suggested that it will be arranged on a proportional basis, that the provision of facilities will lessen the wear and tear, that a closer integration of the work of the practitioner with the various departments which constitute a national health service will reduce in a material way the many and heavy burdens of general practice. If these surmises prove to be correct, it may be that the medical man will find himself in possession of something to which hitherto he has been a stranger—the gift of leisure. Not idleness, for that he will never know, but time and opportunity to engage in something distinct from the daily routine of necessity's demands—to think, to read, to write if he be so inclined, to pursue some recreation or hobby, which like a golden thread in a sombre fabric will bring light and happiness into a life which appreciates what shadows are.

* * *

I know there is another side to the picture. I am aware of the apprehensions which have been expressed—that there may be some interference with liberty of action, that the sense of security in respect of occupation and income may lessen initiative and foster complacency, that the exercise of the art of medicine may become increasingly impersonal. There may be some justification for these fears, but after all they may prove to be unfounded, and, if experience shows them to be real and prejudicial, it will be the business of the individuals affected to do what they can to remove them. I would remind you that developments which postulate advantages to the many are likely to imply some degree of sacrifices by the few.

THE INDEX and title-page to Vol. I, 1944, which was completed with THE LANCET of June 24, is published with this issue. A copy will be sent gratis to subscribers on receipt of a post card addressed to the Manager of THE LANCET, 7, Adam Street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive indexes regularly as published should do so now.

In England Now

A Running Commentary by Peripatetic Correspondents

WHEN I recollect my own and everyone else's feelings during the earlier blitz, I believe that the blitzed people were more tranquil than the tough young men over here in France. The Londoners were no braver in action, because in action very few people fail to be brave; but they were happier when they were passively waiting. I used to think about this a lot. During the blitz I never woke up shivering as I once did during a wild night's shelling, and since being alarmed is always unpleasant I wondered why. I think it is partly that we are away from home, which could be alarming even in peace-time; partly that there are no girls to be brave in front of; partly that shells, though far less deadly, make a very hostile noise in the air (how often have I ducked as our own went well overhead). But somewhere in the difference must lie the cause of "battle-exhaustion," which is surely only chronic fear, and I should like to know the true cause—and the cure. Could you ask your peripatetic trick-cyclist?

* *

The tannins seem to be in disfavour these days. First they banish them from burns, and now a resuscitation type has written an article deploring hot sweet tea for the badly shocked. I hope no-one goes too far and condemns hot sweet tea altogether. For one thing, h.s.t. and morphia are all the RAP can offer, and one likes offering things to men you have known for some time, as the actress said to the bishop. For another, to the minor casualty, who is frequent and who I am at present, the giving of tea is a symbol no less important than the mutual chewing of betel nuts. On the route to base one is always waiting in tents and places while the RAMC document and look uninterested, and the giving of tea is the kindest thing they do and shows that they do care after all. (I remember a unit near the beaches which gave penicillin and plasma and intravenous sulphadiazine but No Tea at all—no morphia either incidentally—and my troops disliked that unit and thought they were inefficient.) And finally, tea is very nice and assuages one's childish expectation of comfort and sweets to take the pain away.

* *

My 3 months in Normandy has gone as a dream. We did not move for 2½ months, and all that time (save for the beaches) it was the same. We got up at dawn, there was a small sick parade, patrols went out, we read, played cards and slept, and someone got hurt and we took him away on the jeep. (The man who invented stretcher-carrying jeeps saved many thousands of lives.) We had eleven hits on the farm we used as an RAP—the one which penetrated furthest failed to explode—but as they all occurred in half an hour they did little to break the monotony. Time slid by very quickly. No-one read anything good or said anything very important. There were, as our 2 i/c said, only two emotions: *Christ!* and Thank God. And I am not sure that either exclamation was blasphemy.

* *

It is over now for the time being for me because I tried to smoke out some bees with a phosphorus grenade and got too close (delicious honey, my RAP sergeant tells me). We live between sheets, we have English nurses; and all that time when our boots and clothes were never off and every plan was punctuated by the possibility of death, all that seems to have lasted no more than a week.

* *

One of my medical orderlies (in the Commandos we are blessed with a fair number and very fine ones) has found a new disease and is preparing a paper for you on it. This is an advance note of his findings, in the hopes that I may eventually get the credit. He calls it Crog, and there are variants known as Pog and Zog. The cause is an accumulation of Compo biscuits in the rectum, and the symptom's vary from constipation (Crog verum) to projectile defæcation (Pog). The prognosis, or prog, is by no means good, because an intractable Zog may occur, impervious and lethal. As a Polish skin-specialist once said to a friend of mine who asked for the prognosis of some rare rhinoceros-like condition, "quoad restitutionem functionis et vitam, infaustum." We treated several cases expectantly, and I must admit they were cured. But the medical orderly assures me that this shows that they were not Crog at all. I think he is on a good wicket. The sooner we start to revise the textbooks the better. The name of Pollard is about to join that of Osgood, Schlatter, Pellegrini-Stieda, Kümmell, Marie, Strümpell and their old friends Charcot and Tooth.

* * * *

When Gray wrote in his Elegy:—"But knowledge to their eyes her ample page, rich with the spoils of time did ne'er unroll" he was probably in that irritable mood after breakfast when one has tried and failed to open *The Lancet*. Swaddled in its utility wrapper *The Lancet* has become harder to remove than a patient from his Abbot's jacket. It is a tribute to the reading matter within and the doctor without, that once a week in so many medical households a dishevelled number is successfully extracted from its tube. As peace draws nearer, so does the hope of a more ephemeral binder; and the monograph I intended to publish, on 101 different ways of undoing *The Lancet*, will not appear. I will confine myself to a few tried favourites.

(1) *The bloodless operation, or sherry-bottle method.*—Those who are skilled in removing corks from bottles by banging their bases against a cushion claim that by holding the binder firmly and banging the protruding unwrapped portion against a wall a complete delivery is obtained, leaving the tube intact. This method is noisy and dramatic but it involves no cutting, and chronic alcoholics can thereby keep themselves in practice for peace-time sherry consumption.

(2) *Simple incision and lancectomy.*—This operation has to be done on an empty stomach, which is a great disadvantage. If it is done after breakfast the result is that table knives soiled with marmalade and margarine, leave a dirty wound with staining and stickiness of the outer pages.

(3) *The family method.*—To my mind this is the best. The owner by showing suitable extracts to his family awakens in them such a degree of medical curiosity that if he leaves his *Lancet* unopened for a day somebody else will have excised it.

I am indebted to Dr. J. (personal communication) for advice on the first method.[1]

* * * *

We sailed from Liverpool for Gothenburg in pouring rain with about 600 Germans on board who had been interned in the Isle of Man. It was not a very comfortable voyage, for the small British party had to use the same living rooms and bar as the Germans; however, both sides exhibited a formal politeness to each other and there were no unpleasant incidents. It was rumoured that one or two members of the British party locked their cabin doors to avoid being murdered in the night, but I had no proof of that.

It was interesting to watch the German reactions to going home. The majority of them appeared so pleased and relieved to be free and outside barbed wire that they really had not had time to adjust their thoughts to what they were going back to. The only person who seemed to have a job on board the ship was the head sister from the German Hospital at Dalston; and she, as far as we can make out, used to visit all the cabins each night to make sure that the right people were in the right ones. What she did if she found the wrong ones we were never able to find out.

As we got near Scandinavia we were escorted by German aeroplanes, minesweepers and destroyers, to whose crews all the passengers waved frantically. The Germans were rapidly disembarked at Gothenburg and the next day we took on board about 600 British civilians from camps in Germany and France, and about 100 officers who were being repatriated for health reasons. The contrast between the appearance of the German civilians, with their decent clothes and elegant baggage, and the British party who were shabbily dressed and whose luggage consisted very largely of bundles and old Red Cross boxes, was very striking. Most of the party were elderly men, whereas in the previous repatriation

1. We take this opportunity of expressing regret at the inconvenience caused. Our stock of strip wrappers was exhausted early in the war, and we are now allowed so little paper that loose wrapping is impossible.—ED. L.

from Lisbon the majority were women. Whether because of the difference in sex, or because the presence of the officers on board had a stabilising effect, I do not know, but certainly there were far fewer grumbles and complaints on the journey home from Gothenburg than I had coming back from Lisbon.

Once again we came out of the Skagerrak under the muzzles of German guns with German destroyers and patrol boats all around. The ship I was in got through the German patrol without any trouble, but the last ship of the convoy is said to have been stopped and searched for stowaways. As this ship was entirely full of repatriated prisoners-of-war it must have been a horrid shock for them to wake up and find the Gestapo on board. However, the ship was allowed to proceed and went on her way.

The Swedes in Gothenburg were very friendly and helpful, but to consume three large evening meals in two evenings is possibly carrying one's own indulgence rather far.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

THE House has reassembled after its seven-week recess in good fettle and with a heavy programme of work to be done. During the first few days it has snowed white-papers. There have been white-papers on social insurance, on workmen's compensation, on demobilisation, on increase of pay for members of forces with prolonged service, and on the control of merchant shipping. The Minister of Reconstruction has also issued a child's guide to social insurance (price 3*d*.) which is intended for the general public.

It was thought perhaps that this box-barrage of papers would be enough to contain the curiosity and activity of MPs inclined to poke their noses too far into Ministerial business. In fact, with the first gleam of peace upon us, there is a confusion of projects for discussion and later legislation, and there are of course bills already before the House, including the one on the Portal houses which was discussed on Tuesday and Wednesday of last week. The housing problem is so serious that despite misgivings the House pressed the bill through all its stages after a two-day debate. As a result we shall get 300,000 houses which are scheduled to last for 10 years but which many feel are likely to be left in occupation for longer. This happened with "temporary homes" after the 1914–18 war. If it is not to happen again, a big programme of more permanent building must be begun as soon as labour is available.

From housing and the Home Secretary's announcement of Captain Ramsay's release the House turned to a debate on the war and the international situation, following on Mr. Churchill's speech. Before the adjournment for lunch the Prime Minister spoke for an hour on the military situation and afterwards surveyed the international situation. The adjournment was fixed to suit his convenience and avoid undue strain, but the arrangement deserves extension, for the present method of continuous sittings from 11 AM until 6 PM inevitably means a "poor house" at times, chiefly meal-times, during the day.

Mr. Churchill began by referring to the loss of the 1st Airborne Division at Arnhem, and this defeat naturally influenced the temper and atmosphere of the debate. As a feat of arms the achievement of the division was magnificent. From the point of view of tactics it secured an important success in holding German armoured strength. But the price was a grim and terrible one to pay. The Prime Minister warned the House that it might require not only the remaining months of 1944 but some months of 1945 to achieve victory over Germany.

In the debate full tribute was paid to the armies of our allies and to our own, and an interesting suggestion was made that MPs should visit the 14th Army in India which at a strength of 250,000 to 300,000 men had 237,000 cases of sickness evacuated from the front in the first six months of the year. It was suggested that special welfare arrangements should be made to deal with this serious situation.

FROM THE PRESS GALLERY

Government's Housing Plans

IN the resumed debate in the Commons on Sept. 26 on the Housing (Temporary Accommodation) Bill, Mr. T. JOHNSTON, Secretary of State for Scotland, said that since the debate was adjourned on Aug. 1 the Government had had discussions with the local authorities. The Government had plans ready to increase the strength of the building industry as rapidly as possible. The target was 300,000 permanent houses at the end of the first two years; but even that would not be enough. The Government had produced their proposals for a pressed steel bungalow suitable for a man and wife and two young children. Two other types had been approved by the Burt Committee, and the Government proposed to produce these as soon as suitable terms could be settled. Other types might be brought into production if they could be developed satisfactorily. It was hoped that when the types already approved were in full production some 2500 a week would be available. Local authorities had already applied for 110,515 temporary houses—74,496 in England and Wales and 36,019 in Scotland. The Government would do everything they could to ensure that the local authorities should add to the land available for housing, and they would do their utmost to get the sites serviced. Mr. Johnston assured the House that the last thing that was in the mind of the Government was to offer the people a quasi-permanent house in the guise of a temporary one. Their aim was that some 4 million permanent houses should be built within ten to twelves years after the building was generally resumed, and thus make it possible to remove the temporary habitations. The Government, however, appreciated the anxiety which had been expressed and they would move an amendment to provide that the Minister of Health, or the Secretary of State for Scotland, might, if requested by the local authority after ten years, remove the temporary bungalows unless housing conditions required their continuance.

In the debate Colonel WALTER ELLIOT voiced the general feeling of the House when he emphasised the danger of delay. The Government was expected to go ahead. What would be criticised would not be design or performance, but whether houses were there to live in at all. Mr. J. J. LAWSON said the proposals of the bill were not inspiring, but temporary housing was so necessary and urgent that members had to accept something about which they were not very enthusiastic. Mr. O. LYTTELTON, Minister of Production, said the Government were going to try to begin the production of emergency houses even while the war was still in progress. The bill was read a second time and passed through its remaining stages on the following day.

Lord BALFOUR of BURLEIGH, on Sept. 27, in opening a two-day debate in the House of Lords on town and country planning and the location of industry, called for measures to check the crowding of people into the big towns. That movement threatened the efficiency and health of the nation. There must be a reasonable balance of industry and the preservation of agriculture and the amenities of the countryside.

Lord WOOLTON, Minister of Reconstruction, assured their Lordships that the Government realised that there must be something better in the future than the haphazard growth of cities and roads and open spaces and of industrial development. He agreed that it was desirable to avoid the constant encroachment of towns on good agricultural land. Though we must build in a hurry, he saw no reason why we should build without planning. Provision would be made in subsequent legislation for financial help to local authorities to acquire open spaces.

Disease in the Burma Campaign

In his review of the war in the House of Commons on Sept. 28, Mr. CHURCHILL said that in the first six months of this year the 14th British Imperial Army sustained 237,000 cases of sickness, which had to be evacuated to the rear over the long and difficult communications and tended in hospital. More than 90% of these cases returned within six months, but nevertheless they constituted a ceaseless drain on the Army. In addition there were over 40,000 battle casualties. He trusted

that the toll of disease would be reduced in future operations. Many preventives of tropical diseases had been discovered, and above all against the onslaught of insects of all kinds, from lice to mosquitoes and back again. The excellent DDT powder would henceforth be used on a great scale by the British forces in Burma and by American and Australian forces in the Pacific, and indeed in all theatres. The eradication of lice in Naples by strict hygienic measures might be held to have averted a grievous typhus epidemic in that city and neighbourhood when we occupied it. He could assure the House that the war against the Japanese and other diseases of the jungle would be pressed forward with the utmost energy.

QUESTION TIME

Accommodation in London Hospitals

Sir E. GRAHAM-LITTLE asked the Minister of Health whether he was aware that through recent requisitioning of another 50% beds in the London hospitals occasioned by the opening of the second front, the admission of civilian patients to the London hospitals had become almost impossible; and, as this had serious results upon the civilian population, whether he would now release for civilian use a proportion of the empty beds reserved for military casualties.—Mr. H. WILLINK replied: As part of the plans for receiving casualties from Western Europe, hospitals throughout the country were asked to restrict the admission of civilian patients, the aim being to reduce occupancy on the average to about 50% of the beds. In some hospitals this step was necessary in order to secure more beds for the casualties, and in others, notably in London, to set free staff for the hospitals specially designated to receive the casualties on arrival in this country. At the same time, it was made clear that the restrictions were not to be applied to patients in immediate need of treatment in hospital. In view of recent developments of the war situation my officers are now arranging for the restrictions to be relaxed, bearing in mind the varying needs at each hospital of civilian and service patients respectively.

Service Rations in EMS Hospitals

Sir L. LYLE asked the Minister whether he was aware of the dissatisfaction which was caused by the present arrangement under which only those emergency service hospitals who had 20% or more Service cases could apply for an additional allowance of meat to enable them to give adequate rations to Service patients; and whether steps could now be taken to ensure that these hospitals were given the right to obtain full Service rations for their Service patients so that they would not have to draw on their civilian ration quotas in order to give adequate nourishment to wounded Service men.—Mr. WILLINK replied: Apart from one or two individual complaints I have no evidence of dissatisfaction with the arrangement under which the increased allowance of meat is not given to hospitals with less than 20% Service patients. In such hospitals I am advised that the rationed and unrationed foods available should provide a proper dietary for both Service and civilian patients. This, however, is one of the matters kept under observation by my officers who inspect the feeding arrangements in EMS hospitals.

Milk and Meals in Schools

The percentage of children in England and Wales present on a day in June, 1944, who received a midday meal and/or milk at school is as follows:

	Meals			Milk		
	Free	On payment	Total	Free	On payment	Total
Public elementary schools	4·6	26·1	30·7	8·8	67·6	76·4
Grant-aided secondary schools		52·9			60·0	

(Mr. R. A. BUTLER replying to Miss E. RATHBONE.)

More Paper for Books

Replying to a question Mr. E. H. DALTON said that the Minister of Production had agreed to increase the allocation of paper to publishers of books as from the end of next month to 42½% of their prewar usage. Mr. Dalton hoped that the publishers would do all they could to devote this extra paper to supplying liberated territories as well as Empire and other overseas markets. The Minister had also made a further additional allocation for certain classes of educational books. Mr. Dalton was in touch with the Minister of Labour about the supply for printing and binding.

Pneumoconiosis in South Wales

Mr. JAMES GRIFFITHS asked the Minister of Fuel and Power what action he proposed to take following the report of the committee on the problem of pneumoconiosis in the South Wales coalfield.—Major LLOYD GEORGE replied: The committee's recommendations with regard to the establishment and equipment of a treatment and rehabilitation research centre require discussions with other departments, which are already proceeding. Concurrently I am examining, and propose to put into effect as soon as possible, other recommendations which can be implemented by strengthening existing machinery. These, I hope, will include the radiographic examination of all new entrants into the industry in South Wales; the periodical examinations of selected groups of miners in relation to concurrent assessments of the dust conditions of their employment; and, in association with the Minister of Labour, an investigation into the present and progressive medical condition of miners who because of the disease have left the industry and have taken up other employment, the object being to provide guidance as to what other occupations are best for such cases. The machinery of my department is to be strengthened for this work by appointing a second mines medical officer in South Wales and by adding to the testing station a new section of staff to concentrate on the work of dust assessments.

Coalminers and the Pneumoconiosis Scheme

Under this scheme 42 coalminers, including 10 in South Wales, have been granted certificates of suspension. (Mr. H. MORRISON replying to Mr. GRIFFITHS.)

PRODUCTION OF DDT.—Mr. LYTTELTON said that the total production of DDT available to the United Nations was at present required for military use and it was not possible to release any for general civilian use. A small quantity had, however, recently been allocated to the Ministry of Health for use in air-raid shelters.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED SEPT. 23

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1696; whooping-cough, 1059; diphtheria, 566; paratyphoid, 8; typhoid, 12; measles (excluding rubella), 1509; pneumonia (primary or influenzal), 435; puerperal pyrexia, 134; cerebrospinal fever, 33; poliomyelitis, 16; polio-encephalitis, 1; encephalitis lethargica, 1; dysentery, 365; ophthalmia neonatorum, 74. 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 Sept. 20 was 705. During the previous week the following cases were admitted: scarlet fever, 32; diphtheria, 13; measles, 4; whooping-cough, 28.

Deaths.—In 126 great towns there were no deaths from enteric fever, measles or scarlet fever, 8 (0) from whooping-cough, 8 (1) from diphtheria, 67 (3) from diarrhœa and enteritis under two years, and 10 (0) from influenza. The figures in parentheses are those for London itself.

Nottingham reported 7 deaths from diarrhœa, and in the same week there were 27 fatal cases in Glasgow.

The number of stillbirths notified during the week was 191 (corresponding to a rate of 29 per thousand total births), including 12 in London.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE.—During the autumn session the following lectures will be given at the institute, 28, Portland Place, London, W.1, on Wednesdays, at 3 PM: Mr. A. T. Fripp, common deformities in children (Oct. 18); Miss Alice Bloomfield, recent advances that have contributed to making childbirth safer (Oct. 25); Dr. Frank Knott, blood transfusion in practice (Nov. 1); Mr. Harold Dodd, the modern radical treatment of varicose veins (Nov. 8); Dr. G. Hamilton Hogben, community health centres and their function (Nov. 15); and Brigadier F. D. Howitt, the correlation of medical science and physical education (Nov. 22).

Letters to the Editor

A MEETING OF SPECIALISTS

SIR,—A committee has been formed to consider the effect of the White Paper proposal on the consultant and specialist services of the country. The Royal Colleges, the specialist associations, the provincial teaching hospitals, the provincial non-teaching hospitals, and the British Medical Association are represented on the committee.

A large number of specialists attached to hospitals are employed as whole-time officers of local authorities, and we think that they, as a group, should be represented on the committee. The President of the Royal College of Physicians, as chairman of the committee, is sympathetic to this proposal, and is willing to submit it to the committee. It is therefore proposed to call a meeting of specialists employed whole time by municipal authorities on Friday, Oct. 20, at 5 P.M., at the Royal College of Physicians. It is hoped that as many as possible will attend to make the meeting fully representative. No individual notices are being sent out, and we ask specialists to draw their colleagues' attention to this letter. We hope that the medical officers of health will, so far as possible, enable the specialist members of their staffs to attend the meeting.

C. ALLAN BIRCH. J. E. MCCARTNEY.
ALLEN DALEY. GEORGE F. STEBBING.
HORACE JOULES. D. M. STERN.

BACTERIOPHAGE IN BACILLARY DYSENTERY

SIR,—In his letter of Aug. 5 (p. 192) Dr. Arthur Compton criticises certain observations made by Major Portnoy and myself (*Trans. R. Soc. trop. Med. Hyg.* 1944, 37, 243). It is obvious that Dr. Compton has not read our paper in the original, otherwise he would have realised that the bacteriophage we used was not, as he states, "poor and of limited activity," but was in its action on known dysentery organisms vastly superior both to "Bacti-dysenteri-phage" of the Laboratoire de Bacteriophage, Paris (of which quantities were purchased by the Army on Dr. Compton's recommendation that it was one of the best available) and to "Anti-diarrhœa Polyphage" of the Bacteriophage Research Institute of Egypt, which is presumably one of the "perfected Alexandria phages," to which Dr. Compton refers.

Dr. Compton states that according to his later conceptions certain concomitants play an important part in predysentery conditions and acute dysentery, so much so that when a phage preparation covers only classical organisms and fails to cover concomitants it is in his experience ineffective. The concomitants are apparently amenable to "a good salmonella and coliform phage preparation." The suggestion that organisms of the salmonella group are concomitants in bacillary dysentery will bewilder most bacteriologists, as indeed it did me until I discovered that Dr. Compton has his own private definition of the salmonella group and includes in it such diverse organisms as *B. asiaticus*, *Proteus vulgaris*, various "paracolons," *P. morgani 1*, *B. dysent.* Newcastle, and numerous strains of his own identification (Comptes Rendus de la Société de Médecine et d'Hygiène Tropicales d'Egypte, 1940–1941, vol. VIII, pp. 124–149). Dr. Compton attributes to our treatment beneficial results which we ourselves were unable to appreciate, and I am therefore in the happy position of being in full agreement with his considered statement that a phage preparation which "covers only the classical organisms" is ineffective in the treatment of bacillary dysentery.

Without expressing any opinion on the rôle of the organisms which Dr. Compton regards as concomitants in bacillary dysentery (for I do not know of any evidence which incriminates them) I would point out that Dr. Compton's final conversion to these "later conceptions" is comparatively recent. Before adding "salmonella-coliform" bacteriophage to his armamentarium, he for many years claimed outstanding results in the treatment of bacillary dysentery with a type of preparation which he now considers ineffective. Is it possible that his later findings have an equally insecure foundation?

France. J. S. K. BOYD.

CHRONIC DISEASE AND MILITARY SERVICE

SIR,—In Major Mallam's series of cases of hydronephrosis causing backache in your journal of July 22, I was especially interested in case 8, who developed acute nephritis after nephrectomy. In spite of a complete recovery he was boarded out of the Army "owing to the impossibility of making an ultimate prognosis."

A few months ago, while working in a military hospital in England, I had as a patient an RAMC orderly who having already lost an arm at Gazala in 1942 had the additional misfortune to contract acute nephritis. In spite of a three-month stay in hospital and a variety of treatment he had a residual albuminuria and intermittently passed red cells in his urine. His steps appeared firmly planted in the path of the chronic nephritic and there seemed little else to do but discharge him from the Army. He was, however, a keen intelligent lad and he pleaded strongly to be allowed to stay in the Service. So, in consultation with the president of the standing board, he was finally re-graded category C. On his discharge he was promptly placed on the strength of the hospital where I was serving, and in a week or two I found him working as a clerk in my own outpatient department. His duties were entirely sedentery. I was amply rewarded, as his keenness and intelligence made him easily the best outpatient clerk we had so far had.

There is a belief in some circles that severe chronic disease automatically bars a man from further military service. This is by no means so and each case should be judged on its own merits. There are many jobs in the Army at home which are better done by an intelligent invalid than by a duller but fit man. In this particular case the percentage disability and therefore the pension may possibly be greater at the end of the war than now, but surely this is a small matter compared with the spending of many millions a day on the war and the need to conserve man-power.

J. C. HARLAND.

SCARLET FEVER WITHOUT HÆMOLYTIC STREPTOCOCCI

SIR,—Dr. Lorraine's letter of Sept. 16 introduces an important subject to those who work in the Public Health Services. Is it "generally agreed that hæmolytic streptococci can almost invariably be isolated from the throat and nose in ordinary cases of scarlet fever and a negative result is strong presumptive evidence against the diagnosis"? Routine nose and throat swabs taken from patients with scarlet fever on admission to this hospital during 1941 and 1942 showed no hæmolytic streptococci in at least 10% of the cultures. The swabs were taken with care and transmitted immediately to the Oxford Emergency Public Health Laboratory where they were examined by special cultural methods as part of a carefully planned investigation, the results of which are to be published in due course, I understand.

Another question of great interest is the relative potential danger to the community of (*a*) the patient with tonsillitis and hæmolytic streptococci in nose and throat swab cultures, and (*b*) the patient with scarlet fever and no hæmolytic streptococci in nose and throat swab cultures. Five return cases of scarlet fever occurred in our 1942 series; in two out of these five cases the primary patients had shown no hæmolytic streptococci in nose or throat swab cultures on discharge from hospital. I recall, unhappily, a more recent patient who was transferred to another hospital after repeatedly negative nose and throat swab cultures, and who apparently gave rise to a small outbreak of streptococcal tonsillitis and scarlet fever shortly after arrival. On the other hand, 78 patients of the 1942 series were discharged from hospital with hæmolytic streptococci still present in the nose and throat, some of these being very heavy carriers, without any clinical evidence of spread of infection in the families to which they returned.

All these facts throw doubt upon the reliability of nose and throat swab cultures as an indication of the infectivity of a patient. Certainly a well-considered clinical diagnosis of scarlet fever should not be discredited by the failure to isolate hæmolytic streptococci from nose and throat swabs of the patient.

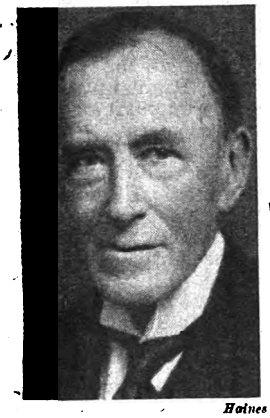
City Isolation Hospital, Oxford. NORA ARCHER.

Obituary

HUMPHRY DAVY ROLLESTON

BT, GCVO, KCB, M D CAMB., F R C P

THE significance of Sir Humphry Rolleston's life, with its span of 82 crowded and fruitful years, can best be seen in the mark it made on the lives of fellow travellers. The short memoirs which follow, written in the revealing atmosphere of personal loss, are by his successor in the regius chair of physic, an assistant in his earliest days as hospital physician, a surgical colleague at a later period, and a literary coadjutor—in that order.



Haines

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The news of Humphry Rolleston's death will sadden many who had the privilege of his friendship and were accustomed to look up to him as an exemplar of the highest traditions of medicine as a humane and scholarly profession. When he came from Marlborough to St. Bartholomew's Hospital his teachers, recognising his promise, advised him to go to Cambridge first—which he accordingly did, gaining a scholarship at St. John's College and a first class in both parts of the natural sciences tripos. He undertook research work on the mechanics of the heart with C. S. Roy and was elected to a fellowship at St. John's College in 1889. Meanwhile he had become qualified and proceeded to the degree of MD in 1891. Two years later he became an examiner for the Cambridge MB, and was elected FRCP in 1894, delivering the Goulstonian lectures the following year. He chose for his subject the suprarenal glands and, at a time when they were becoming regarded as adjuvant excretory organs, maintained on clinical grounds that the symptoms of Addison's disease implied an "atony," as he expressed it, due to the loss of some unrecognised factor. His acumen was confirmed later in the same year when Schäfer and Oliver prepared an active extract from these glands, from which adrenaline was isolated a few years later. This was his pioneer work in endocrinology, a subject in which he always retained his interest.

There were many aspirants then waiting for vacancies on the staff of Bart's, and Rolleston wisely decided to avail himself of the opportunity of becoming assistant physician to St. George's Hospital. A rapid succession of vacancies placed him on the senior staff there at the unusually early age of thirty-five. When everything seemed in his favour there came a temporary set-back, for he was threatened with lung trouble and in 1901 he went to South Africa as consulting physician to the Imperial Yeomanry Hospital at Pretoria during the latter half of the South African campaign, with fortunate effects on his health. His earliest editorial enterprise appeared as three handsome volumes recording the work of the Imperial Yeomanry Hospitals. With these it became clear that the literary side of medicine made a special appeal to him; indeed his knowledge of medical literature was almost unique, his only rival in that field being Dr. Parkes Weber. His labours in producing the second edition of Allbutt's *System of Medicine* which appeared under their joint names are well known and widely recognised. In this personal tribute it is unnecessary to detail all the offices he held with distinction and the honours which fell thick upon him. It must, however, be pointed out that only one other man, the famous Francis Glisson, became both president of the Royal College of Physicians and regius professor of physic in the University of Cambridge. Rolleston's appointment to the chair on Clifford Allbutt's death in 1925 was confidently anticipated.

Among his many activities while at Cambridge he followed his predecessor in interesting himself in Varrier-Jones's work at Papworth, becoming president of the Village Settlement there, work in which he had the inestimable advantage, here as elsewhere, of Lady Rolleston's sympathetic insight and practical coöperation. He also placed all medical graduates of Cambridge under a debt of gratitude by his *Cambridge Medical History*, published in 1932, which bears the mark of the careful research so characteristic of him and which is full of interest. In this book among other things he rescued from oblivion the great services of John Haviland who held the regius chair from 1817 to 1851 and who laid the foundations of the school which was later to achieve such success. Rolleston used to say that one of the results of the retiring age, enforced by the new statutes, would be that emeritus professors would live on in Cambridge *watching* their successors. This he was determined not to do; retiring to Haslemere where he continued an active literary career until the last few months of his life. To this the *British Encyclopædia of Medical Practice*, and the *Practitioner* which he more than restored to a prestige that had begun to fade, bear ample testimony. There were two aspects of his literary work; first, a scrupulous exactitude which made him an ideal editor, though a terror to a contributor careless of his references; and, secondly, a wider survey to include such studies as the changes in the incidence of disease, the history of endocrinology, idiosyncrasy, and medical aspects of old age (which seemed to have an almost painful interest for him). Reference should be made to his minute and delicate calligraphy; his friends jestingly told him that the greater he became, the smaller his handwriting.

Rolleston's outstanding quality was a stirling integrity which shone so clear that men trusted him. Patient, courteous if a trifle aloof, his kindness and encouragement to his juniors was inexhaustible. Self-disciplined, he soon found himself happily at home in the disciplined service of Royal Navy during the last war. A man of peace, he disliked controversy and detested intrigue. Though an academic physician he had great wisdom in consultation and the gift of restoring the patient's confidence. Those of us who were near to him at the time realised his deep (though suppressed) anxiety during his attendance on King George V. in his grave illness. Rolleston's chief recreation was lawn-tennis which he continued to play with zest until he was over 70, enjoying it most as an interlude between spells of hard work. For such a public figure he was a retiring man. He refused to give an inaugural lecture when he became regius professor, and it is typical of this and of his consideration for others that he left instructions that there should be no memorial service for him. But his best memorial is in the minds of the profession he served so well and himself adorned.

W. L.-B.

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I was Rolleston's assistant physician at St. George's. It was throughout a delectable position. He gave me a free hand in his ward, and was considerate about notice when he would be away, and sent me to do his private work liberally, introducing me thereby to many distinguished and interesting people, including a Prime Minister. Through him too I was "locum-tenens consultant" in summer holidays to the Palace, meeting Stanley Hewett. I gather that senior physicians with much larger practices than he had in those early days (1904–12) were not so generous to their juniors. I helped him also in his editing of the second edition of Allbutt and Rolleston. We had a little controversy over this. He sent me a cheque which, useful as it would have been, I could not, in view of his many kindnesses, accept. This friendly dispute ended in my having an inscribed copy of his book on the liver. His little upstairs room in Brook Street where, almost without moving, he could reach many books of reference, inspired William Bulloch to try and catch him out. There would in some of the articles be 2–3 pages of references. Bulloch put in a wrong volume number for fun, but Rolleston found it. His home was informal and charming, the loss of his sons desolating, Lady Rolleston a delightful hostess. I remember a dinner he gave during some congress to be before a reception. Sprigge was there, and Osler, and I think one or two Americans. After dinner the talk went on, the reception was not mentioned, and we parted round about 2 AM not having left the table. In later years I met him in consultation in town and at Ruthin; he was always helpful and brought a new view or fresh information. His goodwill, his literary and personal

integrity, and his scholarship were a combination not matched in my time. E. I. S.

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Humphry Rolleston came to us at St. George's from Bart's as John Hunter did before him. In both cases we were entertaining angels unawares. In his early days the teaching of pathology, which was a less specialised subject than it now is, was the duty of one of the physicians. This fell to Rolleston's lot, a stroke of good fortune for us who sat at his feet, as we were not slow to recognise, for his classes on "slides," which he held in the museum, rapidly became one of the most popular features of the institution. It is there that I first remember him. His methods were gentle, as he was himself in all his ways, but they were none the less inspiring. Under his guidance the recognition of tissue under the microscope, instead of being a rather dull affair, became an exciting adventure. His own reputation as a pathologist became so great that his opinion on a difficult section was widely sought, and his verdict on it accepted without demur as final. I was once present at a discussion on a section of an obscure tumour. Clayton-Greene, who was one of us, said "Has Rolleston seen it and, if so, what does he say it is?" "He says it's an endothelioma," was the reply. "Well, then, what are we arguing about?" said Clayton-Greene. That conversation represents the esteem in which his pathological opinion was held.

Later, it was my good fortune to be his house-physician. Our relationship became more intimate than is usual between a house-man and his chief from the time when he discovered that we had been educated at the same school. Though he was, I believe, essentially a shy man, his smile of greeting was one of the most charming I have ever known and the courtliness of his manner, especially to his juniors, was to me a source of great delight. In a difficult case he would often invite my opinion and listen to it with the same respect which he would have shown to an equal, a very flattering experience for a young man. Is it to be wondered at that I had a profound admiration for him? His erudition was immense and his knowledge of current medical literature was prodigious. Often he would tell me where I could find an account of some rare condition, not only the volume but the very page; and, after he had finished his round, I would go to the library and discover that his information was invariably correct. Do not think that I am belittling him if I say that he was not endowed with that queer clinical instinct, which is given to the few (such as his colleague, Cyril Ogle), that sixth sense which enables them to put their finger unerringly on the essential cause of a malady without apparent effort. But for all that he was a very great physician.

Later still, when he was regius at Cambridge and I was one of his board of examiners, I often spent the time of the examination as his guest at his delightful home in the Trumpington Road. After the labours of the day we would pass the time together in his study and the evenings thus spent are among the most pleasant that I can recall. On one occasion he confessed to me that as a schoolboy and even in his first year as an undergraduate he was backward. But one fine day he woke up and found himself consumed with a passion for knowledge and from that moment of course he swept all before him. He himself attributed this to the fact that one of his endocrine glands, which had hitherto lain dormant, suddenly came into action. Whether it was an endocrine gland that was responsible or not, he was not only a very great physician; he was also a very great gentleman. I. B.

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Sir Humphry took over editorship of the *Practitioner* in 1928 and it can be said without any implied criticism of his predecessors that he brought a new life and spirit to the journal. He had made many contacts with the younger generation of consultants and this, together with his friendship with the leaders of the profession, gave him a wide circle to whom he might appeal for authoritative articles. I joined him in 1934 for ten years of valuable apprenticeship and together—with the help of Mr. Scott Stevenson in the earlier years—we planned each monthly symposium, and spring and autumn special numbers. Sir Humphry had a keen sense for the topical subject and was a wise judge of the best authors to approach. He knew almost instinctively the right sort of title for articles and realised how often the correct choice of title largely determined the article's scope. But it was in preparing scripts for the printer and in his painstaking proof-reading that he showed his greatest skill. He was certainly a leading authority on the presentation of medical articles in clear and faultless prose—as faultless at least as could be reasonably achieved without destroying an individual style. In *The Lancet* on his retirement earlier this year he was spoken of as an "arch-editor," a charming tribute to his position in the field of medical journalism. With all his knowledge and experience he maintained a great humility. (How characteristic of him to be so set against any sort of memorial service.) Right up to the end he asked for advice and frequently embarrassed me by his reminder that I was in recent years a "joint editor" and not in a subordinate position. We did not always agree. I concurred with his cordial dislike of the first person, singular or plural, in medical literature, but I did not readily accept his views on negative construction. He always, for example, altered "no cases" to "not any cases," and sometimes the sentence became a little complicated in consequence. But in most matters I had to agree that he was right and in the ten years I learnt from him a tremendous amount of sound commonsense in dealing with the vagaries of the English language.

He was very ill at the end of last year, but up to then his memory seldom failed and his inspiration never. His kindness and courtesy to all the staff made him a much endeared visitor to the "office" and we were all glad to see him back again in the early spring. But he was still frail and the journey from Haslemere was obviously a strain. So with great reluctance he retired in the early summer of this year. He left behind a great tradition of what a medical periodical should stand for, both in scope and style, and medical journalism owes much to his life-long interest in the written word.

I first met him when, as president of the Royal College of Physicians, he told me that I was through the membership—a joyous occasion with which to start an acquaintance. I last saw him when, nearly nineteen years later, we shook hands again, this time in Bentinck Street, and I realised that I was parting from a friend and the kindest of mentors. A. A. M.

* * *

Sir Humphry Rolleston was the eldest son of Dr. George Rolleston, FRS, Linacre professor of anatomy and physiology in the University of Oxford, and great-nephew on his mother's side of Sir Humphry Davy, PRS. He was born at Oxford in 1862, qualified from St. Bartholomew's Hospital in 1888, and was physician to St. George's Hospital 1898–1919. He was consulting surgeon to the Royal Navy 1914–18 with the rank of surgeon vice-admiral. He was president of the Royal College of Physicians 1922–26 and Harveian orator in 1928. He was physician-in-ordinary 1923–32 and physician extraordinary to King George V 1932–36. He was regius professor of physic in the University of Cambridge 1925–32. He had been chairman of the committees on vaccination and medical records of the Ministry of Health, and the Home Office committee on workmen's compensation. He was a member of the General Medical Council 1922–32. He held some 16 honorary degrees and diplomas. He married in 1894 Lisette Eila, daughter of F. M. Ogilvy and they had two sons of whom one was killed in Flanders in 1915 and the other in quelling a riot in Zanzibar in 1936. He died at Haslemere, Surrey, on Sept. 24.

ERNEST ALEXANDER WALKER

KCIE, CB, MB EDIN., FRCSE; MAJOR GENERAL IMS RETD

Sir Ernest Walker, director of medical services in India from 1933 to 1937, died from a heart attack at his home on Vancouver Island, British Columbia, on Sept 6. He was born in 1880, the son of the Rev. A. Walker, a senior chaplain of the Church of Scotland, and was educated at Forfar Academy and the University of Edinburgh, where he graduated MB in 1901. He entered the IMS the next year and spent a period of duty as a civil surgeon in Burma. On the outbreak of the last war he was recalled to military duty and served in Iraq till he was taken prisoner in the siege of Kut-al-Amara in 1916. He was twice mentioned in dispatches.

After the war he was appointed a specialist in operative surgery, but from 1928 he held administrative appointments and he was promoted to the post of director in 1933. "Walker was an ideal chief," one of his staff writes, "always cheery, never ruffled, and easily approachable. He was quick to see the humorous side of things and was at all times ready to listen with a sympathetic ear. His keen brain and long administrative experience enabled him to give quick decisions, and his instructions were always clear and to the point. A keen fisherman and a good shot he was never happier than on a shikar trip. When he retired in 1937 he settled on Vancouver Island, where he enjoyed to the full the sport of forest, lake and stream." Walker, who was honorary surgeon to the King from 1932 to 1937, was appointed CB in 1934 and KCIE in 1938. He married in 1906 Miss Juanita Power, daughter of the late Surgeon Major R. Power, IMS, and they had one son.

FRANK DOUGLAS MARSH

MC, MB CAMB., FRCS

Mr. Douglas Marsh died at his home at Edgbaston on Sept. 17 after two months' illness. When the war began he was recalled to the Army, and for three years he had charge of the ear, nose and throat department at Netley. But after his discharge in 1942 on medical grounds he was eventually able to resume his hospital and private practice in Birmingham, and his loss is deeply felt there.

Whitlock

His father, the late Frank Marsh, CBE, DL, was also a Birmingham aural surgeon and commanded the 1st Southern General Hospital stationed at Birmingham University during the last war. Douglas, the elder son, born in 1888, was educated at Shrewsbury, Trinity College, Cambridge, and Bart's, and qualified just in time to take a commission in the RAMC in August, 1914. Having seen long service in forward areas, in the course of which he won the Military Cross in 1917, he returned after the war to his old hospital as house-surgeon, took his FRCS in 1920, and spent six months in Vienna. In 1922 he was elected aural surgeon and laryngologist to the Children's Hospital, Birmingham, where he developed his department so successfully that nine years later it was undertaking over 3000 operations a year and had very large outpatient and inpatient clinics. Its efficiency was evidence of the unusual organising and administrative ability he inherited from his father, and of his capacity for hard work. From 1927, again following in his father's footsteps, he was also responsible for the large ear, nose and throat department at the Queen's Hospital, subsequently embodied in the Queen Elizabeth Hospital.

"To his professional work," writes a colleague, "Marsh gave himself unsparingly. In judgment he was sound and definite, and his quiet bearing endeared him to his patients, while his universal courtesy won the devotion of his assistants and his ward and theatre staffs. With juniors he was always approachable, and his colleagues appreciated his personal and professional integrity—holding him in such esteem that at the Queen's Hospital, at the outbreak of war, they chose him as their commandant. His reserved though kindly manner stood in the way of friendships of the easy, familiar sort, and the impression of shyness took long to overcome. But when his natural caution was satisfied and his friendship was given it was deep and lasting and irradiated his whole relation with those who enjoyed it. Often have I met men, both in England and Vienna, whose faces lighted at the mention of his name."

Marsh's interest in the craftsmanship of furniture was more widely known than his interest in natural history. But he was a member of the select circle of the Men of the Birds, and it was his keenness in watching the movements of a bird near Netley that once led to him and his wife being arrested and marched to headquarters under Home Guard escort.

In addition to his work at the Queen Elizabeth General and Children's Hospitals, Mr. Marsh was deputy regional adviser for his specialty under the Ministry of Health, and a clinical lecturer in the Birmingham University. Mrs. Marsh is left with one son.

JOHN OSCAR THOMAS

MC, MD LOND., MRCP

Dr. J. O. Thomas, who was drowned while bathing at Herne Bay, Kent, on Sept. 24, had only lately returned to civilian life after more than four years on active service. Born at St. Blazey in Cornwall in 1891, he went to school at Fowey. He studied medicine at King's College, London, and the Westminster Hospital where he took the Conjoint qualification in 1914. A year later he joined the RAMC and during his service as regimental medical officer to the Middlesex Yeomanry was awarded the MC. After that war he returned to his old hospital to hold house-appointments while studying for higher qualifications, and he obtained his MD in 1922 and the MRCP in 1923. Meanwhile he had settled in practice in Rochester and in due course was appointed physician to St. Bartholomew's Hospital there. A soldier as well as a doctor, he served for thirty years with the Territorials, at one time commanding the County of London field ambulance, and he was called from the reserve at the outbreak of this war. He left his practice to raise a general hospital of 1200 beds with which he went to France at the end of 1939. In the withdrawal of the BEF Colonel Thomas was one of the last to leave St. Nazaire, returning to England to mobilise another medical unit, which in October, 1940, he took to the Middle East, where for three years he commanded a general hospital. He leaves a widow and one daughter.

DR. DENNIS EMBLETON

Dr. F. H. TEALE writes: Dennis Embleton started working with me in the days when clinical pathology, bacteriology and immunology were in their infancy. He followed their advances with enthusiasm, keeping well abreast of research and always hoping that along such lines the problems of bacteriological infection and its treatment would ultimately be elucidated. He himself took a notable part in this research, working unremittingly, often well into the night after a hard day's work in teaching and practice. But he never failed to do more than his share in the routine of teaching and laboratory work, and many who had the privilege of attending his lectures and demonstrations, both for the MB and DPH, bear witness to his success. An able organiser, he worked single-heartedly for the good of his medical school and of his fellow-workers in clinical pathology.

On Active Service

CASUALTIES

DIED

Major R. J. FRANKLIN, RAMC

WOUNDED

Captain C. M. BALLEM, RCAMC

AWARDS

OBE (MILITARY)

Squadron-Leader D. D. MORRELL, MB DURH., RAFVR

In June, 1944, a Liberator aircraft crashed into the sea some distance from the shore at Littlestone and an airman of the United States Army Air Force was trapped in the nose of the aircraft which quickly became almost submerged. Squadron-Leader Morrell immediately waded into the surf and attempted to swim towards the Liberator, but was unable to reach it owing to the very heavy sea and strong current. He then commandeered an amphibious vehicle which was passing along the water front and eventually he was conveyed to the side of the Liberator. By this time the water was up to the shoulders of the trapped airman and he was suffering considerably. Ignoring the possibility of being trapped himself, Squadron-Leader Morrell dived to the bottom of the fuselage. By using great force he tore away a part of the aircraft which then enabled him to release the airman. Immediately afterwards he administered morphia to the suffering airman. All this took place inside the fuselage. Squadron-Leader Morrell finally succeeded in dragging the airman clear of the aircraft and, with assistance, he got him aboard the waiting craft. Squadron-Leader Morrell's outstanding courage and initiative saved the airman's life.

MC

Captain W. R. DALZIEL, RCAMC

Notes and News

MALE NURSES IN THE MINES

MALE nurses are increasingly valued, but there is still little general appreciation of the part they could take in making good the nation-wide shortage of nurses. The Society of Male Nurses have recognised an opportunity for their members to meet an industrial need by serving among the miners. In a memorandum [1] submitted to the Minister of Fuel and Power, they propose that this service should be part of the national nursing service foreshadowed in the white-paper. The male nurses employed in the mines, they hold, should be general-trained and state-registered, with special experience in the casualty department of a general hospital, and of casualties treated in medical and surgical wards. They should have physique and character appropriate to the work, and should be acquainted with the law as it relates to men employed in mines and workshops. They would undertake to learn about the health facilities in their area, including hospital services, district nursing services and pithead canteens; and they should have studied the prevention and treatment of diseases particularly associated with the mining industry. A male nurse in charge of a first-aid post could strengthen and improve existing first-aid teams, attend at once to casualties, if necessary giving drugs for the relief of pain, and organise follow-up services. Male nurses, if properly trained, would also prove valuable members of rescue teams. The memorandum suggests that a nursing advisory officer at the ministry would be in a position to help mine-owners to develop their health services.

CASE OF PELVIC SPLEEN

Dr. E. W. PRICE writes from Pimu, Belgian Congo. He thinks that the following case is of sufficient interest to put on record. A native woman about 25 years of age came to hospital with a suprapubic tumour, which she said was getting larger. It extended about 2 in. above the pubes, was slightly tender, movable from side to side, nodular and continuous with a mass in the pouch of Douglas. The mass was posterior to the uterus but continuous with it, and a diagnosis of submucous fibroids was made. An operation was decided on, with a view to myomectomy. On opening the abdomen, the notched surface of a spleen presented itself, together with two splenculi which had given the impression of outgrowing fibroids. The spleen passed down into the pouch of Douglas, and was firmly adherent to the back of the uterus. The two fallopian tubes were also adherent. Above, a compact sheath of vessels enclosed in fat ran down from the normal position of the spleen to be inserted postero-superiorly. There was no twisting of this pedicle suggestive of any torsion having taken place, and the pedicle ran down like a pencil across the abdomen. The spleen on removal weighed 100 grammes, and was fibrotic on section, as are most spleens seen at autopsy in this malarial area.

University of London

Mr. H. Berry, PH C, has been appointed to the chair of pharmaceutics, and Mr. W. H. Linnell, D SC, to the chair of pharmaceutical chemistry, both tenable at the College of the Pharmaceutical Society.

University of Leeds

Sir Joseph Barcroft, FRS, will give the inaugural lecture in the faculty of medicine at the University Union at 3 PM on Thursday, Oct. 26. He will speak on problems in fœtal life.

Unrra Appointments

Dr. M. T. Morgan has been appointed chief medical liaison officer of the health division of UNRRA with France, and Dr. Gordon Lilico and Dr. J. Miller Vine have been appointed medical liaison officers with Czechoslovakia and Poland, and with Belgium and Luxembourg respectively. Dr. Morgan has been MOH for the port of London and is a former senior medical officer of the Ministry of Health, vice-president of the League of Nations health committee, and president of the permanent committee of the International Office of Public Health, Paris. Dr. Lilico has been for fourteen years MO for Derbyshire, and Dr. Vine for five years has been acting MOH and port MO for Grimsby.

1. Employment of State-registered Male Nurses in the Mining Industry. From the secretary, Society of Registered Male Nurses, 2, Haslemere Avenue, Barnet, Herts.

Medical Defence Union

Dr. James Fenton, in commending the council's report for 1943 to the general meeting of Sept. 19, said that the record new entry of 1861 had brought membership of the union up to 27,439. Despite difficulties of travel the council had met in full session month by month to solve the personal problems of this vast constituency. When the war was over he hoped some of the useful lessons learned would be put on record. The Spackman case had passed into history—"satisfactory history," he called it—without impairing the good relationship between GMC and MDU. Far-reaching conferences on the technical side of narcosis with gases were opening prospects of increased safety for patient and anæsthetist. For those whose practice might lead them to apply artificial insemination the council had drafted a guiding document. He had a few words to say on honest certification and ended with a warning that state service would not remove the doctor's answerability at law for his own commissions or omissions. The meeting re-elected Dr. Fenton president and Mr. E. D. D. Davies treasurer, and added to the list of vice-presidents the name of Prof. Gilbert Strachan, FRCOG.

Royal Society of Medicine

On Tuesday, Oct. 10, at 5 PM, Dr. A. F. Tredgold will speak to the section of psychiatry on the mental defective and the community. On Oct. 11, at 4.30 PM, at the section of physical medicine, Dr. L. D. Bailey will give an address entitled Looking Ahead. On Oct. 13, at 5 PM, at the section of ophthalmology, Mr. P. E. H. Adams is to speak on glaucoma. All three are presidential addresses.

Miss M. O. ROBINSON has been appointed chief nursing officer of the Department of Health for Scotland.

Dr. C. W. F. MACKAY has been appointed a member of the executive council and an official member of the legislative council of the Gambia.

WILLING AND READY.—The 71st of Willing's Press Guides has now appeared (pp. 372, 8*s*. 6*d*.) and the editor has once more arranged British and Colonial newspapers and periodicals alphabetically (from the ABC to *Zodiac*), geographically (from Land's End to John o' Groats), and tactfully classified them so that Almanacs, local and general, stand apart from Almanacs, prophetic, and from Almanacs, religious. The guide is a valuable counsellor for would-be reader, advertiser and contributor alike.

Appointments

HALL, C. W., MRCS: examining factory surgeon for Hawkshead, Lancs.

Births, Marriages and Deaths

BIRTHS

BLOMFIELD.—On Sept. 26, at Sheffield, the wife of Mr. George Blomfield, FRCS—a son.

COOPER.—On Oct. 1, at Darlington, the wife of Lieutenant J. R. Cooper, RAMC—a son (stillborn).

DENTON.—On Sept. 25, at New Milton, the wife of Dr. Aubrey Denton—a daughter.

JONES.—On Sept. 30, at Birmingham, to Dr. Dorothy Jones (née Cooper), the wife of Mr. Lionel E. Jones, FRCS—a son.

MACKEITH.—On Sept. 27, at Edinburgh, the wife of Surgeon-Lieutenant R. C. MacKeith, RNVR—a daughter.

MORSE.—On Sept. 27, at Cranmer Hall, Norfolk, the wife of Lieutenant David Morse, FRCS, RAMC—a daughter.

SALT.—On Sept. 23, at Chirk, the wife of Captain J. W. Patrick Salt, RAMC—a son.

SCOTT.—On Sept. 24, at Speen, Newbury, the wife of Dr. T. G. Scott—a daughter.

MARRIAGES

COOKE—BOND.—On Sept. 14, William Trevor Cooke, MD, to Margaret Anne Bond (née Foxell).

GUNZ—TUCKEY.—On Sept. 23, at Cambridge, Friedrich Walter Gunz, MRCP, to Joan Tuckey.

DEATHS

BREMNER.—On Sept. 29, at Sheffield, Alexander Bremner, CBE, MC, MD EDIN., DPH, DTM & H, colonel AMS.

COOPER.—On Sept. 25, Robert Higham Cooper, CBE, LSA, of Bournemouth.

DICK.—On Sept. 29, in London, Maxwell Dick, MB, LLB LOND., barrister-at-law, lieut.-colonel IMS retd.

JONES.—On Sept. 28, at Ruthin, Selwyn Owen Jones, MRCS.

MOFFITT.—On July 31, Thomas Beattie Moffitt, LRCPI, lieut.-colonel RAMC retd., aged 85.

O'CONNOR.—On Aug. 20, at Blackrock, co. Dublin, Arthur Patrick O'Connor, MC, MB RUI, colonel late RAMC retd., aged 60.

THOMAS.—On Sept. 24, John Oscar Thomas, MC, MD LOND., MRCP, of Rochester, Kent, aged 52.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

DESERT CLIMATE

PHYSIOLOGICAL AND CLINICAL OBSERVATIONS*

W. S. S. LADELL, M B CAMB. J. C. WATERLOW, M B CAMB.

M. FAULKNER HUDSON, M R C P; MAJOR, R A M C

THIS report is an outline of observations made at Shaiba, in Southern Iraq, on British Army personnel during the summer of 1943. Regular measurements were made on a number of fit men from May to October. The majority of cases of effects of heat admitted to a British general hospital during that time were investigated.

Shaiba is situated near the head of the Persian Gulf. The course of the weather is shown in fig. 1. Maximum temperatures above 100° F. occurred daily for four months, and there were two periods, one of a week and the other of a fortnight, when the temperature each day was above 115° F. (fig. 3). The humidity was low throughout; the dew-point was usually between 50° and 60° F., and the relative humidity at midday about 15%; thus the climate was a true desert climate (Buxton 1923). These figures give a fair estimate of the conditions to which the men were exposed, for temperatures in sheds where many men worked were found to be within 2° F. of the screen temperatures from which fig. 1 is drawn.

TABLE I

(A) *Chemical Features of Various Types of Case*

Findings	Controls		Hyperpyrexia		Borderline hyperpyrexia		Type I		Type II	
	obs		obs		obs		obs		obs	
Urine vol. (c.cm.)	45	753 [1]	10	2516	9	2197	35	1161	50	2713
Urine-chloride (g. NaCl) per day	45	4·46[1]	10	4·42	9	2·37	35	0·98	50	3·47
Red cells (mill. per c.mm.)	..	..	..	..	..	..	18	4·96	21	4·34
Hb (%)	100	17·8	10	16·1	8	17·4	25	20·1	27	17·2
Protein (%)	118	6·41	11	6·81	8	6·51	26	7·28	31	6·26
Whole-blood chloride (m. eq. /l.)	121	81·90	11	74·1	9	76·1	27	61·0	30	77·5
Plasma chloride (m. eq./l.)	112	100·40	11	88·3	8	92·2	20	79·0	31	86·8
Blood-urea (mg. per 100 c.cm.)	21	47·5 [2]	11	47·8	9	41·1	26	103·0	31	26·1
Sweat chloride (%) as NaCl	11 3	0·27	6	0·36	5	0·39	23	0·44	31	0·53

(B) *Statistical Significance of Differences Found*

Findings	Controls compared with—				Hp compared with—		Type II compared with—	
	Hp	Borderline hp	Type I	Type II	Borderline hp	Type I	Type II	Borderline hp
Hæmoglobin	sig	not	sig	not	not	not	sig	not
Protein content ..	not	not	sig	not	not	sig	sig	not
Whole-blood chloride	sig	sig	sig	sig	not	sig	sig	not
Plasma chloride ..	sig	sig	sig	sig	not	not	sig	not
Blood-urea	not[3]	not[4]	sig[3]	sig[4]	not	sig	sig	sig
Sweat chloride	sig	not	sig	sig	not	sig	sig	not

1. Values for periods when maximum air temperature was above 102° F.
2. Value for week 12 (hottest week of year).
3. Compared with week 12. 4. Compared with week 16.
5. Compared with week 20.

Obs = Number of observations; Hp = hyperpyrexia; Sig = significant; Not = not significant.

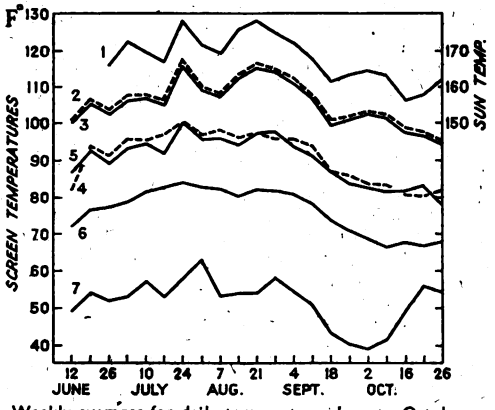
Significance of differences judged from standard error of the difference between the means, or in some cases by t test.

* A report to the Medical Research Council. To be concluded in our next issue.

OBSERVATIONS ON FIT MEN

Physiological and biochemical observations were made each week from May to October, 1943, on 24 soldiers drawn from various units in the area. These were made to serve as controls for similar observations made on cases of effects of heat; and to determine what changes, if any, took place during the hot weather. The subjects had all been in the area long enough for rapid acclimatisation to have taken place (Dill 1938, Bazett et al. 1940).

Fig. 1



Weekly averages for daily temperatures June to October at Shaiba.

(1) Maximum temperature—black bulb thermometer in sun in vacuo.
(2) Maximum temperature
(3) Temperature at 2 pm
(4) ,, ,, 8 am
(5) ,, ,, 9 pm
(6) Minimum temperature
(7) Dew point.

(2)–(6): screened thermometer.

With certain important exceptions described in the next section, it was found that the control subjects showed no deviations from the normal either physiological or biochemical. The average results obtained from the analysis of blood and urine are shown in table I(A) (columns 1 and 2). Thus any deviation from the commonly accepted normal levels found in cases of effects of heat could be attributed to the pathological condition and not to the physiological effects of the climate.

CHANGES IN THE SUBJECTS DURING THE HOT WEATHER

Cardiovascular system.—The pulse-rate of the subjects lying down remained constant throughout the summer at an average level of 65 beats per minute. The difference between standing and lying pulse-rate has been used experimentally as an index of acclimatisation (Scott, Bazett and Mackie 1940, Bean and Eichna 1943). The difference increases on first exposure to heat, and falls again as acclimatisation develops. It is therefore of interest that in this series of control subjects the difference did not increase as the hot weather came on. The average difference for the whole summer was 20 beats per min.; the upper limit in these men was 36. Much greater differences were found in some patients with heat exhaustion.

At the beginning of the summer the average blood-pressure, taken on the subjects lying down, was 112/72 mm. Hg. As the weather became hotter, the BP gradually fell, to a minimum of 98/62 in mid-August. Thereafter it rose again, but by the end of October had not reached the initial level found in May. The pressure taken with the subjects standing up changed in the same way, falling from 113/83 in May to 100/75 in August. This fall in BP occurred in all the men; it was not accompanied by changes in pulse-rate or exercise tolerance, and its interpretation is obscure.

Salt and water balance.—All the subjects lost weight in the hot weather, and some of them lost as much as 7% of their initial body-weight (fig. 2). When the weather became cooler they recovered weight.

The volume of urine passed in 24 hours also fell as it got hotter, and subjects who showed the least weight loss showed the least change in 24-hour urine volume. In a period when the air temperature remained below 102° F. the average 24-hour urine output for a group of men was 1004 c.cm. When the daily maximum air temperature was above 108° F. their average output fell to 715 c.cm. Another group of 10 men † had an average daily output

† This group of men was extra to the 24 who were observed each week.

at the beginning of July of 880 c.cm., and a fortnight later, when the temperature was 5° F. higher, their average output was 660 c.cm. The changes in each group are statistically significant. A urinary output of less than 500 c.cm. in 24 hours was common in the hottest periods; that is, these men had a urinary excretion rate as low as that of men in temperate climates in severe water debt (Ladell 1943). The diuresis after drinking water was less when the room temperature was above 95° F. than when it was below. The first observation shows that these men were not drinking any water in excess of their requirements; the second that some of these apparently

TABLE II—DISTRIBUTION OF BLOOD-UREA VALUES (MG./100 C.CM.) AMONG CONTROLS

Week	Av. max. air temp.	obs	% of values					Mean for week
			Below 20	20–30	30–40	40–50	Above 50	
7	106·2	22	0	9	68	23	0	36·8
8	103·1	21	0	5	71	14	10	37·1
12	117·4	21	0	10	14	28	48	47·5
16	116·0	23	0	30	48	13	9	36·2
21	102·0	25	28	60	12	0	0	22·2

normal individuals contracted a slight water debt when it became hot.

A low urine output was associated with a high blood-urea. In week 7 (average daily maximum temperature 106° F.) the mean blood-urea for the control group was 36·8 mg. per 100 c.cm.; in week 12 (average daily maximum temperature 117·5° F.) the value was 47·5 mg. The difference is statistically significant. Values above 50 mg. were common in the hot weather (table II).

Loss of weight, low 24-hour urine volume, and raised blood-urea are features of dehydration. Calculation based on the rate of weight loss at work and at rest when the daily maximum temperatures were about 115° F. showed that a daily intake of the order of 7½ litres per day was needed to keep in water balance. Intake charts kept by the subjects when it was some 10° cooler showed a daily fluid intake of 5½ litres; to this must be added 1 litre for the water content of the food. The subjects stated that they increased their fluid intake when it became hotter, so it appears that their actual water intake was probably in most cases enough for balance. The dehydration cannot, therefore, be entirely attributed to a failure to drink enough water.

Dehydration was most probably the result of insufficient intake of salt (NaCl). Urinary chloride output was low: in a period when the daily maximum temperature was between 102° and 108° one group of men excreted an average of 5·88 g. (as sodium chloride) per day per man; when daily maximum temperatures were above 108° the average daily excretion was 3·03 g. These men were receiving the full salt ration of 21 g. per day (in this Command the usual 14 g. is supplemented by an extra 7 g.). An additional 10 g. daily may have been available from tinned foods, giving a total maximum intake of 31 g. per day. The actual intake may have been less than this, owing to unavoidable waste in the cookhouse and at the table, and failure to take all that was provided. During the hot weather one individual over several different periods of 24 hours excreted no chloride in his urine. But diminished chloride content, either of whole blood or of plasma, was not found in this or any other control individual, so there was no other direct evidence of salt deficiency.

Salt requirements were estimated by determining the chloride content of the sweat. Sweat was collected from the arm during light exercise; the arm was thoroughly washed in distilled water and enclosed in an impervious bag reaching to the shoulder. It was found that those subjects who lost most weight had the greatest chloride concentration in their sweat. Nine subjects (group A) had an average rate of weight loss, in weeks when sweat samples were taken, of 11·7 oz.‡ per week; the average chloride content of their sweat was 0·32% (as NaCl) (34 samples). The average rate of weight loss for the remaining 15 subjects (group B) for the same weeks was 1·6 oz. per week, and the chloride content of their sweat (45 samples) 0·21%. These differences are statistically significant.

Observations were made of the weight losses during work and during rest, and it was calculated from this that the sweat loss per day during the hottest weeks was about 7 litres. From this figure and the chloride concentration in the sweat, group B were losing an average of 14·7 g. of salt per man per day, and group A 22·4 g.; thus group B's sweat requirements were well covered by the salt ration but group A's requirements may not have been. It has already been pointed out that a variable amount of salt, up to 10 g. a day, was available from the food in excess of the ration. In group B an amount equal to this extra salt was excreted in the urine, but for group A a proportion was used to make up the deficit between salt ration and salt requirement, so that the amount lost in the urine was less in group A than in group B; thus on one particular morning the average loss of sodium chloride in the urine was 0·22 g. per hour for group A, and 0·41 g. per hour for group B. Sufficient data are not available, however, to give 24-hour losses in the two groups separately.

These observations suggest that there are certain individuals who have a higher salt requirement than the average; they react to high rates of sweating by cutting down salt loss in the urine to a minimum. The chloride content of the body fluids is kept up by a reduction in the total fluid volume, shown by the loss in body-weight. Measurements of extracellular fluid and plasma volumes were made but varied too much for any positive conclusions to be drawn.

FIELD TESTS ON THE SUBJECTS

Lee (1941) has shown that the performance of a given amount of work in a hot room deteriorates both if water intake is not maintained during the exposure to heat and if a large dose of salt is taken before the exposure. We have confirmed these observations.

When the room temperature was 94° F. dry bulb, 68° F. wet bulb, the subjects refrained from drinking over a period of 3 hours and then carried out a light exercise test. The maximum heart-rates during exercise averaged 6·4 per min. higher, and the heart-rates standing after 10 minutes' recovery averaged 7 per min. higher than the corresponding rates the previous week when the subjects were drinking and conditions were otherwise the same.

Ten grammes of salt in a litre of water were given to the control subjects already receiving their full salt ration. One hour later a light exercise test was carried out in the sun at a temperature of about 110° F. Their performance as judged by the heart-rate was not affected, but they sweated less than on other occasions when conditions were the same except that fresh instead of salt water was given; their rate of weight loss was an average of 20 oz. per hour instead of 24 oz.; and their rectal temperature rose more, the average increase being 1·16° F. instead of 0·65° F. These differences are statistically significant. No changes were found in the blood.

TABLE III—CHANGE IN CHLORIDE CONTENT OF SWEAT DURING THE SUMMER

	Before first hot spell		After first hot spell	
No. of specimens ..	32	100%	53	100%
No. above 0·35% NaCl ..	2	6·25%	11	20·7%
No. above 0·4% NaCl ..	0	0	9	17%
No. above 0·45% NaCl ..	0	0	5	9·4%
Maximum concentration observed ..	0·36%		0·60%	

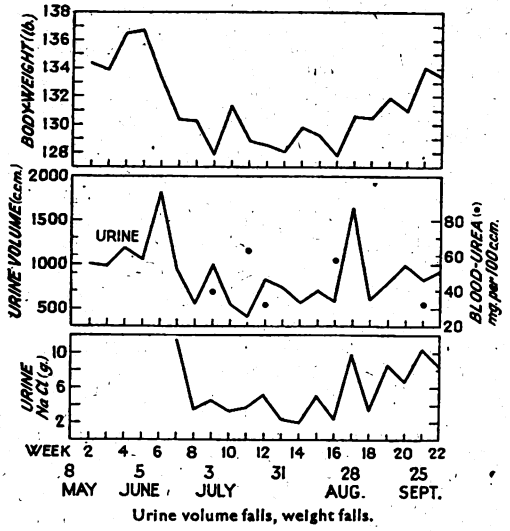
After single large doses of salt on this and other occasions the urinary salt loss was increased and the chloride content of the sweat also rose. Considering only the sweat samples taken in this test, the average chloride content of the sweat after fresh water was 0·25%, and after salt water 0·33%. This difference is statistically significant. From this it appears that single large doses

‡ Weights are given in ounces because this was the unit in which they were measured.

Fig. 2

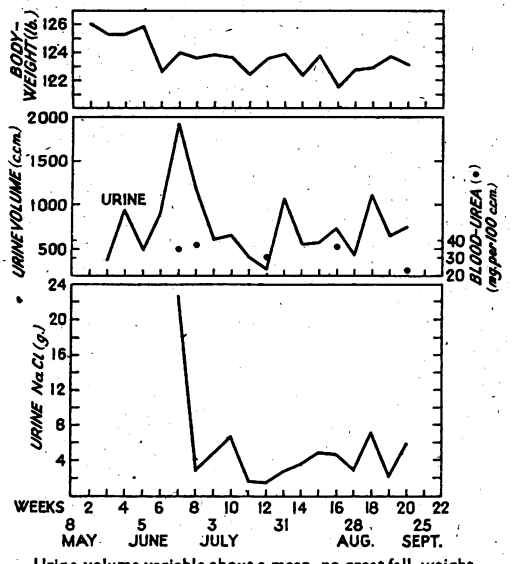
WEIGHT LOSS OF NORMAL SUBJECTS CORRELATED WITH URINE VOLUME

(a)



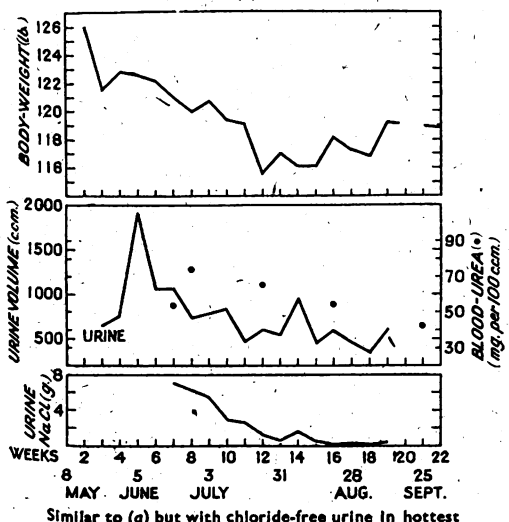
Urine volume falls, weight falls.

(b)



Urine volume variable about a mean, no great fall, weight fairly steady.

(c)



Similar to (a) but with chloride-free urine in hottest weather. Subject apparently fit.

of salt may be physiologically uneconomical. There are other factors, not yet fully understood, which influence the salt content of the sweat. Sweat samples were obtained at intervals throughout the year and at the end of the summer much higher concentrations of chloride were found than earlier on (table III), in some cases surpassing those found in sweat after a dose of salt.

EFFECTS OF HEAT

The data that follow are drawn from a series of 169 cases. Of these, only 3 were Indians; but this low figure does not reflect the true incidence in Indian troops. The majority were admitted to a single British hospital.

The series is representative of all types of case occurring in the area, and of all degrees of severity, with certain exceptions:

1. It contains no fatal cases. Three patients in the area did succumb to effects of heat, but they died before they could be seen.
2. Many very mild cases were treated in their unit, and never reached hospital. They are therefore not represented in the series.
3. No cases are included of effects of heat confined to the skin—i.e., without general symptoms and signs.
4. No cases are included in which effects of heat were superimposed upon some other disease.

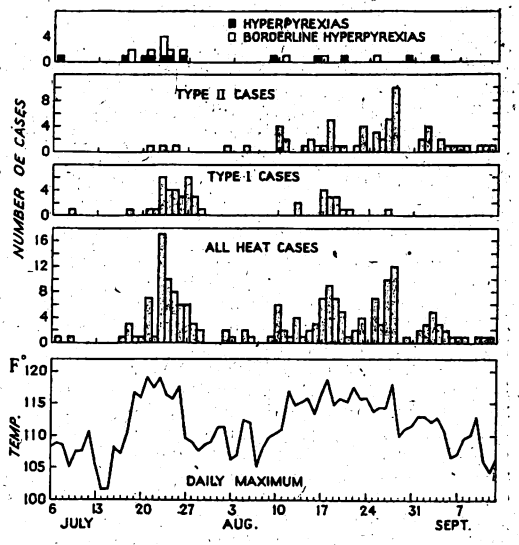
HYPERPYREXIA

Twelve patients were seen, who had a rectal temperature of 107° F. or more. The clinical picture in these cases did not differ from that described in standard textbooks (Manson 1940, Rogers and Megaw 1942, Willcox 1942, War Office *Memoranda on Medical Diseases in Tropical and Subtropical Areas* 1941). Therefore only a brief description is necessary.

ÆTIOLOGICAL FACTORS

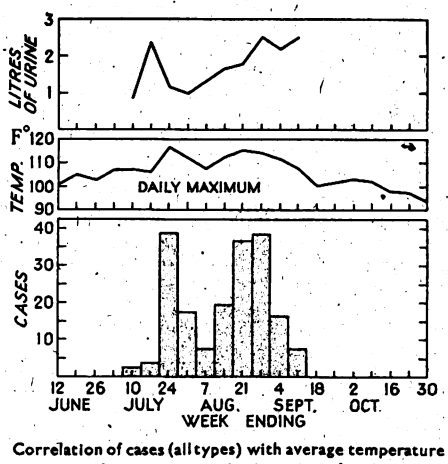
Age.—It has been repeatedly stated that increasing age predisposes to hyperpyrexia. Of the 12 cases 9 were

Fig. 3



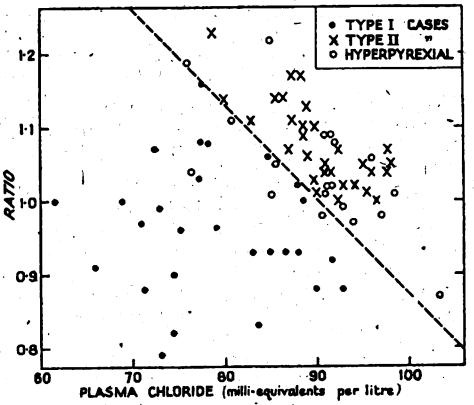
Correlation of case-incidence (different types) with daily temperature.

Fig. 4



Correlation of cases (all types) with average temperature per week; average urine outputs for cases on admission also shown.

Fig. 5



Reduction ratio and plasma chloride; the line is drawn to the equation

$$P + 75\,R = 106{\cdot}8$$

where P = Plasma chloride in m. eq./l.
R = Reduction ratio.

over 30, compared with 40% over 30 in the whole series.

External temperature.—Of the 12 cases 5 occurred during the hottest week of the summer, July 19–26 (fig. 3). The others occurred sporadically between the beginning of July and the beginning of September.

Other factors.—In no case was there a history of excessive exposure to the sun, of unusually hard physical work, or of lack of sleep. In fact, many patients were doing less than the ordinary amount of work. In one only was excessive intake of alcohol a possible factor.

CLINICAL AND LABORATORY FINDINGS

In most patients the onset was sudden. All except one gave a history of sweating having stopped over a period varying from 3 days to half an hour before the attack. This is in agreement with the findings of Willcox in Iraq in 1917 (Willcox 1920). Frequency of micturition has also been repeatedly described as a warning sign of hyperpyrexia. A frequency of more than four times in 24 hours may be considered abnormal in that climate, and 6 of the 12 hyperpyrexial cases gave a history of frequency, according to this definition. In all cases copious amounts of urine were passed. The main elements in the clinical picture were: a rectal temperature of 107° F. or more; a skin that was hot and dry to the touch all over the body; and partial or complete loss of consciousness. Abdominal and tendon reflexes were absent in only 3 cases.

On admission the patients were producing large volumes of urine but had stopped drinking some time previously, owing to unconsciousness. After admission their urine outputs were higher than the outputs of other patients in the same ward (2516 c.cm. compared with 1376 c.cm.). After sweating was re-established the excess of fluid intake over urine output was still low in comparison with other patients (720 c.cm. compared with 3030 c.cm.) These figures demonstrated the negative water balance stressed in such cases by other authors (Hearne 1932) as they leave no margin for sweat loss. Blood samples taken on or soon after admission from 11 out of the 12 cases showed diminished hæmoglobin, and a chloride content in both whole blood and plasma slightly less than normal (table I). Blood-urea and plasma-protein levels were within the limits found for the control subjects. The sodium content, estimated on 2 samples only, was also normal. Though there was some chloride deficiency in the blood there was an apparent anomaly in that all these cases had chloride in their urine; the average daily excretion for the first 2½ days was 4·42 g.; but urine passed soon after admission at the time of taking the blood samples contained less chloride than samples passed later.

TREATMENT

Treatment followed standard lines. The body temperature was reduced by wet sheets and fanning, and the patients were then transferred to an air-conditioned ward (temperature about 80° F.). Convalescence was rapid. Sweating was in most cases restored within 12 hours of the onset. The quick recovery of sweating contrasted with the slow restoration to normal found in patients with type II heat exhaustion, described later.

Discussion

The strictly hyperpyrexial cases all had a rectal temperature of 107° F. or over and all showed clouding or loss of consciousness. A definition of hyperpyrexia based on clinical features such as these, and not on ætiology, must be purely formal. It is to be expected that in other cases the same fundamental causes may be at work, but, because of early treatment, or for some other reason, the body temperature may not reach extreme heights.

In fact, in the present series, there were 12 patients whose condition resembled hyperpyrexia in all essential features, except the height of body temperature and the presence of unconsciousness or mental confusion. These may be called "borderline hyperpyrexial cases." Of these 12, 9 were admitted in the hottest week. As in hyperpyrexia, the onset was sudden with defective sweating. The rectal temperature on admission averaged 104·8° F. Temperatures as high as this were not found in cases of other types. The skin was dry on admission in 10 cases, but sweating was quickly restored with immediate recovery.

In both these groups, the history and the dryness of the skin on admission suggest that sweating had stopped completely over the whole body. No local cause for this was found; the skin appeared normal, and prickly heat was not severe. From the rapid onset, and the equally rapid recovery, it seems probable that the failure was of central origin. The reason for it is not clear. In no case was there any evident precipitating factor, either physical or psychological.

The laboratory findings fit in with the theory that the first breakdown is in the sweating mechanism. Although sweating had stopped, water absorption continued; the patients often said they felt hot and dry and had kept on drinking just before the attack. The history of frequency of micturition shows that there was a compensatory increase in urine excretion. The chemical findings suggest that this increase was inadequate and delayed, and that consequently water accumulated in the body and dilution occurred; this was indicated by the low hæmoglobin and diminished chloride content of the blood taken on admission. When urine excretion did increase sufficiently the excess water was lost so that there was an apparent and transient negative water balance; when the body fluids became more concentrated again, chloride was excreted in the urine as there had never been any gross deficiency.

Recovery was rapid and uneventful. Blood samples taken just before discharge were quite normal in 5 cases, but in 5 other cases the chloride content of the plasma was still not as high as in the control subjects. These cases had not been treated with extra salt. This suggests that there may have been after all a true salt deficiency in some cases; a cause for this was found in the sweat. The average chloride content of the sweat collected from 6 cases was 0·39% (as sodium chloride).

HEAT EXHAUSTION TYPE I

The classification of heat exhaustion is confused. Various subdivisions have been described, such as heat prostration and syncope, subacute effects of heat, and sun traumatism, but their definition is not clear. In the present series two types of case were seen, which have been called heat exhaustion types I and II. The clinical and chemical features of the two types are summarised and contrasted in tables I and IV.

TABLE IV—COMPARISON OF CLINICAL FINDINGS IN HEAT EXHAUSTION, TYPES I AND II

	Type I	Type II
Number in group	45	55
History—		
Vomiting	73%	4%
Cramps	70%	4%
Defective sweating	13%	87%
Increased frequency of micturition *	0	82%
On admission—		
Dryness of skin	5%	40%
Desquamating prickly heat	7%	80%
Signs of dehydration	50%	2%
Pulse volume poor	33%	0
Lying pulse-pressure less than 30 mm. Hg	46%	2%
Blood-pressure not maintained on standing	72%	2%
Colour of skin	Pale	Red
Av. lying pulse-rate (beats/min.)	90	76
Av. incr. of pulse-rate on standing (beats/min.)	40	20
Av. lying blood-pressure (mm. Hg)	111/79	121/69
Av. rectal temperature (° F.)	100·6	100·9
Av. mouth temperature (° F.)	98·2	99·5
Av. frequency of micturition (per 24 hr.)	2–3	9
Av. weight gain in hospital (oz.)	121	41

* By "increased frequency of micturition" is meant passage of urine 5 times or more in 24 hours.

INCIDENCE

The great majority of type I cases were seen in the two hottest weeks of the summer (figs. 3 and 4). In both periods they did not begin to appear until the daily maximum temperature had been above 115° F. for 3 or 4 days running. From this there appears to be a direct and cumulative relation between the height of the external temperature and the incidence of cases of this type. Two-thirds of the type I cases were admitted in July, and one-third in August. This is in spite of the fact that

there were more hot days in August than in July. In August, the dry-bulb temperature reached 115° F. on 13 days, in July on only 8 days. This suggests that by August most of those susceptible had already fallen sick and been evacuated to a cooler area.

HISTORY

The history was usually short—2–4 days. Complaints of giddiness, anorexia, headache and constipation were present in varying combinations in all cases. The salient features of the history were vomiting and cramps. The vomiting always began before admission to hospital, and probably precipitated admission. Half the patients who vomited did so more than once, and some vomited 6–8 times.

Cramps, when present, preceded vomiting. The commonest sites were the legs and thighs, followed by arms, abdomen, hands, feet and jaw.

With rare exceptions, cases of this type had no history of diminished sweating. Frequency of micturition was not present. Several patients stated spontaneously that their urine output had decreased since the onset of symptoms.

CONDITION ON ADMISSION

These patients on admission looked exhausted, anxious and ill. They were pale and sweating profusely, with a cool skin. Often they showed the classical signs of dehydration—inelasticity of the skin, and sunken, hollow eyes. Prickly heat was sometimes present, but was not prominent or severe. The rectal temperature was slightly raised; the average was 100·6° F. The elevation was slight but constant: 83% of cases had a rectal temperature of more than 100·0° F., whereas, even in that climate, such levels were rare in control subjects at rest.

The average pulse-rate on admission was 90 beats per min., compared with 65 in controls. In 35% the pulse-volume was poor. In patients lying down the systolic pressure was occasionally low; it was less than 90 mm. Hg in only 4 cases. In the others it was well maintained. The diastolic pressure in most cases was higher than in the controls; a level of more than 80 mm. Hg was found in 70% of type I cases, in 20% of type II and in 2% of observations on controls. The pulse-pressure was therefore low; it was less than 30 mm. Hg in nearly half the type I cases; in 9 of them it was less than 20 mm. Pulse-pressures as low as this were not found in control subjects, nor in patients of other types. The possible significance of these findings will be discussed below. The effect of standing was dramatic. The pulse became progressively more difficult to feel and more rapid. The BP fell, and often could not be taken because the sounds were inaudible. The patient became increasingly pale, began to sweat profusely, to yawn and to complain of dizziness. He was obviously on the verge of syncope after standing for only one or two minutes.

In the first 24 hours after admission type I cases passed relatively little urine; often the volume was less than 750 c.cm. It was heavily pigmented and the specific gravity was often over 1020. Out of 32 samples only 1 had a chloride concentration above 0·1%, 10 contained no chloride at all, and 8 others had less than 0·01%. With treatment by intravenous saline and fluids by mouth the urine volumes increased, and the average daily output for the first 2½ days in hospital was: for 26 cases in the open ward 1122 c.cm., and for 10 cases in the air-conditioned ward 1376 c.cm. These volumes are low when it is considered that the patients were inactive and drinking up to 16 pints of water per day. The urines remained low in chloride for the first 2½ days. The average daily excretion was 0·98 g. (as NaCl); this is significantly lower than the chloride excretion of the control subjects who had the same salt ration as the hospital patients, and who were leading an active life.

Blood samples were taken from 27 cases of type I heat exhaustion soon after their admission. The average values obtained for the various analyses are shown in table I. A raised hæmoglobin and plasma-protein content indicated hæmo-concentration. The chloride contents of the whole blood, and that of the plasma were both grossly diminished; the drop in the whole blood chloride was more marked than that of the plasma chloride. The ratio

$$\frac{\text{Observed value for whole blood}}{\text{Control value}} \div \frac{\text{Observed value for plasma}}{\text{Control value}} = \text{(Reduction ratio)}$$

was below 1 except for mild cases § and the average ratio was 0·95.

Of 27 cases 12 had a reduction of 25% or more in the whole-blood chloride (i.e., were below 60 milli-equivalents per litre), and of 26 cases 10 had an equivalent reduction in the plasma chloride (i.e., were below 75 milli-equivalent per litre). Plasma sodium was estimated on 5 samples only and was found to be only slightly diminished.

The blood-urea was raised in all cases. The lowest value was 46·4 mg. per 100 c.cm.; 12 out of 26 cases had levels above 100 mg. In spite of the high blood-urea and low urine volumes the urea content of the urine was low (average for 10 cases, 2·7%). The average ratio between urea concentration in urine and urea concentration in plasma (U/P ratio) was, for the 9 cases in which it was measured, 40·5.

PLASMA AND EXTRACELLULAR FLUID VOLUME

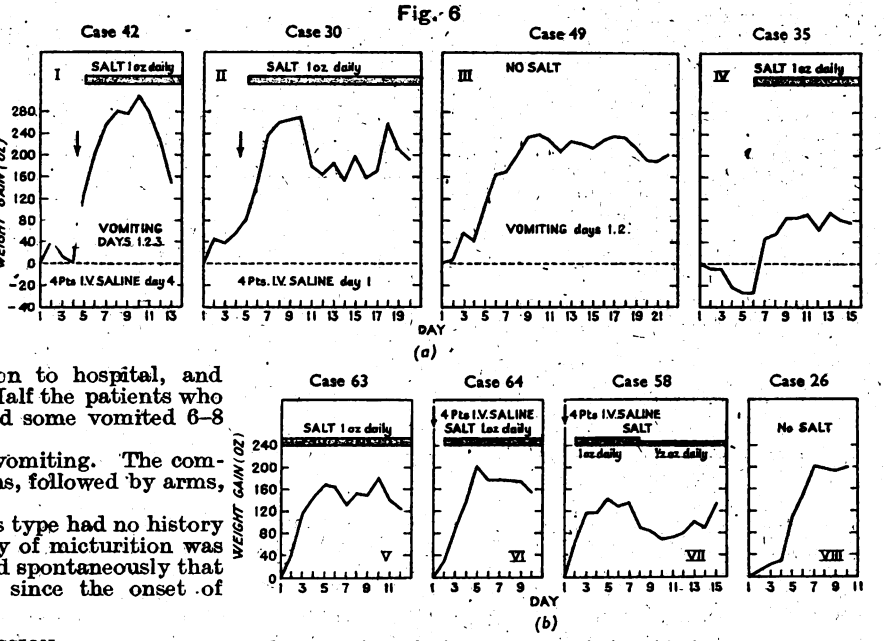
In 8 cases plasma and extracellular fluid volumes were measured on admission, and in 7 of these the measurements were repeated before discharge. Plasma volumes were estimated after the method of Crooke and Morris (1942), using a visual colorimeter; extracellular fluid volumes were measured by the technique of Lavietes, Bourdillon and Klinghoffer (1936). The results are shown in table V. Judging by the figures on discharge, in 7 out of 8 cases there was on admission a gross reduction in plasma volume, and in 5 out of 7 a lesser, but still considerable, reduction in extracellular fluid volume. It is probably legitimate to take the figures on discharge as a standard, for when they are expressed as per cent. of the body-weight, the average results are as follows:—

	Plasma volume	Extracellular fluid volume
	% body-weight	
Recovered type I patients ..	5·1 ..	20·5
Accepted normal standard ..	5·0 ..	20·0

TREATMENT AND PROGRESS

In all cases, liberal fluids by mouth were ordered; the amount aimed at was 16 pints daily. Some patients

Fig. 6



Patients with type I exhaustion: gain in body-weight during treatment.

§ If the reduction ratio is plotted against the plasma-chloride content it is found that all values for type I fall below an arbitrary line, and all values for type II cases fall above it. See fig. 5.

TABLE V—PLASMA AND EXTRACELLULAR FLUID VOLUME IN TYPE I CASES

Case no.	Plasma vol. (litres)		Extracellular fluid volume		% reduction	
	On admission	On discharge	On admission	On discharge	Plasma	Extracellular fluid
27	2·2	2·4*	..	..	9	..
30	2·0	3·6	9·6	14·9	45	35
42	2·0	4·1	10·4	15·0	51	31
49	2·2	3·2	12·6	13·1	32	4
57	2·3	3·2	13·3	13·4	28	1
61	3·2	4·2	11·0	13·5	31	18
63	1·6	3·4	10·7	16·3	53	33
64	2·0	3·0	10·5	13·0	34	19

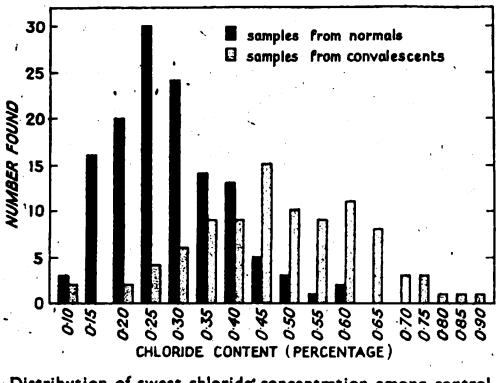
* Discharged before clinically cured.

were given extra salt by mouth, in daily doses of 1 ounce (28 g.). Those who were obviously dehydrated, or who, because of vomiting, could not retain fluids, received intravenous saline. The usual amount given was 4–5 pints of 0·9% in 3 hours; in some cases the first pint was 1·8%. Most patients responded rapidly to treatment. When intravenous saline was given, vomiting and cramps immediately stopped, and in a matter of hours the patients began to look and feel almost well. Progress was followed by daily measurements of weight and BP, and by analysis of blood and urine before discharge. Some curves showing the relation between treatment and gain in weight are shown in fig. 6.

Sufficient data are not available for a valid comparison of those who received salt and those who did not. Some patients, who were not receiving extra salt, improved only slowly or even deteriorated until salt was given (e.g., cases 35, 30 and 42). Others without salt did improve steadily and finally became well, but the course of recovery was slower than in the other group (e.g., case 26). When the patients did begin to gain weight they often did so very rapidly; thus case 42 gained 256 oz. in 3 days, case 30 gained 160 oz. in 2 days, and case 35 gained 100 oz. in one day. The standing and lying BP returned to normal, pari passu with the increase in weight.

In spite of the large fluid intake the urine volumes remained relatively low. A large excess of fluid intake over urine output (6500 c.cm. per day), though the patients were inactive, indicated considerable water retention, reflected by the gains in weight. In those cases receiving only the standard salt ration the chloride content of the urine was still low after 4 days, showing that there was also salt retention. Even when extra salt was given, the return to normal was slow; in 6 out of 7 patients who were given extra salt and from whom blood samples were taken during treatment, the plasma chloride had not yet regained the control level after 6 days.

Fig. 7



Distribution of sweat chloride concentration among control subjects and recovered heat cases.

Blood and urine were obtained from 23 cases of type I exhaustion just before discharge. Hæmoglobin, blood-urea, and plasma-protein concentrations were normal, but in 6 cases the plasma chloride was still low. Of these 6, 4 had not received any extra salt. One of the 6 was readmitted two weeks later with a plasma chloride even lower than before.

The sodium content of the plasma was found to have risen in those cases where it had been measured on admission. The average daily urinary chloride excretion in patients who had been receiving a nominal 28 g.‖ of extra salt daily was 10·14 g.: in those who had not had any extra salt the amount lost in the urine was 4·79 g. Sweat was also collected from these 23 patients; the average chloride concentration was 0·44%; this was significantly higher than the concentration in samples from the control subjects. In general, sweat from all patients suffering from effects of heat was found to contain more chloride than sweat from the controls (fig. 7).

Discussion

Many previous authors have described cases that agree in most essentials with the syndrome called here heat exhaustion type I. It has often been inferred, but not proved, that these cases are dehydrated. Our findings strongly support this view. The relevant facts may be summarised as follows:—

1. The presence, in a large proportion of cases, of clinical signs of dehydration.
2. The demonstration of considerable reductions in extracellular fluid volume in 5 of the 7 cases in which measurements were made.
3. The relatively low urine output, compared with patients of other types.
4. The large and rapid gains in weight in response to treatment.

As table V shows, the plasma shared in the general reduction of extracellular fluid volume. This fact provides a reasonable explanation for some of the clinical findings. The high diastolic pressure and low pulse-pressure typical of the group are signs of peripheral vasoconstriction. By this means the capacity of the vascular bed would be reduced to compensate for the reduction in blood-volume. In the more severe cases the compensation was only partially successful: although the BP was maintained while lying down, syncope occurred on standing.

Vasoconstriction is likely to be most intense in the regions which normally act as blood reservoirs—the skin and splanchnic area. A reduction in the circulation to the skin implies a low rate of heat transport from the interior of the body to the surface. This may account for the slight but fairly constant heat-retention found in the presence of a cool, normally sweating skin.

Nielsen, Herrington and Winslow (1939) found that the rate of absorption of water from the gut was less in the vertical than in the horizontal position. They suggested that the splanchnic vasoconstriction necessary for maintaining the BP caused impairment of intestinal function. By an extension of this hypothesis, the stomach might also be affected, and this could explain the vomiting, for which no other cause has been found.

One conclusion of practical importance for diagnosis may be drawn from the present results. It is that, in agreement with much recent work, the systolic pressure is an extremely unreliable guide to the state of the peripheral circulation. A reduction in pulse-pressure to a level of 20 mm. Hg or less is probably a more important diagnostic sign.

BIOCHEMISTRY

The findings in blood and urine showed a gross salt deficiency. The general biochemical picture was of dehydration secondary to lack of salt rather than to lack of water. Besides the low chloride content of the blood and plasma, typical features were the high blood-urea and raised hæmoglobin (cf. Nadal et al. 1941), the diminished extracellular fluid and plasma volume (cf. Russell Elkinton et al. 1942, 1943) and the low U/P ratio (cf. McCance 1936).

One feature of note was the disproportionate fall in the whole-blood chloride as compared with the plasma chloride. An increase in red-cell volume is not alone enough to explain this. Though hæmatocrit measurements could not be made, the hæmoglobin concentrations

‖ The extra salt was issued in tablets once a day for the patients to take as they wished throughout the day. It was not possible to ensure that the full amount was taken; the extra intake was almost certainly less than 28 g.

were measured; there were cases of other types with diminished plasma and whole-blood chloride contents and with hæmoglobin levels just as high, and in these cases the blood chloride was not disproportionately low. This suggests that in type I exhaustion more chloride is lost from inside the cells than from outside. Such sodium estimations as were done indicate that the base lost with the chloride was not entirely sodium.

ÆTIOLOGY

There was an ample supply of good drinking-water in the area, and the men were encouraged to drink as much and as often as possible. There was no reason for a man to become water-deficient unless he was lazy about drinking. Many men stated that it was a definite task to drink enough water to prevent thirst.

With salt the position was different. The salt intake was limited to an average per man of 31 g. per day; of this about 10 was supplied by the food itself, and half the remainder was used in the cookhouse. The rest was available as table salt or as tablets. In practice most men did not take their full share of salt at table, and did not achieve the maximum possible intake; calculations based on observations made on the control subjects suggest that actual intake was probably about 25 g. per day. It has already been pointed out that this may not be adequate for certain control subjects (group A), when sweating at high rates, who had an average chloride concentration in their sweat of 0·32%. The average chloride concentration in the sweat from type I cases was 0·44%; thus these men would have gone into negative salt balance as soon as their rate of sweating was more than 5½ litres per day, and any man who had a chloride concentration in his sweat of only 0·33% (20 out of 23 type I cases had concentrations higher than this) would become salt-deficient if he was sweating at a rate of more than 7 litres per day. Such rates of sweating certainly did occur in the hot weather.

PREVENTION

The evidence points to type I heat exhaustion being a salt-deficiency dehydration which develops, when sweating rates are high, in individuals who habitually excrete an unusually high concentration of chloride in their sweat. Prevention of this type of exhaustion therefore should proceed along certain lines:

1. The men should be educated to drink enough to produce at least 30 oz. of urine per day; a low urine volume is a danger signal.
2. If type I heat exhaustion is to be avoided altogether, during the hot weather a daily salt issue of 48 g. should be aimed at. This amount is to cover sweating at 7½ litres per day, a urine loss of 5 g. per day to buffer the effect of any sudden extra loads, and a waste of 6 g. This will protect all men except the very few who secrete sweat containing more than 0·5% NaCl. In actual practice few men would be willing to take such large quantities; and in men with a low concentration of chloride in their sweat extra drinking might be necessary to get rid of the excess salt via the kidneys. Other measures should therefore be adopted.
3. The urine should be tested for chloride at regular intervals. Absent or low chloride in a concentrated urine is an early sign of salt deficiency (McCance 1936).
4. Personnel should be weighed at regular intervals during the hot weather. Any man who shows a persistent loss of body-weight should be instructed to drink more water and take more salt.

(To be concluded)

"... The point of view that holds a chest injury to be progressing satisfactorily as long as pleural infection has not developed is no longer tenable. Every consideration is now given to the restoration of full lung function. The change of the focus of attention from the pleural space to the lung stands as one of the important achievements of the military surgeon in this war."—Colonel EDWARD D. CHURCHILL, surgical consultant to the US Army, Mediterranean Theatre.

TREATMENT OF STAPHYLOCOCCAL INFECTIONS WITH PENICILLIN

BY INTERMITTENT STERILISATION

JOSEPH W. BIGGER, MD, SCD DUBL., FRCP, FRCPI
LIEUT.-COLONEL RAMC

ALL who have used penicillin in the treatment of staphylococcal infections agree that it is vastly superior to the only other chemotherapeutic substances—some of the sulphonamides—which have any demonstrable action against staphylococci in the living body. Penicillin has undoubtedly saved lives and limbs of patients suffering from staphylococcal infections, but it has not usually cured the disease as it has cured gonorrhœa. It appeared, therefore, to be useful to investigate the reasons for the limited success of penicillin against infections with these bacteria. In some cases, owing either to an inadequate blood-supply or to tissue barriers, penicillin probably does not reach the focus of infection or reaches it only in insufficient amount. But these factors are not considered the only ones which reduce the success of penicillin therapy.

A considerable amount of experimental work was carried out to investigate the action of penicillin on *Staph. pyogenes* in vitro, for only in this way can scientific methods of treatment be devised. Full details of the experiments will be published elsewhere. The objects of this paper are to summarise the main findings, outline a hypothesis based on these and suggest modifications in the methods now in use for the treatment of staphylococcal infections in man.

BACTERICIDAL ACTION OF PENICILLIN

My results strongly oppose the commonly accepted belief that penicillin is merely bacteriostatic. In view of the weight of opinion and high authority against me, it seems desirable to state the criteria of death of bacteria on which I relied. I was interested in judging whether staphylococci, present in broth to the extent of either many thousands or a few millions per c.cm., which had been exposed to the action of penicillin for periods ranging from a few hours to more than a week, were living or dead.

A loopful of the broth was inoculated on the surface of an agar slope or into a tube of broth and these were incubated. In most cases the period of incubation was only 24 hours, but in a limited number of experiments incubation was continued for 7 days. Controls showed that the amount of penicillin transferred on the loop was insufficient to prevent growth of living cocci. Absence of growth was accepted as establishing the absence of living bacteria in the volume (one loopful or approximately 0·005 c.cm.) examined. This result, which will be referred to as "one-loop sterility," implies that the original bacterial population had been reduced by penicillin to less than 200 cocci per c.cm. When it was desired to determine if complete sterility had been produced, penicillinase was added to the broth in sufficient amount to destroy at least five times the amount of penicillin originally present. The whole was incubated, usually for 3 days, but in some cases for 14 days. Absence of turbidity was accepted as proof of sterility.

Broth containing 250,000 *Staph. pyogenes* per c.cm. was usually reduced to one-loop sterility in less than 18 hours by penicillin in concentrations ranging from 2 units to $\frac{1}{10}$ unit per c.cm. When the concentration was lower than $\frac{1}{10}$ unit per c.cm. the time required to kill this number of bacteria was longer. The lowest concentration found to be effective in producing one-loop sterility with the type of broth, strain of staphylococcus and density of cocci used was $\frac{1}{14}$ unit per c.cm. With higher densities of staphylococci, either higher concentrations of penicillin or longer periods of action or both were required. When the number of staphylococci was 25 million per c.cm., $\frac{1}{14}$ unit per c.cm. of penicillin required about 28 hours and 2 units per c.cm about 20 hours to produce one-loop sterility. With 1 unit per c.cm. of penicillin, one-loop sterility was produced in broth containing 50 million *Staph. pyogenes* in 40 hours and in broth containing 100 million *Staph. pyogenes* in 64 hours.

These results, which are only a few of those obtained, appear to justify the statement that penicillin is bactericidal for *Staph. pyogenes*.

It is sometimes admitted that penicillin has a bactericidal action, but only in concentrations higher than are attainable in the human body. My experiments do not support this view, since I have demonstrated well-marked killing power in concentrations ranging from 1 down to $\frac{1}{64}$ unit per c.cm., while, in the sera of patients undergoing treatment, such concentrations as $\frac{1}{16}$, $\frac{1}{8}$ and $\frac{1}{4}$ unit per c.cm. are often and $\frac{1}{2}$ and 1 unit per c.cm. occasionally recorded.

VARIATIONS IN STERILISING POWER

Having established the power of penicillin to kill *Staph. pyogenes*, the next part of the investigation dealt with its ability to sterilise, that is, to kill all the bacteria in, a given volume of broth. This problem presented many difficulties, among which was the irregularity of its action.

Four bottles, each containing 50 c.cm. of broth, 1 unit per c.cm. of penicillin and a total of 250 million *Staph. pyogenes*, were incubated. Penicillinase was added to two bottles on the second day and to the other two on the fifth day and incubation was continued for 3 days after the addition. One of each pair of bottles proved to be sterile, the other giving a growth of staphylococci. Similar irregularities and inconsistencies occurred in almost all experiments of this type.

Another problem was the difference in the sterilising power of penicillin against the same total number of staphylococci in different volumes of broth. Sterility was more commonly attained in a small volume of broth than in a large volume. When the total number of staphylococci present was 250 million and the volume of broth was 10 c.cm., 1 unit per c.cm. of penicillin produced sterility within 3 days in 19 out of 45 tests, but only in 6 out of 75 tests when the number of cocci and the concentration of penicillin were the same but the volume of broth was 50 c.cm. When the total number was 10 million cocci, 19 out of 20 tests of 1 unit per c.cm. in 10 c.cm. of broth gave sterility but only 4 out of 15 with the same concentration of penicillin in 50 c.cm. of broth.

The frequent failure to sterilise broth containing staphylococci with penicillin is disappointing, but the disappointment is somewhat mitigated by finding that the attempt failed only by a very narrow margin. Out of 55 tests in which 250 million *Staph. pyogenes* in 50 c.cm. of broth were acted on by 1 unit per c.cm. of penicillin for 72 hours, the number of surviving cocci was less than 11 in 25% of tests, less than 35 in 50% of tests and less than 115 in 67% of tests.

Failure to sterilise cannot be due to the presence of excessive numbers of staphylococci. In most of the tests in which the question was examined, the survivors numbered less than 100 cocci out of the 250 million originally present. If these had survived merely because too many cocci were present to be killed by the amount of penicillin available, sterility should always have been obtained when the initial number of staphylococci was 249 million. But it was not, and even when the initial number was as low as 10 million cocci, sterility was by no means invariably attained.

PRESENCE OF PERSISTERS

The only hypothesis which seems to explain the occurrence of a small number of survivors out of the millions of cocci originally present is that these differ from the majority of their fellows in that they are capable of surviving a concentration of penicillin which, in the time of action allowed, kills the others.

These abnormal cocci are few in numbers—rarely more than 1 per million of those inoculated. If the inoculum is large, some of these forms are certain to be present and sterility will not be attained in any test. When the inoculum is smaller, abnormal forms will be present in some test volumes but not in others. They are distributed at random among the normal cocci, which explains the chance distribution of test volumes which are not sterilised. As a matter of convenience, these abnormal cocci have been termed "persisters," to denote their power of surviving in the presence of sufficient penicillin to be lethal for the normal forms. The term "resister" has been avoided, because this implies, in the case of bacteria, special qualities which the abnormal cocci may or may not possess.

Persisters appear to be present in very small numbers in the broth culture used as inoculum. When broth in 10 c.cm. volumes was investigated, the number of tubes remaining unsterilised by penicillin was roughly proportional to the number of cocci inoculated, and, it may therefore be presumed, to the number of persisters present in the inoculum. When 50 c.cm. volumes were examined, the number of non-sterile bottles decreased as the number of staphylococci inoculated decreased, but the decreases were not proportional. It was clear that several factors were operating. One was the number of staphylococci originally introduced, but this factor tended to be overshadowed by others. Ultimately it was found that some cocci in the inoculum were predestined to be persisters, but that the persister phase could be induced in normal cocci by contact with their new environment. Persisters appear rapidly when a broth culture is added to cold broth, and the longer the period of chilling the larger the number of persisters produced. Another factor is dispersal. More persisters are produced when a given number of staphylococci are introduced into a large volume of broth than when the volume of broth is small.

These findings explain why sterility is more commonly produced in 10 c.cm. volumes of broth than in 50 c.cm. volumes, both inoculated with the same number of staphylococci, and also why the sterility-rate is proportional to the number of staphylococci introduced in the small volume but not in the large. In small volumes the persisters are almost entirely those present as persisters in the inoculum. Few new persisters develop as the dilution of the cocci is low and the period elapsing before body temperature is reached in the incubator is short. In large volumes the dilution is higher and the period of chilling longer than in small volumes, and, in consequence, in these both primary persisters and newly developed persisters are present.

In most of the experiments on sterilisation, the period of action of penicillin was 3 days. In one, however, 2 units per c.cm. of penicillin was allowed to act for 11 days. Two out of 10 bottles were not sterilised. It is probable that, by greatly prolonging the time of action of penicillin, the sterility-rate may be increased, but even with such a high concentration as 2 units per c.cm., and such long period of action as 11 days, some persisters survive.

Most of the experiments were performed with *Staph. pyogenes*, strain H, the strain used in assaying penicillin. Eight other strains were found to behave in much the same way when acted upon by penicillin. Similar results were also obtained when serum was used as the culture medium instead of broth.

NATURE OF PERSISTERS

Three theories of the nature of persisters must be considered. Persisters may be:—

1. Cocci with highest natural resistance to penicillin.
2. Cocci which have acquired resistance to penicillin.
3. Cocci with no greater resistance to penicillin than normal but which happen to be, when exposed to it, in a phase in which they are insusceptible to its action.

A weighty argument against the first theory is that 1 unit of penicillin per c.cm. kills 99·96% of 250,000 cocci in 6 hours. It is improbable that the curve of individual resistance to penicillin would be so prolonged as to permit, within the limits of normal variation, cocci capable of surviving this concentration of penicillin for 72 hours and still less for 11 days.

To acquire resistance to penicillin, long exposure through many generations to gradually increasing concentrations is required. In the experiments under consideration, the cocci were suddenly exposed to relatively high concentrations and no time was permitted for growth, which appears always to be necessary for adaptation to take place.

If persisters had an abnormally high resistance, either natural or acquired, to penicillin, it is probable that their descendants would also possess abnormally high resistance. The descendants of a number of persisters which had survived contact with 1 unit per c.cm. penicillin for 3–5 days were found to be killed by $\frac{1}{4}$ unit per c.cm. within 46 hours and to have no greater tendency than normal forms to produce persisters.

For these reasons, it is improbable that persisters are, in the sense in which the term is usually applied to bacteria, resistant. How then is their survival to be explained? The only theory of the mode of action of penicillin on bacteria to gain general acceptance is based on Gardner's observation[1] that when bacteria are exposed to weak concentrations of penicillin they increase in size but do not divide. The theory is that penicillin acts bacteriostatically by preventing division. If it be accepted, as indeed it must, that penicillin is bactericidal, it is not unreasonable to assume that it acts on bacteria at the time of division and that it not merely prevents division but actually kills. It was, therefore, important to determine if only bacteria which are about to divide are susceptible to the action of penicillin. Three experiments were performed which give reasonable support to the suggestion that penicillin is without effect on non-dividing bacteria.

1. Penicillin was titrated in broth in triplicate. One set of tubes was kept at 37° C., one set at air temperature and one at 4° C., all for 23 hours. One loop sterility in the 37° tubes was given by from 1 unit to $\frac{1}{10}$ unit per c.cm. Even 1 unit per c.cm. in the tubes kept at air temperature failed to attain this standard, 14 colonies resulting from 1 loopful of the broth. The same concentration at 4° gave an extensive growth from 1 loopful.
2. Staphylococci die rapidly in distilled water but the addition of 1 part of broth to 800 parts of distilled water gives a medium in which the number of staphylococci remains practically constant at 37° for 24 hours, and in which, therefore, it may be presumed that little multiplication is occurring. One unit per c.cm. of penicillin in this medium, acting for 18 hours at 37°, caused only a slight reduction in the number of living staphylococci, while $\frac{1}{2}$ unit per c.cm. did not appreciably reduce the number.
3. Boric acid in low concentration is bacteriostatic. When 1 unit per c.cm. of penicillin acted for 24 hours on staphylococci in broth containing a small amount of boric acid, the number of staphylococci was reduced to about a third. With lower concentrations there was no appreciable reduction.

These three experiments suggest that penicillin does not injure staphylococci which are not dividing and give a considerable degree of probability to the hypothesis that persisters are cocci which survive contact with penicillin because they are in a dormant, non-dividing phase. Further support is given to the theory by the fact that, when 1 unit per c.cm. of penicillin had acted on staphylococci in broth for 72 hours and was then inactivated by the addition of penicillinase, culture being continued, not all the persisters multiplied at once. In 64% of tests turbidity was present after 24 hours' incubation, and in 29% turbidity was first observed after incubation had continued for 48 hours. In the remaining tests, turbidity was delayed for 3 or more days. In one test it was first observed on the ninth day. This shows that the condition of dormancy may persist for a considerable time after penicillin has been destroyed.

Attention may here be called to the important practical lessons which are to be learned from the three experiments described above. These are that, in order to obtain the maximum effect of penicillin on bacteria, temperature should approximate to that of the body, action must take place in a nutrient medium, and admixture with other antiseptics must be avoided unless (as is true of the sulphonamides) antagonism does not occur.

We may now summarise what we know, what we have reasonable experimental evidence for believing and what we surmise about persisters.

1. Despite the well-marked bactericidal power of penicillin, attempts to sterilise broth containing *Staph. pyogenes* often fail because, among the millions of cocci present, there are a few which are insensitive to penicillin. These I call "persisters."
2. Persisters represent a small, but not constant, proportion of the staphylococci initially present.
3. Some cocci are in the persister phase when inoculated into fresh medium, but the condition is induced in others by their new environment.
4. There is no evidence that the production of persisters is due to penicillin, although they may be produced in its presence.
5. Persisters are not killed by concentrations of penicillin sufficiently high to kill ordinary forms. For them penicillin is bacteriostatic.
6. Persisters are believed to be insensitive to penicillin because they are in a dormant, non-dividing phase, similar to that of bacteria in the lag phase of the growth curve, and because penicillin kills bacteria only when they are dividing or about to divide.
7. Persisters are individually insensitive to penicillin but their descendants are no more resistant than are normal cocci.
8. When penicillin is destroyed, the majority of persisters develop normally and divide quite quickly, but in a few the dormant phase persists for several days.
9. Penicillin is believed to prolong the dormant phase, but not indefinitely.
10. It is believed that, despite the presence of penicillin, the biological urge to multiply may ultimately force persisters to undergo the processes preparatory to division with the result that they become susceptible to the action of penicillin and are killed by it.

So far we have considered only experiments in vitro, but it is believed that these are of importance because persisters are no mere laboratory artefacts. Clinical evidence strongly suggests that they also occur in the body. Every bacteriologist with experience of the control of penicillin treatment has probably examined specimens of pus from lesions treated locally with penicillin which on direct plating yield no growth, but which after treatment with penicillinase give extensive growths of the causative bacteria. If cultures of these organisms are tested, they will usually be found just as sensitive to the action of penicillin and just as easily killed by it as was the strain isolated before treatment was commenced. Such organisms are persisters and not resisters.

CLINICAL APPLICATIONS

We must now attempt to apply what we have learned in the laboratory to clinical practice.

Treatment of a case of staphylococcal osteomyelitis with penicillin is usually continued for 7 or 8 days. During the first few days after the cessation of treatment it appears possible that the infection has been eliminated, but then, in most cases, the disease again becomes active. The probable explanation of this is the survival in the focus of infection of persisters which, within a few days of the withdrawal of penicillin, begin to multiply. There is fairly good evidence to suggest that persisters occur more commonly in the body of a patient and there tend to remain dormant for longer periods than in broth cultures.

So long as penicillin treatment is continued the persisters will be held in check. If the supply does not fail and if the patient does not revolt the invading cocci will ultimately be eliminated, partly either by death in the persister phase or by the action of penicillin on cocci which despite its presence have begun to divide, and partly by the action of polymorphonuclear leucocytes. Such evidence as is available suggests that several weeks of continuous treatment would be required to sterilise the body of the patient by this method.

An alternative, which might be worthy of trial, is to stop penicillin after 4 days, during which time all non-persisters should have been killed, and to substitute sulphonamide therapy for it. Sulphathiazole and sulphadiazine have considerable bacteriostatic power against staphylococci in vitro. Their limited value in the treatment of staphylococcal infections is probably due to their inability to cope with large numbers of bacteria, but they might be capable of controlling the limited number of persisters remaining after 4 days of penicillin therapy until these could be disposed of by leucocytes.

Both these methods rely mainly on the power of polymorphonuclear leucocytes to eliminate staphylococci, but the extreme chronicity of some types of staphylococcal infection, particularly when bone is involved, and the lack of complete success of penicillin and sulphonamide therapy, as generally administered, urge

1. Gardner, A. D. *Nature, Lond.* 1940, **146**, 837.

extreme caution in predicting a complete cure of the disease by either.

It is believed that a more logical method of treatment based on what we have learned about the behaviour of staphylococci in the presence of penicillin, can be devised. The method suggested is fractional or intermittent sterilisation, essentially similar to that employed to kill spores in culture media. The method consists in alteration of periods of treatment with periods of absence of treatment. During treatment, all cocci in a susceptible phase should be killed by penicillin. During periods of absence of treatment, persisters should commence to divide and so become susceptible to penicillin. But, since the persister phase may be of long duration, even in the absence of penicillin, several alternations of treatment and absence of treatment would be required for the complete elimination of staphylococci from the body.

The details of treatment must depend on clinical trials, but it is suggested that the first treatment should extend to 4 days and subsequent treatments to 2. It is difficult to decide on the optimum duration of intermissions. If too short, only a few persisters may have resumed their activities. If too long, a fresh infection may have begun.

The following scheme is tentatively suggested :—

1st treatment	4 days	3rd intermission	2 days
1st intermission	1 day	4th treatment	2 days
2nd treatment	2 days	4th intermission	3 days
2nd intermission	1 day	5th treatment	2 days
3rd treatment	2 days		

This course covers a period of 19 days, during which treatment is given for 12 days. Apart from the therapeutic value which they are believed to have, the intermissions will be welcomed by the patient.

Next we must consider dosage and method of administration of penicillin. Both laboratory and clinical experience suggest that the now almost conventional 120,000 units per 24 hours is inadequate against staphylococcal infections. The aim should, I believe, be maintenance of ½–1 unit per c.cm. in the patient's serum, which corresponds to complete inhibition of the Oxford staphylococcus by the patient's serum in a dilution of ½ to 1/16. To achieve this 400,000 units per 24 hours should suffice.

In suggesting such high dosage and penicillin level in the serum, I have in mind not so much cocci in the blood-stream, which should be controlled and mastered by a much smaller dose, but the cocci in the tissues, some of which may have poor blood-supplies. Several experiments demonstrated the value of high concentrations of penicillin in killing staphylococci in broth.

Continuous intramuscular injection is strongly recommended as the method of administration. The dose of penicillin (sodium salt) decided upon—my suggestion is 400,000 units—should be dissolved in 100 c.cm. of saline and the rate of dropping should be so regulated that this amount is administered in 24 hours. Fluid intake by mouth should be restricted in the hope that this will reduce the rate of excretion of penicillin. In order to attain a high concentration of penicillin in the blood-stream as promptly as possible, an intramuscular injection of 30,000 units should be given immediately before the drip is started in each treatment period.

Some parts of the body, notably the central nervous system and pleural cavities, are relatively or absolutely inaccessible to penicillin present in the blood-stream. For these, as also for lesions of bone and abscesses wherever situated, we must supplement general by local treatment, administered by appropriate routes and methods. Such local treatment should be administered coincidentally with the general and the same intermission should be observed.

Finally we must not, because we are using penicillin, neglect the assistance of surgery. All collections of pus, which constitute reservoirs of persisters, should be evacuated as completely as possible. Every effort should be made to persuade the surgeon to use closed methods and to avoid open drains. When working with penicillin even surgeons must learn new techniques.

It must be emphasised that the scheme of treatment outlined is in no way dependent on the truth of the theory that penicillin kills bacteria only when they are about to divide, and that persisters are bacteria which survive because they are not, when first exposed to penicillin, about to divide. The treatment is based on the finding that, while the great majority of staphylococci are killed by penicillin in concentrations easily attainable in the body, a few cocci survive contact with high concentrations for long periods, but, when freed from it, they multiply and their descendants are easily killed by it.

The experimental work on which the suggestion for treatment by the intermittent sterilisation method are based dealt only with *Staph. pyogenes*, but it is unlikely that this is the only organism to produce persisters. Some, such as the gonococcus, probably do so rarely, but there is good clinical evidence that *Strep. pyogenes* and the penicillin-sensitive non-hæmolytic streptococci responsible for some cases of subacute bacterial endocarditis do so almost invariably. Treatment of such infections by the intermittent sterilisation method, therefore, offers increased prospects of cure.

It is claimed that this method of treatment, which is based on laboratory experiments, is worthy of clinical trial in all infections due to penicillin-sensitive bacteria which are not cured by a single course of treatment with penicillin. It is believed that, when it is generally appreciated that penicillin is bactericidal and when treatment is so designed as to exploit this property, the success of penicillin therapy will become more commensurate with its potentialities.

SUMMARY

Penicillin is bactericidal for *Staph. pyogenes*.

Failure to sterilise broth containing *Staph. pyogenes* is due to the survival of a small number of staphylococci called persisters.

It is believed that persisters are insensitive to penicillin because they are temporarily in a non-dividing phase and because penicillin kills only bacteria which are about to divide.

Unlike resistant strains, descendants of persisters are easily killed by penicillin.

Penicillin fails to cure staphylococcal infections in the body because some of the cocci are in the persister phase.

A scheme of treatment in which penicillin is alternately administered and withheld is suggested, in the hope that bacteria in the persister phase will divide during an intermission and be killed by penicillin when its administration is recommenced.

OVARIAN FIBROMA

WITH ASCITES AND HYDROTHORAX (MEIGS'S SYNDROME)

R. H. GARDINER
D M, M CH OXFD, F R C S E
SURGEON

V. LLOYD-HART
M R C P
PHYSICIAN

ROYAL BUCKS HOSPITAL, AYLESBURY, AND EMS

THE occasional association of benign ovarian fibromas with ascites and hydrothorax was first recognised as a syndrome by Meigs and Cass in 1937, though Griffith and Williamson (1906), Owen (1923) and McIlrath (1937) had mentioned the occurrence of hydrothorax in this connexion. Since 1937 many further cases have been reported. In 1943 Meigs, Armstrong and Hamilton collected 27 fully documented cases, and 6 more were reported in the discussion which followed their paper. Three others have since been published in America (Jones 1943, Herrick et al. 1943, Keleman 1944), bringing the total to 38.

As far as we can ascertain only 4 cases have been described in this country, the first by Cullingworth (1879), the next, to which Thompson (1943) has drawn attention, by Lawson Tait (1892), the third by Borg (1941) and the fourth by Gild (1943).[1] It is therefore natural that the condition should be little known in Britain, yet it deserves wide recognition because the patient may come first under the care of either physician or surgeon, depending on her presenting symptoms, and though the condition responds completely to surgical treatment he may well regard it as malignant and inoperable if he

1. Since this paper was written 2 more cases have been reported in England, by Clay, A. C., Johnston, R. N. and Samson, L. (*Brit. med. J.* 1944, ii, 113).

is unfamiliar with it. Furthermore, if it is recognised a patient may be spared many unnecessary and complicated investigations, and the dangers and subsequent disadvantages of a radical operation, such as was performed in our case. Simple removal of the fibroma is all that is necessary.

CASE-REPORT

A married woman of 38, nulliparous, was admitted to hospital on Sept. 7, 1943, complaining of shortness of breath on exertion and pains in the back. In 1941 she first noticed severe pain across the back, which was so bad she could not get out of bed. There was some improvement with liniment and medicine, though since that time it had continued on and off. In February, 1943, she began to have pain in the right knee which gradually became more severe and needed the care of a doctor. She was first seen on March 29 when the right knee showed a considerable effusion into the joint but there were full movements in it, and nothing else abnormal. An X ray showed no bony disease. Wassermann and Kahn reactions were negative. The knee remained painful and swollen for some weeks but suddenly became normal in 2 days, after a cycle ride. Almost immediately after this she had an attack of shortness of breath, followed by tightness in the chest which she described as "asthma." These attacks of shortness of breath continued intermittently for 8 weeks but then disappeared, though from the time of the first attack until her operation she noticed shortness of breath on exertion. By about August she thought her abdomen was "getting hard." Her periods, up to 7–8 months previously, had been normal, lasting 3–4 days every 28 days. They had then become irregular, lasting 3–4 days every two months, and the last monthly period was on May 20, 1943.

On admission, Sept. 7, she showed slight wasting, but no œdema of feet. Diminished movement and stony dullness on the right side of the chest extending from the base to the axilla, with diminished air-entry and a few distant râles. The left side of the chest was clear. X rays showed a large pleural effusion at the right base, and an area of consolidation, which was thought to be postpneumonic, though neoplasm could not be excluded. There was a hard mobile mass rising out of the pelvis reaching three-quarters of the way to the umbilicus which per vaginam seemed very like a fibroid. It could not, however, be divorced from the uterus and the question of pregnancy was not entirely ruled out. There was evidence of some free fluid in the abdomen. On Sept. 9 a Friedmann's pregnancy test was negative and X rays excluded the presence of fœtal parts, but showed calcified glands to right of the 5th lumbar vertebra. On Sept. 10 the right side of the chest was tapped and a large quantity of clear straw-coloured fluid drawn off. The deposit contained a few polymorphs and lymphocytes. No organisms or malignant cells were seen, and the culture was sterile, Tubercle was excluded by guineapig inoculation. On Sept. 20 X rays showed no change in the chest. More pleural fluid was aspirated, and gave the same results on examination. Bronchoscopy on Sept. 24 showed nothing abnormal. On Sept. 30 the abdomen was explored; some clear straw-coloured fluid escaped, and the pelvic mass was found to be a solid white hard tumour of the left ovary, 6 in. by 5 in. Nothing else abnormal was found. A subtotal hysterectomy was performed with removal of the solid tumour and both ovaries. The tumour turned out to be a fibromyxoma with no evidence of malignancy.

The patient made an uneventful recovery. X rays on Oct. 7, 1943, showed no effusion in the chest but the pleura at the right base was thickened. She was discharged on Oct. 20 and has remained well except that she has lost all sexual desire, has put on weight and has other symptoms referable to an early menopause.

ANALYSIS OF FINDINGS

Presenting symptoms.—In most published cases the presenting symptoms are referable to chest and abdomen, and a combination of shortness of breath or pain in the chest with enlargement of the abdomen and discomfort or pressure symptoms should bring the syndrome to mind. Less often the symptoms are referable to the abdomen alone, and occasionally to the chest alone. Slight continuous uterine hæmorrhage, menorrhagia, normal menstruation and amenorrhœa have all been reported, amenorrhœa being the commonest.

Physical signs.—Apart from the usual signs relating to hydrothorax and ascites, in nearly all cases the tumour can be palpated easily. Tumours vary considerably in size, sometimes being larger than an adult head. Occasionally ascites conceals the underlying tumour. The fibroma itself may be associated with one or other ovary, or be bilateral; it is therefore essential to scrutinise the apparently healthy ovary carefully; but there is no need to remove it unless it appears abnormal, since the condition resolves completely with removal of the offending fibroma alone. Hydrothorax is commonly purely right-sided, often bilateral, and only rarely left-sided. The side on which the fluid in the chest develops does not seem to be related to the side of the abdominal lesion; all combinations have occurred. Cachexia is often present, especially in cases with a long history. Œdema of the feet has been noted in at least 8 cases. Whether the synovitis in the right knee in our case was due to the presence of the ovarian tumour or not is difficult to say. The facts that it developed with no other obvious cause, about 7 months before admission to hospital, and that it was followed by the shortness of breath which heralded the onset of the hydrothorax, makes it likely that it was part of the syndrome. We found no other reports of synovitis associated with the syndrome.

Other findings.—Pleural fluid has been examined in many instances and in no case has the tubercle bacillus been cultured or demonstrated by inoculation into guineapigs. A few lymphocytes are commonly found in the fluid, but never any malignant cells. Specific gravity and protein content suggest that the fluid is a transudate, not an exudate. The abdominal fluid is similar in nature to the pleural fluid, as confirmed by laboratory tests (Meigs 1934), X rays, while confirming the presence of fluid, have never revealed active tubercle or any other condition likely to account for fluid in the pleural cavities. In Harris and Meyer's (1941) case the tentative diagnosis of a uterine fibroid was made, and an intensive course of X-ray therapy given, without benefit. In the few cases where the blood chemistry was systematically examined no gross abnormality was found and the plasma proteins were within normal limits. Electrocardiograms, in the few cases where they have been done, have usually shown some abnormalities, though in at least one case (Glass and Goldsmith 1942) the original diagnosis of congestive heart-failure was later considered wrong, in view of the response to surgical treatment.

Differential diagnosis.—It is essential that the diagnosis of malignancy should not be final until this syndrome has received full consideration, and in all doubtful cases an exploratory laparotomy should be performed. Lawson Tait (1892) advocated exploration of the abdomen in all cases of ascites and hydrothorax, lest a fibroma or other operable tumour might be missed. A few other cases have been reported where hydrothorax (not associated with secondaries) and ascites have been associated with a pelvic neoplasm; all responded completely to removal of the tumour. These include fibroid of uterus (Salmon 1934), papillary cystadenocarcinoma of the ovary (Schenck 1934), benign ovarian cyst (Dannreuther 1937), and cystadenoma of the ovary (MacFee 1939). Krukenburg's tumours of the ovary should also be borne in mind in the differential diagnosis. They are almost invariably associated with ascites and a primary lesion in the gastro-intestinal tract, usually a carcinoma of the stomach. Exploratory laparotomy will, however, rule them out, as also it will exclude cystadenoma of the ovary with secondaries in the pleura—another diagnosis that has been wrongly made in the past.

DISCUSSION

Ascites associated with fibroma of the ovary has long been recognised, and has been estimated to develop in association with 40–75% of all such fibromas (Peterson 1902, Meigs et al. 1943); indeed, any large benign pelvic tumour may cause ascites. Many theories have been put forward to account for the ascites and the less common hydrothorax, of which the more likely are:

1. Small congenital openings in the diaphragm allow direct passage of fluid from the abdomen.
2. It is an example of Selye's "alarm reaction."
3. The fluid enters the pleural cavities via the diaphragmatic lymphatics.
4. There is mechanical obstruction of the venous or lymphatic outflow of the thorax.

5. The pleural and ascitic fluid are due to congestive heart-failure.
6. Hypoproteinæmia is responsible.
7. Torsion of the pedicle of the tumour leads to outpouring of ascitic fluid.

In his first article Meigs (1937) inclined to the "alarm reaction," Selye found that repeated minor traumata to mice, especially if applied to the peritoneal cavity, lead to a building up of resistance; later, this resistance is lost, and the mice show a decline in urinary excretion, with retention of fluid, and ascites with hydrothorax followed by death. Meigs and others (1943) have still found no satisfactory explanation of the hydrothorax. Their findings may be briefly enumerated:

1. A direct congenital pleuroperitoneal hiatus is very unlikely to be present, since subjects having such a communication between chest and abdomen generally die in infancy. Meigs found no X-ray evidence of such a communication between the cavities in two cases of the syndrome. In one case he injected air into the abdominal cavity, in the other into the pleural cavity; in both cases, even with tilting, it was impossible to demonstrate that air had passed through the diaphragm.

2. Selye's alarm reaction has not been proven experimentally.

3. A communication between abdomen and thorax via the diaphragmatic lymphatics is more likely, and Meigs and his colleagues have conducted experiments in 2 cases. They injected 2 c.cm. of sterile Indian ink into the abdomen, and later tapped the chest. In both cases the cells in the chest fluid showed the same concentration of carbon granules as those in the abdomen. Examination of the blood shortly after the injection of the ink showed that the granules did not arrive in the pleural fluid by way of the blood-stream. Furthermore, the abdominal and thoracic fluids were identical in protein content. This work strongly suggests that at any rate some of the fluid from the abdomen reaches the chest via the diaphragmatic lymphatics, though the major problem of why fluid should be present in the abdomen remains unsolved.

Bomze and Kirschbaum (1940) considered that both their cases were due to congestive heart-failure and put this theory forward as the cause in all cases. The evidence in their cases does not seem conclusive and we feel that the complete recovery of all cases after operation is alone sufficient to disprove it. Hypoproteinæmia can be excluded, since in those cases where the blood was suitably examined it was found to be normal.

Our own inclination is towards mechanical obstruction of the venous return to the heart. In the right azygos vein valves are often absent or imperfect and those in the upper portion are inefficient (Cunningham 1931, Spalteholz 1933); and in cases of obstruction of the inferior vena cava, the azygos system, draining as it does into the superior vena cava, is able to take over in part the return of blood to the heart; finally, the azygos system varies greatly. In the cases above discussed five points are relevant. First, at the autopsy of Borg's case the azygos vein was twice as wide as the abdominal aorta. Secondly, in at least 8 cases œdema of the feet has been noted and in one case œdema of the abdominal wall as well; possibly these conditions have occurred in others but have not been recorded. Thirdly, the hydrothorax is nearly four times more common on the right than the left. Fourthly, in several instances the tumour has been recorded as being wedged tightly into the pelvis, and with the sizes of the tumours given together with their hard consistency it is likely that this has happened more often than has been stated. Lastly, the presence of fluid in the right knee in our own case.

From these considerations it seems certain that pressure on the inferior vena cava in its lower part must occur to a greater or less extent with a consequent increased load to be carried by the azygos system, leading in its turn to dilatation, and with the inefficient valves in its upper part to back pressure and transudate into the right pleural cavity. That œdema of the feet does not occur in all cases is difficult to account for on this theory, but presumably in these cases the inferior vena cava and azygos system between them are sufficiently patent to deal with the venous return from the lower limbs.

Again, the common variations in the anatomy of the azygos vein may well account for the occasional development of a left hydrothorax alone. The vena azygos may be formed on the left side, and such is a normal arrangement in some mammals; the hemiazygos vein may be a continuous trunk and open into the left innominate vein (Cunningham 1931). Meigs and Cass (1937) do not consider these facts when rejecting the possibility of the azygos system playing a part in the causation.

Finally, while we consider this theory the most likely one yet put forward, explaining as it does the occasional hydrothorax found in other pelvic tumours, it must be admitted that no theory has yet been proven, and further investigations are required, notably a study of the leg-lung circulation-time before and after operation, detailed necropsies if occasions arise, and research into the incidence of hydrothorax in other conditions causing ascites.

SUMMARY

Some 38 cases with fibroma of the ovary, ascites and hydrothorax are reviewed, one being a new case.

The differential diagnosis is discussed, with particular reference to the possibility of withholding operation because of a mistaken diagnosis of malignancy, and the risks of performing an unnecessary radical operation.

Fibroma of the ovary should be considered in all women complaining of shortness of breath or pain in the chest with enlargement of the abdomen and pressure symptoms.

The possible causes of the abdominal and pleural effusions are discussed. The most likely explanation is mechanical obstruction to the venous return within the abdomen.

We wish to thank Mr. Victor Lack for his coöperation.

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HEREDITARY FAMILIAL TELANGIECTASIS WITH EPISTAXIS AND MIGRAINE

A. M. G. CAMPBELL, D M OXFD, M R C P
SQUADRON-LEADER RAF

THE following case of hereditary familial telangiectasis presents some unusual features. This somewhat rare disease was first accurately described by Osler,[1] who reported numerous telangiectases on the skin and mucous membranes in a family in which 7 members were affected. The telangiectases are usually first noted in adolescence and may increase in number as age advances. The capillaries in the nævi are extremely fragile, hence the tendency to bleed. Osler stresses the severity of the condition and the danger of bleeding to death. He also states that trauma is the precipitating factor producing hæmorrhage. Hurst and Plummer [2] have summarised the known facts and mention 5 fatal cases. Figi and Watkins [3] have recently described 20 cases seen over a period of twenty years at the Mayo Clinic. They mention that on the whole life is not seriously shortened by

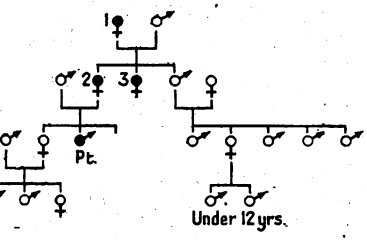
1. Osler, W. *Johns Hopk. Hosp. Bull.* 1901, **12**, 333; *Quart. J. Med.* 1907, **1**, 53. See also Parkes Weber, F. *Lancet*, 1907, ii, 160.
2. Hurst, A. F. and Plummer, N. S. *Guy's Hosp. Rep.* 1932, **82**, 81.
3. Figi, F. A. and Watkins, C. H. *Proc. Mayo Clin.* 1943, **18**, 418.

is disease and add that none of their cases were blood lations. They found hæmorrhages might come on ontaneously whilst lying in bed, and consider electro-agulation the best form of therapy.

CASE-RECORD

A cadet aged 23 attended neurological outpatients in an AF general hospital complaining of bouts of severe adache with blurring of vision, flashes of light, typical rtification spectra and epistaxis. A history of telangiec-sis was obtained in 3 other members of this family (see ure).

The patient was perfectly fit until the age of 14 when he began to suffer from severe epistaxis, at times crippling; after several bouts he had to retire to bed to recover. The bleeding was difficult to control and twice had been so severe as nearly to warrant blood-transfusion. Bleeding took place once weekly and was always preceded by a severe attack of



lent's family tree: 1. Patient's grandmother; lied aged 70. 2. Patient's mother; alive, ged 57, semi-invalid. 3. Patient's aunt; died fter operation for carcinoma mammæ, aged 60.

graine, which was relieved by the epistaxis. The migrainous in was over the right eye and was accompanied by blurring vision and fortification spectra and telescopic vision. The tacks lasted for ½–5 hours and invariably terminated in istaxis with relief of pain. At the age of 16 two other evi appeared on the upper lip and gradually more appeared the trunk. During these years the patient found he was ced to curtail his activities owing to loss of blood—e.g., he d to give up swimming and running. At the age of 19 had a sharp attack of malaria in Costa Rica. He began rk in an aircraft factory at the age of 21, in 1939, d in 1941 joined the RAF to fly as a pilot from patriotic otives. He found work at his initial training wing difficult d had reported sick and been sent for a specialist's opinion to his fitness for service. He was a thin pale youth weigh- about 9 st. Nævi were evident on the upper lip and the sal mucosa, and there were several on the trunk. The only ublesome ones were those in the nose and on the upper . Clinical examination of other systems did not reveal y abnormality. The spleen was not palpable. Blood-unt: red cells 4,100,000 per c.mm.; Hb. 65% (Sahli); ite cells 8500 per c.mm., differential count normal; bleeding e normal; clotting time normal.

A severe epistaxis occurred in the ward and lasted 30 nutes. The inflated finger-stall, as described by Hurst d Plummer, was effective in controlling the bleeding.

A test-meal showed no gastric bleeding and the stools tained no occult blood. The urine was normal. The grainous attacks failed to respond to ergotamine or pheno-rbitone. Since there is only symptomatic treatment for s condition he was discharged from the Service with the vice to return to his civilian occupation in an aircraft rks, to rest if the bleeding became severe, and to use the ger-stall.

The case is of interest in that it was associated with graine and the bleeding came on with the vaso-atation of the nasal mucosa which accompanied the grainous attack. Spontaneous bleeding is not mmon in this disease, as the fragile capillaries in the aneous nævi tend to bleed only when knocked. No vious reference to this association could be found in literature.

The presence of an intracerebral telangiectasis might sibly be a cause of the migrainous attacks but this med somewhat unlikely. There is no way of proving point and examination of the central nervous system wed no abnormality.

Though 3 other members of his family were affected, ad not seriously affected their longevity, and a study the family does not confirm the serious prognosis ich Osler gave the disease, thus agreeing with the ws of Figi and Watkins.

My thanks are due to the DGMS, RAF, for permission to lish this paper.

CONGENITAL SYPHILIS WITH OBSCURE INITIAL SIGNS

C. PAGET LAPAGE, MD, FRCP
PHYSICIAN, ROYAL MANCHESTER CHILDREN'S HOSPITAL

THERE was an increase in the number of cases of congenital syphilis after the last war and there is a likelihood of a similar increase now. Nabarro (*Lancet*, 1943, i, 291) draws attention to unrecognised congenital syphilis and gives many figures which show how dangerous the disease is. The word "unrecognised" in his title should be noted, and it is with regard to that aspect of the problem that the following six cases seen recently in infants are worthy of record.

In most of these cases the classical signs—rash round the anus and snuffles—were absent, the mothers were apparently healthy during pregnancy and the infants usually seemed normal at birth. It is also interesting that three cases out of the six had initial paralytic signs. Paternal occupation was half civilian and half Army but the number of cases is too small for this to have any scientific significance.

CASE 1.—Age 6/52; weight at birth 7½ lb. Father in the Army. Brought with a diagnosis of Erb's paralysis because he was not moving his arms, but the mother said he had never done so. The fontanelle was open; X ray for rickets negative. Had been vomiting for a day. Slight albuminuria. The bilateral paresis was suspicious, and a Wassermann on cerebrospinal fluid was positive. Result: done well on sulpharsphenamine ('Sulfarsenol.').

CASE 2.—Age 4/12; weight at birth 8 lb. Father a workman. Developed a napkin rash and bronchitis. Cross, under-nourished, with tendency to snuffles. Skin dry and unhealthy. Wassermann positive. Treated with sulpharsphenamine; improved on discharge.

CASE 3.—Age 4/52. Father in the Army. Brother died at age of 3 weeks; erythroblastosis suggested. Patient was admitted for the blood tests. Developed a macular rash on arms and legs. Skin of the soles and palms was dry. Wassermann positive. Treated with sulpharsphenamine. Died.

CASE 4.—Age 2/52. Father a navvy. Brought in as case of double Erb's paralysis. Child had head-retraction and neck-rigidity, a purulent nasal discharge and blepharitis; considerable wasting. There was a possibility of cerebral hæmorrhage. Wassermann positive, and child did well on sulpharsphenamine at first but died later.

CASE 5.—Age 13/52; weight at birth 5 lb. 15 oz. Father a fitter. Mother well during pregnancy. Negative family history. Pain (abdominal) at 4 weeks; stools unaltered. Was then found to be unable to move arms and legs, but could move head; marasmic, snuffles, dry and cracked lips, depressed bridge of nose and hydrocephalic appearance with bulging fontanelle; scalp veins distended and liver enlarged. Considerable deformity of epiphyses of upper limbs; X ray showed decided erosion suggesting congenital syphilis. Pain on movement; desquamation of arms and feet; slightly red buttocks and balanitis. Wassermann positive. Did well at first on 'Sulphostab,' but died later with indefinite meningeal signs.

CASE 6.—Age 2 years. Well nourished. Father in Navy. Normal infancy except for squinting at 3 weeks. Bilateral internal strabismus and neck-rigidity. Meningo-encephalitis or brain tumour suspected. There was slight papilloedema. Unable to sit up or move limbs but answered if spoken to. Appeared to be blind but this appearance was probably due to ocular palsy. Lumbar puncture: colourless fluid under increased pressure; protein 200 mg., sugar 63 mg., chlorides 718 mg. per 100 c.cm. Wassermann positive. Steady improvement with sulpharsphenamine, and can now stand and talk.

A Wassermann test is essential in all suspicious cases, and should cerebrospinal fluid not be available for this purpose there should be no postponement because of the difficulty of obtaining blood from the infant. Puncture of one of the larger veins, or, if these are not accessible, a fairly deep stab into the heel with a sharp scalpel or edged needle will usually give enough blood.

Reviews of Books

Biomicroscopy of the Eye

Vol. I. M. L. BERLINER, MD, assistant professor of clinical surgery (ophthalmology), Cornell University; assistant surgeon, New York Eye and Ear Infirmary. (Hamilton Medical Books. Pp. 709. £4 4s.)

Alvar Gullstrand, in 1911, solved a problem that his generation had considered beyond solution. A successive series of magnifying lenses had already been evolved for the clinical study of the eye and such lenses are still in routine use in clinical practice; but study of the living eye under the microscope was still impossible. The magnification given by the lenses was neutralised by the lack of an adequate light source; Gullstrand, by means of the slit lamp, provided a controlled and focused beam. Clinical exploitation of his work was almost entirely due to Alfred Vogt, a versatile genius whose unique three-volume treatise on the subject is not the least of memorials he has left behind on his death a year ago. In the present volume, which is to be followed by a second and concluding volume, Dr. Milton Berliner has produced a textbook survey of the subject, differing in its treatment from the monograph study of Vogt. Other attempts at textbook surveys of biomicroscopy of the eye have been made during the past twenty years, but none so comprehensive as this. The accumulated observations of the past quarter of a century are systematised, and the survey recalls the far-reaching additions the study of biomicroscopy has made to clinical knowledge. This is strongly brought out in the chapters on the cornea: an ætiological classification of corneal lesions is beginning to emerge, to which the slit-lamp has contributed much. Study of the angle of the anterior chamber, a relatively new departure, is a direct development of slit-lamp microscopy, well described by Dr. H. S. Sugar. Profusely illustrated, simply written, and with a full bibliography, the book should do much to popularise slit-lamp microscopy.

Nutritional Deficiencies: Diagnosis and Treatment

(2nd ed.) JOHN B. YOUMANS, MS, MD; E. WHITE PATTON, MD. (Lippincott. Pp. 389. 30s.)

THOSE who feel guiltily that they have a lot to learn about the deficiency diseases will be encouraged by the sight of this beautifully produced if expensive book. On reading it, however, the student will realise that his guilt is unjustified: deficiency diseases are, after all, only his old friends rickets, scurvy, anæmia and goitre, and his new acquaintances ariboflavinosis, and vitamin-K deficiency. They are all described in his 1944 general medical textbooks, some in greater and some in less detail than here. Within these limits the book is good. Professor Youmans gives a clear standard account of the vitamins and of the major deficiency diseases, and shows wise caution in his selection of recent claims for vitamin therapy. He has not been beguiled into advocating synthetic vitamins at the expense of a good diet or cheaper vitamin concentrates.

Aids to Orthopædic Surgery and Fractures

(2nd ed.). I. E. ZIEVE, MA CAPE TOWN, FRCS. (Baillière. Pp. 270. 6s.)

THIS is another useful book in the *Aids* series. Nearly half is devoted to fractures and joint injuries, the rest to inflammatory diseases of bones and joints, neoplasms of bone, congenital and acquired deformities, and paralyses—in fact, to the whole of the orthopædic surgeon's work. The information is well presented and comprehensive. It is always surprising how much can be got into so small a compass. The book should be popular with students revising for their final examinations. The old terminology is used throughout.

So You're Grown Up Now!

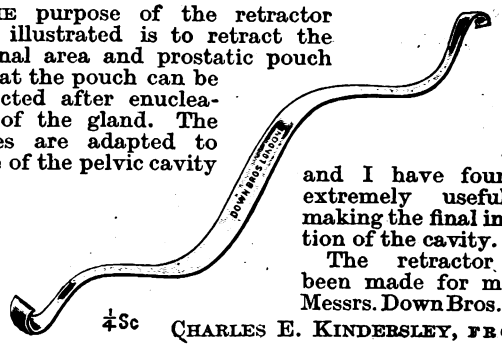
ARTHUR C. GEE, MRCS, DPH, asst. MOH, Holland county council, Lincolnshire. (Wright. Pp. 31. 1s.)

THIS good booklet should prove valuable to those who have to teach the young about sex. It will serve as a basis for lectures, or can be handed to adolescents to read for themselves. It deals both with the physical and emotional sides of the process of reproduction and puts the sexual act in its true perspective as only a small part of the whole cycle. Dr. Gee stresses the importance of learning to control the sex instinct, and the dangers and difficulties which may arise from failing to do so. Though attraction between young people of opposite sexes is perfectly natural and desirable, they should understand that the family is the unit upon which we have chosen to base our society, and a complete and satisfactory sexual life can be built within that framework alone.

New Inventions

PROSTATIC POUCH RETRACTOR

THE purpose of the retractor here illustrated is to retract the trigonal area and prostatic pouch so that the pouch can be inspected after enucleation of the gland. The curves are adapted to those of the pelvic cavity and I have found it extremely useful in making the final inspection of the cavity.



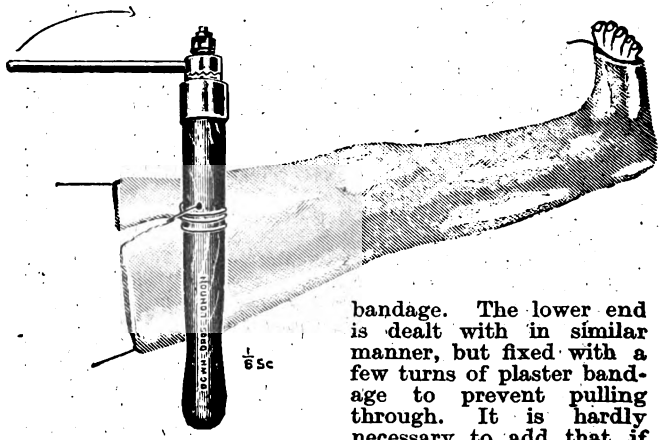
The retractor has been made for me by Messrs. Down Bros., Ltd.

¼Sc

CHARLES E. KINDERSLEY, FRCS.

WIRE PLASTER CUTTER

THE instrument here illustrated is designed to facilitate the rapid removal of plaster splints by cutting through the plaster with a wire which has been laid in it at the time of application. The wire should exceed the length of the splint by about 6 in. top and bottom. The upper end is bent over and held until required by a plain cotton bandage. The lower end is dealt with in similar manner, but fixed with a few turns of plaster bandage to prevent pulling through. It is hardly necessary to add that if any padding with wadding bandages or adhesive felt is used at the extremities of the splint, or elsewhere, for protection purposes, the wire must be "laid" superficially to this.



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The instrument consists of a wooden rod about 12 in. long. One end of this is shaped to afford a good stabilising grip for the left hand; to the other end a ratchet lever is attached, giving a powerful pull for the right hand. The rod is provided with a threading hole to take no. 16 gauge galvanised iron wire, which appears to be adequate and does not rust. No excoriation of the skin has been observed after the removal of skin-tight plasters by this method. The ease with which this simple tool does the work is surprising. A mid-thigh 'Cellona' cast can be cut from end to end in a minute or less, including any additional thickness there may be due to the fixation of the stirrup. Occasionally the end of a plaster becomes somewhat soggy; it is then advisable to cut down until firm plaster is reached, so avoiding dragging of the plaster bandage by the wire. The wire will never cut a plaster which is not quite dry.

The instrument is manufactured by Down Bros., Ltd.

NORMAN FLOWER, BM OXFD.

THE LANCET
LONDON: SATURDAY, OCTOBER 14, 1944

Prevention of Congenital Syphilis

EVER since syphilis was introduced into Europe by e sailors of COLUMBUS in 1493 and was disseminated roughout the Continent by the disbandment of HARLES VIII's mercenaries after his fruitless invasion f Italy in 1495, the disease has flared up during every ar. The two world wars have been no exception. rogress was made after 1918 in the treatment and rophylaxis of syphilis, and the number of new cases eported annually from the VD clinics was steadily eclining until the outbreak of the present war. But nce 1939 the incidence of venereal diseases has risen nd the increase in adult syphilis has been accom-anied by an increase in congenital syphilis. The umber of new cases in infants under one year of age, s returned by the VD clinics in England and Wales, vhich was 339 in 1931 and fell progressively to 191 n 1940, rose to 223 and 245 in 1941 and 1942. This noreover is by no means the whole story, for the igure does not include the cases seen by practitioners outside clinics, nor of course those that remain undiagnosed. On another page Dr. LAPAGE of Man-hester records six recent cases, most of which did not exhibit the classical signs and symptoms, and recalls NABARRO'S statement [1] that the disease may be so mild in infancy that it passes unnoticed and is only made manifest in early adult life by the appearance of interstitial keratitis or symptoms of neurosyphilis, or indeed is discovered only when the affected person offers himself as a blood donor. The tragedy of congenital syphilis is not so much the number of still-births to which it gives rise—a number which in the past was probably over-estimated—as the number of survivors who later develop eye disease, deafness, and other nerve and mental disorders which, in the words of Colonel L. W. HARRISON, "convert a promising youngster from an economic asset into an economic burden."

So far as they go then, the figures indicate that during and owing to the war the incidence is increasing, and judging by experience immediately and for some time after the last war, the increase will continue unless preventive measures are taken forthwith. Congenital syphilis is almost entirely preventable and the means of preventing it have been usefully discussed at two meetings of the Medical Society for the Study of Venereal Diseases, first in 1928 and again quite recently.[2] On the latter occasion Dr. NORA WATTIE gave some encouraging figures from the antenatal clinics of the Glasgow Corporation. When the clinics were started in 1924 less than 1000 women attended and about 5% of them had positive blood reactions. By 1939 the number examined had risen to 8616, with only 1·2% positive results, and with intervening fluctuations it had risen in 1943 to 11,067 with 1·8% positive. In Glasgow the general principle followed is that syphilis in mothers and children is, whenever possible, treated where it is discovered—be it at an antenatal clinic, a child-welfare centre, or a maternity hospital; and it is this principle, aided doubtless by the enthusiasm of Dr. WATTIE and her assistants, that has yielded such success. The number of new cases of congenital syphilis under one year of age in Glasgow, which in 1922 was 335, had fallen to the gratifying figure of 15 in 1941. In the two following years it rose to 27 and 32, mainly because the increased promiscuity of war-time led to infections during pregnancy after the antenatal blood test had been made. Dr. WATTIE maintains that this is now the predominant problem in Glasgow, and doubtless the same applies to other cities; congenital syphilis from this cause cannot be prevented by the work of antenatal clinics, but only by the control of syphilis as an infectious disease. These facts lend support to our plea for the anonymous notification of venereal diseases.[3]

From analysis of figures furnished by medical officers in various parts of the country, NABARRO [4] estimates that between 1% and 2% of expectant mothers are positive reactors, and if this figure is confirmed by the Tyneside investigation now in progress, it will be evident that the potentially syphilitic still-births and children to be expected will number some thousands yearly unless adequate precautions are taken. A similar figure for positively reacting expectant mothers in the United States was given to Dr. NABARRO by Dr. J. R. HELLER, of the US Public Health Service, though he added that data were at the moment incomplete in the different states: New Jersey, New York, and Rhode Island in 1938 passed legislation requiring antenatal blood tests, and by September, 1943, 31 of the 48 American states had followed suit. An objection sometimes raised to the introduction of such general antenatal blood-testing and the treatment of the positive reactors is the possibility of false positive reactions in pregnancy. In the discussion on WATTIE and NABARRO'S papers, Colonel HARRISON refused to dismiss this as a bogy: he said that the incidence of positive reactions among prospective blood donors (males and females) is less than half the incidence indicated for pregnant women, and pointed out that this finding may be explained by the tendency of pregnancy to make the serum labile. Dr. A. E. W. MCLACHLAN quoted the latest Newcastle figures which gave 0·9% strongly positive and 0·75% doubtful reactions in blood donors, and 1·4–2·0% positive in pregnancy according to the district. In all antenatal blood-testing one must remember that any admixture of spirit or other antiseptic or of water with the blood may give rise to doubtful or weak positive reactions; and that the test itself should be carried out by approved technique, preferably in an approved laboratory. But in the absence of these two possible sources of fallacy a strong positive reaction in a pregnant woman, verified by a repeat test, justifies the treatment of the woman both for her child's and her own sake.

What Glasgow has succeeded in doing for the prevention of congenital syphilis should be an inspiration and an example to local authorities all over the country, and should stimulate the Government to take the steps necessary to eradicate this disease. The education of the public as to what could be done is urgent—and particularly, under present conditions,

1. Nabarro, D. N. *Lancet*, 1943, i, 291.
2. Report. *Brit. J. ven. Dis.* 1944, **20**, 61.
3. Editorial. *Lancet*, 1944, ii, 17.
4. Nabarro, D. N. *Brit. J. ven. Dis.* 1944, **20**, 65.

mothers must be induced to have their first antenatal examination as soon as they believe themselves pregnant. Here we have a chance of adding some thousands of healthy children to the population each year.

Evolution of Epidemiology

EPIDEMIOLOGY is still badly taught and poorly practised in this country, whereas the Americans have been taking a livelier interest in it—an interest which has doubtless been a spur to Professor WINSLOW of Yale in his heavy task of describing, in a scholarly, critical and readable volume,[1] the development of epidemiology through the ages. The history of epidemiology typifies the relativity of scientific theory. Thus the sanitary awakening of the nineteenth century, which accomplished so much, was based on the false assumption that dirt is the mother of disease—today we should recognise it as the wet nurse. Similarly, from time immemorial, tribes and communities have related disease and its control to malign forces which had to be propitiated or warded off—the demonic theory; or, as was the teaching of the Old Testament, to the wrath of God as a punishment for sin. A third belief centred round the movements of the heavenly bodies and magical happenings—horoscopes were being cast as late as the 17th century to determine the "critical days" for bleeding and purgation. About the 5th century BC, Greek civilisation replaced supernatural and metaphysical influences by a universe of natural law, and Greek medicine, led by HIPPOCRATES, played a notable part in this revolution of thought. Deduction from observation became established, and man's diseases were attributed to disturbances of his bodily "humours," often under the influence of atmospheric and climatic changes. The dawn of epidemiology came with HIPPOCRATES' great work, *Airs, Waters and Places*, where hot winds were blamed for poor appetites and digestive disorders, cold winds for pleurisy and acute diseases; where rain-water and upland waters were good, and marshy water associated with large stiff spleens. After HIPPOCRATES came GALEN, the rationalist—but also an acute observer and original thinker—whose concept of epidemiology, based on the factors of atmospheric influences, individual predisposition and, in a minor key, contagion, dominated medical thought and practice for many centuries.

Contagion, although vaguely appreciated in ancient times and among primitive races, as instanced by the leper laws, was first given prominence in the writings of FRACASTOR, better known for his poem on syphilis. His germs or "seminaria" were conceived as chemical rather than biological substances, susceptible to evaporation and diffusion through the air, and despite the pioneer work of LEEUWENHOEK in the 17th century this concept of infection by gaseous miasmata prevailed till PASTEUR'S time. WINSLOW blames SYDENHAM for halting epidemiological progress by his insistence on the metaphysical "epidemic constitution" and the interdependence of diseases to the exclusion of contagion, but praises RICHARD MEAD (1673–1754), who in the last of the plague tractates emphasised the importance of the spread of infection by contact and by fomites. A century later saw the rise of EDWIN CHADWICK as the apostle of sanitation, for his extensive report on the sanitary condition of the labouring population in Great Britain had shown how closely associated were filth and disease. And if the premises were false, the purification of water-supplies and the introduction of the water-carriage system of sewage resulted in the elimination of cholera and a great reduction in the morbidity of typhoid fever.

The latter half of the 19th century belonged to bacteriology, with PASTEUR, LISTER and KOCH in the van. The establishment of a tangible materies morbi, with the later recognition of the rôle of human and insect carriers, helped the moderns to unravel the riddles of the sources and modes of spread of infectious diseases. With new techniques for typing streptococci, pneumococci, typhoid and salmonella bacilli, there is a danger today that epidemiology may become too much an appendage of bacteriology. WINSLOW does well, therefore, to remind us that SNOW and BUDD and PANUM had by keen observation and logical deduction from field experience revealed the essential epidemiology of cholera and typhoid and measles before the bacteriological era. That there is still plenty of opportunity for this kind of field epidemiology has been demonstrated by PICKLES of Aysgarth in his work on infective hepatitis and the like. Some of the present difficulties in advancing epidemiological practice, such as delay in ascertainment and notification and the dual control in county areas, have been indicated by CURNOW,[2] who pleads for a local service covering larger areas, linked to a central service for specialised work and for training purposes. If some such scheme can be put into operation in association with a national public health laboratory service as outlined by DOWNIE,[3] the prospects of better control over our epidemic diseases are good. As FROST has said, epidemiology is something more than the total of its established facts; the present need is for men trained in the clinical and applied science along with improvements in the administrative machine.

The New Family Allowances

THE size of young Americans who visit us on their way to do battle in Europe reminds us what twenty years of good eating can do for the children of men. At the end of the peace there were many children in England going short of food; not of bread, not of something to fill the belly, but of food as nutritionists understand it—of an adequate and balanced diet. How many suffered in this way it is hard to judge, but the chief medical officer of the Board of Education reported in 1938 that among 1,674,023 school-children nutrition appeared "excellent" in only 14·5%; it was subnormal or bad in 11·3% and "normal" in 74·2%. Commenting on these figures in a broadsheet on family allowances[4] we took the view that the word "excellent" should have read "normal," and the word "normal" should have read "average." Only 14·5% of these children were enjoying the abundant and vigorous health which is evidence of proper nutrition in childhood and nothing less should be accepted as "normal." Since war broke out, the fair sharing of a common food store and the end of unemployment have combined to

1. The Conquest of Epidemic Disease. By C.-E. A. Winslow, MD, professor of public health, Yale School of Medicine, New Haven. (Oxford University Press. 1943. Pp. 411. 30*s.*)

2. Curnow, R. N. *Proc. R. Soc. Med.* 1944, **37**, 483.
3 Downie, A. W. *Ibid*, p. 486.
4. An Aylesbury Broadside, 1940. 3*d.*

raise standards of nutrition among those who went short before. This gain we must conserve in the coming peace, bearing in mind that nutrition does not depend on food alone, but also on a clean and comfortable home, fresh air and proper rest.

BEVERIDGE estimated that at 1938 prices a child could be fed, clothed and warmed for 7*s*. a week. His suggested allowance of 8*s*. per child allowed 2*s*. for rise of prices, but assumed that benefits in kind provided at school in the form of meals and milk were worth 1*s*. a head. He excluded the first child from the cash allowance on the ground that most parents can afford to maintain one child. The Government also omit the firstborn, but propose an allowance of only 5*s*. a week for second and subsequent children. As they are suggesting old-age pensions higher than those advocated in the Beveridge report, many will feel that they are showing generosity at the wrong end of a citizen's life; and some have remarked cynically that old-age pensioners have votes while children have none. The decision, however, is not unexpected, for the Government have already explained [5] their view that a large part of any further subsidy to children from public funds should be given in kind as milk and meals, and they do in fact propose to extend existing services of this nature. They have even gone further than was expected, for whereas in 1943 they declared themselves willing to provide services costing 2*s*. 6*d*. a week for each child (as against the 1*s*. a week assumed by Beveridge) they now estimate the total cost of the extended school milk-and-food service at £60 million, against £69 million for the cash allowances—i.e., nearly half the children's benefits are to be in kind. This arrangement, though ensuring that the child profits by the sums spent and incidentally helps the eldest member of the family, also has drawbacks. School dinners do not continue in the holidays, and children under the age of five are excluded altogether from such extra meals. Milk may be available in urban areas to school-children out of term, but many will not trouble to go round to the school to get it. Finally, the general provision of school meals which the Government rightly have in mind may be delayed some years by difficulty in getting accommodation, staff and equipment. A parliamentary answer recorded on another page states that the present cost of milk and meals in elementary schools is only about £9 million.

The Government hold that though it is in the national interest for the state to help parents to look after their children properly, nothing should be done to remove their responsibility for doing so. The allowances offered are frankly not intended to cover the whole cost of bringing up a family; indeed the Government clearly recognise that even 8*s*. would no longer meet a child's expenses, since they propose a cash allowance of 12*s*. a week for orphans. Their policy is clearly to give their support as much as possible through the schools, so that it is bound to go to the child and not be spent on something else; and if the schools can do it we shall all agree that this is best. Pursuing the same object we suggest that the cash allowances should normally be paid directly to the mother, rather than the father, thus giving her the status which, as an unpaid worker, she lacks at present, and also increasing the probability that the money is spent directly on the children. The Government's present plan is that the allowance should be paid to the father but drawn in such a way that the mother can also cash it; but there are good grounds for reconsidering this decision in a country where the saying "Never tell a woman how much money you have" is still regarded by many as a sound maxim.

The institution of family allowances, even at a level lower than was hoped, represents an immense social gain which cannot fail to benefit the children, rapidly and conspicuously. How far it will also succeed in what is probably its secondary aim—to increase the number of those children—is something only time can show; but the maternity benefits and grants, which are also offered, should be an additional encouragement in this direction. To meet the immediate financial anxieties of confinement the Government propose a grant of £4 for all women, whether married or not, insured or not, earning or not; 13 weeks' benefit at the rate of 36*s*. for women who are earning, provided they give up work for that time; and a weekly grant of 20*s*. for 4 weeks to pay for a home-help for the housewife during the lying-in.

A Lead from Durham

WHAT most disturbs men and women in the Services is the idea that their years of absence will put them at a lasting disadvantage compared with coevals who have stayed at home. Having borne much of the burden and heat of the day they are afraid that nightfall will find them out in the cold and their civilian friends in the best seats round the fire. Those furthest from England have the added fear that they will get back latest and fare worst. They will note, however, that the general scheme for reallocating man-power at the end of the German war seems to be based more on equity than on convenience. Before anyone at all is demobilised there is to be "a pause during which the Services can identify the men who are to be released first and arrange for the return to this country of those who are overseas." Though nobody can come home if he cannot be spared, "the Services will make every effort to release men in their turn in whatever theatre of war they may be serving." And they will go on calling-up young men to take the place of older ones.

Our advertisement columns show that many major appointments are now offered temporarily: we read, for instance, that an appointment "will be readvertised after the end of the war, so that doctors now serving in the Forces may have the opportunity of applying." This, however, will hardly satisfy those who do not expect to be in Europe when the time of readvertisement comes. An excellent alternative plan has been adopted by the University of Durham, which in filling its chair of surgery "will make no appointment until it is satisfied that persons serving overseas have had full opportunity to apply." If it chooses as professor a man now in the Forces, the University will keep his chair empty but warm till his return.

5: *Lancet*, 1943, 1, 283.

APPOINTMENTS TO UNRRA.—Prof. R. R. STRUTHERS, who is on leave of absence from the chair of pædiatrics at McGill University, Montreal, has been appointed medical specialist attached to the European regional office of UNRRA. Dr. W. C. V. BROTHWOOD, deputy MOH for Lancashire, has been appointed chief medical liaison officer with Norway.

Annotations

PENICILLIN DOSAGE

THE sulphonamides and penicillin are believed to exert their antibacterial powers principally by preventing growth of the parasite. In the case of sulphonamides this bacteriostatic action is apparently related to interference with enzymic activities connected with the nutrition of the organism; the mode of action of penicillin has not yet been defined. What matters clinically is that these drugs, in virtue of their bacteriostasis, diffusibility and non-toxicity, can be used both locally and systemically to control bacterial growth and thus give the tissues a chance to deal with the invader and complete the kill. That this is essentially the mode of action of the sulphonamides is substantiated by the experience of Anderson and his colleagues [1] in the treatment of pneumococcal pneumonia. In young healthy adults, the results were excellent even in severe infections; in older subjects with less reactive tissues the results were poor. This important function of the host in controlling bacterial infections may be too easily overlooked in our enthusiasm for the new panaceas, and as penicillin becomes more widely available we must be prepared for many disappointments in patients whose tissues are either so old or so seriously damaged that they cannot play their essential antibacterial rôle. On the principle of bacteriostasis, it has been found that a blood-level of sulphonamides of 2–3 mg. per 100 c.cm. is as adequate for cure as a concentration of 10–15 mg.%, except in the more fulminating septicæmias. Dosage of penicillin has been planned on the same basis—that is, to maintain by frequent injections or continuous drip a bacteriostatic level in the tissues. While this system of treatment has often resulted in seemingly miraculous cures, particularly in patients treated early, there have been instances of relapse, especially in staphylococcal infections, requiring second and even third courses of penicillin. Chronic infections, such as osteomyelitis and discharging sinuses, may show both clinical and bacteriological cure after a local course of the drug, only to flare up again when treatment is discontinued. A possible explanation for these clinical observations is suggested by the experimental work of Bigger, reported on another page. Bigger found like Fisher [2] that penicillin is bactericidal to the staphylococcus, even down to concentration of $\frac{1}{24}$ unit of the drug per c.cm. of fluid. But the bactericidal action was variable, and often was not absolute. This failure to completely sterilise a broth culture of *Staph. aureus* was explained, in the light of further experiments, as due to a small number of the staphylococci being in the resting or dormant phase and thereby resistant to the penicillin which acts on the organism during or preparatory to division. Bigger calls the survivors "persisters" rather than resisters because when they begin to multiply their descendants are no more resistant than ordinary cocci. In this they differ from staphylococci which "acquire" resistance to penicillin, for these apparently can hand on their resistance to further generations, though Spink and his colleagues [3] have lately suggested that they do not constitute a danger because they are readily destroyed by the blood itself.

In view of his test-tube findings, Bigger suggests that a much larger dosage of penicillin—e.g., 400,000 units in 24 hours—should be used in the treatment of severe staphylococcal infection with a view to *killing* the organisms quickly, and that treatment should be intermittent with off-periods of a day to allow any persisters to change from the resting to the active stage, and thus become susceptible to attack by the drug. This is perhaps forgetting the host's reaction to the parasite, for ordinarily the tissues will be able to kill off small numbers of surviving bacteria unless these are inside abscess cavities, or surrounded by chronically inflamed fibrous tissue or associated with foreign bodies such as dead bone: in such instances, surgery must come to the aid of chemotherapy. The need for bigger dosage to destroy the organisms might be met by an initial dose of 50,000 to 100,000 units to allow seepage into pyæmic abscesses from which the organism may spread in relapsed infections. (In this connexion the intermittent intramuscular injection may have advantages over the continuous drip.) On the other hand, small maintenance doses over a longer period may allow the host's tissue to wall off these secondary foci, and an autogenous vaccine containing staphylococcal toxoid to stimulate the antibody mechanism should be a useful adjunct to such a course. The important point is that penicillin dosage should not become stereotyped until various permutations have been tried. Even if Bigger's experiments are not strictly comparable with the clinical infection, his suggestion of treatment by intermittent dosage is worth a trial, both systemically and locally.

1. Anderson, T. and others, see *Lancet*, July 1, 1944, p. 20.
2. Fisher, A. M. *Bull. Johns Hopk. Hosp.* 1943, **73**, 343.
3. Spink, W. W., Ferris, V. and Vivino, J. J. *Proc. Soc. exp. Biol. N.Y.* 1944, **55**, 210.

MALNUTRITION IN JAPANESE INTERNMENT CAMPS

GROSS malnutrition is rarely seen in white people living in tropical and subtropical areas, although it is only too well known among the indigenous populations. In March of this year Whitacre,[1] repatriated from the Philippines on the *Gripsholm*, reported on conditions in a Japanese internment camp at Manila, where there were 3900 internees, 80% of them Americans. A further account has been given by four other repatriated doctors, Adolph, Greaves, Lawney and Robinson,[2] who have collected and condensed the reports of 100 repatriated physicians and nurses from 5 different camps. The essentials in the camp diets were fairly constant, though the actual dietaries differed considerably from camp to camp. The caloric intake ranged from 1500 to 2500 daily, the calcium intake was universally low (0·12–0·44 g. per day) and in most cases the protein was deficient. Vitamins A, C and D seemed to be adequate except in one camp where a number of cases with subperiosteal hæmorrhages and extensive ecchymoses pointed to a deficiency of vitamin C. All the diets were seriously deficient in vitamin-B complex. Contrary to the common belief that a starving man will eat anything, palatability of the food was found to be a most important factor. Many of the internees preferred starvation to consumption of the food supplied, a point which should be carefully noted by those dietitians who pay more attention to figures than palates. Complaints of lassitude, easy fatigue, headaches, restlessness, anorexia and loss of weight became increasingly common in all the camps as the months went by. These symptoms were attributed in some cases to the low caloric intake and in others to vitamin-B complex deficiency. The reports emphasise the importance of emotional factors and note that those who found adjustment to camp life most difficult were among those showing abrupt losses in weight. Cases of beriberi occurred at all the camps, and in most there was evidence of generalised B-complex deficiency in the appearance of mild pellagra, glossitis, cheilosis, angular stomatitis and seborrhœic skin lesions, which all responded to nicotinic acid and riboflavin. Some cases of beriberi had œdema of the ankles which responded to treatment with thiamine hydrochloride. Œdema of the ankles was prevalent in one camp where the intake of protein was particularly low, and cure was rapidly effected by increasing the protein in the diet. Diarrhœa was troublesome at two of the camps. One outbreak was due to infection with an organism of the

1. Whitacre, F. E. *J. Amer. med. Ass.* 1944, **124**, 652.
2. Adolph, W. H., Greaves, A. V., Lawney, J. C., and Robinson, H. L. *War Med.* 1944, **5**, 349.

salmonella group, but in most cases no infective agent could be found; in these the diarrhœa was attributed in one camp to the large amount of roughage in the diet and in another to nicotinic acid deficiency. In the latter, limitation of roughage with relative increase in carbohydrates merely aggravated the condition and led to the development of sore tongues and loss in weight, but daily injections of 150 mg. nicotinic acid, followed by a maintenance dose of 50 mg. daily led to "striking improvement." Stevenson,[3] in his report on conditions in German prison camps, describes the syndrome of œdema, headaches, and diarrhœa, unassociated with other symptoms and signs commonly found in vitamin-B deficiency, and concludes that the syndrome was mainly due to lack of proteins. In all the Japanese camps a large proportion of the internees suffered from an increasing affection of the eyes. The first complaint was usually of a "shimmering effect" or blurring when reading. Later some were quite unable to read. Examinations of one camp revealed irregular contraction of the field of vision with a central scotoma. Treatment with protein, thiamine hydrochloride and nicotinic acid was ineffective. At one camp riboflavin therapy seemed to result in improvement, but there were insufficient supplies to give it a proper trial. At the same camp locally grown yeast was effective in a large proportion of cases. This condition sounds similar to that reported by Wilkinson and King[4] and Fitzgerald Moore and recently referred to by Stannus.[5] These papers serve to emphasise how much we have yet to learn about nutrition, and how few symptoms and signs are specific for any one deficiency or even for deficiency of any sort. They may lead to action to improve the lot of native races, among whom the conditions now being observed in special sections of the white population are prevalent at all times.

EARLY RISING IN THE PUERPERIUM

THE time-honoured custom of keeping patients in bed for at least ten days after delivery has again been challenged. This time Rotstein of Baltimore[6] allies himself with Charles White,[7] Kustner[8] and the many other obstetricians who have advocated early rising after the child is born. Rotstein's claims do not differ much from those of his predecessors: he maintains that involution is accelerated, the lochial flow stimulated, the incidence of thrombophlebitis reduced, and the likelihood of prolapse no greater in those patients who rise from their bed on the fourth day than in those who remain in it until the tenth or later. He reports on 150 cases, including primiparas, multiparas, breech deliveries, and deliveries by forceps and even mid-forceps. In America episiotomies are usual, and they were done on more than two-thirds of these women; the incisions healed well. When the patients were examined six weeks after confinement only 22% had any serious degree of retroversion—which compares favourably enough with other reported figures on the incidence of retroversion. The advantage of early rising is that hospital beds are more quickly freed for maternity patients.

There are however many arguments against it. Most patients enjoy a rest in bed after the anxieties and discomforts of pregnancy and the pains and exhaustion of labour. Among some working-class women relaxation during the puerperium is the nearest approach to a holiday they ever achieve. To establish the claim that prolapse is not favoured by early rising would need a careful follow-up of a large series of patients over many years. After delivery the genital canal is bruised and stretched, the uterus heavy, and common-sense suggests that if its weight is allowed to press on the flaccid pelvic floor prolapse may result. This seems to be supported by observations on races where it is the custom for women to rise early in the puerperium: among Indians, for example, prolapse is common. Again the stretching of the pelvic articulations must not be ignored; possibly sacro-iliac strain and chronic backache may be encouraged by early rising. Lastly, although Rotstein reports a somewhat reduced incidence of sepsis, his series is a small one. Many organisms inhabit the vaginal canal during the puerperium, and, if patients are allowed to walk about, raw granulating surfaces may be pulled apart and exposed to heavy infection. Whether or not early rising is the ideal routine treatment for puerperal cases, necessity sometimes enforces it. Thus during the 1941 blitz, maternity beds in London were in such urgent demand that puerperal patients had to be sent home on the fifth or sixth day after delivery. This study suggests that this practice was less reckless than it seemed at the time.

3. Stevenson, D. S. *Brit. med. J.* 1944, i, 658.
4. Wilkinson, P. B. and King, A. *Lancet*, 1944, i, 528. See also Greaves, A. V. *Ibid*, Aug. 12, 1944, p. 227.
5. Stannus, H. S. *Brit. med. J.* 1944, i, 103.
6. Rotstein, M. L. *J. Amer. med. Ass.* 1944, **125**, 838.
7. See Adami, J. G. *J. Obst. Gynæc.* 1922, **29**, 1.
8. Kustner, J. *Mitt. Ges. Geburtsh. Lpz.* 1899, **1**, 482.

THE HEART IN RHEUMATOID ARTHRITIS

OPINION has swung full circle since the '70s on the relationship between rheumatic fever and that large group of rheumatic diseases of which rheumatoid arthritis is the main example. Then Sibson[1] was proclaiming that there is a tendency for patients with rheumatic fever to develop gout as they get older. Ten years later Jonathan Hutchinson was stirring up a hornet's nest by claiming that many cases of rheumatoid arthritis originate in attacks of rheumatic fever. Dyce Duckworth[2] was one of those who took up the cudgels against the unitarian view and instituted a school of thought which is only now beginning to weaken. The establishment of a bacteriological cause for any of the rheumatic diseases has proved so difficult that there is strong support for the theory that, in the words of Levinthal,[3] "the disease is not due to an external specific micro-organism, but to a specific reaction of the macro-organism to any invasion by a foreign protein, whether living or dead."

One of the arguments advanced against the unitarian view has been the different incidences of cardiac involvement in rheumatic fever and rheumatoid arthritis, but recent investigations, based on necropsy findings, show that this difference is more apparent than real. Thus in a post-mortem examination of 38 cases of rheumatoid arthritis Young and Schwedel[4] found cardiac lesions in 33 cases and in 25 of these the lesion was rheumatic in origin. The mitral valve was involved in 6 cases, the aortic in 3; combined aortic and mitral involvement was present in 9 cases; mitral, aortic and tricuspid in 5; and in 1 case all four valves were affected. The rheumatic process in the heart was active in 6 of the cases. The pericardium was involved in no less than 10 cases and congestive heart-failure had occurred in 22. Most of the patients were over the age of 45 when they died. One of the most important findings was that in 14 of the 32 cases in which full clinical notes were available the cardiac lesion was not detected clinically. A definite history of rheumatic fever was obtained only twice, with a "probable" history in 2 more cases. Comparable necropsy findings were reported by Baggenstoss and Rosenberg[5] in 25 cases of chronic rheumatoid arthritis, in only 2 of which was there a history of rheumatic fever. Five of the hearts in that series were normal; in 14 rheumatic lesions were found; and the necropsy diagnosis in the remainder was myocardial infarction (2 cases), hypertension, fibrinous pericarditis, hydropericardium, and obliteration of the pericardial sac. Here again clinical diagnosis lagged far behind pathological findings, for only 7 of the 14 cases with

1. Sibson, F. *Lancet*, 1870, ii, 218.
2. Duckworth, D. *St. Bart's Hosp. Rep.* 1880, **16**, 185.
3. Levinthal, W. *Ann. rheumat. Dis.* 1939, **1**, 67.
4. Young, D. and Schwedel, J. B. *Amer. Heart J.* 1944, **28**, 1.
5. Baggenstoss, A. H., Rosenberg, E. F. *Arch. intern. Med.* 1941, **67**, 241.

rheumatic cardiac lesions were known to have symptoms or signs of heart disease during life. Bayles [6] found rather a lower incidence—5 of the 22 necropsies on cases of rheumatoid arthritis with no history of rheumatic fever showed typical rheumatic carditis.

If so many patients with rheumatoid arthritis have involvement of the heart without its being detected clinically, then the previous figures based on clinical findings must be accepted with caution. The incidence of cardiac involvement in these three series is too high to be merely fortuitous. At the Mayo Clinic, according to Baggenstoss and Rosenberg, in all the material available for necropsy the incidence of rheumatic cardiac lesions was only 5 per cent., compared with 56 per cent. in rheumatoid arthritis. If these findings are confirmed they will go a long way towards re-establishing Ballonius's conception of a single "rheumatism" with manifold manifestations. But the whole story is anything but clear yet.

TYPHUS IN THE MIDDLE EAST

MANY years' experience of typhus fever in Egypt is summarised by Kamal and Messih.[7] They show that Egypt is a country where typhus is endemic but subject to epidemic waves of prevalence ("hyperendemic" of Biraud).[8] The large-scale epidemics during the war years of 1914–18 and again in this war illustrate a classical relationship. Kamal and Messih, however, lay stress on labour recruitment and movement, rather than simple economic conditions, as the chief factor in the genesis of war-time epidemics. They regard rural Lower Egypt as a reservoir ("incubator") of the infection, whence it is spread to the cities, towns and rural areas of Upper Egypt by the movement of labour. This theory can hardly be accepted at its face value without more information about economic conditions prevailing during the war. It will be recalled that in 1942 Algeria and Tunisia also suffered the greatest outbreak of typhus for many years, at precisely the same time as the Egyptian epidemic; yet there was no mobilisation of labour for war purposes in the North African countries and Biraud held that shortage of food was mainly to blame.

The clinical features of 11,410 cases of typhus in Egypt are well described and much useful information on the variation in clinical picture will be found by those interested. There are fewer data on pathological aspects, but the Weil-Felix reaction receives attention. Of 684 cases this test (OX19) was positive in only 30% during the first week of illness and then at a titre usually of 1 in 125. Later a positive reaction was found in 86% of the cases and the authors rightly emphasise the importance of a rising titre of OX19 agglutinin as the most valuable sign in the diagnosis of the disease. They record that an agglutinin titre of 1 in 250 with proteus OX19 is found at times in sera from normal Egyptians, and in sera from patients with various diseases, and they therefore refuse to rely on a single examination by the Weil-Felix test for diagnosis. A diagnostic skin test which employs a heat-killed emulsion of OX19 is briefly described. Normal subjects react with a raised erythema 12–16 hours after intradermal injection of 0·2 c.cm. of diluted culture, and patients with typhus show no reaction. It is not stated whether the reaction is negative at all stages of the illness, or whether it is negative before the development of a positive Weil-Felix; but it seems unlikely that it will displace from favour the Castaneda slide agglutination test with proteus OX19 [9] which proved so valuable during the recent epidemic of typhus in Naples.

In the same report from Egypt, Vassiliadis reports failure to establish evidence of murine typhus by examination of rat-fleas. Such evidence is abundantly supplied, however, by experience in the British Army where cases of typhus in the Middle East were investigated by van Rooyen and Bearcroft [10] by the use of the rickettsial agglutination test. Murine typhus was found to be commoner in the troops than the epidemic variety, yet Crofton and Dick,[11] who record the clinical features of 67 cases at a British general hospital, were unable to detect sharp clinical differences between the two types of disease, although the murine patients were less severely ill. van Rooyen and Bearcroft noted a particular prevalence of murine typhus in certain Middle East countries such as Palestine, and the Suez Canal area provided more sera with a murine type of reaction than did the larger towns of Egypt.

More evidence of the ubiquity of murine typhus comes from a paper by Patel [12] who describes 6 cases of typhus in Bombay city. Of these 5 gave a positive Weil-Felix reaction with OX19 antigen, and from 1 a strain of rickettsia capable of producing orchitis was isolated in the guineapig. The remaining case gave a positive reaction with OXK and thus resembled scrub rather than murine typhus. These two varieties of typhus in India were distinguished by Boyd in 1935 [13] in an account of typhus in British troops, and the situation in India is thus analogous to that in Malay.[14] Knowledge of the geographical distribution of all these rickettsial diseases is likely to increase now that rickettsial antigens have been shown to be of value in typing, and the coming campaign in South East Asia will probably add as much to our knowledge of scrub typhus as the Middle East campaigns have added to the OX19 group of typhus fevers.

PREVENTION OF FLUORINE INTOXICATION

THE more general recognition of the bone changes caused by the use of drinking waters containing over 5 p.p.m. of fluorine, is centring attention on methods of prevention in men and animals. The well-known fact that fluorine interferes with calcification is further exemplified by recent work in India, but Pillai and Rajagopalan [15] have shown that in rats the deleterious results of a high fluorine intake on calcification are diminished by the inclusion of calcium-containing substances such as milk or fish meal in the diet. In Madras endemic fluorosis among farm animals has been controlled by supplementary feeding with bone-meal, but it is noteworthy that the fluorine effects on the teeth are not altered in the same degree by additional calcium. In England, Kemp and others [16] found spondylosis deformans in an endemic fluorosis area only among the less well-nourished children, and the absence in Essex of skeletal changes such as are described in Southern India,[17] South Africa [18] and Texas,[19] is probably due to the higher standard of nutrition in Essex. The best preventive measure therefore seems to be an adequate diet with plenty of calcium. The fluorine hazard arising out of industrial processes in England has been receiving further notice,[20] and deserves more attention still. There is now strong evidence for the giving of additional milk to industrial workers subjected to the risk of fluorine intoxication.

Sir JOHN LEDINGHAM, FRS, who retired from the directorship of the Lister Institute last year, died on Oct. 4. He was in his 69th year.

6. Bayles, T. B. *Amer. J. med. Sci.* 1943, **205**, 42.
7. Kamal, A. M., Messih, G. A. *J. Egypt. publ. Hlth Ass.* December, 1943, p. 75.
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Special Articles

THREADWORM INFECTIONS
PREVALENCE, PATHOGENICITY, PERIODICITY AND PREVENTION

CLAYTON LANE, M D LOND.
LIEUT.-COLONEL IMS RETD

KNOWLEDGE of the life-history of *Enterobius vermicularis* has gaps because no experimental animal is known in which it will develop. Life in guineapigs, mice, rats, dogs and rhesus monkeys it will not undertake, even when attempt has been made to lessen a possible host resistance by feeding albino rats on diet deficient in vitamin A (Cram, XXVIII). But the following are established observations.

Leuckhart, by deliberate self-imposed infections, showed in 1868 that 15–28 days after swallowing the eggs the worms are mature. Within the last six years knowledge has been greatly widened by publication of Studies in Oxyuriasis, a series of 28 papers by the late Maurice C. Hall, and by Eloise B. Cram and their associate zoologists of the United States government departments.

The translucent female parasite, about to give birth to young, reaches the rectum at certain hours, passes out of the anus, travels to the perianal skin and clothing, and deposits on them chains of eggs (each female giving birth to about 10,000) after which by drying she becomes opaque and dies. Yet an individual life less than a month long is amply sufficient for the survival of the species. One reason lies in the numbers of this prolific species that may inhabit a single host, Gunawardana (1937) reporting for example the finding of 643 at a single necropsy.

A second reason lies in distinctive properties of the eggs that have been deposited outside the host. They stick to skin from which frequent bathings may not detach them, and to clothing and bedding; but once detached they must readily be airborne, for a moist camel-hair brush has collected them from cornices, mouldings and other projections at all room levels from floor to ceiling, particularly in bedrooms and dormitories where they have perhaps been started on air travel by a routine and seemly shaking out each morning of pyjamas and bedding. The viability of eggs is considerable (Cram, XXVIII): taking survival for 48 hours as a yardstick, conditions favouring this are coolness and moisture (20° C. and humidity between 30% and 54%) yet in them only 10% have done so; in conditions of warmth and moisture (28° C. and humidity between 50% and 72%) few eggs survive for 48 and none for 96 hours. Egg differs, then, from egg, and it was hard to get a 100% kill; but at any temperature the wetter the air the more eggs have survived; use of these physical conditions may perhaps aid prevention, for fumigation with hydrocyanic acid gas, naphthalene or paradichloro-benzene has been ineffective.

There is a gap in this life-history. It covers the period from the time at which the egg either reaches the nose—from which Lentze (1935) recovered it—or is more directly swallowed, and that at which the worm reaches the rectum. It could be filled in were a susceptible experimental animal known. In its absence fancy seems to have run loose: Penso (1935) held, on grounds not disclosed in that paper, that the female worm makes her way into the bowel wall, at any part of its length, and oviposits in the submucosa, there the larvæ hatch and force their way back into the lumen of the bowel. But Lentze (1935) has reported that for its development the egg must be in an acid medium for some hours; and it is not apparent how it could obtain this condition while it lies in tissue fluid within the intestinal wall, nor indeed on what ground Penso bases his whole assumption.

PREVALENCE

Since the female threadworm rarely oviposits before leaving the bowel, microscopic examination of the stool for eggs cannot determine presence or prevalence of infection. So Hall (I) used knowledge of the worm's life-history to devise and bring into use the NIH swab, a folded strip of transparent 'Cellophane' rubbed or scraped over the perianal skin and then spread on a slide, so bringing into view under the microscope any adherent threadworm eggs, occasional artefacts in the cellophane being disregarded. Swabbings repeated on other days have added, often largely, to the number of detected infections. Thus in Washington (VI), of 222 persons ultimately found infected, the first swab detected only 80·7% and the figure 222 was reached only after six swabbings. Again in a police boys' summer camp near Washington, where Bozicevich and Brady (XV) examined 504 white lads coming mostly from rather poor families, the first swabbing detected infection in 38·8% of them while five weekly swabbings raised this figure to 57·3. Other percentage figures of prevalence got in this way are these: in a mental hospital at Tampa, Florida, 50 of 165 white women; in 6 charity homes in Habana 74·3% of 482 children; in children's homes in New Orleans 89·1% of 278 white boys. In a village near Quebec one swab gave an infection percentage of 33, while here in England M. R. Young at Cell Barnes Hospital (St. Bartholomew's) examined 119 children with these percentages of infection—after one swab 25, after two 40, and after three 52. In school-children of the Manila district of the Philippines the detected percentage of infection was 75·2.

Within this wide prevalence are variations attributable to race, age and housing.

Cram (XXIV) reported that dealing with the general population of Washington four swabbings gave infection percentages of 41·9 in 2582 whites, of 15·5 in 789 negroes and of 24·5 in 209 Jewish children. The age with the highest infection-rate was somewhat under 14 years, but in children, often classed as of preschool age (but in fact attending infant school) the rate has been as high as that at the usual school age—a further example of heightened infection where people are collected in rooms or dormitories. Barrack life can hardly fail to raise the infection-rate. Families with only one member infected formed in whites less than a quarter, in negroes more than half, of the racial totals (IX).

PATHOGENICITY

A sure basis for listing the ill effects of any infection must be a sure distinction between infected and uninfected persons. In this infection few examinations made with this aim have been of a kind that even by repetition could hope to make this essential separation, and even those workers who have used the NIH swab most thoroughly have stated their belief that still further repetitions of swabbings would have added to the infection-rate. Again the high percentage of infections detected in children who seem to have ordinary health must raise the doubt whether this infection harms. Moreover some of the evidence held to support pathogenicity will not bear critical examination; thus because the worm's eggs have been found in the walls of an anal fistula (Fitzwilliams 1934) and female worms have been seen in the cavity of an ischio-anal abscess (Marshall and Wood 1938) it has been assumed that the parasites caused the lesions. This assumption ignores the possibility, or probability, that female worms on their journey to death have as usual oviposited when they have experienced in environment a change like to, or near to, that which normally stimulates their oviposition.

As to whether threadworms cause appendicitis views vary.

Gordon (1933) found no connexion; in 12 instances he saw minute mucosal changes, on 33 occasions worms lay in the substance of the organ's wall but the microscopic appearance satisfied Gordon that in every instance this penetration had taken place after the appendix had been removed. Such penetration when the host tissue is dead or dying, and the parasite accordingly threatened with death, seems to fall in with that urgent instinct for forward movement which normally precedes the worm's death.

Schwarz and Straub too hold (1940) that this reactionless immigration is "post-vital"; they report the frequent presence of the worms in acute appendicitis and hold them to be an important provoking cause of it. Kuitunen-Ekbaun and Morgan (1942) found however in 100 surgically removed appendices no connexion between this infection and inflammation, for the worms were present in 27 normal organs and

in 5 that were acutely inflamed, and it was in a normal appendix that they found the largest number—namely, 290.

On the other hand Nino (1942) holds the worms responsible for causing lesions: he cites two excisions of the appendix with ulcers in the mucosa of the organ and worms in the ulcer cavities as well as in the lumen and holds that the worms had caused the ulcers and had not entered pre-existing cavities. Penso had taken this view still further, holding it proved that enterobius enters not merely the appendicular mucosa but that of the intestine at any part of its length; he does not make acceptable the grounds for his conviction.

That maturing female worms have an urge for travel to the open explains the end part of their life-history, and it is presumably because of a failure to keep direction that they have been found in a fallopian tube (Chomet 1942) and eggs identified as theirs in its wall (Wu 1935). Were the worms and their eggs the cause of the inflammation, or did the results of this direct, or ease, the worm's travel along vagina, uterus and tube?

The investigation of Brady and Wright (XVIII) into symptomatology of 200 infected persons, found vaginitis commoner than had been suspected. Worms moving within the rectum caused, they held, conscious sensations, but on the skin rarely did so; enuresis was commoner in infected than in uninfected; there might be restlessness and even insomnia, and restlessness in school hours is apt to lead to trouble. An increase in eosinophilia which they detected will, they expect, be confirmed in wider examinations. Finally many infected children after treatment by means that they do not seem to state improved in colour and lost pigmentation under the eyes.

With the unsuspected infection found to be so common, severe illness must rarely be caused by it, but close study has disclosed a subnormal state of health which has improved on unworming. Further study will no doubt take up the question of the extent to which treatment has rid a host of other infections which too may have injured health.

PERIODICITY

About 50 special examinations were made by Bozicevich and Brady (XV) at a metropolitan police boys' camp for Washington, boys mostly from poorer families.

The camp rules regulating life allowed play till 20.30 hours and prescribed bed at 21 hours. Examinations were made without instruments, the boy being in the knee-chest position with the buttocks gently separated by the examiner's hands. In many the anal sphincter thereon relaxed and gave a good view of the anal canal. From 20 hours onward gravid female worms appeared in the canal, at 21 hours they were seen at the mucocutaneous junction, but this did not happen till the boys had been in bed, usually for half an hour, and then the worms might travel as fast as 2½ in. from the anus. Their locomotion they apparently effected by fixing the head end to the skin (presumably by the suction of the bulbed muscular œsophagus) and by using the tail as another purchase point. Following exposure of the worm to the air its opacity and its oviposition promptly followed. These were normal findings, for "at any one examination fully half the boys showed one or more gravid female pinworms; many boys showed several and 1 boy consistently showed over 10."

It has escaped comment both by those who made these observations and by those whose writings have noted them, that there is here an account of a nightly periodicity in the preliminaries to, and presumably in the act of parturition as definite as that of the changes prior to and accompanying parturition and of the appearance of microfilariæ in the circulating blood in the periodic race of *Wuchereria bancrofti*. Further evidence for this statement based on examinations of Prof. E. W. O'Connor's studies is nearly ready for publication.

The threadworm periodicity has been noted in all cases examined. Its general acceptance as a thing habitual in this infection will, as usual, have to await yet wider examinations. Its confirmation will mean that in nearly every country there is the means to determine what stimulus sets in action a periodicity in worm parturitions, an investigation promising interest and value.

PREVENTION

Threadworm eggs are rare in fæces. Keller et al. (1938) found them in North Carolina in 0·7% of 250 stools from white persons and in 0·03% of those from 630 negroes. Again Vassilkova et al. (1934) working in Moscow and Odessa have reported these in small numbers among other parasitic worm eggs in the irrigation canals of sewage farms. The eggs are destroyed by such heat as is generated in the Beccari process and this is a possible means of making a harmless and valuable fertiliser; their destruction is a part of ordinary fæcal disposal and has a minor place in the prevention of this infection.

Essential measures are those dealing with female worms that are behaving as usual and will oviposit only after having actively left the bowel for the open; and regarding these measures d'Antoni and Sawitz (1940) made disconcerting observations in a children's institution in New Orleans having 58 inmates, absence of infection in any of them being accepted only after seven negative examinations by the NIH swab.

The place, scrupulously clean, showed 38% of infections. So two extra housemaids were engaged who cleaned every room daily with hot soap and water; night wear, underwear and bedsheets were changed and sterilised daily; and each child had its own nail brush, had to take two showers daily instead of one, and was treated with gentian-violet tablets of a kind said to dissolve in the cæcum. After six weeks of this regime the rate of detected infection rose by 13%. If from the reference to cleaning by washing, it may be concluded that the increased sanitary energy did not include added air carriage by dust-raising and if the two extra maidservants were not themselves infected and did not thereby introduce new foci, the increase seems to be due to something unknown that had happened two or three weeks earlier.

Three other points need mention.

(*a*) There seems to have been one recent report only on finger-nails as collectors and carriers of these eggs; Ogura (1936) examined parings 1–3 mm. long from dirty finger-nails of 300 children in Chosen, and found eggs of various worm parasites 35 times but those of threadworms once only. Chosen can hardly be free from an otherwise world-wide infection, or finger-nails be less effective scrapers than the NIH swab; nails as egg collectors certainly need renewed study.

(*b*) In New Orleans washing down seems to have failed to prevent infection and soap tablets have contained the eggs. Could material for the bag of a vacuum cleaner be got with small enough pores to hold back threadworm eggs? If not the machine must merely set them on new air travels as surely as does the broom, and in any case it will not at present come into general use in wide areas where the infection prevails.

(*c*) Accordingly hope of preventing infection and reinfection, particularly self-reinfection, must rest on unworming by drugs. Now drug treatment may not risk a greater injury to health than is inflicted by a parasite when it is left alone, and since the drugs that have recently been advocated for the elimination of the threadworm do not meet that essential condition, drug treatment is not here allowed a heading of its own. These drugs are gentian-violet and phenothiazine.

A typical report on the aptness of *gentian-violet* to cause gastrointestinal trouble is one by Wright and Brady (1938) who treated 163 patients with half-grain doses each day given before meals for eight days. The NIH swab gave 90% of cures and the price paid was nausea, vomiting, griping diarrhœa, headache or dizziness in 69% of them; to these their study of the literature added allergy.

Phenothiazine holds an unusual position. The dose advised for sheep is 1·0 gramme for every pound of body-weight (Swales 1939), but for horse the lethal dose is 1·0 g. for every 20 lb. body-weight, Schmidt and Smotherman (1941) reporting that a dose of 60 g. had killed two of seven mares weighing between 1000 and 1200 lb. As Lapage showed (1940) it produces methæmoglobinæmia, and in so doing it destroys red cells and brings about anæmia. Of this Grant's report (1943) is typical. To a girl of 7½ years was given during seven days 14 g. of this drug; the red cells fell

to 1,810,000 and the hæmoglobin to 70%; she was given a blood-transfusion and in 18 days conditions were again normal. The death reported in THE LANCET (1942) was of a girl of 6, only suspected of threadworm infection and given 8·5 g. of the drug during 5 days. In spite of drip-transfusion of 10 oz. of blood she died with multiple small brain hæmorrhages about the corpus callosum and conditions as of hæmolytic anæmia, a name also elsewhere used for the condition the drug induces.

De Eds and Thomas report (1941) that on oxidation phenothiazine becomes first leucothionol and then thionol. They gave the drug to a man with a biliary fistula, and found all three substances in the bile and in the fæces, and they reported that thionol first stimulated and then depressed ascaris particularly when bile was present. If thionol is the real anthelmintic, there is here one more instance of this being made by the body from the drug administered, and the work raises the question whether in this chain of substances the anthelmintic and the hæmoglobin-changing links are the same.

Swales (1939) raised another old question, that of particulation of the drug by its deposit in the stomach as fine particle. He gave it to sheep as a bolus which also contained tartaric acid and bicarbonate of soda, and the carbonic acid gas produced by the mixture in the alimentary canal broke the bolus and its contents into fragments. Comparison of the numbers of worms passed during life and those recovered by necropsy satisfied him that the drug's efficacy was thereby increased. Years ago it was shown that particulation increased the anthelmentic efficacy of thymol, and as to phenothiazine it may mean equal efficacy in man when given in a smaller dose and so with lessened risk of injury or death. Again, it may prove significant as reported by Schnitzer, Siebenmann and Bett (1942) that when a second course of the drug was given to dogs, anæmia could not be produced though it had been by the first course.

With the original onset of anæmia there had gone evidences of blood regeneration—namely, anisocytosis, poikilocytosis and nucleated red cells—that is to say, the blood-forming mechanism had with the first course of treatment been stimulated into hypertrophy (but this had happened only after blood destruction had been great), had remained in some overgrowth, and had not had to be built up again from a state of merely normal potentiality when the second call on it came; so it was able without delay to replace the blood destroyed by the second course of treatment. But to give a second course in man implies satisfaction that the first had left the mechanism of blood regeneration keyed to this greater efficiency; if it had not the second would constitute a yet greater risk to life.

These writers have also pointed out how differently different species of animals react to this drug, which seems to imply a difference in the way in which they change the drug. The suggestion in what has been noted is that in the species *Homo sapiens* there is a similar difference; as Most puts it, idiosyncrasy occurs. Four years have passed since Hubble wrote (1940) "phenothiazine is probably too dangerous a remedy to be used in the routine treatment of threadworms," and they have, I suggest, done nothing to call for a change in attitude.

Drug treatment for general unworming would have to be on a huge scale, so would have to be by mouth: because the fastidiously exclusive threadworm will accept no host but man the drug must be found by experiment on man; because the worm so rarely causes serious trouble the drug may not risk causing ill health, far less death. These essential conditions are hard but provocative.

SUMMARY

Examination of the perianal skin by the NIH cellophane swab, a procedure based on knowledge of the worm's life-history, has shown the heavy and wide prevalence of *E. vermicularis*. The worm rarely does conspicuous harm, but careful examinations have shown the host's health to be subnormal. The worm rarely oviposits in the bowel, and such eggs as come away in the fæces merely form part of the problem of fæcal disposal. The normal condition is that, in persons living regulated lives, the mature female worms at a certain hour pass down the rectum and through the anus, creep along the perianal skin, oviposit on it and on the covering clothing, and die. The eggs are airborne to another or to the same host. Attempts to prevent this transfer have thus far failed, so anthelmintic drugging by mouth remains the most promising preventive. But no drug is yet known that is deadly to the worm yet less risky to man than is the infection. It needs finding.

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Infectious Disease in England and Wales

WEEK ENDED SEPT. 30

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1838; whooping-cough, 982; diphtheria, 545; paratyphoid, 11; typhoid, 11; measles (excluding rubella), 2015; pneumonia (primary or influenzal), 479; puerperal pyrexia, 143; cerebrospinal fever, 39; poliomyelitis, 20; polio-encephalitis, 2; encephalitis lethargica, 2; dysentery, 351; ophthalmia neonatorum, 67. 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 Sept. 27 was 707. During the previous week the following cases were admitted: scarlet fever, 32; diphtheria, 16; measles, 11; whooping-cough, 28.

Deaths.—In 126 great towns there were no deaths from measles or scarlet fever, 1 (0) from an enteric fever, 8 (3) from whooping-cough, 6 (1) from diphtheria, 63 (1) from diarrhœa and enteritis under two years, and 9 (1) from influenza. The figures in parentheses are those for London itself.

Newcastle-on-Tyne reported the fatal case of enteric fever. There were 8 deaths from diarrhœa at Nottingham.

The number of stillbirths notified during the week was 182 (corresponding to a rate of 28 per thousand total births), including 14 in London.

The King has given permission to Dr. COURTNEY GAGE to wear the decoration of chevalier, first class, of the order of St. Olav conferred on him by the King of Norway. Permission has also been granted to Lieut.-Colonel A. G. HARSANT to wear the insignia of the third class of the order of the Nile conferred on him by the King of Egypt on his retirement from the chair of anatomy in Fouad University.

In England Now

A Running Commentary by Peripatetic Correspondents

"... this 'ere England," I read over my lunch in the last Penguin *New Writing*, "... they even give you money to bury yourself with now. Suits me." And sure enough when I picked up the Government white-paper there it all was in black and white in an ascending scale—£6 if you manage to die in infancy, £10 between the ages of 3 and 6, £15 between 6 and 18, and £20 if you last out till 18 or over. Quite a nice little nest egg—only of course you can't take it with you, and that's what makes me uncomfortable. Who is going to get these mementoes mori, and how are some of them going to spend the stuff? Infanticide is not an unknown practice, even unrewarded; at £6 it becomes a business proposition, and I felt very glad I was out of that class. Between 3 and 6 I suppose most people would be fairly safe, being at their peak for civilised and attractive behaviour about then. But what about the rowdy ten-year-old, the tough or moody adolescent? And those of riper years? What if their nearest and dearest preferred a cash settlement? I began to think of my nearest and dearest ... I am sorry, I shall vote against this measure—unless they let me fix things up with the undertaker and choose my own hearse and plumes before I go.

* * *

If I had fallen into the sea, or even a puddle, I might make something of it, but too much has happened since June 9 to be potted in a paragraph. Never mind; the notepaper on which this is written is Jerry paper and burns well. Normandy now is just a dream, and the earlier days there a nightmare. My chief impression of that time is feeling "this is none of I," as one did things no middle-aged oculist ought to do, such as wade through the French surf at dawn in charge of a section of 12 men; a constant tiredness and a sense that there was much more to do if only one had the energy; nights of blitzing when one crouched thankfully in a hole in the ground beneath a sheet of corrugated iron. The rich man then was the one who had the best cover, and I remember envying a colleague who had acquired the blown-off door of a tank under which to sleep, and how I went down to his place to have a look at it, as one might go in envy to see the neighbour's new Rolls. I hope I am free for ever now from that welter of blood, brains, pus and vomit.

Then a period of rest, followed by a journey into the Falaise pocket. I stayed one night at a deserted château, sleeping on the first carpet my matches illuminated. On waking I saw a bookcase full of English books, and I slept again uneasily, for something told me this was all wrong in France. But later their fly-leaves told me they belonged to a French colonel and his English wife, both patients of mine in England. We sat up in the grounds and were visited shortly by the colonel himself, who had come over from Paris, which he had entered the day before with the French armoured brigade. He took me back there with him, and I won't easily forget Paris as she looked in the moonlight. We drove round the Bois and up the Champs Elysées, and had a late supper in the Place Vendôme. Next morning he escorted me round the city—he resplendent in a pale-blue kepi laced with silver and scarlet; I in a D + 3 battle-dress, in which stains of blood, oil and flavine fought for the upper hand. Everywhere the same question, "Where are the English? Why didn't they come with the Americans?" That morning I saw in Paris one British corporal and one other rank. They saluted, so surprised they were, and we all shook hands.

Then a rush back to the unit to be told that I was to convoy my own 2 three-tonners and 18 others across France to Belgium. We carried food and water for three days and slept on top of the load, but the traffic was appalling, for two whole armies were on the move. This ignorant oculist, more used to removing fragments from the cornea than convoying three-ton trucks, had imagined that anything as big as a lorry would be difficult to lose, but the trouble was to find any of them. We made bad time, and still had 100 miles to go on the last day, but when we started at dawn someone had chalked on the front truck, BRUSSELS OR BUST, and that was how we all felt. We soon realised that whereas France had been glad to see us Belgium was delirious with joy. We were pelted with fruit, mobbed, cheered and autographed; one small boy delivered his gift apple with such warmth of feeling that he cracked my windshield. We pulled up in the outskirts of Brussels as night was coming on, and were surrounded by admirers in a flash—brandy-bottles and coffee-pots poured forth, and soon my men, who hadn't eaten much, were too dazed with fatigue to drive on, so once again we slept by the curb on the load. At dawn (sorry; dawn is bound to keep cropping up in stories like this) we made our destination, the central hospital, where we took over from a German hospital which had been left behind. For two days we worked with them—there were 600 Jerries counting the patients—and then they were removed and we had the place to ourselves. What happened there I'll tell you later.

* * *

J. G. Crowther's *Famous American Men of Science II* (Pelican Books, pp. 154, 9*d*.) deals with Thomas Alva Edison and Josiah Willard Gibbs. Edison was self-made, slightly unscrupulous, an inventor at large and the world's largest inventor. He was deaf, but his account of how he became deaf is unconvincing. He was probably traumatising and dramatising a double otitis media. Long before the alleged accident he had attended school for a few months, but made no progress. An inspector described him as addled, and if our guess is correct he was by no means the first deaf child to be so described. Gibbs was an academic physicist of Yale, who never did experiments. He suffered from a mother fixation. He was, however, a father of entropy, defined as "the availability of energy."

Mr. Crowther in this and other books is always hunting the "leisured and governing classes." Good luck to him, but one can easily have too much of it. I am the last person to deny how valuable is that spot of obsession that is present in most of us. I know at least one barrister who has made a fortune out of his own paranoia—all he has to do is imagine himself in the dock. The psychiatry books never mention this natural history of mental exuberance, yet what the world owes to its manics it would be hard to over-estimate, and schizophrenia itself has paid the churches and cults rich dividends in the form of saints and mystics. Melancholia is probably the resting stage for mania, but a few of them in the Cabinet in the next year or two might have a restraining influence on planning, spending and general expansiveness. No, I do not grudge the author his chevy, but after all the reader is buying nine penn'orth of Edison and Gibbs, and there is some much more relevant hunting to be done with these subjects.

Did the principle of entropy, for instance, account for Gibbs's mother fixation? He had a fragile body and it seems reasonable to suppose that if its energy had had to knuckle into the mêlée of married life there would not have been enough left over to make one of the greatest theoretical physicists. Similarly with Edison. Did the energy that he saved on his 8th nerves produce his astounding inventions? To be more precise, was this saved energy put into his second cranials with the result that there was much greater storage of visual memory, a greater faculty for manipulating it—plotting out the stage and inanimate characters, and then watching the play run? Here is a hare indeed, but his scalp is hard come by and his tail feathers beyond our immediate grasp; the goal is distant and the winning-post below the horizon; oceans of false analogy and masses of mixed metaphor must be swallowed or spat out before we can get to the dregs of this fascinating quart mug. For instance, ... O blast! "Time, gentlemen, please."

MEDICAL MISSION TO CZECHOSLOVAKIA.—Mr. W. Cockburn house-governor and secretary of the Royal Hospital, Wolverhampton, referring to our statement of Sept. 23 (p. 425) that the rapid organisation of the medical mission to Czechoslovakia "has been made possible by the British Government and local authorities having granted immediate leave to Czechoslovak medical personnel," points out that voluntary hospitals have also had a hand in this matter. The Royal Hospital has granted leave to a valued member of its staff so that she might join the mission.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

THE House spent the whole of last week on the committee stage of the Town and Country Planning Bill. When this bill came up for second reading before the adjournment in August, it received such a slamming that it had to be withdrawn for alterations and repairs. The bill in its then form was opposed by the Corporation of the City of London, the County Councils' Association and practically every other association of local government authorities. It has been extensively and intensively considered during the recess, but its reception in committee gives no good augury for its passage into law.

The badly blitzed towns, like Plymouth and Coventry, are not satisfied because they feel it will not give them the power they need to plan and rebuild their towns in the way it should be done. Their criticisms might, however, have been smoothed over, and in fact were partly smoothed over, but a crisis arose over the compensation to be paid to landlords. The bill has already departed from the original proposals for compensation laid down by the Uthwatt report and the clauses dealing with it were a compromise between the views held by the parties comprising the Government. Differences became so acute on the floor of the House last Friday that the Prime Minister had to intervene to suggest that the compensation clauses be deleted altogether and the method of compensation for land compulsorily acquired be dealt with in a separate bill.

As Mr. Pethick Lawrence said, this is rather like rehearsing the play of *Hamlet* with the proviso that the part of Hamlet will be introduced separately at a later stage. At the moment of writing it is not clear what will happen to the bill. But it is quite clear what has happened to the Parliamentary situation.

The parties all know that the end of the war is approaching. They are therefore thinking now in terms of a general election which cannot be long postponed, and finding it difficult to agree on a compromise in which all sides have to make concessions. Mr. Bevin has said that he did not threaten to resign if the compromise on the bill as drawn was not accepted by those representing the landlord interests, but the rumour was so strong that he had to deny it.

That an election cannot be long postponed was also made clear in an answer by the Prime Minister on the question of the method of voting to be adopted by men in the Services, including those overseas. Mr. Churchill said, "I cannot think that an election is imminent in the sense of what you call impending ..." and then went on to state his view of the intentions of the Government to give overseas serving officers and men every chance of recording their votes. Other portents are the publication of statements by the Liberal party and by the Labour party, and a speech by Mr. Eden for the Conservatives clearly indicating that all parties will fight the next election as separate bodies.

Unless, therefore, some unexpected move is made in the high command of the Government the political aspect of the measures dealing with postwar reconstruction will be, from now on, predominant, and this will affect the Beveridge Social Insurance proposals and the proposals of the white-paper on a National Medical Service. A general election will inevitably be dominated by large questions such as the demobilisation and resettlement of men and women in the Services, the control of transport, mines and land, and international security. It is to be hoped that among these issues social insurance and the medical services will get adequate consideration.

The new House of Commons when it is elected will have many new faces, for some of the older members have already announced that they will not contest their seats again. Among these, unfortunately, is Dr. A. B. Howitt, Conservative MP for Reading, who has been for so long a pillar of the Medical Parliamentary Group. For many years, up to the death of Sir Francis Fremantle, Howitt was the secretary of the group and held it together through dark days. Since Fremantle's death Howitt has been chairman, and members hoped he would continue with us for many years. His wide knowledge of medical affairs, his great and consistent interest in non-party medical politics, and his friendly greeting will be a great loss to the group and to his many friends outside it.

QUESTION TIME

Milk and Meals in Schools

Mr. E. H. KEELING asked the Minister of Education the cost of supplying milk and meals to children attending schools.—Mr. R. A. BUTLER replied: According to the estimates submitted by local education authorities at the beginning of the present financial year, their net expenditure for the year on the provision of meals and milk for children attending public elementary schools will amount to about £9 million. This figure does not include the provision of premises and equipment free of cost by the Ministry of Works, nor does it include the cost of enabling the schools to obtain milk at the special rate of ½*d.* per ½ pint under the milk-in-schools scheme. Corresponding figures for secondary schools are not available.

Service Rations in EMS Hospitals

Sir G. JEFFREYS asked the Minister of Health whether his attention had been drawn to the fact that rations on the civilian scale were issued instead of Service rations to wounded patients in EMS hospitals; and, as the more ample rations to which as serving personnel they were entitled would conduce to the restoration of their strength, what action he was proposing to take in this matter.—Mr. H. WILLINK replied: Where the number of Service patients is a substantial proportion of the total patients in a hospital, meat on the Home Service scale may be made available for all the Service patients. Other rations are on the civilian scale, and I have been advised that these, with the other foods available, should enable hospitals to supply their patients, both Service and civilian, with a well-balanced diet suited to their needs.—Sir G. JEFFREYS: Is the Minister aware that in Park Prewett Hospital, Hampshire, where there are, or were, some 1200 wounded Service patients, these conditions do not apply? The meat is issued on the civilian scale. Is he further aware that the medical officer in charge and the committee of that hospital drew the attention of his department to the fact that they wished Service rations to be issued to these wounded Service patients, and that they consider that their health and nourishment would be greatly benefited by the Service ration?—Mr. WILLINK: I will of course look into the position at that particular hospital, but it is surprising to me to hear that the meat position is as described.

Local Authorities' Hospitals

Apart from specialised institutions, such as mental hospitals, maternity hospitals, infectious diseases hospitals and sanatoria, the number of beds under the control of local authorities in England and Wales is 131,440, of which 73,921 are in 154 general hospitals and 57,519 in 376 institutions for the sick, the infirm and mental cases. Of this total of 530 hospitals and institutions about 390 are administered under the Poor Law. (Mr. WILLINK replying to Sir E. GRAHAM-LITTLE.)

Paper for Scientific Journals

Mr. E. W. SALT asked the Minister of Production whether he was aware that many important technical journals were still obliged by the paper shortage to refuse to print important technical data which would be of great value to British scientists in the development of new processes; and whether he could give an assurance that at an early opportunity the full requirement of scientific journals would be met as regards paper supplies.—Mr. OLIVER LYTTELTON replied: The fullest consideration will be given to the needs of technical journals as soon as paper supplies permit.

Ophthalmic Services in Nigeria

Mr. B. RILEY asked the Secretary of State for the Colonies whether there were any fully qualified ophthalmic specialists in the service of the Government of Nigeria; and whether the service of such specialists was available to inhabitants of the Colony.—Colonel STANLEY replied: A government medical officer fully qualified in ophthalmology has been attached to the Nigerian government and his services have been available to the public at the government ophthalmic clinic. I understand that he will shortly be leaving Nigeria, and I am inquiring of the governor as to the arrangements

which he proposes then to make.—Mr. R. W. SORENSEN: Has he any assistants adequate to the task?—Colonel STANLEY: He has assistants, I think, but there is in Nigeria, I understand, only one other fully qualified practitioner.—Mr. RILEY: Does not the Minister consider it advisable that there should be a greater supply of ophthalmic assistants in Nigeria with its 20 million people?—Colonel STANLEY: There is an extreme scarcity of medical practitioners all over the world today, and I am governed not by what I desire to have but by what I can get.

PENICILLIN PRODUCTION.—Sir ANDREW DUNCAN stated that seven plants are at present producing penicillin in this country. Nine large-scale plants are expected to come into operation within the next six months. Two of them are about to start production.

APPROVED SOCIETIES' FUNDS.—Mr. WILLINK estimated the balance in the Approved Societies' current account on June 30, 1944, at £13,300,000 and the cost price of investments at that date at £104,400,000.

Letters to the Editor

PSYCHIATRIC CASUALTIES OF WAR

SIR,—Your readers will all welcome communications such as that from Colonel Elliott Cutler in your issue of Sept. 30. He no doubt will also see evidence of our friendliness in the fact that we query or criticise some of his facts and conclusions.

First I would like to ask him on what facts he bases his statement that there is an alarming increase, or indeed any increase, in the number of psychiatric casualties relative to the strength of the United States and British Armies as compared with the 1914–18 war? Are there, in fact, in the US Army relatively more or fewer psychiatrists than in the last war?

I am all in favour of his practical realism with regard to absence or desertion, but feel we must be sure of our arguments. Diagnosis must precede treatment. The well-established stability of submariners has been explained in quite other ways to me when I have inquired from the Royal Navy at various stages of the war. Further, though I am aware that this statement about the troops on Malta was made publicly, it was only partially true and most misleading.

How can we diagnose and deal with the neurotic predisposition and softness which is so widespread? If welfare and spoiling the men are to be indicted then it is curious that our rate of psychiatric breakdown is so near to that of the US Army. Our men had no sheets and have not yet got collars and ties. The Royal Air Force has a rather lower breakdown-rate than the Army, though to most of us it seems to have somewhat greater comfort for its men.

Finally, we must recognise that hatred of an ideology and hatred of the Germans that is *taught* (i.e., other than that experienced in action) are very different things. The latter has paid poor dividends, for it is in fact somewhat of an emotional boomerang.

J. R. REES, Brigadier.

SIR,—Colonel Cutler believes that "a chief difference in the two wars is the increase in neuropsychiatrical or exhaustion-neurosis casualties" and that "the alarming increase in this special category has brought the psychologist and the psychiatrist to the armies in increasing numbers." It would be interesting to know how these comparisons were drawn; since, for example, it is known that in the present American Army, as compared with that of 1918, there has been, at least so far, a substantial *decrease* in the number of psychiatrists in proportion to the strength of the forces. More important, however, is Colonel Cutler's use of this "increase" in psychiatric casualties in this war as a premise for sociological conclusions with which many of us would find it hard to agree. For this reason, it should be said that there is no evidence of any increase in psychiatric casualties in this war. It is impossible, for security reasons, to give in detail the figures which do exist; but no-one aware of the facts is likely to doubt the suggestion that if there has been a change in incidence it is likely to be a decrease.

In order to correct any impression that psychiatric casualties were rare in the US Army of 1918, it may be wise to give some figures published [1] by the US Veterans Administration, a body which corresponds to our Ministry of Pensions. Despite the relatively short period during which US troops were exposed to combat stress in World War I, during the period 1923–40 the pensions and treatment of these disabilities, excluding domiciliary care, cost the US Government $924 million; and even as late as 1940 the annual cost was over $40 million. "Three out of every five beds in the 79 Veterans Administration Hospitals were occupied by 'service patients' with service-connected psychiatric disabilities." Finally, at the Armistice in 1918, "693 psychiatrists were employed" for service duties by the US Government. Then, as now, there were protests from combatant and line officers regarding the danger of "inducting" into the US Army, even for limited service, men whose psychiatric condition made them completely unsuited for such work. There was, for example, General Pershing's cable, sent to Washington from France on July 15, 1918:

> "Prevalence of mental disorders in replacement troops recently received suggests urgent importance of intensive efforts in eliminating mentally unfit from organisations new draft prior to departure from the United States. Psychiatric forces and accommodations here inadequate to handle a greater proportion of mental cases than heretofore arriving, and if less time is taken to organise and train new divisions, elimination work should be speeded."

With regard to the British situation, in the early years after World War I there were over 100,000 pensions awarded for attributable service psychiatric disabilities, including effort syndrome. These cost roughly £10 million annually (Ministry of Pensions report, 1931) and it is conservatively estimated that in 1939 such pensions were still costing this country over £4 million per annum. The War Office report on Shell Shock (1922) deals with this problem.

The demands of space, and the difficulties of political discussion for serving officers, make it impossible to do more than disagree with Colonel Cutler's suggestions as to what happened, at least in this country, between the two wars. If, as all available evidence suggests, there is likely to be a decrease rather than an increase in psychiatric casualties in the present war, and if, as seems rather more certain, the prognosis when they do occur is rather more favourable, many of us would be inclined to suggest that this is the result of those very factors which are advanced in the Linacre lecture as the basis of the "change" in military mental health in this war—more tolerance, better welfare and new methods of officer selection. To put the matter in the terms which experience suggests are most convincing to those of us away from combat areas, there is more than enough evidence to show that it pays, even in hard cash, to plan and administer for the soldier, not on a veterinary basis, but with due respect to his human qualities. There can be little objection to the suggestion that it will always pay, on any basis, to select officers by the best available methods, and, whatever the methods, to improve them by checking up the results. If the reports of field commanders are to be believed, there is very little wrong with the junior officers of today.

Finally, it is impossible to avoid pondering the remarks on the "softness" of life between the two wars. They call to mind a bitter comment recently overheard on Clydeside—"The end o' the war'll be no long noo. I see they're paintin' up the labour burroos."

A. T. M. WILSON,
Lieut.-Colonel.

UNSUSPECTED TUBERCLE

SIR,—In his letter of Sept. 16 Dr. E. H. Hudson appears to blame the radiologist for delay in treatment, when the latter has not advised the practitioner to seek "reference to tuberculosis officer or other competent physician." If "the radiologist would qualify his statement by suggesting confirmation" by these authorities would he, the radiologist, then be freed from this blame? I might reasonably ask, what right has the radiologist so to belittle the judgment of the practitioner? He certainly has no evidence to indicate that any useful contribution could thus be obtained to the radiologist's interpretation. The clinician who sends

1. Cooley, M. *War Med.* 1941, 1, 372.

the case for X-ray examination has charge of it; the radiologist is merely asked for the opinion he, as a medical man with expert training in the technique and interpretation of radiological appearances, is best qualified to give. The practitioner shows his desire to coöperate by sending with the case such details of the clinical history and findings as cause him to make the request. I see no reason why the radiologist should doubt the practitioner's ability to assess the additional evidence he supplies or to call in such other experts as he sees fit. Contrary to the indifferent clinician who sends cases to the X-ray dept. with the request "X-ray chest" without any indication of the clinical findings, even of those sent to him, the practitioner has given evidence that he has made a clinical examination and knows the history. Such a practitioner is therefore as capable as anyone else of recognising obvious radiographic signs—they can easily be taught to the novice even more readily than the more obvious clinical signs. The early signs, on the other hand, whether clinical or radiological, need the infinite capacity for taking pains which characterise alike the work of the good physician and good radiologist.

In spite of statements to the contrary there is evidence that with increased use of X rays there is a concomitant deterioration in clinical examinations. The hasty and indifferent clinical examination is not materially assisted by radiological interpretation of a like nature, for I have knowledge of operative measures on structures in symptomless patients which were radiologically normal and of failure to treat lesions shown on radiograms of patients with definite localised signs and symptoms, because the radiographic appearances were interpreted as normal. In other words the radiographic appearances as interpreted, and not the patient's condition, decided the treatment. These experiences indicate that radiology permits the indifferent clinician to masquerade as a physician.

Neither the physician nor the radiologist need fear neglect through helpful coöperation.

Even if the radiologist is so unwise as to report "the disease is inactive" I cannot think he does much harm, except to himself, seeing that the doctor has sent the patient to him because of existing clinical signs and symptoms which he is unlikely to ignore.

Edgbaston, Birmingham. JAMES F. BRAILSFORD.

CARDIAC NEUROSIS AS A MANIFESTATION OF HYPOGLYCÆMIA

SIR,—I rather agree with Dr. Richards's criticism of my paper on cardiac neurosis and hypoglycæmia. Had I given a fuller account of the psychological condition of the patients he would not, I think, have criticised my conclusion, which was simply that the symptoms of the two conditions are sometimes identical because both sets are produced by excessive adrenaline secretion, in response in the one to fear and in the other to a low blood-sugar. The question whether my patients had hysteria or an anxiety neurosis does not, within the strict limits I set myself, really arise. In fact, as I pointed out, two of my cases were obviously neurotic individuals. Their neurosis was not relieved by treatment, though their cardiac symptoms were. My first patient, who fell to the ground without losing consciousness, was definitely not hysterical. Dr. Richards appears to believe that anybody who does this must be hysterical, but there are many other possible causes, including, before the war, slipping on banana skins.

I agree with Dr. Richards that the symptoms shown by my patients were symptoms also of an anxiety state. Some writers have assumed, I think on insufficient evidence, that the mild spontaneous hypoglycæmia so commonly encountered, an example of which was described by Dr. Prunty in the *British Medical Journal* of Sept. 23, is due to an anxiety state. Others have even gone so far as to suggest that patients in an anxiety state suffer these symptoms because the anxiety state produces hypoglycæmia. I carefully avoided discussion of this point because there is as yet insufficient evidence for discussion to be fruitful.

It is true that there was not an absolutely consistent relationship between blood-sugar level and symptoms. All those who have studied the subject agree that there never is. One could hardly expect it in view of the highly complex manner in which blood-sugar levels are controlled. Nevertheless, the usually accepted criteria were fulfilled in all my patients—the symptoms were associated with a blood-sugar level unusually low for the patient in question; they could be reproduced by lowering the blood-sugar; and they could be relieved by giving glucose. There was sufficient correlation between the onset and relief of symptoms and the blood-sugar levels for suggestion to be excluded.

Whitchurch, Bucks. RAYMOND GREENE.

MEDICAL PLANNING AND THE SERVING DOCTOR

SIR,—I wish to comment on one phrase in your leading article of August 12, in which you refer to "the widespread impression that Service officers as a whole are relatively favourable to change." This harmless statement is certainly true, but it seems in its context to be intended to mean that most serving doctors are in favour of state medicine as proposed in the white-paper. No-one has the least right to make that supposition. The attempt to prove that the relatively inarticulate serving officer is welcoming the prospect of a continuance of state medicine for the rest of his life is rather cynical propaganda. I meet a fair number of medical officers, and they are no more unanimous than the practitioners at home seem to be. Some look forward to the idea with enthusiasm, others hate it bitterly, both with complete sincerity. Most however make a jest of it. After all, a very important medical politician repeated out here recently what we have been told already, that state medicine is coming, whether we like it or not. Meanwhile, the war goes on and there is work to be done: perhaps we shall move on to the Far East: sometime we shall get back to our families, which is the most constant of the dreams of the man serving overseas. After that we shall find out what all this medical planning is about.

Impressions are notoriously unreliable, but I am as entitled to mine as you are to yours. I do not know how widespread is the feeling I have tried to represent, but it certainly exists.

CMF. MALEESH.

POSTURE IN LUMBAR PUNCTURE

SIR,—Your leading article of Sept. 23 (p. 410) will warn doctors, particularly hospital residents, who have to perform lumbar punctures fairly frequently, about the dangers and distressing after-effects which are bound to occur if a faulty technique is used. Very little is usually taught about the after care of patients who have had to undergo this minor operation. Even when the lumbar puncture has been performed with skill and the necessary care, unpleasant after-effects are not rare. Of these the most frequent and troublesome is headache, sometimes of great intensity, which may last for several days. This is mostly due to leakage of cerebrospinal fluid through the puncture opening in the meninges. Having performed a few hundred lumbar punctures, I have found that correct aftercare is an important factor in preventing low-pressure headaches. Usually, after a lumbar puncture has been performed, the patient is made to lie flat on his back for several hours and then is allowed to get up. Trying out different postures, I found that the prone one prevents leakage of cerebrospinal fluid from the site of puncture and therefore the headache as well. The action of the prone position may be further increased by raising the foot of the bed. The method I adopted is as follows. The lumbar puncture being completed, the patient is made to lie flat on his abdomen with as little disturbance as possible, the head being turned to the side and no pillows allowed. The foot of the bed has previously been raised. The patient remains in this position for two hours. At the third hour one pillow is added and an hour later a second. After another hour the patient is made to lie on his back and a third pillow is added. Generally 12 hours after the lumbar puncture the patient is allowed to get up. Usually, I perform the lumbar puncture in the evening so that next morning the patient can go home. Coffee and alcoholic drinks are forbidden for 48 hours after the investigation. Since I have followed this technique, I have seen practically no troublesome after-effects. Headaches were rare and when present were always slight and lasted a few hours only.

French Hospital, London. M. BENDIT.

SPREAD OF SCABIES

SIR,—In his section on scabies in *Common Skin Diseases* (p. 115), Roxburgh, in common with most other writers on the subject, is emphatic that "fairly close and prolonged contact" is usually necessary before scabies can be transmitted, and he states that the usual social contacts between adults are unlikely to spread the disease. During recent investigations of an outbreak of scabies in a printing works in this city the only common factor which could be found among various patients was the passage of packets of paper from one person to another. Four workers next on an assembly line from the original victim were infected, while those who handled the paper before her were free from the disease. I would be interested to hear of any similar experience.

Dublin. J. FLEETWOOD.

YELLOW FEVER

SIR,—Clinicians, pathologists, epidemiologists and field hygiene specialists will give a warm welcome to the work of Brigadier G. M. Findlay and his colleagues in helping to determine the nature and causation of hepatitis following prophylactic inoculation against yellow fever (*Lancet*, Sept. 2, 9 and 16). Not only have they pointed to the factor responsible for this complication but they have more clearly demonstrated the way of preventing it in future—namely, by avoiding the use of icterogenic serum in preparation of the vaccine.

But it would be a mistake to dwell so much on the icterogenic potentialities of previous batches of vaccine that we lose sight of the real boon this preventive measure has conferred on humanity and war-time Africa in particular.

In October, 1942, the Secretary of State for War said in Parliament that at least 135,000 people had been inoculated against yellow fever between January, 1941, and June, 1942, and that there had been only 3 cases of yellow fever among British and Allied troops since the outbreak of war. These cases occurred in European troops serving in the West African Command and were under my care in a general military hospital. The diagnosis was confirmed by pathological and postmortem evidence as the attacks were very severe and two of the patients died. The cases were admitted in January and February, 1942. This was the critical period of the transfiguration of the North African campaign, and thousands of men and tons of supplies were passing by sea and air from West Africa to the Middle East. An outbreak of yellow fever at this juncture might have had devastating consequences; but it did not occur. The silent testimony of a Polish officer and a British sergeant proved that the combustible elements for an outbreak were indeed present; but they fizzled out on contact with the sera of those inoculated, were they icterogenic or otherwise!

MOUNTJOY ELLIOTT.

TROPIC OR TROPHIC?

SIR,—I have just read with great satisfaction the letter from Dr. A. E. Meyer, of Brooklyn, NY, in your issue of Sept. 30, and I heartily concur in his support of the word *tropic*, used in connexion with pituitary and other hormones. Last December I drafted the following footnote for p. 807 of the next edition of Beattie and Dickson's *Textbook of Pathology*:

> We note with regret the tendency of late to alter the second component of this series of terms from "-tropic" to "-trophic." We ourselves, however, prefer to retain the original form "-tropic," as signifying "*turning towards*" and so "influencing," on the analogy of the recognised biological term "tropism," which means the turning of an organism towards, and in response to, some particular external *stimulus* such as sunlight—rather than "-trophic," which would imply that there must also of necessity be some element of "nourishment" or "regulation of the nutrition" of the organ or tissue influenced. That the correct signification is that of "*turning towards*" is further borne out by the analogous series of expressions "dermo-*tropic*," "neuro*tropic*," &c., as applied to certain viruses (p. 105), which can scarcely be interpreted as signifying viruses that "nourish" the skin, nervous system, &c.

London, W.1. W. E. CARNEGIE DICKSON.

On Active Service

CASUALTIES

KILLED

Lieutenant ROBERT RUSSELL WADDELL, MB GLASG., RAMC
Flight-Lieutenant GEORGE EDWARD THOMAS SODEN, MRCS, RAFVR

DIED

Captain I. M. HILL, RAMC

WOUNDED

Lieutenant G. R. CONNOLLY, MB DUBL., RAMC
Lieutenant W. L. COOPER, RAMC
Captain I. S. DALTON, MB LOND., RAMC
Major R. L. HARWARD, MB LOND., RAMC
Captain P. W. HENDERSON, BM OXFD, RAMC
Captain MALCOLM MACINTYRE, LRCPE, RAMC
Major J. B. MENZIES, MB EDIN., RAMC
Lieutenant J. H. ORR, MB DURH., RAMC
Lieutenant T. R. STEPHENS, MB BRIST., RAMC
Captain D. H. SWAYNE, BM OXFD, RAMC
Captain I. F. THOMSON, MB LOND., RAMC
Captain V. F. TYNDALL, MB ST. AND.

AWARDS

DSO

Major D. G. C. WHYTE, MB BELF., RAMC

MC

Captain RADHA RAMAN, LAL, MB, IAMC

MEMOIR

Captain C. R. VEALE was born in Battersea in 1919 and educated at Walter St. John High School there. He took the Conjoint qualification from Charing Cross Hospital in 1942, and was appointed house-surgeon at Ashridge Hospital under Mr. Norman Lake, who writes: "Veale's enthusiasm and zeal for the welfare of his patients were magnificent and they all loved him. Beneath an unassuming manner he had a splendid ability and there was no-one on the staff who did not admire both his work and his character. Sincere, staunch and bright, he was a most delightful colleague." Veale joined the RAMC at the end of 1942 and sailed with a regiment of the Royal Armoured Corps to Normandy shortly after D-day.

He was killed near Noyes in July trying to rescue a wounded man under fire. His colonel relates how he was warned to go cautiously when his car came under enemy fire but insisted on going forward. "Charles had three half-tracked, semi-armoured ambulances," a brother officer writes, "and he was always saying that he had to help the infantry, because they only had jeeps for collecting casualties. The very morning he was killed he said to me 'I don't seem able to do my own job, everyone else does it for me,' meaning that first-aid was given to casualties by the troops themselves on the spot, but he didn't add that it was due to his own efforts through difficult days of training that every man in the regiment had a thorough grounding in first-aid. Charles's eager spirit made him go right into the battle in his semi-armoured vehicle to collect casualties almost before they were wounded. He did it almost in disregard of orders, but not without realising the danger, for he often left his driver behind and drove himself."

Captain Veale married Miss Anita Burnham in 1942 and their son was born this year.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE.—At a meeting to be held at 26, Portland Place, London, W.1, on Thursday, Oct. 19, at 3 PM., Dr. L. G. Eddey will speak on spray killing of mosquitoes in houses as a contribution to malaria control on the Gold Coast.

EUGENICS SOCIETY.—On Tuesday, Oct. 17, at 5.30 PM, at a meeting in the rooms of the Royal Society, Burlington House, Piccadilly, London, W.1, Dr. Innes Pearse will speak on the health centre and the family.

Obituary

ALEXANDER BREMNER

CBE, MC, M D EDIN, D T M & H, D P H, T D

Colonel Bremner died suddenly at his home in Sheffield on Sept. 29, aged 54. He had led an adventurous and unselfish life as a physician and as a soldier in two wars. Son of Robert Sutherland Bremner, schoolmaster, he was born at North Roe, Shetland, educated at the Anderson Institute there, and at Edinburgh University where he was a prominent member of the OTC and graduated MB in 1913. When war broke out in 1914 he joined the army as a sergeant-major and an unofficial MO to a battalion raised in Hull by Auckland Geddes, being soon transferred to the RAMC; but after a few months in France he was invalided home with typhoid fever, and later was attached to the Dublin Fusiliers, seeing service at Suvla Bay, Salonika, Egypt and Palestine. He was in the *Transylvania* when she was torpedoed in the Mediterranean and spent several hours in the sea before being rescued. For valour in rescuing wounded under fire he was awarded the Military Cross.

In 1919 Bremner married Miss Ella Elphinston, herself an Edinburgh medical graduate, and settled at Sheffield, where he took over the practice of his uncle, Dr. S. M. Inkster. In 1925 he became deputy director of the Edgar Allen Institute and in 1926 hon. physician to the Children's Hospital, whose progressive policy was largely due to his wise advice and administrative ability. He also lectured on pædiatrics at the university. Among other appointments he held were those of MO for tropical diseases to the Ministry of Pensions, and examining factory surgeon. The aftercare and rehabilitation of rheumatic children was his preoccupation, and he organised the clinic for rheumatism under the school authority, acting not only as physician but as committeeman and administrator. He had a talent for getting things done and a capacity for persuading other people that things ought to be done.

He joined the Territorial Army as MO to the 71st Field Brigade RA about 1925 and continued to serve with them until the early part of 1940, when he was promoted lieutenant-colonel and went out in command of a field ambulance and acting ADMS. Although his division was largely untrained, he led his command from the south of France to Belgium when the Germans broke through in May, 1940, the story of which is an epic in itself. The only order Bremner received during the retreat to Dunkirk was one instructing him to set up a casualty clearing station in a certain village. His reply was that he would be delighted if it were not for the fact that his German was a little rusty; the previous evening he had pulled out from one end of the village while the Germans were entering the other end. The only boast he allowed himself over this part of the campaign was that in his sector not one wounded man was left behind. While still thirty miles from the coast a shell-burst severely wounded him and eight of his medical officers, but they managed to reach Dunkirk with the help of a quartermaster who drove the ambulance through screens of shells at each cross-roads and frequent machine-gunning from German planes. Back in England, he spent some months in hospital, mending his fractured legs, but getting wind of further adventures he attended, limping badly, a medical board which was to decide his capacity for further service. Finding that the senior member of the board was a major, he elected himself chairman and passed himself fit for active service—a decision reviewed later by a board of generals. He was promoted colonel AMS in charge of a general hospital, and with this unit he landed with the first British troops in North Africa. His equipment was sunk in harbour by enemy action, but under heavy aerial bombardment he organised the salvage of enough stores to erect a hospital, receiving casualties within a few days. He was again mentioned in dispatches and later was awarded the CBE. In North Africa he organised the hospital medical service's disinfecting station. He returned to this country in October, 1943, after his services had been asked for by his hospital and by the university, when he threw himself immediately into organising means to assist those now in the Forces on returning to civilian life. His understanding of their postwar problems was helpful to many young Army doctors.

A correspondent writes: In all Bremner's actions, whether in civilian or military life, could be discerned his high courage, unselfishness and humour. A strikingly handsome man with the exuberant fair hair and direct blue eyes of his Scandinavian forbears, he was vigorous and restless; but when he entered a sickroom he turned off his restlessness as if with a tap and became the ideal physician who inspired confidence by his rock-like steadiness, gentleness and common sense. If anyone was really ill, he would go to infinite trouble to reach the correct diagnosis and to apply the proper treatment. He was particularly successful with children, probably because he himself was still a boy at heart. Often his therapeutic measures were helped by gifts, and to one boy in whom he discovered a flair for biology he presented a microscope and mounted specimens of insects. Then for days he could be found gravely discussing with his boy patient the finer points of bed bugs and fleas. It is said that he had more non-paying patients than any other doctor in Sheffield, and indeed his generosity was a byword in the town. He had a genius for making and keeping friends, and though always at his best he was never more so than when entertaining them at home.

JAMES TELFER CALVERT

CIE, M B LOND., F R C P, D P H

Lieut.-Colonel Calvert, who died at his home in Eastbourne on Sept. 20, was an able and popular officer of the Indian Medical Service who filled important posts. After qualifying in 1887 from St. Thomas's Hospital, he held several house appointments there before joining the IMS with a high place in the entrance examination. He saw active service on both the North-eastern and North-western Frontiers of India, and then entered the Bengal civil medical department. At Cuttack in Orissa, where he was civil surgeon and took charge of a medical school, he showed a natural bent for surgery; but, when he found no opening on the surgical side of the Calcutta Medical College Hospitals, with characteristic energy he took the membership examination of the Royal College of Physicians in 1906, and was rewarded with the appointment of physician and professor of materia medica in Calcutta. He edited an edition of Ghosh's *Materia Medica* and showed a healthy scepticism towards new drugs until their position had become well established. When a vacancy occurred in the senior post of principal of the Calcutta Medical Hospital and College and professor of medicine, he was the obvious choice. This is one of the most onerous medical appointments in India, involving the administration of a large group of hospitals and of a large medical school in addition to charge of beds and teaching work. Calvert was also dean of the medical faculty of Calcutta University, in which post he did valuable work, and his sound knowledge of medicine ensured to him a large consulting practice in both the European and Indian communities. His abilities found full scope, and his successful work was recognised by the award of the CIE and his election as FRCP in 1917. Soon after his retirement—which took place under the age rules before he could obtain promotion to higher administrative rank—it was found necessary to relieve the professor of medicine of administrative duties by the appointment of an additional senior officer.

After his retirement Colonel Calvert lived quietly at Eastbourne with his wife, three sons—two of whom are now serving in our military forces—and one daughter. His breezy personality and his remarkable fund of good stories brought him many friends.

Appointments

BATEMAN, JEAN, MB LEEDS: RSO at the Birmingham Accident Hospital.

LINDSAY, JAMES, MD EDIN., MRCP: medical referee for the county-court districts of Bath, Chippenham, Frome, Melksham, Trowbridge, Warminster, Wincanton, Calne, Devizes, Hungerford, Malmesbury, Marlborough, Newbury and Swindon (circuit 52).

DR. LEWIS SMITH

H. L. T. writes: As a former pupil and for many years subsequently a friend of Dr. Lewis Smith, I feel that the obituary notice of Sept. 30 does not do full justice to him as a man and as a physician, and does not present a portrait which would be recognised by a large circle who knew and admired him.

"L. A.," as he was affectionately called, excelled in two branches of a physician's profession, as a teacher and as a consulting physician in practice. It is given to few men to add a third success to these time-consuming and tiring activities.

He possessed to the full the qualities necessary for a successful teacher. On the basis of a sound knowledge of medicine, he was alert and clear in expression, careful and thorough without wasting time, and with beautiful hands in physical examination, with a sense of humour and the power of being firm when necessary both with patients and students. He taught usually to the standard of qualification, but this was not the limit of his knowledge, and often some chance question from a student would reveal his full acquaintance with a subject.

These qualities, together with an innate knowledge of human nature and a quick sympathy with human beings, brought him a large practice which he thoroughly enjoyed. He had the gift of friendship, and his attractive personality made him a delightful companion, and these gave him a large circle in which his presence was always welcome and to whom in his last few years his cheery letters were always a pleasure.

Notes and News

AIR EVACUATION OF CASUALTIES

Major-General D. N. W. Grant, air surgeon of the US Army Air Forces, in an address on Oct. 3 at the AAF School of Air Evacuation at Bowman Field, Kentucky, disclosed that C 54s of the Air Transport Command were now flying combat casualties home to the USA at the rate of 4000 a month—about 40% of all casualties returning from overseas. The school will be made a division of the AAF School of Aviation Medicine on Oct. 15. In the past two years it has organised 29 medical air-evacuation squadrons and trained nearly 1000 flight nurses and a comparable number of surgical technicians. Since Pearl Harbour more than 425,000 sick and wounded patients of the US and Allied forces have been evacuated by air, and since D-day 55,000 have been evacuated from France by the C 47's of the Ninth Troop Carrier Command. General Grant added that though the most critical cases were given air priority, the death-rate of air-evacuated patients after admission to Army general hospitals in England was reported to be only 0·4%.

VITAMIN C IN TOMATOES

THE ascorbic acid content of ripe tomatoes bears a close relationship to their size—the bigger the tomato the less the vitamin content per gramme until a weight of 30 g. is reached, after which there is no further fall. Hallsworth and Lewis (*Nature, Lond.* Sept. 30, 1944, p. 431), who made this observation in Sydney, NSW, show that there is a close correlation between ascorbic acid content and the ratio of surface area to weight. This might be foreseen if we assume that the vitamin is synthesised by the action of the sun's rays. They found a wide variation in ascorbic acid content from bush to bush, and seed taken from plants with a high yield tended to hand on this quality, suggesting a profitable field for the breeder. The fruit ripening together on a bush showed a closely similar content, but it increased as the plant aged, even in the autumn when the days were shortening.

Training Grants for Service Psychiatrists

The Child Guidance Council has set aside £500 to give as grants to medical officers with psychiatric and preferably pædiatric experience who wish to train as child psychiatrists when they leave the Services. Inquiries should be sent to the secretary of the council, 39, Queen Anne Street, London.

London County Council

Dr. J. A. Scott has been appointed a principal medical officer, and Dr. F. J. Bentley a senior medical officer, in the public health department of the council, primarily for duties in connexion with the work arising from consideration of the proposals of the Government for the establishment of a national health service.

Dr. Scott, who is 44, graduated MB at the University of Liverpool in 1924, taking his DPH two years later and his MD in 1927. After holding resident appointments at the City Hospital North and Alder Hey Hospital in Liverpool he joined the staff of the Surrey county council as an assistant medical officer. He was for some time MOH and school MO for Barnsley before he was appointed to his present post as MOH for Fulham. He has written much on problems of practice and public administration. He was awarded the OBE in 1941.

Dr. Bentley, who is also 44, is at present a principal assistant medical officer of the council. He graduated MB at Durham in 1922 and MD in 1924. He obtained the DPH in 1928 and like Dr. Scott has held an appointment with the Surrey county council. As a clinical assistant at the Hospital for Sick Children, Great Ormond Street, he had made a special study of rheumatism, and in 1927 when he was already a divisional medical officer of the LCC he contributed to the Medical Research Council's report on social conditions and acute rheumatism. He was also the author of the MRC report on artificial pneumothorax published in 1936, and in 1940 discussed the scope of mass radiography.

National Health Service

In a report submitted to the city council last Tuesday the Birmingham public health and maternity and child-welfare committee welcomes in principle the proposals of the white-paper on a National Health Service, but urges variations. It thinks that the administration of hospitals at present owned by local authorities should remain with these local authorities under arrangements similar to those suggested for voluntary hospitals; and it believes that maternity and child-welfare services should be able to function without severance, and with full coördination between their institutional, clinical and domiciliary branches. The joint-authority area for Birmingham should, it is felt, be confined to the present area of the city together with such adjacent areas as cannot effectively be absorbed into other joint authorities. The committee regrets the exclusion from a "comprehensive" National Health Service of the industrial medical service, remarking that insufficient emphasis appears to be laid on the intimate connexion between health conditions in industrial establishments and the public health generally. Administration of all measures relating to factory health should, it is argued, be diverted to the Minister of Health.

The report of the mental hospitals committee recommends that the proposed joint authorities should be obliged to appoint special commitees to deal with the Mental Health Service.

Births, Marriages and Deaths

BIRTHS

BAILIE.—On Oct. 1, at Belfast, the wife of Captain H. W. C. Bailie, RAMC—a daughter.

BENTALL.—On Sept. 30, at Shrewsbury, the wife of Surgeon Lieutenant A. P. Bentall, RNVR—a daughter.

COOPER.—On Oct. 4, at Ipswich, the wife of Mr. Stanley Cooper, FRCS, Colonial Service, Gold Coast—a son.

CREAN.—On Sept. 30, the wife of Surgeon Commander T. F. Crean, RN—a daughter.

GAUNT.—On Sept. 29, at Stornoway, the wife of Surgeon Lieut.-Commander R. T. Gaunt, RNVR—a daughter.

HOWARD.—On Oct. 1, at Esher, the wife of Dr. A. C. Howard, Colonial Medical Service, Nigeria—a daughter.

MACDONALD.—On Sept. 30, in London, the wife of Brigadier George Macdonald, MD—a daughter.

MARTIN.—On Oct. 1, at Woodchester, the wife of Captain J. K. Martin, RAMC—a son.

MATTHEWS.—On Sept. 29, at Oxford, the wife of Captain Bryan Matthews, RAMC—a son.

WEST.—On Oct. 4, at Edinburgh, the wife of Dr. Ranyard West—a son.

MARRIAGES

CHALMERS—EVANS.—On Sept. 29, at York, Kenneth M. Chalmers, MB, to C. Mary Evans, MB.

DAVIES—MACMIN.—On Sept. 30, in London, Sydney Vivian Davies, MB, to Barbara Joan Macmin, SRN.

MCNAB—BOGUE.—On Sept. 30, at Appleby, David John Norwell McNab, surgeon lieut.-commander RNVR, of Glasgow, to Kathleen Bogue, ARRC, acting senior sister, QARNNSR

TINLEY—GRAYBURN.—On Sept. 21, at Lythe, William Edwyn Falkingbridge Tinley, MD, JP, to Kathleen Edith Grayburn.

DEATHS

BREND.—On Oct. 5, in London, William Alfred Brend, MA CAMB., MD LOND., MRCP, aged 71.

GRAY.—On Oct. 4, at Peterborough, Egerton Gray, MRCS, LSA.

LEDINGHAM.—On Oct. 4, Sir John Charles Grant Ledingham, CMG, MB, D SC ABERD., FRCP, FRS.

NEATBY.—On Sept. 30, at Poole, Thomas Miller Neatby, MA, MD CAMB.

POYNDER.—On Oct. 3, at Simla, India, Louisa Margueretta Poynder, MD LAUSANNE, MRCS, aged 67.

STABB.—On Oct. 3, at Stroud, Arthur Francis Stabb, MB CAMB., FRCP.

THE CONSERVATIVE TREATMENT OF ABDOMINAL WOUNDS

C. G. ROB, MC, M CHIR CAMB., F R C S
MAJOR RAMC; SURGICAL SPECIALIST

In the treatment of war wounds laparotomy is commonly performed on patients with no intraperitoneal lesion or with a lesion that does not necessitate this operation. This paper is based on a series of 141 cases, with definite abdominal symptoms and signs, in 43 of which laparotomy was not performed. The importance of avoiding an unnecessary laparotomy lies in the fact that many patients have multiple wounds, and unnecessary surgery may result in avoidable death.

ANALYSIS OF 141 CASES WITH DEFINITE ABDOMINAL SIGNS

A. LAPAROTOMY PERFORMED	98	
I. *Laparotomy necessary*	88	(deaths 32)
Wounds of alimentary tract	81	Differs from total owing to multiple lesions
Wounds of solid viscera in which hæmorrhage necessitated laparotomy	11	
Intraperitoneal wounds of bladder	5	
Wound of gall-bladder	2	
II. *Laparotomy unnecessary*	10	(death 1)
Wounds of liver	4	
,, ,, and kidney	3	
,, ,, retroperitoneal tissues	2	
,, ,, kidney	1	
B. LAPAROTOMY NOT PERFORMED	43	(death 0)
Extraperitoneal hæmatoma	13	
Thoraco-abdominal or abdominal wound with hæmoperitoneum (liver or kidney only)	6	
Chest wound with abdominal signs	6	
Buttock wound with fractured pelvis	6	
Kidney wound	4	
Localised lesion more than 36 hours old	4	
Injury of spine with paraplegia	2	
Blast injury	1	
Wound of colon (extraperitoneal)	1	

The cases were treated at an advanced surgical centre in Italy and were followed until their evacuation between the 10th and 23rd day.

DIAGNOSIS

As the table shows, the cases in which laparotomy was necessary had either lesions of hollow viscera or lesions of solid viscera with hæmorrhage which would not stop without operation. Those in which laparotomy was unnecessary or not performed had either a simple hæmoperitoneum or wounds of the structures in close relationship with the parietal peritoneum; nothing except exploration was done and recovery followed; actually one of these patients died, but from a pulmonary embolus on the 8th day.

In judging which cases will require laparotomy we are guided first by the patient's general condition, particularly by the blood-pressure and pulse-rate. Resuscitation is begun where necessary, and may provide a valuable pointer, since most patients without a lesion of the alimentary tract do not require resuscitation or else respond to it rapidly, unless they have associated limb or muscle wounds. A clinical examination is then made with due allowance for the effects of morphine (which may considerably reduce abdominal pain and rigidity), the presence of dehydration, the fact that fit soldiers often have an abdominal wall of high muscle tone, and the fact that a lesion of the alimentary tract may produce very little peritonitis in the early stages. This examination will often make it clear that there is an injury of the alimentary tract; the abdomen shows the general rigidity and tenderness, the absence of respiratory movements, and the silence on auscultation of general peritonitis. In these cases and those with prolapse of viscera through the wound the diagnosis is never in doubt. It is the less obvious case that presents the problem, and here there are two physical signs which have been found of great help.

1. *Auscultation of the abdomen*, often more than once and if necessary for 1–2 min. at a time, to ascertain the presence or absence of peristaltic sounds. In only 2 cases in which peristalsis was heard was an intraperitoneal lesion of the alimentary tract found at operation, or the patient failed to recover when treated conservatively. The two exceptions were a lesion of the hepatic flexure with the foreign body plugging the perforation, and a case of jejunal wounds with minimal peritoneal soiling. Absence of peristalsis was noted in all the other intraperitoneal lesions of the alimentary tract. Peristalsis may also cease for long periods in cases of extraperitoneal hæmatoma, blast injury, hæmoperitoneum, and late spinal wounds with paraplegia; but a second or even a third auscultation has usually revealed it, particularly after a period of resuscitation. Of all the cases of unnecessary laparotomy, or no laparotomy, only one, a large posterior extraperitoneal hæmatoma, was completely silent throughout. Difficulty arose in a case of bladder injury in which peristalsis was heard; but a urine peritonitis is not of such urgency that a few hours' delay does harm.

2. *Clinical estimate of the wound track*, aided by radiography (if available) to locate foreign bodies and demonstrate fractures. This is of most help in: (*a*) the buttock wound with a fractured ilium; (*b*) wounds of the lower chest and upper abdomen where the foreign body may be located in the thorax or liver; and (*c*) wounds of the extraperitoneal regions.

Many unnecessary laparotomies can be avoided if one adopts routine exploration of the wound track in the operating-theatre before opening the abdomen.

Certain points are of particular help in particular types of case. Thus with an extraperitoneal hæmatoma in the anterior abdominal wall, a careful wound excision will demonstrate the foreign body outside the peritoneal cavity. In 2 cases the deep epigastric artery was torn. In buttock wounds with a fractured ilium, excision on two occasions was followed by an extraperitoneal exploration above the inguinal ligament and removal of a foreign body from the pelvic fascia. In one of these the descending colon was lacerated extraperitoneally, and suture with drainage but without laparotomy was successful. In these cases also the abdominal rigidity and tenderness is localised to the wounded region. Diagnostic catheterisation and rectal examination are especially valuable in wounds of the buttock and perineum.

A wound of the posterior extraperitoneal tissues may be diagnosed principally by finding rigidity and by hearing peristaltic sounds—often faint and requiring patience to detect. When a wound of this region is associated with paraplegia the hyperæsthesia just above the paralysed level may cause confusion, and early abdominal distension must also be expected. If the kidney may be involved, hæmaturia, the position of the wound and local signs, often with a palpable swelling, usually make diagnosis easy. Wound excision allows accurate palpation of the kidney, and an estimate of its state and of the amount of hæmorrhage allows one to decide whether nephrectomy is necessary. Conservative treatment is usually possible.

The diagnosis of a hæmoperitoneum due to a liver wound is assisted by finding mild rigidity on light palpation and by observing some movement with respiration. These patients are watched very carefully for further bleeding, and if this occurs, as it did in one case, operation is performed and suture of the liver attempted.

In chest wounds with upper abdominal signs exclusion of an intra-abdominal lesion has usually been straightforward; peristalsis is easily heard, radiography shows no penetration of the abdomen if a foreign body has been retained, and light abdominal palpation discovers only mild rigidity (generally on the side of the lesion) and no tenderness. One case however was of extreme difficulty. The patient had a cannon-shell wound of the back and left chest, with pronounced abdominal signs including absence of peristaltic sounds. After resuscitation very faint peristalsis was heard once, and accordingly the chest wound only was treated. Recovery followed and it is thought that the abdominal signs were due to blast effects of the cannon shell.

In 4 cases the wounds were more than 36 hours old and the abdominal signs localised. These men had lain on the battlefield for long periods, and were treated conservatively. The wounds were thought to be of the colon only. A local abscess which required drainage developed in 3, and a fæcal fistula in 2.

It will have been noticed that I have made no mention of certain signs of great value in the diagnosis of the

"acute abdomen." The reason is that they have been found of little help in the gunshot wound. For example, abdominal pain has been so masked by morphine that it is the exception rather than the rule to see a patient complaining by the time he reaches the surgeon, and the diagnostic value of pain is therefore small. Vomiting may occur with any kind of wound, and apart from the character of the vomit its diagnostic value is slight. Bowel actions and passage of flatus have also given little information, though bleeding per rectum is of obvious importance. The tongue has often been dry in the absence of an abdominal wound. Urine analysis, beyond a search for blood, has not been performed. Finally, though abdominal percussion is helpful in demonstrating shifting dullness, diminution of liver dullness has had little significance; indeed this sign was positive in 3 cases of simple liver wound, presumably because air entered along the wound track.

TREATMENT

Conservative.—Apart from wound excision and the treatment of other wounds, conservative treatment has consisted in resuscitation followed by observation. In 3 cases, after such observation for an average of seven hours, operation was undertaken; one had a wound of colon with the foreign body plugging the perforation, another had an intraperitoneal rupture of the bladder, and the third a liver wound which was bleeding and required suture. These 3 men recovered. It must be emphasised however that wherever a definite doubt existed laparotomy was performed.

The other problem of conservative treatment has been complications, but only two have been noted. The first was an intraperitoneal abscess in the wound more than 36 hours old, and this, as already described, was forming on admission and required incision and drainage. The other and more important complication has been paralytic ileus, particularly with spinal wounds and posterior extraperitoneal hæmatomas. Here, when enemas have not given relief, gastric suction and intravenous saline have been employed. The mortality among cases treated conservatively has been nil.

Operative.—Laparotomy has been performed through a paramedian incision in most cases, but in wounds of the flanks, if clinical examination—particularly of the wound track—has led one to expect a wound of the right or left colon with possible damage to the small intestine, an oblique incision has been adopted to avoid if possible further soiling of the peritoneal cavity.

Treatment of the injured viscera has consisted in suture of all perforations of the alimentary tract above the ileocæcal valve, with resection in 10 cases (4 deaths) when mesenteric wounds have damaged the blood-supply. Wounds of the large intestines have been exteriorised with the following exceptions:

(i) Very small perforations have been sutured.
(ii) Extraperitoneal perforations have been sutured with drainage.
(iii) Perforations below the rectosigmoid junction have been sutured, proximal colostomy being performed.

Bladder wounds have been treated by suture followed by suprapubic cystostomy, and the one gall-bladder perforation was sutured with drainage. Apart from this, peritoneal drainage has not been used, but the recto-peritoneal tissues and rectus sheath have frequently been drained.

Wounds of the spleen have been treated by splenectomy, wounds of the liver (if very large or associated with severe hæmorrhage) by suture or packing. Renal wounds have as a rule been treated conservatively but those of the hilum necessitated nephrectomy in 3 cases. The 1 wound of the pancreas was drained into the loin, but acute pancreatitis developed.

Where other wounds are associated with abdominal wounds our practice has depended on the general condition. Where this was poor we have sometimes treated the abdomen only, and have left the other wounds until the condition has improved, penicillin (100,000 units) and gas-gangrene serum (50,000 units) being injected as a prophylactic against gas gangrene. Where the general condition was good, we have operated on the other wounds before commencing the abdomen.

Postoperative.—Resuscitation with blood or plasma is continued after operation if necessary, and glucose-saline or glucose (5 pints per day) is given till fluids can be taken by mouth. Nearly all wounds of the alimentary tract have required gastric suction, which is continued until auscultation reveals the re-establishment of peristalsis and until clamping the tube does not produce vomiting. Fluids by mouth are allowed in liberal quantities as long as the suction is working, and since careful fluid-balance charts demonstrated that on an average 1 pint per day of this fluid was retained, nutrient fluids have been given instead of water only. After gastric suction a fluid diet is prescribed for 24–48 hours, and then a light diet.

Sulphadiazine has been injected intravenously in a dosage of 3·0 grammes twice daily; if this was not available, sulphathiazole was used, in all about 20 g. being given. Morphine has been used liberally, up to grain ¼ 6-hourly. When possible hæmoglobin is estimated on the 5th day, and if it is below 85% a pint of blood is given, sometimes repeated on the 10th day. When hæmoglobin estimation has been impossible blood has been given to most of the patients. Plasma at intervals during the first days has been tried but found unsatisfactory because reactions have occurred with these repeated plasma transfusions. Finally all patients have been retained for 10–14 days before evacuation, and if the wound has been infected this time has been prolonged.

COMPLICATIONS AND DEATHS

The most striking thing about complications has been the rarity of residual intraperitoneal abscesses; this is presumably due to sulphonamides. Death has occurred in 33 cases:

Shock and hæmorrhage caused death in 18 cases in an average of fifteen hours from operation. Of these, 5 had pulmonary atelectasis.

Peritonitis caused 6 deaths in an average of eight days.

In 3 patients the injuries were too severe and old for surgery, and the laparotomy was closed without visceral repair. Pulmonary embolus was the cause of 3 deaths, and cerebral abscess and acute pancreatitis of 1 each, while in 1 case a high posterior gastric perforation was missed.

Over the same period 6 patients died after admission, but before reaching the operating-theatre.

In cases that recovered the average time between wounding and operation was 8·4 hours; in those that died from shock and hæmorrhage it was 15 hours, and in those that died from peritonitis it was 25·5 hours.

SUMMARY AND CONCLUSIONS

Of 141 patients with gunshot wounds producing definite abdominal symptoms and signs 43 were treated successfully without laparotomy. This appears to justify the plan of diagnosis and conservative treatment adopted. Many patients have multiple wounds, and an unnecessary laparotomy favours collapse.

Where genuine doubt exists, laparotomy should be performed.

PENICILLIN UNITS.—The Oxford unit, an arbitrary measurement adopted by Florey and his colleagues for laboratory work, is the amount of penicillin contained in 1 c.cm. of their standard buffer solution. Samples are standardised against this original solution, and the unit has been adopted by most workers in the United States and Canada as well as in Britain. In systemic therapy doses running into hundreds of thousands of Oxford units are commonplace, and the objection to the adoption of a larger unit has been that it would introduce fractions in stating the strength of the weaker solutions used for local application, which may contain 10 or less units per c.cm. But there is now an obvious risk of confusion when large quantities of penicillin are being ordered and numbers running into 13 figures have to be written on order-sheets or sent by cable; and unfortunately what is a billion to an American is only a thousand million, or a thousandth part of a billion, to an Englishman. The American and British authorities have therefore agreed on a "mega unit," which will represent a million Oxford units; it will be used for ordering and supplying only, and not to express clinical dosage.

NEW DRUGS ACTIVE IN THE CHEMOTHERAPY OF EXPERIMENTAL GAS GANGRENE

D. G. EVANS, PH D MANC.
A. T. FULLER, PH D LOND., F R I C
J. WALKER, PH D ST. AND., D PHIL OXFD

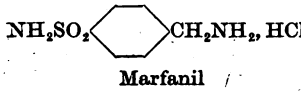
National Institute for Medical Research, London

IN spite of the progress made by chemotherapy in the interval, the case-mortality of gas gangrene in this war is not less, and may even be greater, than it was in the last war (Coupal 1929, MacLennan and Macfarlane 1944). In gas gangrene two concomitant factors are at work, the infection and the resulting toxæmia. Chemotherapy must be directed towards checking the infection, while antitoxin is used to neutralise the toxin.

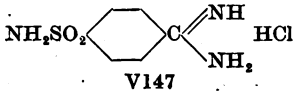
The value of sulphonamides in gas gangrene has been questioned (MRC War Memo No. 2, 1943, MacLennan and Macfarlane 1944), although much attention has been devoted to their effect in experimental anaerobic infections (for review, see Bliss, Long and Smith 1941). *Cl. œdematiens* infection is uncontrolled by sulphonamides and the response of *Cl. welchii* and *Cl. septicum* is at best moderate. A mixture of sulphathiazole and proflavine has been recommended for general prophylactic use in wounds (McIntosh and Selbie 1943, 1944).

A fresh impetus was given by the introduction of 'Marfanil' (originally called 'Mesudin'), or *p*-sulphonamidobenzylamine hydrochloride (Klarer 1941), which was shown to possess considerable activity against anaerobes both in vitro and in vivo (Domagk 1942), and is used for prophylaxis in the German army. The substance had also been described in America (Miller, Sprague, Kissinger and McBurney 1940), but its specific action on anaerobes remained unobserved. That experience emphasises the necessity for a wider and more systematic form of preliminary testing of drugs for in-vitro antibacterial activity. By such tests we have been able to select for study the most potent of many new compounds and to choose the infections it was most likely to control.

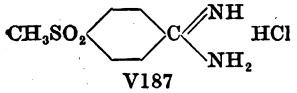
In the course of work on the chemotherapy of rickettsial infections (Andrewes, King, van den Ende and Walker 1944) we have synthesised many new compounds in further development of the discovery of antityphus activity in *p*-sulphonamidobenzamidine (V147), which also possesses moderate to good antibacterial activity. In vitro, one new compound, *p*-methylsulphonylbenzamidine hydrochloride (V187) proved outstanding in its activity against the gas gangrene organisms and hæmolytic streptococci, although it was inactive against typhus.



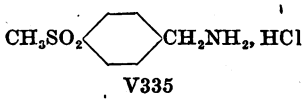
Marfanil



V147



V187



V335

Chemically, V187 is a sulphone in which the sulphonamide radicle of V147 has been replaced by the methylsulphonyl group. To complete the series, we have also synthesised the methyl sulphone corresponding to marfanil—namely, *p*-methylsulphonylbenzylamine hydrochloride, V335—and it has similar high antibacterial and chemotherapeutic activity. Furthermore, as these compounds do not contain a primary amino-group directly attached to an aromatic nucleus, their mode of action is not connected with *p*-aminobenzoic acid and their activity is therefore not depressed in its presence. This paper reports experiments in vitro and in vivo with the four drugs, which we have compared with sulphathiazole, representing the more potent members of the sulphonamide group.

Antibacterial Activity *in vitro*

The cultures and technique used were those described by Fuller (1942). Table I shows the minimal concentrations, expressed in mg. of drug per 100 c.cm. of culture medium, which prevented the appearance of visible growth during 20 hours at 37° C., or prevented growth in blood as judged by (*a*) absence of hæmolysis, or (*b*) plate-counts. Each recorded value is the result of several concordant tests. The table presents the results for V147, V187, marfanil, V335, and sulphathiazole, but as V147 was less active than V187, it was not submitted to the same extended series of tests as were the other drugs. V187 is most active against hæmolytic streptococci and clostridia, and only weakly active against staphylococci and the gram-negative organisms. Marfanil and V335, in addition to inhibiting strongly the growth of hæmolytic streptococci and clostridia, are much more active in broth and in serum broth against staphylococci and *Ps. pyocyanea* than is V187, although both drugs are much reduced in activity in whole blood. Thus, V187 is as active against streptococci and staphylococci in whole blood as it is in serum broth, whereas marfanil and V335 possess in whole blood only a small fraction of the activity shown in serum broth against these organisms. Furthermore, we have incubated marfanil with whole blood before introducing the implant and its activity then appeared to be still further depressed. We ascribe this reduction in the activity of marfanil and V335 in blood to breakdown at the sensitive benzylamine group, $>CH_2 \cdot NH_2$, probably by an amine-oxidase type of oxidation (compare Blaschko, Richter and Schlossmann 1937). From a practical point of view, blood is possibly the best medium for the in-vitro assay of drugs, since low activity in the presence of blood is likely to go with low activity in the animal, even for local therapy.

TABLE I—ANTIBACTERIAL ACTIVITY IN VITRO

Minimal inhibiting concentrations in mg. of drug per 100 c.cm. of culture medium

Medium and organism	V147	V187	Marfanil	V335	Sulphathiazole
BROTH					
Strep. hæmolyt.	1·5	0·2	1·5	1	15
Strep. hæmolyt. (SR)	..	0·2	1·5	0·5	30
Staph. aureus	500	250	15	5	>100
Cl. welchii	7	2	0·4	0·3	5
Cl. œdematiens	..	0·1	0·2	0·7	>100
Cl. septicum	..	0·8	0·2	0·15	1·5
Bact. coli	1500	300	200	100	5
S. typhi	200	75	120	..	..
Bact. dysent. Flexner	100	50	120	..	..
Bact. proteus	1200	300	300	50	10
Ps. pyocyanea	1500	150	15	8	5
50% SERUM BROTH					
Strep. hæmolyt.	3	1	5	1·5	20
Strep. hæmolyt. (SR)	..	1	5	1·5	>100
Staph. aureus	..	75	15	5	>100
Cl. welchii	..	5	0·3	0·6	5
Cl. œdematiens	..	7	3	0·5	>100
Cl. septicum	..	5	1·5	0·06	10
Bact. coli	..	50	50	20	0·5
Bact. proteus	..	100	100	20	3
Ps. pyocyanea	..	5	2	4	5
HORSE BLOOD					
Strep. hæmolyt.	..	1	100	75	0·3
Strep. hæmolyt. (SR)	..	2	120	..	4
Staph. aureus	..	75	250	..	1
SYNTHETIC MEDIUM					
Staph. aureus	..	100	20	5	2
Bact. coli	..	400	300	..	0·03
Bact. proteus	..	500	300	..	0·1
Ps. pyocyanea	..	120	100	..	7
50% SERUM-SYNTHETIC MEDIUM					
Staph. aureus	..	100	30	8	2
Bact. coli	..	75	120	..	0·2
Bact. proteus	..	150	300	..	1
Ps. pyocyanea	..	100	25	..	7

SR = sulphanilamide-resistant.

The titrations with V147, V187, marfanil and V335 all gave sharp and well-defined end-points below which growth at once became practically optimal and above which no growth was observed. With sulphathiazole, on the other hand, suboptimal growth took place at a range of concentrations above that at which no inhibition was observed; so the values recorded lack some of the precision of those quoted for the other drugs.

None of the V drugs (147, 187 or 385) or marfanil is affected by 100 times its weight of *p*-aminobenzoic acid,

TABLE II — PROTECTIVE PROPERTIES OF V187 GIVEN AT VARYING TIMES AFTER INFECTION OF GUINEAPIGS WITH *Cl. welchii*

V187				Controls—NO DRUG		
GP	Dose of drug	Time given after infection (hrs.)	Result	GP	Infecting dose	Result
1	100 mg./500 g. body-weight	1	S —	15	10,000 ld	D1 ††††
2			S —	16		D2 ††††
3			S —	17		D2 ††††
4		2	S —	18	1000 ld	D1 ††††
5			S —	19	100 ld	D1 ††††
6			S —			
7			S —			
8			S —			
9		3	S —			
10			S ††			
11		4	S ††			
12			D8††††			
13		5	S †††			
14			D4††††			

Each guineapig received 10,000 lethal doses of *Cl. welchii*.

Key to tables II–VIII inc.
S = Survival
D1, D2 = Death after 1 or 2 days.
— = No reaction.
† = Local swelling.
†† = Small gangrenous lesion.
††† = Large gangrenous lesion.
†††† = Extensive gangrene.

and they are essentially as active against the sulphanilamide-resistant as against sensitive strains of hæmolytic streptococci (see also table IX).

Chemotherapeutic Action *in vivo*

The strains of gas-gangrene organisms used were: (i) *Cl. welchii* strain SR9; (ii) *Cl. œdematiens* strain Jolly; and (iii) *Cl. septicum* strain VS54. With each strain approximately 50 organisms produced a fatal infection in guineapigs.

Guineapigs weighing 400–500 g. were used throughout, and the technique for producing infection was similar to that devised by Armstrong and Rae (1941) and one which we have previously employed (Evans 1943a b). Into the shaven thigh of the left hind-leg of the animal, 0·2 c.cm. of a 15% aqueous solution of calcium chloride was injected intramuscularly, and three hours later 0·2 c.cm. of a saline suspension of washed bacilli was injected at the same site. The cultures were prepared as follows:

Cl. welchii.—A 3-hour culture in liver broth was centrifuged, and the deposit, after being washed once in saline, was suspended in saline to give a concentration, by measured opacity, of 250×10^6 organisms per c.cm. From this saline suspension 10-fold serial dilutions were made in saline and 0·2 c.cm. of the chosen dilution was injected.

Cl. œdematiens and *septicum*.—With these organisms, 18-hour cultures in liver broth were used, and the washed suspensions were prepared as described for *Cl. welchii*.

Interval between infection and treatment.—We carried out an experiment to find out what interval could elapse between producing the infection and instituting effective chemotherapy. The results are shown in table II.

Guineapigs were infected with approximately 10,000 lethal doses of *Cl. welchii* and at varying times afterwards the different groups received intramuscularly at the site of infection one dose of an aqueous solution of V187, equivalent to 100 mg. per 500 g. body-weight. The concentration of drug was 100 mg. per c.cm. of solution; so each guineapig received 0·8–1 c.cm. It is apparent that, under the conditions of this experiment, V187 showed some chemotherapeutic activity when given as late as 5 hours after infection, and complete protection and clinical cure were achieved when the drug was administered 2 hours after infection. In subsequent experiments, described below, we have adopted as standard procedure an interval of 2 hours between infection and treatment.

The *route of administration* was of prime importance, as we had anticipated. Using *Cl. welchii* we achieved complete protection of guineapigs by intramuscular injection of drug at the site of infection, but not by intramuscular injection remote from the site of infection, and not by the intraperitoneal or oral routes. The same effect was shown with marfanil. Since gas-gangrene infection extends longitudinally along muscles (McNee and Shaw Dunn 1917), it is natural that intramuscular administration at or near the lesion should be most effective.

COMPARISON OF THE CHEMOTHERAPEUTIC ACTIONS OF V187, MARFANIL AND SULPHATHIAZOLE

Tables IV–VI show results obtained with the three drugs in experimental infections by *Cl. welchii*, *œdematiens* and *septicum*. (For ease of dosage and injection we used sodium sulphathiazole, but in a separate experiment its behaviour was identical with that of sulphathiazole.) In each experiment four groups of guineapigs were used: the animals in one group served as controls and received no drug, while those in the other three groups received single, falling, intramuscular doses of V187, marfanil, or sulphathiazole, in 10% aqueous solution, 2 hours after infection. All the animals were kept under observation for either 6 or 12 days. Cultures were taken from the thigh either at death or at the end of the period of observation.

With all three organisms V187 and marfanil had a similar protective and curative action and were superior to sulphathiazole. With *Cl. welchii* the number of deaths in the sulphathiazole-treated group is comparable with the numbers of deaths in the other two drug-treated groups, but the clinical picture was very different, for all the sulphathiazole-treated survivors were heavily infected and exhibited gangrenous lesions.

CHEMOTHERAPEUTIC ACTIONS OF V335 AND V147

Similar experiments were carried out with V335 and V147 in *Cl. welchii* infections. Table VII shows that V335, V147 and marfanil could not be differentiated in their ability to protect guineapigs. Table VIII shows that the action of V147 was somewhat weaker than that of sulphathiazole and much weaker than that of V187. As in the previous experiment (table IV) the sulphathiazole-treated survivors showed signs of gas gangrene, but the 2 animals receiving the highest dose (50 mg.) of V147 were free from infection.

CHEMOTHERAPEUTIC ACTION OF V187 IN HÆMOLYTIC STREPTOCOCCAL INFECTION

It was mentioned above that in vitro, V187 was equally active against sulphonamide-sensitive and sulphonamide-resistant strains of hæmolytic streptococci, and we are indebted to Mr. W. R. Maxted of the Emergency Public Health Laboratories, Hammersmith, for conducting a therapeutic test in mice. When this experiment was made we were without knowledge regarding the absorption of the drug and the oral route was used.

Normal sulphanilamide-sensitive *Str. hæmolyticus*, strain Richards, was used in the first experiment. The same strain was made sulphanilamide-resistant by six subcultures, at weekly intervals, in broth containing increasing amounts of sulphanilamide, the final broth culture containing 500 mg. of the drug per 100 c.cm. This resistant strain was used in the second experiment. Table IX shows that V187 was therapeutically as effective

TABLE III—PROTECTIVE PROPERTIES OF V187 AND MARFANIL GIVEN BY DIFFERENT ROUTES TO GUINEAPIGS INFECTED WITH *Cl. welchii*

	V187		MARFANIL		CONTROLS—NO DRUG		
Method of giving drug (100 mg./500 g.)	GP	Result	GP	Result	GP	Infecting dose	Result
Intramusc at site of infection	1	S —	13	S —	25	1000 ld	D2 ††††
	2	S —	14	S —	26		D1 ††††
	3	S —	15	S —			
					27	100 ld	D1 ††††
Intramusc. remote from site of infection	4	D1 ††††	16	D2 ††††	28		D2 ††††
	5	D1 ††††	17	D2 ††††			
	6	D1 ††††	18	D1 ††††	29	10 ld	D2 ††††
Intraperitoneally	7	D1 ††††	19	D1 ††††	30	1 ld	S †††
	8	D5 ††††	20	D1 ††††			
	9	D1 ††††	21	D2 ††††			
By mouth	10	D1 ††††	22	D1 ††††			
	11	D1 ††††	23	D2 ††††			
	12	D2 ††††	24	D1 ††††			

Each guineapig received 1000 lethal doses of *Cl. welchii* 2 hours before the drug.

against the sulphanilamide-resistant organism as it was against the normal form, and it is possible that parenteral administration of the drug might have saved more of the mice. Domagk (1943) remarks that in mice infected with hæmolytic streptococci marfanil, which is highly active in vitro, is no more active than sulphanilamide, which is much weaker in vitro. He ascribes this to the too ready excretion of marfanil.

Estimation, Absorption and Excretion of V187

A colorimetric method has been developed for estimating V187 in blood, urine and fæces, depending upon the magenta colour produced when an aromatic amidine and glyoxal are heated together in faintly alkaline solution (borate buffer, pH 9). As the method is capable of wide application to aromatic amidines, and differs considerably in technical detail from a similar reaction described by Devine (1944), it will be described in a separate communication.

Guineapigs were given the drug intramuscularly, intraperitoneally and by mouth. Table x shows that after intramuscular administration the blood concentration reaches a maximum in about 15 minutes, falls to less than half in 2 hours, and is negligible in 5 hours. After

TABLE IV—PROTECTIVE PROPERTIES OF V187, MARFANIL AND SULPHATHIAZOLE IN *Cl. welchii* INFECTION IN GUINEAPIGS

Dose of drug (mg./500 g.)	V187 GP	V187 Result	V187 Thigh culture	MARFANIL GP	MARFANIL Result	MARFANIL Thigh culture	SULPHATHIAZOLE GP	SULPHATHIAZOLE Result	SULPHATHIAZOLE Thigh culture	Controls—NO DRUG GP	Infecting dose	Result	Thigh culture
100	1	S —	—	21	S —	—	41	S †	+	61	1000 ld	D1 ††††	+
	2	S —	—	22	S ††	+	42	S †	+	62		D1 ††††	+
										63		D1 ††††	+
75	3	S —	—	23	S —	—	43	S †††	+	64		D1 ††††	+
	4	S —	—	24	S —	—	44	S †††	+				
										65	100 ld	D2 ††††	+
50	5	S †	+	25	S —	—	45	D4 ††††	+	65		D2 ††††	+
	6	S —	—	26	S —	—	46	S †††	+	67		D1 ††††	+
										68		D2 ††††	+
25	7	S ††	+	27	S —	—	47	S †††	+				
	8	S —	—	28	S †††	+	48	S †††	+	69	10 ld	D1 ††††	+
										70		D2 ††††	+
20	9	S —	—	29	S —	—	49	S †††	+	71		D1 ††††	+
	10	S —	—	30	S †	—	50	S †††	+	72		D2 ††††	+
10	11*	D2 ††††	+	31	S —	—	51	S †††	+	73	1 ld	D2 ††††	+
	12	S —	—	32	S —	—	52	S †††	+	74		S —	—
	13	S †	+	33	S †	+	53	S †††	+	75		D2 ††††	+
	14	S †	—	34	S †	+	54	S †††	+	76		D2 ††††	+
5	15	D3 ††††	+	35	D2 ††††	+	55	S †††	+				
	16	S †††	+	36	S †	+	56	D6 ††††	+				
1	17	D2 ††††	+	37	D2 ††††	+	57	D5 ††††	+				
	18	D5 ††††	+	38	S ††††	+	58	D4 ††††	+				
0·1	19	D2 ††††	+	39	D1 ††††	+	59	D2 ††††	+				
	20	D1 ††††	+	40	D1 ††††	+	60	D2 ††††	+				

* Pregnant.

Thigh cultured at death or after 6 days.

Cl. welchii isolated +.

Cl. welchii not isolated —.

Each guineapig received 1000 lethal doses of *Cl. welchii* 2 hours before the drug.

TABLE V—PROTECTIVE PROPERTIES OF V187, MARFANIL AND SULPHATHIAZOLE IN *Cl. œdematiens* INFECTION IN GUINEAPIGS

Dose of drug (mg./500 g.)	GP	Result	Thigh culture	GP	Result	Thigh culture	GP	Result	Thigh culture	GP	Infecting dose	Result	Thigh culture
100	1	S —	—	16	S —	—	31	S —	—	41	10 ld	D1 ††††	+
	2	S —	—	17	S —	—	32	D3 ††††	+	42		D1 ††††	+
										43		D2 ††††	+
50	3	S —	—	18	S —	—	33	D4 ††††	+	44		D3 ††††	+
	4	S —	—	19	S —	—	34	D4 ††††	+	45		D3 ††††	+
										46		D4 ††††	+
25	5	S —	—	20	S —	—	35	D3 ††††	+				
	6	S —	—	21	S —	—	36	D3 ††††	+	47	1 ld	D3 ††††	+
										48		D5 ††††	+
10	7	S —	—	22	S —	—	37	D4 ††††	+	49		D2 ††††	+
	8	S —	—	23	S —	—	38	D5 ††††	+	50		D5 ††††	+
5	9	S —	—	24	S —	—	39	D3 ††††	+				
	10	S —	—	25	D4 ††††	+	40	D2 ††††	+				
	11	D3 ††††	+	26	D2 ††††	+							
	12	D4 ††††	+	27	D2 ††††	+							
1	13	D2 ††††	+	28	D2 ††††	+							
	14	D2 ††††	+	29	D2 ††††	+							
0·1	15	D1 ††††	+	30	D1 ††††	+							

Thigh cultured at death or after 12 days.

Cl. œdematiens isolated +.

Cl. œdematiens not isolated —.

Each guineapig received 10 lethal doses of *Cl. œdematiens* 2 hours before the drug.

TABLE VI—PROTECTIVE PROPERTIES OF V187, MARFANIL AND SULPHATHIAZOLE IN *Cl. septicum* INFECTION IN GUINEAPIGS

Dose of drug (mg./500 g.)	GP	Result	Thigh culture	GP	Result	Thigh culture	GP	Result	Thigh culture	GP	Infecting dose	Result	Thigh culture
100	1	D2 ††††	+	16	S —	—	31	S —	—	41	100 ld	D2 ††††	+
	2	S —	—	17	S —	—	32	D3 ††††	+	42		D2 ††††	+
										43		D1 ††††	+
50	3	S —	—	18	S —	—	33	S —	—	44		D1 ††††	+
	4	S —	—	19	S —	—	34	S —	—				
										45	10 ld	D1 ††††	+
25	5	S —	—	20	S —	—	35	D2 ††††	+	46		D2 ††††	+
	6	S —	—	21	S —	—	36	D3 ††††	+				
										47	1 ld	D2 ††††	+
10	7	D2 ††††	+	22	S —	—	37	D5 ††††	+	48		D2 ††††	+
	8	S —	—	23	D5 ††††	+	38	D2 ††††	+				
5	9	S —	—	24	S —	—	39	D3 ††††	+				
	10	S —	—	25	S —	—	40	D2 ††††	+				
	11	S —	—	26	D2 ††††	+							
	12	D2 ††††	+	27	D2 ††††	+							
1	13	S —	—	28	D2 ††††	+							
	14	D1 ††††	+	29	D2 ††††	+							
0·1	15	D1 ††††	+	30	D1 ††††	+							

Thigh cultured at death or after 12 days.

Cl. septicum isolated +.

Cl. septicum not isolated —.

Each guineapig received 100 lethal doses of *Cl. septicum* 2 hours before the drug.

TABLE VII—PROTECTIVE PROPERTIES OF V187, MARFANIL AND V335 IN *Cl. welchii* INFECTION IN GUINEAPIGS

Dose of drug (mg./500 g.)	V187 GP	V187 Result	V187 Thigh culture	MARFANIL GP	MARFANIL Result	MARFANIL Thigh culture	V335 GP	V335 Result	V335 Thigh culture
50	1	S –	–	11	S –	–	21	S –	–
25	2	S –	–	12	S –	–	22	S –	–
10	3	S ††	+	13	S –	–	23	S –	–
	4	S –	–	14	S –	–	24	S †	+
5	5	S †	+	15	S †	+	25	S –	–
	6	S †	–	16	S †	+	26	S –	–
1	7	D4 ††††	+	17	D4 ††††	+	27	D3 ††††	+
	8	D6 ††††	+	18	S ††	+	28	D6 ††††	+
0·5	9	D5 ††††	+	19	D1 ††††	+	29	D5 ††††	+
	10	S †††	+	20	D5 ††††	+	30	S †††	+

Controls—NO DRUG GP	Infecting dose	Result	Thigh culture
31	1000 ld	D2 ††††	+
32		D2 ††††	+
33	100 ld	D3 ††††	+
34		D2 ††††	+
35	10 ld	D4 ††††	+
36	1 ld	D3 ††††	+

Thigh cultured at death or after 12 days.
Cl. welchii isolated +.
Cl. welchii not isolated –.

Each guineapig received 1000 lethal doses of *Cl. welchii* 2 hours before the drug.

TABLE VIII—PROTECTIVE PROPERTIES OF V187, V147 AND SULPHATHIAZOLE IN *Cl. welchii* INFECTION IN GUINEAPIGS

Dose of drug (mg./500 g.)	V187 GP	V187 Result	V187 Thigh culture	V147 GP	V147 Result	V147 Thigh culture	Sulphathiazole GP	Sulphathiazole Result	Sulphathiazole Thigh culture
50	1	S –	–	11	S –	–	21	S ††	+
	2	S –	–	12	S –	–	22	S ††	+
25	3	S –	–	13	D4 ††††	+	23	S ††	+
	4	S –	–	14	D4 ††††	+	24	S ††	+
10	5	D5 ††††	+	15	S †††	+	25	S †††	+
	6	S †	–	16	D4 ††††	+	26	S †††	+
5	7	S –	–	17	S †††	+	27	S †††	+
	8	S –	–	18	S †††	+	28	S †††	+
1	9	S ††	+	19	S †††	+	29	D8 ††††	+
	10	D5 ††††	+	20	D3 ††††	+	30	D 10 ††††	+

Controls—NO DRUG GP	Infecting dose	Result	Thigh culture
31	1000 ld	D2 ††††	+
32		D1 ††††	+
33	100 ld	D6 ††††	+
34		D2 ††††	+
35	10 ld	D2 ††††	+
36	1 ld	S †††	+

Thigh cultured at death or after 15 days.
Cl. welchii isolated +.
Cl. welchii not isolated –.

Each guineapig received 1000 lethal doses of *Cl. welchii* 2 hours before the drug.

intraperitoneal administration the blood concentration reached a maximum in about 45 minutes and was again negligible in 5 hours. The 24-hour urinary excretions were about four-fifths and up to two-thirds of the doses for the two routes.

When the drug was given by mouth it appeared to be poorly absorbed and no significant blood level was attained, although there was a tendency for a maximum (about 1 mg. per 100 c.cm.) to be shown at 24 hours, and none was detectable at 72 hours. Taking an average for several experiments, about 13% of the ingested drug appeared in the urine in 24 hours, about 15·5% in 48 hours, and 17% in 72 hours. About 35% was recovered

TABLE IX—PROTECTIVE PROPERTIES OF V187 AND SULPHANILAMIDE IN MICE INFECTED WITH (A) NORMAL AND (B) SULPHANILAMIDE-RESISTANT *Strep. hæmolyticus*, STRAIN RICHARDS

(A) NORMAL

No. of mice	Drug given orally	Deaths (days) 1	2	3	4	5	6	7	8	Survivors
20	Nil	12	7	1	..	..	..	..	..	0
20	20 mg. V187 at 1, 6, 10, 26, 50 and 74 hrs.	0	0	1	3	4	3	1	1	7
20	5 mg. sulphanilamide at 1, 6, 10, 26, 50 and 74 hrs.	0	0	0	1	2	3	1	2	11

(B) SULPHANILAMIDE-RESISTANT

6	Nil	0	6	..	..	..	..	..	..	0
6	20 mg. V187 at 1, 5, 9, 24, 30, 48, 55, and 72 hrs.	0	0	1	1	1	0	0	0	3
6	5 mg. sulphanilamide at 1, 5, 9, 24, 30, 48, 55 and 72 hrs.	0	3	2	1	..	..	..	..	0

Each mouse received 100 lethal doses of *Strep. hæmolyticus*.

TABLE X—CONCENTRATION OF V187 IN BLOOD AND URINE OF GUINEAPIGS AFTER GIVING THE DRUG BY VARIOUS ROUTES

GP	Method of giving drug (100 mg./500 g.)	DRUG IN BLOOD (mg./100 c.cm.) Hours after injection ½	½	¾	1	2	5	DRUG IN URINE (mg.) Hrs. after inj. 0–3	3–6	6–24	Total
1	Intramuscularly	4·7	4·7	3·2	3·0	1·8	< 1	27·6	30·7	19·9	78·2
2		4·8	5·3	4·9	3·2	1·8	< 1	52·0	19·4	7·0	78·4
3		3·3	3·3	3·6	3·0	3·1	1·0	24·2	38·3	16·2	78·7
4	Intraperitoneally	2·9	5·9	6·0	4·6	2·0	< 1	28·8	..	34·2	63·0
5		2·7	4·3	5·8	3·5	2·4	< 1	..	26·3	9·4	35·7
6		2·3	4·0	3·1	2·8	1·4	< 1	27·0	32·8	7·2	67·0
7	By mouth	< 1	< 1	< 1	< 1	< 1	< 1	7·6	1·8	7·5	16·9
8		< 1	< 1	< 1	< 1	*	..	0·8	..	..	..
9		< 1	< 1	< 1	< 1	< 1	< 1	3·0	8·5	5·2	16·7

* Died after bleeding from heart.

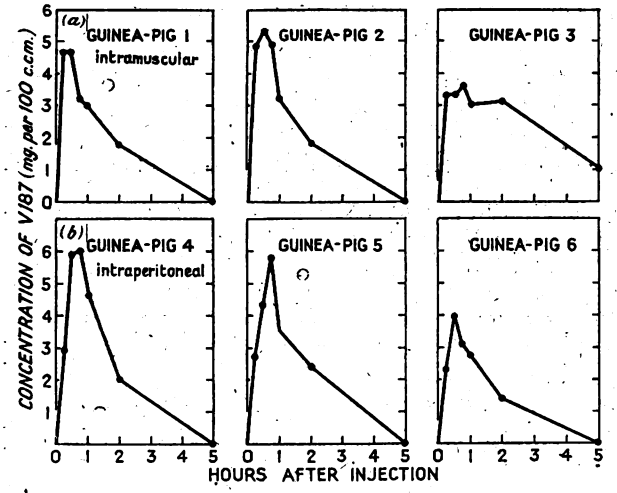
from the fæces and intestinal contents at 72 hours; so only about half the ingested drug was accounted for. The slowness of absorption was evident from the fact that up to 72 hours the fæces still contained the drug, and the intestines contained about 10% of the original dose. We have not studied possible modifications of the drug in the body, for the inherent difficulties of estimating likely degradation products are considerable.

Some of these results are illustrated in the figure.

Toxicity

In vitro.—The behaviour of leucocytes in solutions of the drugs was observed under dark-ground illumination at 37° C (Abraham et al. 1941). The toxic concentrations, taken to be those causing immobilisation of the majority of isolated leucocytes in one hour, were: V187, 1000 mg. per 100 c.cm.; marfanil 500 mg. A saturated solution of sulphathiazole (100 mg. per 100 c.cm.) was not toxic.

In vivo.—The acute toxicities of the drugs were assessed by giving pairs of mice increasing volumes of



Blood concentration of V187 in guineapigs after (a) intramuscular, and (b) intraperitoneal administration of 100 mg./500 g. body-weight.

10% aqueous solutions of the drugs, intramuscularly and intraperitoneally. Table XI shows the results, expressed as mg. of drug per 20 g. mouse.

Guineapigs have received five intramuscular injections each of 100 mg. V187 per 500 g. body-weight in 24 hours without showing signs of drug intoxication. Young rats, weighing 90–100 g., have consumed 120 mg. of V187 daily for a week without any untoward symptoms beyond a slight decline in weight which may be ascribed to the bitter taste of the drug rendering the food unattractive.

We are indebted to Prof. J. H. Burn, FRS, and Dr. G. S. Dawes for undertaking a comprehensive study of the pharmacology of V187, which they are reporting elsewhere.

Discussion

We have shown that a new drug, V187, has a chemotherapeutic action against *Cl. welchii* infection in guineapigs, when administered intramuscularly at the site of infection within 5 hours of the injection of an infecting dose of washed toxin-free bacilli. Five hours appears to be the period during which an antibacterial drug can cope with the infection, since toxæmia is not yet far enough advanced to kill the animal. Preliminary experiments have shown, however, that chemotherapy can be effective after considerably more than 5 hours if antitoxin is given too.

Application of the drug intramuscularly at the site of infection always saved the animals, but alternative routes

TABLE XI—TOXICITY OF DRUGS (MG./20 G. MOUSE)

Route	V187	MARFANIL	V335	V147
Intramuscular ..	30–40	70–80	70–80	10–20
Intraperitoneal ..	20–30	50–60	40–50	10–20

of administration were unavailing with both V187 and marfanil, although Domagk (1942) claims to have given marfanil orally with success.

Unlike the sulphonamides V187 is equally effective chemotherapeutically against *Cl. welchii*, *œdematiens* and *septicum*. In guineapigs its action corresponds closely to that of marfanil, and is much greater than that of sulphathiazole. Later in our experiments, another new drug, V335, became available and we have shown it to be just as effective as V187 and marfanil against *Cl. welchii* infection.

We are not yet in a position to discuss the mode of action of the drugs. They are not inhibited by *p*-aminobenzoic acid, and their chemical structures do not permit of reference to any known growth factor for bacteria.

Injected intramuscularly or intraperitoneally into the mouse, V187 appears to be somewhat more toxic than marfanil or V335, but the chemotherapeutic experiments in guineapigs show that there is a considerable margin of safety. Doses well above the therapeutic dose produced no toxic effects.

These drugs might be useful not only against gas gangrene but against sulphonamide-resistant streptococci, and the in-vitro antibacterial titres suggest that V335 may be of value against staphylococci and *Ps. pyocyanea*.

Summary

Two new drugs, *p*-methylsulphonylbenzamidine hydrochloride (V187) and *p*-methylsulphonylbenzylamine hydrochloride (V335), have been synthesised and found to have a potent local chemotherapeutic action in experimental gas-gangrene infections in guineapigs. Their action is not inhibited by *p*-aminobenzoic acid.

An extended study of V187 has demonstrated its effectiveness against *Cl. welchii*, *œdematiens* and *septicum* infections. It is well tolerated when given intramuscularly in therapeutic doses. In vitro and in the mouse, V187 is as effective against sulphanilamide-resistant streptococci as it is against a sulphanilamide-sensitive strain.

In guineapigs, V187 is rapidly absorbed and excreted after intramuscular and intraperitoneal administration. Given orally, it is but poorly absorbed.

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DESERT CLIMATE

PHYSIOLOGICAL AND CLINICAL OBSERVATIONS*

W. S. S. LADELL, MB CAMB. J. C. WATERLOW, MB CAMB.
M. FAULKNER HUDSON, MRCP; MAJOR RAMC

(*Concluded from p.* 497)

HEAT EXHAUSTION TYPE II

Cases of this type were seen almost exclusively in the second half of the summer (figs. 3 and 4). They did not appear in any numbers until towards the middle of August, and they were still appearing in the second week of September, when cases of type I exhaustion had long ceased. The incidence, therefore, seems to be related, not to the height of the external temperature, but to the duration of the hot weather. Patients admitted in August said that they had stood the hot weather in July without discomfort.

HISTORY

The most prominent symptom was defective sweating; 87% of the patients complained of this (table IV). In some the history was short; they said that sweating had stopped on the day of admission, or the day before, and that they then became exhausted and dizzy, and had to report sick. Others said that sweating had been reduced, particularly on arms and legs, for many days—sometimes for as long as 3 weeks. During this time they had felt increasingly weak, with dizziness, loss of appetite, and insomnia. A common symptom in this group was dyspnœa, which was present in 23 out of 55 cases; in 8 it was associated with tingling and numbness of the hands and feet. Dyspnœa and exhaustion were worse in the middle of the day; often the subject felt fairly well in the early morning, but symptoms began to come on at about 11 o'clock.

In contrast to the findings in type I, vomiting and cramps were each only present in 2 cases, and were not severe. Frequency of micturition was extremely common;

* A report to the Medical Research Council.

80% of the patients had been passing urine more than 4 times a day, and in copious amounts. Nearly half had been passing urine more than 8 times in 24 hours. In the most extreme case the frequency was half-hourly during the day and hourly during the night. Several patients said that the frequency started when sweating began to be defective.

CONDITION ON ADMISSION

These patients did not look ill. They were a good colour, sometimes flushed. Signs of dehydration were considered to be present in only one case. There was slight tachycardia on admission; the average lying pulse-rate was 76 beats per min. The pulse-volume was always good. The mean systolic pressure, lying down, was 121 mm. Hg, which is nearly 20 mm. higher than the mean in controls at the same time of year. The diastolic pressure was very variable, with a mean of 69 mm. Hg. In some cases it was low, persisting at a level of 40–50 mm. Hg on repeated examination. The pulse-pressure was also variable; but in contrast to the findings in type I cases high values were much more common than low ones. Seven patients had a pulse-pressure of more than 70 mm. Hg, a figure which was never found in type I cases or in control subjects. Many patients showed obvious and easily elicited capillary pulsation in the nail-bed. The reaction to standing was normal. The average increase in pulse-rate was 20 beats per minute—the figure found in normal subjects—and the BP was well maintained in all except one case.

The average rectal temperature on admission was 100·9° F., and the mouth temperature 99·5° F. High temperatures were not found, and this is one of the features that differentiates this group from hyperpyrexial and borderline hyperpyrexial cases. It is probable that in many cases the temperature had been higher when taken in the unit before admission, but no figures are available to confirm this.

As already stated, a history of defective sweating was given by nearly all patients in this group. It was difficult to put this claim to the test, and usually all that could be done was a careful physical examination. The patients varied considerably; none were sweating profusely, as in type I; many had patchy areas that were dry, particularly on the back, arms and legs. The chest was usually moister than the back, and the belly moister than the chest. A few cases were dry to the touch all over, except for forehead and face, where sweating was never seen to be impaired. In all, 23 out of 55 cases were recorded as having a dry skin on admission.

Eighty per cent. of the patients of this type had severe or moderately severe prickly heat.

This condition begins with a papular rash: on the summit of each papule is a minute vesicle. The vesicles are only seen when the skin is sweating and moist; when the skin dries (e.g. during the night) they disappear. As the rash begins to heal, the vesicles burst leaving on each papule a ring of scales. In the later stages, the whole of the affected area may be covered with a diffuse branny desquamation. This disappears and the skin may then be normal, or there may remain a considerable degree of lichenification.

In these cases, prickly heat was characteristically in the scaling (desquamating) stage. Many of the patients said that their prickly heat had been very bad, but had begun to clear up before admission at the time when symptoms began. The severity and distribution of the desquamation both varied. It was usually earliest, most intense, and most persistent on legs, forearm and back. The forehead was never affected. In some cases the skin, particularly of the legs, was shiny, wrinkled and atrophic. In one case there were linear intracutaneous hæmorrhages at pressure points on legs and back. Where there was desquamation the skin was dry to the touch: dryness was not found without desquamation. This is in contrast to the condition in hyperpyrexia, where the skin, though dry, was otherwise normal.

Skin-temperature measurements were made on a number of patients, with a copper constantan thermojunction. When these were carried out under identical conditions on type II patients, and on controls who were considered to be sweating normally, the results were:

Mean temperature of the trunk:

Type II exhaustion (15 cases) 99·0° F.
Controls .. (8 cases) 95·8° F.

The difference is statistically significant.

In individual cases the skin-temperature measurements strikingly confirmed the results of clinical examination:

CASE 96.—Back: severe scaling prickly heat, skin dry to touch; mean temperature of skin 98·6° F. Belly: no prickly heat, sweating well; mean temperature of skin 91·8° F.

CASE 148.—Prickly heat in acute stage, visibly sweating. Mean temperature of skin 95·1° F.

CASE 71.—Branny desquamation all over, dry to touch. Mean temperature of skin 100·0° F.

The measurements in cases 71 and 148 were made at the same time under identical conditions.

The outstanding chemical feature of these cases was the excretion of large volumes of dilute urine. Two-thirds of the group excreted more than 2 litres per day, and the average daily output for 50 cases was 2724 c.cm. for the first 2½ days. The greatest volumes of urine were recorded towards the end of the season: thus no case had an output of more than 3000 c.cm. before Aug. 20. The average output before that date was 1638 c.cm. and after that date 3289 c.cm. Two cases excreted more than 8 litres per day. The increase in average urine output with the passage of the summer is shown in fig. 4. The average excess of fluid intake over urine output was 4200 c.cm.; this is significantly lower than that for type I. The total urinary chloride was relatively high, though actual chloride concentrations were low. The average daily loss for 45 subjects for the first 2½ days was 3·47 g. (as NaCl). The average urea concentration was 1%.

Blood samples were obtained from 31 type II cases. The only abnormalities found were reduced whole-blood chloride and reduced plasma chloride. The reductions were not so great as in type I, and were more pronounced for the plasma than for the whole blood. In some cases the whole-blood chloride was hardly reduced at all and the differences between the chloride concentrations in plasma and whole blood were very small. The mean reduction ratio for the group was 1·08, which is significantly higher than for type I. Blood-ureas were low; the highest in the group was 48·2 mg. per 100 c.cm. The average U/P ratio was 43·7.

TREATMENT AND PROGRESS

All patients were encouraged to drink large amounts of fluids. Intravenous saline was not considered necessary. Salt by mouth, in doses of ½–1 oz., was given to alternate cases.

Progress in objective signs was slow, in contrast to type I. In a few patients the skin soon became moist and sweating was apparently normal. In most, this was a slower process and still incomplete by the time of discharge, 10–20 days after admission. In one case the skin was still dry at the end of September, after 4 weeks in hospital. The prickly heat also improved but slowly. In most cases, on discharge, there were still faint markings of the healed rash, with little or no scaling. The final and most persistent stage was lichenification, which was most severe on the back. It did not seem to be associated with as dry a skin as the previous stage of desquamation. Several cases developed infections of the skin and subcutaneous tissues (impetigo, 5; multiple boils, 2). Three of these were patients with the most severe desquamation and the most obstinately dry skins. In contrast, no infections developed in type I cases. In spite of the dryness of the skin, there was little evidence of any instability of temperature under the conditions of life in the ward. One patient on one occasion developed a temperature of 105° F. for a short time. There was no evidence of infection, nor were malarial parasites found in the blood; the skin was dry all over. This case was quite exceptional.

The average BP on discharge was identical with that on admission. The low diastolic pressure and high pulse-pressure noted in some cases often persisted for many days.

The average weight gain in this group, during the stay in hospital, was 41 oz., which was significantly less than the average gain of 121 oz. in type I. Extra salt by mouth was given to alternate cases, but did not have any effect on the amount or rate of gain in weight.

Urine output remained high; the average 24-hour volume on the two days before discharge was 2580 c.cm. Chloride excretion improved steadily, even in those cases

receiving no extra salt. Cases which received extra salt retained little (see note in discussion of heat exhaustion type I).

The chloride content of the blood was in most cases normal at the time of discharge. However, in 6 out of 31 cases the plasma chloride was still below the control value, and in 2 others the chloride content of the whole blood was still low. All these 8 cases nevertheless had chloride in their urine.

Sweat was collected from 30 cases. The average chloride concentration was 0·53%. This was significantly higher than in either type I cases or the controls.

Four men of this group were readmitted later, one twice. Four others had been under treatment a few weeks earlier for effects of heat of an indeterminate type. This tendency to relapse was in line with the slow progress, in spite of all therapeutic measures, characteristic of the group. Three type I cases relapsed; in all three there was definite evidence of inadequate treatment; none had received salt on first admission.

Discussion

Type II exhaustion has five salient features: (1) occurrence in the second half of the summer; (2) history of defective sweating; (3) abnormal condition of the skin; (4) polyuria; and (5) diminished blood and plasma chlorides, in spite of the presence of chloride in the urine.

A similar condition occurring in United States Army personnel in the Arizona desert has been described by Wolkin, Goodman and Kelley (1944) and given the name of thermal dysidrosis. No mention was made, however, of polyuria; and though skin changes are described, in particular the branny desquamation, these observers did not report any association with previous prickly heat.

Before discussing the interrelations and causes of the various features, we must emphasise that in any individual case they were not always present together, nor in equal severity. For this reason the limits of the group were hard to define. Of 57 unclassified cases, 33 presented some elements of the syndrome. From a study of the unclassified cases 2 points emerge:—

1. Every gradation was found between the fully developed case, with all the features of heat exhaustion type II, and the one who complained of exhaustion and weakness but had normal blood and urine chemistry and no abnormal physical signs.
2. On the other hand, it was not uncommon to find that a patient complaining of exhaustion, with no physical signs whatever, had a plasma chloride as low as the levels found in the fully developed case. If it is accepted that such levels of plasma chloride are not physiological, it follows that the clinical picture alone was not a safe guide to the state of a man's health.

OCCURRENCE

Cases of type II exhaustion were rare in the first half of the season. Most of them occurred after the hottest weather, and some when it was beginning to be quite cool again. These individuals had therefore been able to stand up to severe heat, and it was only after prolonged exposure that they broke down. In this respect the syndrome had the appearance of a fatigue phenomenon, in which one or more of the defence mechanisms of the body against heat had failed after prolonged activity. There was an indication that the same thing may have been happening in the control subjects (table III). At the end of the summer they secreted sweat containing more chloride than the sweat secreted at the beginning.

DEFECTIVE SWEATING

The history of defective sweating has not the same objective validity as the other signs. It was necessary, therefore, to examine more closely the question "Was sweating really defective?" There is considerable variation in the rate of sweating among normal men; even when all the conditions are known, no standard can easily be laid down, below which sweating is defective. Skin temperature is not an absolute indication of the presence or absence of sweating, since the temperature of the skin depends not only on the rate of heat loss from it, but also on the rate of blood-flow through it. Some direct measurements were therefore made of total weight loss. These were made on selected type II cases with the dryest skins, and on controls who were apparently sweating normally. The subjects were lying at rest for an hour, at a room temperature of 103–110° F. The results showed that:

1. The patients lost an average of 9 oz. in the hour. Since no urine was passed, and since loss from the lungs was less than ¼ oz. this must represent water loss from the skin. Sweating was therefore by no means completely deficient. Controls under the same conditions lost approximately 12 oz.
2. During the hour, 6 patients out of 7 showed a rise in rectal temperature averaging 1·1° F., whereas in the controls the temperature was maintained constant. The mean skin temperature was more than 5° F. higher than in the controls, so that, in spite of the rise of rectal temperature, the rectum-skin temperature gradient was much reduced, from an average of 6·3° F. in the controls to 1·8° F. in the patients.

These results show that, under the experimental conditions, the patients were unable to maintain a constant body temperature. Since at the prevailing air temperature all heat loss was by evaporation, and since control subjects showed no rise in temperature, it may be concluded that in the type II patients the rate of evaporation of sweat was abnormally reduced.

The presence of a hot dry skin, with difficulty in maintaining a completely normal body temperature, may explain some of the other clinical findings.

Gross capillary pulsation, a low diastolic, and a high pulse-pressure, such as were observed in many patients of this type, are signs of peripheral vasodilatation and an increased blood-flow to the skin. It might be argued that the increased blood-flow to the skin was the cause of the increased skin temperature; but in this environment, where the air temperature is above the blood temperature, a dry skin will be cooled by an increased blood-flow through it. So far from being the cause, the increased blood-flow may be regarded as the necessary effect of the high skin temperature; without it heat transfer from inside the body to the surface could not be maintained at its original level.

Dyspnœa and an increase in respiratory rate have been described many times in experimental exposure to heat. It has been suggested that they result from stimulation of the medullary centres by a raised blood temperature. Such an explanation would harmonise well with the history in type II cases: the dyspnœa came on and was worst in the heat of the day. Hill and Flack (1909), in experiments in hot baths, observed that respiratory distress was accompanied by tingling and numbness in the limbs, such as occurs with voluntary hyperpnœa. This symptom was present with dyspnœa in 8 type II cases, and suggested the possibility of an alkalosis due to hyperventilation. Measurements of plasma bicarbonate and of alveolar CO_2 concentration were made in a small number of cases with dyspnœa. No significant deviations from normal were found. This is, perhaps, to be expected if the changes are secondary to an increase in body temperature. The body temperature, if originally raised, rapidly fell after admission, and was probably normal in most cases by the time blood was taken. However it cannot be stated definitely that the acid-base balance was normal because measurements were few, direct estimations of pH could not be made and the only base measured was plasma sodium. The figures for whole blood and plasma chloride showed that there must have been considerable disturbance of the normal ionic balance; the high chloride content of the whole blood relative to the plasma indicated an abnormally high chloride content of the cells, as the hæmoglobin concentration in these bloods was not reduced. A chloride level in the whole blood nearly equal to that in the plasma was also found in partially recovered cases of type I exhaustion, and in a normal individual made salt and water deficient experimentally. The latter was noticeably dyspnœic.

POSSIBLE CAUSES OF DEFECTIVE SWEATING

Three causes suggest themselves: (1) fatigue of the sweat glands, from prolonged overactivity; (2) failure of the controlling mechanisms, either central or peripheral; and (3) pathological changes, interfering with the function of the glands.

Of these three causes there is some evidence that the first may be concerned; but there is insufficient

evidence either to support or to exclude either of the other two.

1. There was no direct evidence of fatigue of the sweat-glands, but some observations supported this hypothesis. The type II cases excreted a sweat very rich in chloride, that is, their sweat-glands were doing very little osmotic work; in some cases the sweat was almost isotonic with plasma; this shows considerable impairment of function. These individuals could not habitually have excreted such a high concentration, as otherwise they would not have been able to withstand the very hot weather, when sweating rates were higher, without becoming salt deficient. They were comparable with the control subjects, who also excreted sweat containing more chloride at the end of the summer than at the beginning (table III).

   The amounts of sweat collected in the standard manner, in the type II cases, were small. This is further evidence of dysidrosis; but the amounts of sweat collected from the control subjects were also less in the second half of the year than the amounts collected earlier; this also suggests that there may have been a common factor at work, which may have been fatigue.
2. The reactions of the sweat-glands to various stimuli were not tested experimentally either on the controls or on the patients. No evidence is therefore available of central or peripheral failure.
3. It is a possibility that prickly heat may involve damage to sweat glands. Three biopsies of skin with prickly heat were carried out. They showed capillary dilatation and perivascular round-cell infiltration. No definite pathological changes were seen in the glands, but further evidence is needed on this point. The presence of prickly heat in so many cases of heat exhaustion raises an important question: is severe prickly heat inevitably or usually followed by general symptoms? The answer is necessary, not only for understanding the ætiology of type II exhaustion; it is of practical importance for prevention and selection of potential casualties.

POLYURIA AND CHEMICAL CHANGES

Polyuria began when sweating became defective. Initially, therefore, the polyuria might have been due to the individual continuing to drink at his old rate although his requirements were diminished as a result of the dysidrosis; but in some cases the polyuria persisted after the skin began to sweat again.

Patients with type II exhaustion were salt-deficient, but not dehydrated. There was a continued loss of chloride in the urine in spite of the salt deficiency; this was seen most strikingly in certain cases where blood was not taken until 2–3 days after admission; in these a low blood-chloride level was found even though they had been excreting chloride in their urine for the previous few days, and indicated that the salt deficiency was due in part at least to an an inability to retain salt.

In view of the well-established relationship of the posterior pituitary and of the suprarenal cortex to salt and water elimination by the kidney, a breakdown in the endocrine mechanisms was considered as a possible cause of the continued polyuria and the failure to retain salt. Certain cases with a persistently low plasma chloride only retained salt after being treated with DOCA. Pituitrin in doses of 1–2 c.cm. daily was given in several cases in an attempt to control the urine output, but it failed to do so. More cases would have to be investigated and experimental work done before any definite conclusions could be made.

A contributory cause to the salt deficiency must have been the high chloride content of the sweat. Because of the dysidrosis, the salt loss was less than it would have been if the rate of sweating had been normal, and therefore gross salt deficiency did not develop.

DIFFERENTIATION FROM EFFORT SYNDROME

Certain features of these cases resembled those described in the effort syndrome. These were dyspnœa, tachycardia and raised systolic pressure and pulse-pressures. A number of patients showed signs of emotional strain; this was not a feature in patients suffering from other types of effects of heat. In 3 patients with type II exhaustion the dyspnœa was almost certainly of functional origin; during examination the respiration was rapid and shallow, but it returned to normal as soon as the observer's back was turned. On the other hand even in these cases the resemblance to the effort syndrome was not complete. Palpitation and precordial pain were complained of by only 2 patients, and apical murmurs were not found. The fact that abnormalities of the skin and of sweating, of urine output and of blood chemistry, were present rules out the effort syndrome as an adequate description of the condition.

PREVENTION

It was not established that type II exhaustion was the result of changes in the skin caused by prickly heat. But the evidence strongly points that way, and we therefore recommend that all severe cases of prickly heat should be placed on light work under as easy climatic conditions as possible until the skin becomes normal—or, better still, that they should be evacuated to a cooler climate.

Urine output should be watched. If a man, late in the summer, suddenly begins to pass more urine than previously for no apparent reason, he should be regarded as a potential case of type II exhaustion.

Especially in view of the fact that type II exhaustion may be a fatigue phenomenon, personnel should not be exposed to a climate such as that of Shaibá for many months without a break. Men should be sent away on short leaves to cooler parts in the middle of the summer; this was, in fact, done in as many cases as possible.

SUMMARY

1. During the summer of 1943 observations were made in a desert climate on fit soldiers and on cases of effects of heat admitted to a military hospital.

2. All the fit men observed lost some weight in the hot weather. The loss was greatest in those who had the highest chloride concentrations in their sweat. It is suggested that this loss was due to a minor degree of salt-deficiency dehydration; calculations based on the measured rate of sweating and the estimated salt intake indicated that subjects with a high concentration of chloride in their sweat (i.e. above 0·3% per cent. *NaCl*) may not always have been in salt balance. Evidence of a salt-deficiency dehydration was provided by the following findings: low urine output in spite of a high water intake; low urinary chloride output (less than 2 g. a day in some cases); and raised blood-urea. No changes were found in the hæmoglobin or in the blood and plasma chlorides. Blood-pressure fell as the weather grew hotter, but there was no evidence of cardiovascular inefficiency.

3. Twelve cases of hyperpyrexia are described; these conformed to previous descriptions. The onset was acute, with absence of sweating and loss of consciousness. These cases all went through a phase of apparent negative water balance; they excreted large quantities of dilute urine, at a time when they were drinking very little. During this phase the chloride content of the blood was diminished. These findings support the view that hyperpyrexia is accompanied by superhydration.

4. Two distinct types of heat exhaustion were seen; these have been designated types I and II.

5. Cases of heat exhaustion type I were seen mainly in the first half of the summer, and at the peaks of external temperature. Vomiting and cramps were common in these patients. On admission the patients were pale, collapsed and sweating profusely. The blood-pressure was occasionally low, but the most consistent abnormality was a reduction in pulse-pressure; on standing the blood-pressure fell and syncope occurred. Chemically, heat exhaustion type I was a salt-deficiency dehydration; plasma and whole-blood chlorides were grossly diminished, hæmoglobin and plasma protein were raised, blood-urea was very high, extracellular fluid and plasma volumes were diminished, and the urine was scanty, of high specific gravity, and almost free from chloride.

Treatment of these patients consisted in replacement of salt and water. In severe cases intravenous saline was given with excellent results. The patients gained weight rapidly, indicating retention of water and salt. There is evidence that type I heat exhaustion occurs in persons who habitually secrete sweat containing a much higher concentration of chloride than the average; their salt intake is inadequate at high rates of sweating, and they become salt-deficient. Prevention of these cases might be achieved by increasing the salt intake of all men, but this would probably be impracticable. Potential cases

could be picked out and treated before they became casualties by following the body-weights and the urinary chloride (by some simple test) of all men exposed to risk. Any man who is consistently losing weight and is excreting a concentrated urine with low or absent chloride should be regarded as a potential case and given extra salt.

6. Cases of heat exhaustion type II were seen only in the second half of the summer, among men who had already come through the hottest weather unscathed. Clinically, they were characterised by defective sweating and polyuria; the skin was always more or less severely affected by prickly heat in the healing and desquamating stage. Vomiting, cramps and cardiovascular abnormalities were not present. Chemically, these cases were salt-deficient, but not so grossly as those of type I, and they were not dehydrated. During convalescence they were found to secrete a sweat with a high concentration of chloride; but it is not believed that this was habitual.

The general picture suggests a breakdown of the defence mechanism of the body against heat. Signs of a similar breakdown were found in some of the fit men observed, in that during the second half of the summer their sweat was richer in chloride than it had been during the first half.

The incidence of heat exhaustion type II could probably be reduced if men—particularly those suffering from severe prickly heat—were given a break of a few days in a cooler climate after 8 weeks' continuous exposure to extreme desert conditions.

The expedition was organised and equipped by the Medical Research Council, at the request of the Director-General, Army Medical Services. In the field we are grateful to the Director of Medical Services, Paiforce, for the facilities afforded to us in the Command, and to Brigadier F. M. Lipscomb, consulting physician, Paiforce, for his interest and encouragement. We also wish to thank Colonel W. H. A. D. Sutton, RAMC, commanding the British general hospital where the investigations were carried out, for the facilities given us there, and two of his medical officers, Captain J. O. D. Alexander and Captain T. Ronai, RAMC, for their valuable clinical assistance.

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CONGENITAL ABSENCE OF SWEAT GLANDS

D. H. G. MACQUAIDE, M D LOND., M R C P
SQUADRON-LEADER RAFVR

THE complaint of inability to stand heat is occasionally met with in the Services, from personnel under examination for fitness for overseas service. This complaint may be difficult to disprove, but the finding of complete lack of sweating is conclusive evidence that tropical service should be avoided. I have lately seen 2 such cases, the first of whom was sent for opinion as to suitability for service in the tropics, the second because he had fainted on parade one hot afternoon.

CASE 1.—An officer, aged 24, who said he had never perspired, and in very hot weather felt uncomfortable though he repeatedly damped his face and hands with cold water. He had suffered with crusting of the nasal passages since a boy, and for many years had had a hoarse voice. Otherwise he felt perfectly fit. There was no evidence among his grandparents, parents and five siblings of ectodermal dysplasia: one brother had a saddle-shaped nose, but had normal hair and teeth and perspired normally.

His height was 6 ft. 1¼ in. and general proportions normal. The skeletal and muscular systems were normal. The facies was striking. The head was narrow from side to side, and there was scanty, fine hair on the vertex, sides and back. The nose was saddle-shaped and the ears were rather malformed, but the supraorbital ridges were not prominent. The lips were markedly protrusive with the vermilion border well defined; there were no rhagade-like lesions at the corners of the mouth. Although the eyelashes were very short the eyebrows were normal, and the lacrimal glands were capable of producing tears. The axillary and pubic hair was scanty and of lanugo type; there was no hair elsewhere on the body. The skin was thin and smooth but not excessively dry; the palms of the hands showed parchment-like skin with numerous cracks and fissures. There was a papular acneiform rash on the back of the neck and shoulders. The nails were normal. There was atrophic rhinitis with extension of this condition down the pharynx, involving the larynx; the sense of smell was retained. The dentition was as follows. Upper jaw: permanent teeth, left 2nd premolar; temporary teeth, left and right canines and 2nd molar; lower jaw: permanent teeth, left 2nd molar, right and left canines and right 2nd molar; temporary teeth, right 2nd molar. There was a history of both temporary upper central incisors and later of two successional teeth, probably central upper incisors, erupting in malocculsion and extracted for æsthetic reasons. X ray disclosed no unerupted teeth. The upper temporary canines were peg-shaped. A general examination showed no other abnormality. X ray of the skull showed an atrophic jaw, absent frontal sinuses, dilatation of the nasal cavities and a normal pituitary fossa. Intelligence was above average.

He was tested for sweating, by being placed stripped and wrapped in a blanket under a heat cradle. Even when his mouth temperature had risen to 103·7° F., pulse-rate 110, respiration-rate 22, there was no evidence of sweating. He was allowed drinks freely, including hot tea. He complained of discomfort and slight headache.

CASE 2.—An airman, aged 22, who had always noticed discomfort in hot weather, and for relief used to dip his hands in cold water. Since the age of 10 he had had nasal catarrh with crusting. He had previously been investigated in two hospitals as a case of pyrexia of unknown origin, and had been diagnosed as pluriglandular deficiency. For many years he had had recurrent blepharitis, and his ears easily got clogged up with wax. Otherwise he felt fit. He shaved every 3–4 days. When he was out in hot sun he had felt faint. There was no evidence of ectodermal defects in his father, mother or sister.

His height was 5 ft. 10 in. and there was a noticeable lack of subcutaneous fat. His facies was not so striking as that of case 1. The head was of normal shape with thin fine sandy hair, somewhat scanty, the scalp showing through. The nose was not saddle-shaped, but there was atrophic rhinitis; the sense of smell was retained. The supra-orbital ridges were not prominent. The eyelashes were scanty and the eyebrows present only in their inner thirds. He had never been able to shed tears. The lips were protrusive but there were no rhagade-like lesions. His face was very freckled and there was a papular eruption on the back of the neck and upper part of the chest. The axillary and pubic hair was scanty, and there was no hair elsewhere on the body or limbs. The skin was smooth and dry. The palmar skin was thin but there were no cracks in it. The nails were normal. The dentition was as follows. Upper jaw: permanent teeth, right and left 2nd premolars and central incisors; temporary teeth, right and left canines. Lower jaw: permanent teeth, right and left 2nd premolars, and canines. X rays disclosed no unerupted teeth; the upper central incisors had malformed crowns and exhibited deep semilunar notches on the incisal edge. X ray of the skull showed enlargement of the nasal cavities and very small frontal sinuses; the pituitary fossa was normal. Intelligence was above average.

He was tested for sweating with similar results to those in case 1. Biopsy of skin showed complete absence of sweat glands.

COMMENT

Complete absence of sweat glands associated with various other ectodermal defects make up a clinical

picture that has been well described in the literature. Thurnham,[1] in 1848, described two cases of imperfect development of the skin, hair and teeth, and since that time many identical cases have been reported.[2] Congenital ectodermal defects can occur singly or in various combinations, and only some of them are hereditary.[3] Two main groups can be distinguished, an idrotic and an anidrotic group. The former is mainly a hair and nail dystrophy, appears in both sexes, and is transmitted by either sex; the latter is found mainly in males, and is probably transmitted through a maternal carrier. This anidrotic type was reviewed in 1929 by Weech,[4] who suggested the term "hereditary ectodermal dysplasia of the anidrotic type." The main features include: total absence of sweat glands, and occasionally of sebaceous glands; dental dysplasia; atrophic rhinitis and depressed nasal bridge; thick, protrusive lips; prominent supra-orbital ridges; growth of fine, scanty, lanugo hair; the skin is dry, smooth, and thin, with frequent papular eruptions, especially on the face and back of the neck and shoulders. The fully developed picture is not always present. The condition has been described in the white races, in Indians and some other coloured races, but no cases have been described so far in negroes or Latins. Although no skin biopsy was done in case 1, the clinical picture was so complete that both the cases can be considered as falling into the category of "hereditary ectodermal dysplasia of the anidrotic type." They were both categorised as permanently unfit for Service in the tropics.

I should like to thank Wing-Commander H. F. Harvey, my senior medical officer, for permission to publish these cases, and Flight-Lieutenant A. E. Shaw for his notes on the patients' dentition.

TRAGEDY OF MALIGNANT MELANOMA

MARGARET C. TOD, MB EDIN., FRCSE, FFR
ASSISTANT DIRECTOR, HOLT RADIUM INSTITUTE, MANCHESTER

THERE is no greater tragedy in medicine than the death from multiple metastases of a young patient who had been in perfect health until a small pigmented mole was removed for cosmetic reasons. Unfortunately ignorance regarding the great danger of interfering with any pigmented mole or "birthmark" still prevails, and suffering and death result from inefficient treatment both by general practitioners and in hospital outpatient departments.

Malignant melanoma is not a common tumour, but during the last three years 74 such tumours have been seen at the Holt Radium Institute, a number which dispels any idea that it is so rare as to be unimportant. After excluding intercurrent deaths and a few surgical cases not followed up, 100 cases treated from 1933 to 1942 are available for study and they include no less than 34 patients who died as a direct result of meddlesome and incompetent treatment. Incorrect methods used were:—

(*a*) Simple excision under local anæsthesia by doctor or in outpatient department .. .. 28 cases
(*b*) Ligature tied round by doctor .. .. .. 2 cases
(*c*) Cauterised with CO_2 snow, silver nitrate, &c. .. 4 cases

Some of the expressions used by patients give a vivid picture of the careless way these dangerous lesions were handled: "It was nipped off"; "He tied a string round it"; "He cut the top off"; "He touched it up with caustic"; "He gouged it out." Such words are sufficient proof that treatment was given without any thought as to the nature of the condition treated. In excuse it may be pleaded that melanoma may be very difficult to diagnose. This is true when the site is unusual, for instance at the urethral orifice, or when the original lesion has been replaced by an ulcer; but as a rule it is the disfiguring pigment which draws attention of the patient or doctor. Any lesion of the skin which is pigmented, any history that a mole was present at the site of an ulcerated lesion, or that a mole has been excised must be regarded with the greatest suspicion. Were such suspicion aroused the grave risks would be recognised. The following histories and photographs show how real these risks are.

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RESULTS OF TREATMENT IN MALIGNANT MELANOMA

Primary treatment	Treated more than 5 years ago		Treated 1–4 years ago			Total	
	Alive and well	Dead	Alive and well	Alive with recurrence	Dead	Alive	Dead
Radical surgery ..	1	1	15	2	10	18	11
Radical radiation ..	2	3	5	1	..	8	3
Combination of surgery and radiation ..	5	2	4	2	..	11	2
Total ..	8	6	24	5	10	37	16
Incorrect; then treated by surgery	1	2	4	3	16	8	18
Incorrect; then treated by radiation	..	4	1	1	10	2	14
Incorrect; then treated by surgery and radiation ..	1	2	1	1	..	3	2
Total ..	2	8	6	5	26	13	34
Grand total ..	10	14	30	10	36	50	50

CASE-NOTES

CASE 1.—Boy, aged 15 years. Noticed for two months that a small brown mole on his thigh was being rubbed by his shorts. Lesion excised under local anæsthesia in a hospital outpatient department. One stitch inserted. Four months later a lump found in the groin. Excised for biopsy by resident. Pathological report: "Malignant melanoma." Block dissection of glands. Died within a year of first excision.

CASE 2.—Aged 36. Small mole on chest excised locally in hospital outpatient department. After one year recurred. Nodule removed, again in outpatient department, and two weeks later a second nodule removed. Section lost, no pathological report. Seen 4 months after at the Holt Radium Institute; multiple pigmented skin nodules and metastases in liver. Died 18 months from first excision.

CASE 3.—Aged 24. Small mole on cheek excised for cosmetic reasons. Two years later an enlarged gland appeared in the neck and was excised by the same doctor. In six months further enlarged glands. Sent to a surgeon who carried out block dissection. Pathological report: "malignant melanoma." Six months interval then recurrence. Radium implantation of neck with local improvement but developed multiple metastases and died 2 years 9 months from first excision.

CASE 4.—Aged 33. Black mole on chest which had begun to grow eight weeks before; excised in outpatient department of a hospital under local anæsthesia. Within three weeks was recurring in the scar and new nodules had appeared with enlargement of axillary glands. Palliative radiation attempted without improvement. Died with multiple metastases 16 months from first sign of growth.

CASE 5.—Aged 22. Pigmented mole on thigh removed by doctor under local anæsthesia; eight months later the glands in the left groin enlarged and a dissection was carried out. Pathological report: "malignant melanoma." Recurred very rapidly with extension to abdominal glands. Sent to Holt Institute, but palliative X-ray treatment did not arrest rapid spread and died 18 months from first excision.

CASE 6.—Aged 26. While being examined for military service abroad the removal of a pigmented mole on the inside of the knee was recommended. This was carried out in a military hospital. A local anæsthetic was used and two stitches were inserted. Six months later while with the Eighth Army in Libya his inguinal glands enlarged very rapidly. He was flown to Johannesburg, where a complete excision of the lymphatics of thigh and the mass of glands was performed. Returned by hospital ship to England. Seen at the Holt Institute with metastasis in mandible. Good immediate response to X-ray therapy but developed further secondaries and died of multiple metastases 16 months after first excision.

POSSIBLE LINES OF TREATMENT

These 6 cases and the photographs show the results of incorrect treatment, and with these results in mind it is necessary to discuss the possible lines of treatment when a patient with a melanoma seeks advice. There are four different possibilities to be considered. The problem and the treatment advised are taken together.

(1) *The patient asks for the removal, for cosmetic reasons, of a pigmented mole or birth-mark which has been present for a long time and shows no signs of growth.*—It is never justifiable to remove, for cosmetic reasons, a pigmented lesion which shows no sign of active growth. A patient who wishes to have such a lesion removed must be strongly advised to leave it alone and warned that any form of minor treatment is very dangerous. If he insists on removal the operation must be in every way as radical as if the lesion showed signs of active growth.

(2) *The patient comes for advice because a pigmented lesion has begun to grow:* (a) *spontaneously,* (b) *after injury,* (c) *after injudicious treatment.*—If there is no doubt that a lesion likely to be a melanoma is growing,

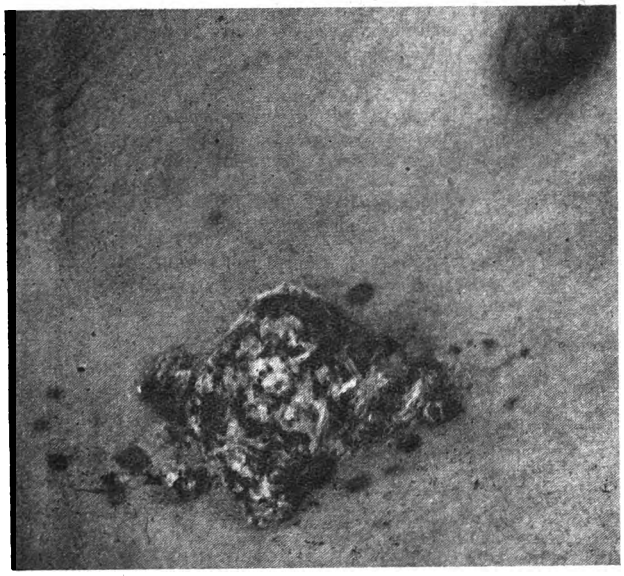

Fig. 1—Malignant melanoma of chest-wall a month after excision of pigmented mole. Patient died in 16 months.

treatment must be radical. Surgery is the first choice, but irradiation to the highest dose which can be tolerated offers a useful alternative. Surgery must aim at excising a very wide margin of tissue all round the melanoma. Skin-grafting is often necessary to repair a wide gap, and the fear that repair may present difficulties must not influence the surgeon in planning his excision. If radiotherapy is preferred, either radium or X ray may be used, and for small lesions where the volume of tissue which must be irradiated is small enough to allow a high biological dose to be given the result may be satisfactory.

(3) *The patient comes with a pigmented lesion, which may or may not show signs of growth, and enlarged regional lymph-glands.*—If the regional lymph-glands are involved the treatment is surgical. Both primary and glands are widely excised with, if possible, the lymphatics between. If the lymph-glands appear after excision of the primary, block dissection is again indicated and is sometimes successful in curing the condition. Lymph-glands should not be treated by irradiation except for palliation when they are completely inoperable.

(4) *The patient, when first seen, already has multiple metastases.*—When metastases are already present beyond the regional lymph-glands, cure is practically impossible. Palliative radiation may be tried and sometimes prolongs life and prevents suffering by delaying the local breakdown of lesions on the surface until metastases in lung or liver end life in a more merciful way. Some melanomas are, unfortunately, so radioresistant that they grow unchecked even by really high doses of radiation.

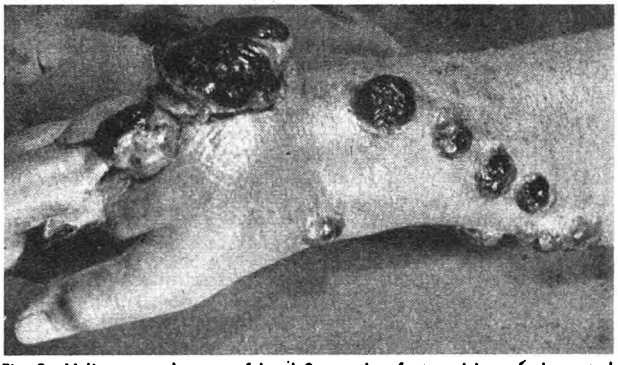

Fig. 2—Malignant melanoma of hand 9 months after excision of pigmented patch on first finger. Patient died in 15 months.

RESULTS

The table indicates the results of treatment among those members of the community who have the misfortune to develop malignant melanoma. The cases were treated in a number of different hospitals over a wide area, the reason for the selection of this particular sample being taken that all were at some stage in the disease seen at the Holt Radium Institute; they cannot therefore be taken as showing the results obtained at the institute. When first seen, 36 of the cases were extensively recurrent and 19 beyond treatment of any kind; but when sufficient details of the treatment given elsewhere were available these cases have been included provided that the treatment was radical and was undertaken by a surgical specialist. All cases treated by radiation were treated at the Holt Radium Institute. Cases of malignant melanoma of the eye have also been included. The tumour in this situation has a rather better prognosis because it tends to be found early while still within the eyeball, and may be cured if removed by complete excenteration of the orbit followed by radium implantation; 6 out of 10 successful cases treated by surgery and radiation were of this type. Once metastases appear prognosis is as bad as when the primary is in the skin. Ages ranged from 5 to 80 years, the best results being obtained in patients over 50.

A considerable number of the cases shown, particularly those primarily treated surgically, are so recent that no survival-rates can be given, and it is enough to draw attention to the fact that 50 out of 100 cases treated are alive: 37 out of 53 (73%) of those whose primary treatment was radical, but only 13 out of 47 (28%) whose

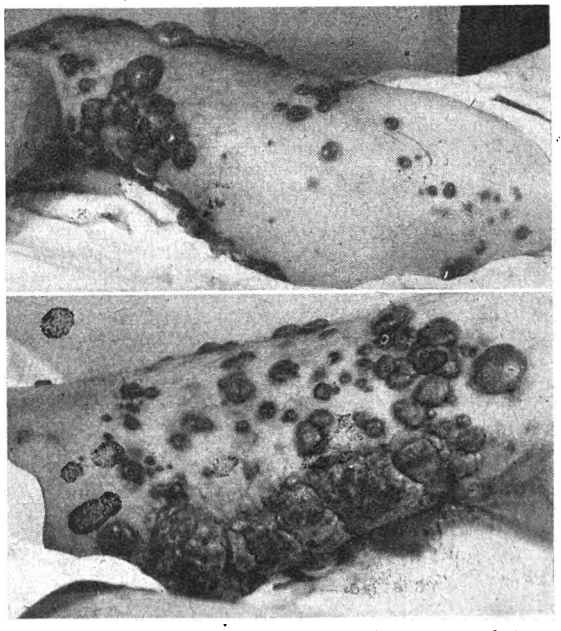

Fig. 3—Malignant melanoma of thigh 18 months after excision of pigmented mole. Patient died in 20 months.

first treatment was incomplete or unsuitable. This in itself would show the extreme importance of careful radical treatment from the beginning; but consideration of treatment must not be allowed to confuse a still more important issue. Melanoma, the common mole, is in the great majority of cases entirely benign and if left alone it will remain benign. These percentages, therefore, represent not merely a deplorable death-rate due to the difficulty of treating this particular malignant tumour but a proportion of deaths which are not inevitable, being the direct result of ill-judged interference.

SUMMARY

Incorrect treatment of malignant melanoma has tragic results. Casual excision, ligature or cauterisation of pigmented moles has led to the rapid death of the patient in 34 cases referred to the Holt Radium Institute when the appearance of recurrence or metastasis gave the alarm.

The best methods of treating such cases are described and a table shows the improvement in results obtained by correct treatment of the primary growth.

VENOUS SPASM PREVENTING BLOOD TRANSFUSION

J. G. HUMBLE, MRCS
ACTING ASSISTANT PATHOLOGIST

G. BELYAVIN, MB LOND.
JUNIOR ASSISTANT PATHOLOGIST

JOHN BURFORD CARLILL LABORATORIES, WESTMINSTER HOSPITAL

IN the last four years we have seen 11 cases in which transfusion of blood or plasma was rendered difficult or impossible by severe generalised spasm of peripheral veins.

Transitory venous spasm in a single vein is well recognised, and is attributed to the local irritation of needle puncture or dissection. The generalised venous spasm we met is more persistent, and in 3 cases lasted until death. Of our 11 cases 8 were mild and 3 severe:—

Mild

(*a*) After hæmorrhage: 5 cases, all survived.
(*b*) After extensive burns: 2 cases, both died.
(*c*) After exposure: 1 case, died.

Severe

(*a*) Associated with sepsis: 1 case, died.
(*b*) Associated with postoperative collapse: 1 case, died.
(*c*) Associated with pulmonary embolism; 1 case, died.

It will be seen that 6 of the patients died.

ILLUSTRATIVE CASES

Mild venous spasm following hæmorrhage

CASE 1.—A well-built girl of 15. A forequarter amputation was performed on May 21, 1942, for intractable pain caused by osteogenic sarcoma of the upper end of the left humerus. The operation, which was difficult with considerable hæmorrhage, lasted 1¼ hours. On return to the ward the patient was pale, cold and sweating. The pulse at the wrist was not palpable; heart-beats feeble, respirations slow and shallow, blood-pressure not recordable. The veins in the right antecubital fossa were not visible, but could be palpated. A cannula was inserted into the left internal saphenous vein at the ankle but a transfusion of serum would not flow at a head of 6 ft. The rotameter (Henry and Jouvelet pump, Lee and Macnab 1935) was applied and 1 pint of serum was transfused in 20 min. The patient then became flushed and warm, the pulse at the wrist was palpable (rate 130) and a BP of 75/50 mm. Hg was recorded. The right arm veins became visible. The rotameter was removed. The transfusion at the ankle ran freely at a height of 3 ft. A further pint of serum was transfused in 45 min. The BP was then 120/80. The patient was well and conscious; pulse-rate 110. Blood-count before operation: red cells 4,910,000; Hb. 88%. Immediately after the second pint of serum venous blood showed: red cells 2,320,000; Hb. 50%; volume of packed red cells, 23% (Wintrobe); plasma proteins—albumin 3·8%, globulin 2·4%. Next day a specimen of venous blood showed red cells 2,520,000; Hb 44%; volume of packed red cells 20%; plasma proteins—albumin 3·8%, globulin 2·4%.

Mild venous spasm following hæmorrhage

CASE 2.—A married woman aged 42. A suprapubic cystotomy under general anæsthesia was performed at 9 AM on Sept. 17, 1941, and radium needles were inserted into a malignant growth of the base of the bladder. At 1.30 PM the same day there was severe hæmorrhage from the operation site and the patient collapsed. She was unconscious but restless, cold and pallid. The pulse at the wrist was impalpable and the BP could not be recorded. A cannula was inserted into the right internal saphenous vein but blood would not flow into it from a height of 9 ft. At 1.45 PM the rotameter pump was applied. At 2 PM 1 pint of blood had been transfused and the BP was 80/60. By 2.30 PM 1½ pints had been transfused; BP 100/70. By 3.15 PM transfusion of the second pint was complete. BP 97/65. A third pint of blood was started. At 3.45 PM the patient was warm, conscious and flushed. The BP was 100/80 and on removal of the machine the transfusion ran freely by gravity. At 5 PM BP was 108/75. The drip was speeded and the third pint finished at 5.20 PM. The BP was then 112/75 and the pulse 110. The patient made a good immediate recovery.

Venous spasm following exposure

CASE 3.—A man of 19 was buried under debris for 11 hours. On admission he had already received morphine gr. ⅓. There were superficial grazes on the neck and right thigh. BP not obtainable; pulse slow and just palpable. Two hours later the pulse was 150 and he was much better, but the BP could not be recorded; 8 hours after admission the BP was 50/30. A cannula was inserted into the left internal saphenous vein but the plasma would not flow at a height of 6 ft. The rotameter was applied and 1½ pints of plasma transfused in three hours. The venous spasm persisted and signs of cerebral irritation appeared; transfusion was given up. The pulse was then 140 per min., BP 85/55. The patient died next day. Autopsy showed extensive broncho-pneumonia and congestion of the brain; no obvious injuries.

Severe venous spasm; pulmonary embolism

CASE 4.—A man aged 48. Cholecystectomy and exploration of the common bile-duct on March 9, 1944, following cholecystostomy on Feb. 24. At 2 PM on March 10 he collapsed; he was white, sweating and restless, and became unconscious. Pulse at the wrist not palpable; BP unobtainable. He was thought to have a large intraperitoneal hæmorrhage, and attempts at transfusion were made. These showed that the superficial veins of the arms and the saphenous veins of both legs were greatly constricted; on palpation they were thick cords and on dissection were thick white structures of rubbery consistence with a tiny central lumen containing dark blood. Six veins were examined, including both internal saphenous veins and all presented the same picture. Cannulas and needles were inserted but no fluid could be made to flow into them. The patient died at 2.50 PM on the same day; the veins were still contracted at 3.10 PM. Autopsy at 1.30 PM on March 11 showed that death was due to pulmonary embolism. The veins were then relaxed and full of blood.

Severe venous spasm; sepsis

CASE 5.—A thin man aged 23. A carcinoma of the œsophagus was resected on April 5, 1944. During operation the spleen was removed, the left diaphragm was divided and the left phrenic nerve crushed. The operation lasted 3¾ hours, during which he received 2 pints of blood and 2 pints of 6% serum. For the last 2 hours the BP and peripheral pulse could not be recorded. In the 6 hours following operation he received 2 pints of blood, 3 pints of 6% serum and 1 pint of 12% serum. His pulse was then 145 and his systolic BP 85 (diastolic not recordable). In the next 4 days he received 10 pints of 4·3% glucose in 1/5 normal saline intravenously, after which the infusion discontinued. All this fluid was given with ease into the left internal saphenous vein. He was also given oxygen intermittently through a BLB mask. On the 6th post-operative day his general condition deteriorated. Radiography showed a left-sided empyema, and on the 8th day about a pint of purulent fluid containing many anaerobes was aspirated. The same night the patient collapsed; when seen, his pulse (reported to be 140 about 20 min. before) was just palpable at 100. He was unconscious, with cool skin and moderate sweating. BP 110/70. Within a few minutes the radial pulse became impalpable, but the veins in both arms and legs could easily be felt as thick incompressible cords, and blood could not be aspirated from them. He died within ½ hour of being seen. At autopsy about 2 pints of exudate was found in each pleural cavity and there was a small mediastinal abscess. The lungs were congested and œdematous. The peripheral veins were relaxed and full of blood.

Severe venous spasm; postoperative collapse

CASE 6.—A man aged 63. Transverse colostomy for carcinoma of the rectosigmoid junction was done on May 11, 1944. An intravenous glucose-saline drip was set up the same evening and ran for 10 hours without difficulty, 3 pints of normal saline being administered in this time. Next day he vomited once but was fairly well; during the night of May 13–14 he vomited five times, a total volume of 24 oz. At 10 AM he was sweating but cool and moderately comfortable; pulse-rate 108. At 12.20 PM his condition had deteriorated; he was sweating, the skin was cool; pulse-rate 120, BP 80/60. The veins of the arm were in spasm, readily palpable under the skin. An intravenous saline drip was attempted, but failed; on dissection the veins of the arms were white cords with a minute lumen.

At 1.30 PM a sternal puncture was done and a 12% serum infusion set up. This ran freely from a height of 3 ft. up to a speed of 80 drops a minute. The first pint was run in in 4 hours. The generalised venous spasm persisted, but the BP gradually rose. A second pint was infused. At 7.20 PM the BP was 100/60; pulse-rate 115. The second pint took 3 hours to run in and was followed by a pint of 4·3% dextrose in 1/5 normal saline. BP at 9.30 PM was 110/60, pulse-rate 100. His condition seemed satisfactory but the venous spasm persisted. The dextrose saline ran until 3.30 AM on May 15; the pulse-rate was then 100. The infusion was continued to 9 AM when the sternal infusion was finally discontinued. He had received 2 pints of 12% serum and 2 pints of 4% dextrose-saline. His condition was considered satisfactory.

At 11 PM he collapsed, the pulse became thready and the rate 120. It was found that the whole of the transverse colon had herniated through the colostomy incision. This was replaced under general anæsthesia without opening the abdomen. The right radial vein also was exposed in the theatre and a portion removed for biopsy; it was in spasm. At the end of the operation the BP was 105/75 and the pulse-rate 120; this seemed satisfactory after, but he died suddenly at 3.50 AM on May 16, the veins being in spasm to the end. At autopsy he was found to have early paralytic ileus, a wrinkled small spleen and dry lungs. The body of the first lumbar vertebra was extremely congested; the sinuses were packed with red cells. The spleen was histologically empty of blood. The right radial vein showed no obvious abnormality.

DISCUSSION

The venous spasm seen in these cases is difficult to interpret. Whether it is a normal mechanism by which blood is transferred to the right heart in an attempt to raise the blood-pressure (Wiggers 1942) or whether it is a pathological central nervous reaction remains to be discovered.

The effect of ventricular puncture on the nail-fold capillaries has been observed by one of us (J. G. H.) in a case of pituitary tumour. The patient was under general anæsthesia. On needling the brain the capillaries contracted immediately and blood-flow in them ceased for approximately 30 sec. Simultaneously a blood-drip slowed down temporarily. This was followed by a steady rise of the BP over the next 20 min. from 90/50 to 180/90.

Case 4 recalls Riml's (1929) experiment in which obstruction to the pulmonary artery raised the pressure in the right auricle. It would be useful to know how far up the venous system the spasm travels. We think that the axillary and femoral veins are affected, though less than the more distal veins. This would fit in with the observation of Hunter (1794) that the more peripheral the vein, the more muscular its wall.

Case 6 shows that the veins in the thorax draining the sternum are not in spasm, for a sternal transfusion ran freely. Nor were the veins of the mesocolon obviously constricted in this case. The great peripheral resistance to injection of blood in these cases is demonstrated by the fact that the rotameter pump, which can build up a pressure of more than 300 mm. of mercury, could not force fluid up the veins in case 4.

Venous spasm has been seen under anæsthesia three times.

We have not found any drug to affect the spastic veins. Papaverine was given to one patient but the picture was obscured by vomiting, the dose being too large. Nitrites have not been used; and nikethamide seems to be without effect.

Since the condition usually brooks no delay, the best available remedy seems to be intravenous protein-containing fluid, injected into the bone-marrow, or into a big vein (jugular, femoral) under pressure.

SUMMARY

Venous spasm, varying from mild to very severe, has been observed in 11 cases.

It seriously interfered with attempts at transfusion.

In the 3 cases in which spasm was greatest the patient died. In one of these it was apparently caused by a pulmonary embolus.

Treatment is by immediate infusion into the bone-marrow or into a large vein, under pressure.

We wish to thank the honorary surgeons to the hospital for permission to abstract notes of patients under their care and the anæsthetic department for similar facilities.

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SULPHANILAMIDE POISONING WITH CEREBRAL MANIFESTATIONS

HOWARD REED, MRCS
MEDICAL OFFICER, TANGANYIKA TERRITORY

A GIRL of 3 years was brought to me at 10.30 one evening by the parents. They had left her at 7 PM and on returning at 10 o'clock had found her lying in bed with vacant rolling eyes and a cold pallid skin, talking wildly. By her side were some sulphanilamide tablets which she had taken from a box, and from the number remaining they estimated that she had eaten twelve tablets—i.e., 6 grammes.

The child was unconscious. The skin was cold, the complexion pale, and the neck, body and legs were stiff in extension with the right hand clenched and the right wrist and elbow held in extreme flexion. She was pursing and pouting her lips, grinding her teeth and rolling her eyes from side to side. The pupils were dilated, showing no reaction to light, and both plantar responses were flexor. The tendon jerks were unobtainable owing to the rigidity of the limbs. The rectal temperature was 98° F., the respiration-rate 34 and the pulse-rate 130 per min. At 10.45 PM an injection of apomorphine gr. 1/45 was given and was soon followed by vomiting. The vomit contained undigested fragments of food, such as carrots; no bile was present, nor were there debris of sulphanilamide. About this time slight cyanosis of the lips was first noticed. It became more noticeable after a few hours but was never well marked. Then followed alternating periods of excitement and quiescence. During the excitable periods, which lasted about 5 minutes, she rolled from side to side, assuming grotesque attitudes, and during the quiet ones, which lasted 3–15 minutes, she lay motionless with her eyes rotated to the left. At 11.30 PM she spoke a few coherent words in a dazed manner and drank a little water, which she vomited soon after. About midnight she was quiet and appeared to be sufficiently improved to be taken home.

At 1 AM I was called to see her because the convulsive movements had recommenced. The movements of the eyes, lips and arms were as before though a little less violent. In order to have equipment and laboratory facilities at hand she was taken to hospital. Although her mother was holding her she repeatedly cried, "Mummy gone, Mummy gone," in a vague anxious manner. On arrival at hospital her pupils were found to react sluggishly to light. A blood slide was taken, and no malaria parasites were found. A lumbar puncture was done and clear fluid spurted out, obviously under high pressure; 6 c.cm. of cerebrospinal fluid was removed but microscopic examination revealed no abnormality. Three ounces of glucose-saline, containing gr. 6 of chloral hydrate, was given rectally and retained. At about 3 AM she fell asleep. The sleep was deep but was interrupted at intervals by restless convulsive movements which were less violent than before. At 6.30 AM she woke with an attack of uncontrollable weeping and failed to recognise her parents. She drank three cups of tea with sugar and 3 oz. of glucose-saline was given rectally. At 7 AM she passed 2 oz.

of urine, which was alkaline with a heavy crystalline deposit. Acetic acid was added to dissolve the phosphate crystals and the centrifuged deposit showed numerous sheaves of needle-shaped crystals, a few red blood-cells and epithelial cells.

From this time onwards she continued alternately moving restlessly from side to side and lying quiet, exhausted and comatose. At 8 AM she first showed signs of returning consciousness by recognising a friend and after this she steadily improved. Although exhausted she was unable to sleep and at intervals the convulsive movements recurred though with steadily diminishing violence. At about midday she was able to recognise her parents but it was obviously an effort for her to concentrate and remember. She ate a little food at midday and slept in the afternoon. At 7 PM there was much improvement. She was conscious of her surroundings and readily recognised her parents though she was extremely fatigued and somewhat dazed. She was still very pale with slight cyanosis of the lips and a temperature of 100·5° F. During the next few days the pallor persisted, and there was a tendency to vomit. There were still periods of excitement and a greater desire for sleep, but the steady improvement continued.

Hawking [1] found that when rabbits and cats were given 1·5–2 g. of sulphanilamide intraperitoneally they developed head-retraction with dilated pupils and rigidly extended legs. Pushing the animals caused convulsive movements. After 3–4 hours voluntary movements recommenced, alternating with periods of quiescence in an extended posture. Some animals showed violent side-to-side movements of the head and grinding of the teeth. Hawking points out that these symptoms were obtained only by very large doses and would not often occur in human therapy. The present case was marked by symptoms closely resembling those in the rabbits and cats.

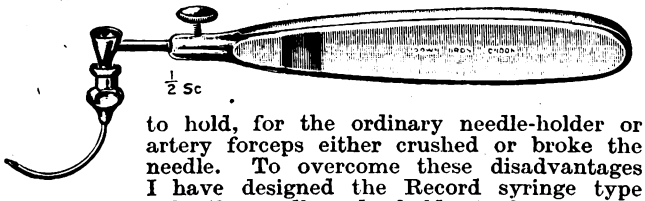
The restlessness in my patient was similar to that reported by Cutts and Bowman [2] in a man who was given a 5% instead of a 1% solution of sodium sulphapyridine intravenously, and received 30 g. of the drug in ten hours—about the same dose, relative to body-weight, as in my patient. The man recovered on sedative treatment with large quantities of intravenous glucose-saline.

My thanks are due to Dr. W. A. Young, Acting Director of Medical Services, Tanganyika Territory, for suggestions, and to the Director of Medical Services for permission to publish this paper.

New Inventions

TUBULAR SUTURE NEEDLE AND HOLDER

FOR neat and almost painless suturing of small wounds, and for situations where it is difficult or impossible to use ordinary needles, I have for many years used a tubular needle, in which there is no eyelet to pull through the tissues. It was, however, difficult to thread and



to hold, for the ordinary needle-holder or artery forceps either crushed or broke the needle. To overcome these disadvantages I have designed the Record syringe type of end-piece for the needle and a holder to fit this; the illustration is self-explanatory. These have been made for me by Messrs. Down Bros. Ltd. The angle-piece is detachable and can be supplied or bent in any variety of angle to meet particular requirements. As a precaution against the needle becoming detached, which might be disastrous in such sites as the mouth, the bayonet type of fitting can be used. The needles are made in the usual curves, and their calibre can be made specially to take all sizes of suture material, including non-toxic stainless malleable steel wire, originally advocated by W. W. Babcock in America and gaining increasing favour in this country.

WRIGHT LAMBERT, MRCS, LDS, DPM.

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Reviews of Books

Medical Diseases of War

(4th ed.) Sir ARTHUR HURST, DM, OXFD, FRCP (Arnold. Pp. 511. 21s.)

THE fourth edition of this book is a fitting memorial to its author. It is redolent of his personality: full of clinical wisdom, of that polite but sarcastic comment which attacks the doctrine, not the man, and of experience founded on one war and enlarged and corrected by another. It is highly characteristic, for instance, that after many years of passionate support for the obstructive explanation of catarrhal jaundice, Hurst should have recognised the weight of scientific evidence against him and have admitted that infective hepatitis is the more common explanation; equally characteristic that he should have stuck to his guns and maintained the obstructive nature of some of the epidemics in the last war.

Hurst's book is recognised as a classic on the medical diseases of war; it is also a contribution to the understanding of the medical diseases of peace. The assignment of about half the book to functional nervous disorders corresponds much more nearly to the nature of the illnesses seen by a general practitioner or an out-patient physician than does the proportionate space in the ordinary textbook; and many of the disorders caused by war conditions appear in peace-time in men who fear to lose compensation or who unconsciously desire to escape from a disagreeable situation. With every war we seem to be brought more closely to the understanding of the psychological factor in illness. The section on sciatica, rewritten in this new edition, is also highly applicable to civilian practice, and the same is true of the chapter on digestive disorders.

Advances in the treatment of dysentery are noted, and the present state of our knowledge of malaria is well set out by Colonel Dixon. Major-General Stott contributes a good chapter on meningococcal fever, and Dr. Harries another on diphtheria. Dr. Barber has rewritten his article on the seborrhœic state as an epitome of the dermatophytoses in general. "DDT" must have missed this new edition by a short head.

A History of Comparative Anatomy

From Aristotle to the Eighteenth Century. F. J. COLE, D SC OXFD, FRS, emeritus professor of zoology, University of Reading. (Macmillan. Pp. 524. 30s.)

Professor Cole, studying afresh the reputed masters of comparative anatomy, has analysed their discoveries and the developments which arose from their work. His shrewdness and vigour make the book an enlightening contribution to biology. He shows that Galen's contribution to biological knowledge was not so loaded with error as to prove more dangerous than useful. Only Leonardo da Vinci merits study before the revival of learning, which, in anatomy, was heralded by Vesalius, Belon and Rondelet. Vesalius, however, did not contribute directly to the growth of comparative anatomy, so the book lacks reproductions of the beautiful plates of the *Fabrica*. It includes the less well known but equally able figures of Ruini's anatomy of the horse and Coiter's studies on comparative anatomy. William Harvey showed that investigation of the lower animals was by no means subsidiary to the study of man, and thus initiated the development of the new comparative anatomy in which Malpighi, Tyson, Willis, Martin Lister, Grew and the Dutch anatomists played the leading parts. The work of the brilliant Dutch trio Leeuwenhoek, Swammerdam and Ruysch is treated fully here, and well illustrated with reproductions from Swammerdam's *Biblia Naturæ*. Publications of the Royal Society and l'Académie Royale des Sciences are critically reviewed, and lesser known societies are given their due credit for advances in this study. The effect on the science of comparative anatomy of economic conditions is only mentioned in the section on the anatomical museum. An appendix of biographical notes on 91 leading anatomists is valuable. Many readers of this work will hope to see Professor Cole complete the book which but for the war he would have written: a study of "... the little masters of comparative anatomy whose memoirs have been almost completely forgotten ..."

THE LANCET

LONDON: SATURDAY, OCTOBER 21, 1944

Overheating

NAKED man in a cool environment can so manipulate his circulation as to cover himself with the equivalent of 2 cm. of cork.[1] Man exposed to heat is more versatile. Cutaneous vasodilatation effectively destroys the insulating layer, creates a direct temperature gradient between body and surroundings, and up to a point enables him by radiation and convection to get rid of the heat that his basal or other activities are producing. Beyond this point powerful reinforcement is obtained from vaporisation. Every gramme of sweat evaporated transfers 0·58 Calorie to the atmosphere; so even when the air is hotter than the man, heat in the disguise of water vapour is thrown back into it. Until its thirst is slaked the hot air cannot drive home its attack.

Apart from special buildings, man exposed to heat can do little to supplement his automatic defences except by using clothes (like the Arabs) as a protection against radiation from the sun and convection currents of hot air. Unfortunately, with increasing atmospheric humidity, the amount of clothing that can be worn without interfering with evaporation becomes less and less, and in all hot climates man ultimately depends on his ability to sweat. When the air is dry this enables him to tolerate temperatures well above 110° F., but full saturation of the air with water vapour is rapidly fatal at a temperature of only 89° F.[2] because it makes sweating useless. Similarly dangerous is the exposure to high temperatures of people whose sweat-glands are congenitally deficient (as in the case reported on another page by MACQUAIDE) or whose sweating mechanism has for any reason failed. As LADELL, WATERLOW and HUDSON point out in their paper concluded this week, the most likely explanation of hyperpyrexial crises is a temporary disorganisation of the hypothalamic controlling mechanism: it seems as if a well-directed blow has disrupted the communications from GHQ, and normal function returns when these are restored. The other types of "heat exhaustion" recognised by these workers may be likened rather to the results of a campaign of attrition. Although in very hot climates the body temperature can usually be kept down by a sufficiency of skilful sweating—the adjective implies, among other things, that sweat running unevaporated from the skin is wasted—the necessary fluid has to be made available, transported, and excreted. When a man can sweat only by depleting his body fluids or overstraining his circulation—and it must be remembered that the more blood there is in his skin, the less is available for his alimentary tract, brain and muscles—then many different kinds of breakdown are possible, including conceivably exhaustion of the sweat glands themselves. Grouping the results around circulatory insufficiency, electrolyte imbalance and hyper-dehydration, LEE [3] noted numerous third-order consequences of these main secondary disturbances, and remarked that, though a clinical syndrome may be most closely related to one group, it will certainly show connexion with the others.

Types I and II of heat exhaustion described by LADELL and his colleagues, and a variety approximating to type II described by WOLKIN, GOODMAN and KELLY,[4] illustrate this point. Thus, although type II resembles hyperpyrexia in showing defective sweating, the suppression of sweating is not complete, it may have a quite different origin from that seen in hyperpyrexia, and in any case does not account for the rest of the symptoms. Similarly, type I resembles type II in revealing an exhaustion of the body's resistance, but deficiency of salt and water plays a much larger part in its causation. The most significant feature of this important work, and of the observations on artificial hyperpyrexia by WALLACE and BUSHBY which we published on Oct. 7, is the effort to understand the interplay of strains on the various systems involved. For instance, the meaning of "dehydration" when there is a flood of water passing from gut to skin will eventually need careful definition: it seems that something of the kind may result from plain deprivation of water,[5,6] from the side-tracking of water as in excessive sweating, and from deprivation of salt. Meanwhile, the investigations show once more that individuals react differently to the same conditions, and they provide clues—such as the great variation in the chloride concentration of sweat—that may be of real value in disentangling specific factors.

In discussing this very problem a few years ago, LEE [3] said that "consideration should be given primarily not to the disease category into which the case fits, but to the causation and alleviation of individual signs and symptoms." Sir THOMAS LEWIS and Prof. HENRY COHEN have lately reiterated the same principle: "The fruits of studying individual manifestations of disease have far greater permanence than have the descriptions of associated symptoms under separate names" [7]; and it is "only when diagnosis is complete, when we know where disease is situated, what functional disturbances are associated with it and how these have arisen, that we possess the adequate data for rational therapeutics." [8] In the last few years understanding of the way in which the body conforms to physical laws in maintaining its temperature has been placed on a firm basis. Detailed inquiries of the kind under review may be expected to reveal the price, in terms of physiological and pathological consequences, which must be paid for conformity under adverse conditions.

Sulphonamides in Cerebrospinal Fever

Two large-scale studies of the results of treatment in cerebrospinal fever have lately been made, one in Scotland and the other in England and Wales. The first,[9] by the scientific advisory committee of the Department of Health, reviews 2223 cases received by seven Scottish hospitals in 1936–41. In the

1. Du Bois, E. F. *Harvey Lect.* 1938, p. 88.
2. See Lovatt Evans, Starling's Principles of Human Physiology, London, 1941, p. 1093.
3. Lee, D. H. K. *Univ. Qd Pap. Physiol.* 1940, no. 5; (1944) *Ibid* no. 8.
4. Wolkin, J., Goodman, J. I., Kelley, W. E. *J. Amer. med. Ass.* 1944, **124**, 478.
5. Ladell, W. S. S. *Lancet*, 1943, ii, 441.
6. Black, D. A. K., McCance, R. A., Young, W. F. *J. Physiol.* 1944, **102**, 406, 415.
7. Lewis, T. *Lancet*, 1944, i, 619.
8. Cohen, H. The Nature, Method and Purpose of Diagnosis. Cambridge, 1943.
9. Sulphonamides in the Treatment of Meningococcal Meningitis. 1944, HMSO, Edinburgh. 4*d*.

second,[10] BEESON and WESTERMAN analyse 3575 cases reported by more than a hundred hospitals to the Ministry of Health in 1939–41. Both surveys thus include the epidemic of 1940. The gist of their findings is that sulphonamides have materially reduced the case-fatality; that nothing is to be expected from sero-therapy as an adjuvant to chemotherapy; and that big doses and early administration of sulphonamides are less important than the host factor, particularly the patient's age, in determining the outcome.

The Scottish report recalls that in 1907–08, one of the four peak periods in the last 40 years, the fatality-rate was 90·4% in infants under a year, falling to 74% in young adults, the most favourable age-group. The corresponding figures for cases treated with sulphonamides alone in 1936–41 were 28·3% and 2·6%. But fatality-rates depend on accurate diagnosis and conscientious notification, and even as late as 1920 deaths exceeded notifications, so the recent improvement may not be so great as appears. The Scottish cases analysed fall into three groups—those given sulphonamides only, serum only, or serum and sulphonamides. It will be seen from the table that in every age-group

CASE-FATALITY RATES (%) AT DIFFERENT AGES AND WITH DIFFERENT FORMS OF TREATMENT

Age-groups	Treatment		
	Serum only	Serum plus sulphonamides	Sulphonamides only
Under 1 year ..	70·1	36·8	28·3
Lowest figures (young adults)	28·6	9·5	2·6
Oldest patients (35+)	90·9	54·1	35·4
All ages	51·8	31·2	16·7

chemotherapy alone produced significantly better results than combined chemo- and sero-therapy, and serum alone gave the worst results. MITMAN[11] was the first to try combined serum and sulphonamide therapy in scarlet fever, but the expected synergistic action did not develop. Since then the same failure has been recorded in pneumococcal and meningococcal infections, although the specific sera are therapeutically active agents. What is puzzling is that results with combined therapy are often significantly worse than with the drug alone. Possible explanations are that the more serious cases are given sulphonamides and serum, or that inadequate doses of the drug are given because serum is also being administered. There is some evidence of both these factors operating in the Scottish cases. It is unlikely that serum does actual harm, but from the figures this cannot be denied with certainty. The report indeed suggests that an aseptic meningeal reaction is responsible for the poorer results. Clearly intrathecal serum is now contra-indicated, and in practice it has been dropped for some time. Sex was not found to have a material effect on fatality, but age was of great importance. The table confirms that the disease is most fatal at the extremes of life, whatever the treatment. In BEESON and WESTERMAN'S[10] series, too, the case-fatality under one year was about six times that of young adults (15–19 years) and in persons over 60 the rate was ten times worse. Thus age must always be considered in evaluating therapeutic measures. It should be noted, for instance, that fatality-rates of 0–1% with sulphadiazine[12] have been attained only in favourable age-groups. Complications were common in the Scottish series, the rate being 37·9% in those who died and 20·9% in those who recovered; there was no significant difference between sulphonamide-treated cases and others. In the English series the permanence of complications was considered. More than a quarter of the cranial-nerve palsies were permanent; arthritis persisted in about a quarter of the affected cases, deafness in 80%, paralysis of the extremities in half, and blindness in 4 out of 5 cases; hydrocephalus was permanent in all of the 4 cases.

It might be expected that the earlier hospital treatment is begun the better the prognosis. In both series there was no statistical evidence to support this premise; indeed, in Scotland there was a greater fatality among those admitted in the first few days of their illness than in those admitted later in the week; and in England patients who died within 24 hours were admitted earlier in their illness than those who died later or recovered. An explanation is to be found in the tendency to send the more severe cases into hospital earlier. There is, therefore, no justification for delaying the administration of sulphonamides. In assessing the value of therapeutic measures, it is now a common practice to exclude deaths within 24 hours of admission on the grounds that they are too advanced to derive full benefit from the treatment and their inclusion would give a falsely high fatality-rate. But many patients have received adequate treatment before admission, and a true picture of the mortality of the outbreak may be obscured if overall figures are not given. Among the English cases 38% of the deaths occurred within 24 hours of admission; while this suggests a serious outbreak, it does not prove it. The view held by some hospital clinicians—that all cases could be cured if treated early enough with big enough doses—is not borne out by these figures. In both series those who received doses as high as, or higher than, BANKS recommended, fared no better than those who received more moderate amounts; the optimum dosage has not yet been determined. And there are some patients, especially the very young and the very old, who will succumb no matter how early and how intense the treatment. Patients treated with sulphapyridine far outnumbered those treated with other drugs, of which sulphanilamide and sulphathiazole were the chief. In Scotland a sufficient number were treated with the last two drugs to enable some comparison to be made. Rather surprisingly sulphanilamide, in which bacteriostatic power is the lowest of the three drugs, produced the best results, judged by fatality-rate and length of stay in hospital, but gave the highest number of complications. These three are already giving way to newer drugs such as sulphadiazine and its substitution products, excellent results from which have been recorded. And now penicillin threatens to render the mall obsolete—already ROSENBERG and ARLING[13] can report 76 established cases, all but one in the young adult group, with only one death.

10. Beeson, P. B. and Westerman, E. *Brit. med. J.* 1943, i, 497.
11. Mitman, M. *Proc. R. Soc. Med.* 1937, **31**, 158.
12. Taranto, M. *Nav. med. Bull., Wash.* 1943, **41**, 961. Daniels, W. B., Solomon, S. and Jaquette, W. A. *J. Amer. med. Ass.* 1943, **123**, 1. Hill, C. L. W. and Lever, H. S. *Ibid.* p. 9.
13. Rosenberg, D. H. and Arling, P. A. *J. Amer. med. Ass.* 1944, **125**, 1011.

Resolutions and Realities

AT the beginning of December representatives of the British Medical Association throughout the country will meet in London to declare their attitude towards a National Health Service. The by-laws require that any resolution involving material alteration of the policy of the Association shall be published at least two months before the meeting, and in recent weeks many such resolutions have been printed in the supplement of the *British Medical Journal*. No-one can say how much support they will receive, but it is instinctive to examine the opinions of the deviating divisions. Particularly striking, perhaps, is the apparent neglect of any contrary opinions expressed by the majority of doctors who answered the questionary. There is nothing to show that any division promoting a resolution has given weight to the desires of the profession as ascertained for the first time by plebiscite. In fact the only specific mention of the questionary occurs in a series of resolutions from Reigate, Salisbury, Maidstone, Reading and Bath which ask the representative meeting to pay no attention to its findings.

Most of the published resolutions were drafted and debated before the appearance of the white-paper on Social Security; but some of the divisions had obviously given consideration to the situation that would arise if the promised white-paper proposed—as in fact it does—a comprehensive scheme of social security benefits available to everybody. Seen in the perspective of this new white-paper, the National Health Service appears as one very important part of a much wider scheme by which the nation hopes to ensure that all citizens shall be kept free from want through all crises of life; that neither unemployment or sickness, childbearing or widowhood, old age or infirmity, shall throw an unendurable burden on anyone. The Government intend to introduce an all-embracing scheme to which all will subscribe—from their personal income or from that of the family breadwinner—and from which all may receive benefit. They have chosen not to exclude anyone from the right to participate in every part of the scheme; no income line is drawn above which service or benefits cannot be claimed. They have chosen, too, to make the insurance contribution a single undifferentiated payment, and so have given no encouragement to the idea that ways can be found whereby those who do not wish to avail themselves of any particular benefit can "contract out" of part of the cost. In view of these proposals, it is hard to see how the Government can offer the country a health service that in any way falls short of the comprehensive service promised in the white-paper; and as everyone must contribute to the cost of such a service, so everyone must be able, if they wish, to receive benefit. Some of the BMA divisions (Preston, Kesteven and East Norfolk) have recognised this and seek to persuade the Association to accept as inevitable the provision of a medical service available to the whole community. It is well that this issue should be debated again, and we hope that due weight will be given in its consideration both to the questionary replies and to the social security proposals. Those who are chosen as negotiators for the profession should be able to meet the Minister of Health without the embarrassment of having to ask again for a concession which has always been difficult, and now seems impossible, to justify—namely, the exclusion of the richer tenth, whether they wish it or not, from the right to use the service.

Many of the divisions are disturbed by, and oppose, the administrative proposals of the white-paper. The opposition ranges from that of divisions whose only complaint is that the profession is offered too few representatives on central and local administrative bodies, and too little voice in the selection of even these few, to that of divisions—again with Reigate, Salisbury, Reading and Maidstone as their chief spokesmen—which oppose the setting up of any further controls at any level or of any constitution, medical or lay. This last policy has an alluring simplicity, but if it were followed to its conclusion the BMA would presumably have to withdraw from the field of negotiation. Assuming, as we must, that the Government will proceed with its social security plans the Association might then find itself committed to a guerrilla struggle in and out of Parliament, such as accompanied the establishment of social security services in New Zealand, where the provision of better medical advice and treatment for the people, and better conditions and opportunities of work for the doctors, was lost sight of in acrimonious controversy over the size and payment of fees. We feel sure that this would not be the wish even of those divisions making the proposals, many of whose members honestly and understandably fear the introduction of any new and untried administrative machinery. We have faith that the practical good sense of the representative body will prevent it from adopting this extreme position, and will lead it instead to appoint its ablest negotiators and instruct them to exercise their statesmanship in helping to create a service satisfactory to public and profession alike.

For the rest, there are many resolutions concerned with ensuring that no injustice is done to doctor or patient if and when another system is introduced. Many of the subjects approached, such as the sale of practices, compensation, remuneration, pensions, and the graduation of the general practitioner to consultant status, have hitherto received less detailed attention than their importance warrants. It is to be hoped that time will be available for their full discussion, and that many useful ideas will be garnered from the debate. On the other hand time should not be wasted in discussing at any length obstructive resolutions such as the declaration from Ashton-under-Lyne "that this Government has no mandate from the electorate to initiate any such legislation as is contemplated in the white-paper." Electoral mandates are largely a matter of opinion, but it would be at least equally true to say that no Government would now venture to ask the electors' leave to abandon all the plans and promises that have been made for extension of the social services. As a member of the Cabinet has remarked, the white-paper on social security is a legacy that no future Government could afford to ignore.

Prof. C. BRUCE PERRY will deliver the Bradshaw lecture at 2.30 PM on Thursday, Nov. 9, to the Royal College of Physicians of London. His subject is to be the ætiology of erythema nodosum.

Annotations

A CENTRALISED AMBULANCE SERVICE

THE coming of a National Health Service must profoundly affect the existing ambulance associations, and the Hospitals and Welfare Services Union has issued a memo on the ambulance service it thinks ought to be provided. There is much cogency in its views. In the past several unhappy incidents have arisen from the rule that ambulances should not operate outside the area of the authority which provides them. People injured close to the boundary between two areas have sometimes found that no-one knew precisely where the boundary line was drawn and neither authority was willing to help until this point was settled. To avoid such happenings the union suggests that all ambulance services should be free and centrally administered; the Minister of Health should appoint a chief director of ambulance services and he should operate these services through deputy directors appointed by the new regional authorities. This, however, is not the only point which interests the Hospitals and Welfare Services Union. It is anxious that those engaged in the ambulance service should be properly trained whole-time workers. Three years of continuous street work is suggested, plus classes and lectures, before a man is qualified to take charge of an ambulance, and the union would like to see a state register of ambulance workers, similar to the nurses' register. There is not always anyone to accompany the driver of an ambulance, and even if there is some friend riding inside with the patient it may be found in emergency that this friend has no training and cannot even assist the driver to any useful extent. Occasionally drivers have even had to conduct maternity cases in the ambulance to the best of their ability, and the union therefore suggests that "drivers and male attendants should receive a certain amount of education with regard to midwifery." The advantages which have accrued from the unification of our fire services under national control are cited in support of the claim that our ambulance services should be similarly dealt with; and the union is undoubtedly wise in making its voice heard as early as possible.

STILBŒSTROL AND LACTATION

THE possibilities and limitations of diethylstilbœstrol are still imperfectly defined, though it is eight years since Dodds and his colleagues introduced this synthetic œstrogen to clinical medicine. Its uses in the puerperium have been clarified by two recent American papers. Walsh and Stromme[1] divided 190 recently delivered patients in whom breast-feeding was undesirable or contra-indicated into three groups. To one no treatment except analgesics was given to check lactation; in another they applied all the old routine measures such as binders, ice-bags, restriction of fluid intake and saline catharsis; the third received stilbœstrol only, an initial dose of 10 mg. being followed by two subsequent doses of 5 mg. at 24-hour intervals. The pain associated with the onset of lactation was just as severe in those receiving routine treatment as in those who received no treatment at all, but stilbœstrol much reduced both the incidence and the intensity of the pain. Lactation itself was also profoundly affected by the drug. Thus in the group which received no treatment 88% of the women lactated and this function was established about the fifth day. In the stilbœstrol group only 43% lactated, and the secretion was much diminished in amount and did not reach its maximum until the eighth day. Redness of the breasts was noted in 14% of the patients who received no treatment, in 8% of group 2, and in 4% of the stilbœstrol group. Where lactation has already been established the drug will rapidly inhibit the flow, but it is not so efficacious in controlling breast pain once the glands have been allowed to secrete. Evidence of its usefulness in established mastitis is as yet inconclusive. There are of course some disadvantages of synthetic œstrogen therapy: nausea and vomiting are fairly common, angioneurotic symptoms have been recorded and there have been a few cases of exfoliative dermatitis. Some women who are treated with stilbœstrol in the puerperium have an abnormally heavy loss when the menstrual flow first returns. Moreover, the patient in whom lactation has been inhibited by a synthetic œstrogen may seem satisfactory on the tenth day of the puerperium but may report some days later with the breasts engorged again. Bloom[2] has tried combining diethylstilbœstrol with another synthetic œstrogen, dimethylether-stilbœstrol, which acts less rapidly but for a longer period. It is claimed that when the two drugs are used together to control lactation re-engorgement of the breasts is rare.

1. Walsh, J. W. and Stromme, W. B. *Amer. J. Obstet. Gynec.* 1944, **47**, 655.

TWO RAT-BITE FEVERS

RAT-BITE fever has been known for many years, but its ætiology has only been clarified quite recently. Until Brown and Nunemaker[3] thoroughly reviewed the condition in 1942, the *Spirillum minus* was generally recognised as the causal organism: but they showed that infection by *Streptobacillus moniliformis*, which had been isolated under the name streptothrix as long ago as 1914 by Schottmüller[4] and in 1916 by Blake,[5] and was shown by Parker and Hudson[6] in 1926 to be responsible for the milk-borne epidemic called Haverhill fever, was at least as frequent as, and possibly more common than, spirillar infection. This had not been recognised before because the streptobacillus requires somewhat special cultural methods for its isolation and is consequently missed if ordinary blood-culture technique is alone relied on. Up to the present there has been no authentic case of rat-bite fever due to a double infection with both organisms, and the conclusion must be that there are two rat-bite fevers. The spirillar disease usually responds dramatically to a comparatively few injections of one of the organic arsenicals, but therapy of the streptobacillary form has been much less satisfactory. Arsenic is usually of no value, sulphonamides have no effect, and gold, in the form of sodium aurothiomalate seemed to be the most promising therapy; it certainly benefited the arthritic symptoms which were a striking symptom of two of Brown and Nunemaker's cases, and was of great value prophylactically in controlling experimental infections with the streptobacillus in mice.

Heilman and Herrell[7] have recently investigated the value of penicillin in experimental spirillar and streptobacillary infections in mice, with successful results in both. In infections with *Spirillum minus* the blood of all treated mice contained no spirilla after a day's treatment, while 24 out of 25 controls still contained spirilla after 37 days. The results in the streptobacillary infection were even more remarkable—42 out of 43 controls died, while the 43 treated mice all survived; treatment for 7 days produced complete recovery, but while treatment for only 5½ days saved the lives of all the mice, half of the survivors had arthritic complications. In his letter in this issue, Dr. Kane reports that he has put penicillin to clinical test, with successful results. A boy of 15 with rat-bite fever, in which the streptobacillus was demonstrated in blood-cultures as the pathogen, was treated with penicillin after he had had nine relapses. Fever ceased in 12 hours and there was

2. Bloom, O. H. *Ibid*, 1944, **47**, 692.
3. Brown, T. McP. and Nunemaker, J. C. *Bull. Johns Hopk. Hosp.* 1942, **70**, 201.
4. Schottmüller, H. *Derm. Wschr.* 1914, **58** (suppl.) 77.
5. Blake, F. G. *J. exp. Med.* 1916, **23**, 39.
6. Parker, F. jun. and Hudson, N. P. *Amer J. Path.* 1926, **2**, 357.
7. Heilman, F. R. and Herrell, W. E. *Proc. Mayo Clin.* 1944, **19**, 257.

apparently permanent cure. The short period of penicillin therapy which was found necessary is interesting: 200,000 units in all were given over a period of 48 hours by intramuscular injections, but recovery was complete without complications. It remains now to be seen whether the clinical results with penicillin will be equally good in human spirillar infections. If so, this represents a great advance, since arsenic therapy, though very successful in this illness, is not without its risks.

CHEMOTHERAPY AND THE PHARMACIST

BEFORE the outbreak of the present war both the manufacture and introduction of the better known and most widely used synthetic drugs were almost German monopolies. The situation is analogous to that which existed in another branch of the organic chemical industry before the last war; in 1914, few synthetic dyes were prepared in Britain and consequently many difficult years were spent in stabilising the industry in this country—a time during which coöperation, specialisation, and tariff duties all played important rôles. Mr. H. Berry, dean of the College of the Pharmaceutical Society, and recently raised to professorial status within the University of London, advocates that the parallel should be made complete by devoting the same care and attention to synthetic drugs after this war as was given to dyes from 1918 onwards. His salutary exhortation should not fall on deaf ears, as a stable foundation has already been laid in the production of penicillin and in concerted research work among members of the Therapeutic Research Corporation; if, however, progress is to be maintained Government aid after the war, either by protective tariff or by direct assistance, may be necessary. Professor Berry also stressed the need for specialisation by pharmacists in the future to keep abreast, or ahead, of trends in therapeutics. At present 5 universities confer degrees in pharmacy, but the academic course in Glasgow alone extends to four years; in the remaining 4 it is three years only. The shorter period may suffice to instil a good general groundwork in the modern aspects of pharmacy, but leaves no time for specialisation. Chemical manufacturers are beginning to find the graduate in pharmacy more useful than the organic chemist for many modern processes, and a period of intensive specialisation before leaving college would enhance the potential value of the pharmacist. A year could be usefully employed in the study of parenteral medication, antiseptics, mycobiological synthesis, or the relationship between chemical structure and therapeutic action. Headway in the last-named subject has already been made by a small band of graduates working with Professor Berry's colleague, Dr. W. H. Linnell, now university professor of pharmaceutical chemistry; many more trained workers will be needed to garner the rich harvest of specific medicaments in the years before us.

THROMBOSIS AND DIGITALIS THERAPY

ONE of the dreaded, though relatively uncommon, complications of auricular fibrillation is embolism. Hitherto the emboli have been ascribed, rather vaguely, to thrombus formation resulting from stasis in the backwaters of the auricles, particularly the appendages. What has never been explained is why, if such thrombus formation is so common, emboli are so seldom formed and shot off into the systemic circulation. De Takats and his colleagues[1] now suggest that the precipitating factor may lie in the hitherto unsuspected thromboplastic properties of digitalis, a sudden rise in dosage perhaps providing the last straw. Using the heparin-tolerance test which de Takats has evolved,[2] they found in patients as well as in dogs that heparin is less effective if digitalis is given as well. In one patient they also found that digitalis opposed the action of dicoumarol. The significance of this observation is enhanced by the independent findings of Macht,[3] who, while investigating the pharmacological properties of heparin, found that in cats previous heparinisation reduced the toxicity of intravenously administered ouabain and digitalis. For example, in 50 cats the average lethal dose of tincture of digitalis for controls was 8·5 c.cm., compared with 10·2 c.cm. for the heparinised animals; this difference is statistically significant. The coagulation-time of whole blood, estimated by Howell's method, was progressively shortened both in vitro and in vivo by digitalis. Most of the digitalis-strophanthus-squill group of glucosides were investigated and found to have a similar action. Macht is naturally cautious in drawing conclusions, but suggests that there is a connexion between the reduction in digitalis toxicity produced by heparin and this thromboplastic effect of the digitalis group of glucosides. Neither of these reports is more than preliminary and both obviously require confirmation. Indeed, the four case-records with which de Takats and his colleagues open their paper are far from convincing examples of embolism due to a raised dosage of digitalis, for in one the embolism followed myocardial infarction and in two others the ventricular rate was so rapid that neither of these patients could have had anything like adequate amounts of digitalis; in these three cases other factors might well have accounted for emboli being dislodged from the fibrillating auricles. Then again, digitalis is so widely used, and embolism in auricular fibrillation so relatively uncommon, that it is difficult from the clinical point of view to correlate the two. On the other hand, the experimental work in both papers is convincing, if not overwhelming. Further clinical evidence should not be hard to find. Meanwhile no-one, because of these preliminary reports, should desist from the full exhibition of digitalis when it is indicated.

MISMANAGEMENT OF THE STERILE MARRIAGE

THERE are very few hospitals or clinics in Great Britain where a childless couple can be sure of thorough investigation and treatment of their infertility. Elsewhere they are liable to be dealt with according to some inadequate routine, or even frankly neglected. Too often the incurably sterile are not told the truth, while those who have little chance of becoming parents are encouraged to use expensive remedies whose value is doubtful or not established. These kinds of mismanagement breed much chronic unhappiness and some neurotic illness—offspring for which the patients had not bargained and which they scarcely deserve. A definite statement that children cannot be expected is generally borne better than perpetual uncertainty; and once they have given up hope many couples are willing to adopt a child. Here are a few examples:

A woman of 35, who had been married for 9 years without becoming pregnant, sought advice at a London teaching hospital. She was treated by replacement of a retroverted uterus, dilatation and curettage, and insertion of a Hodge pessary. Since she was still barren 8 months later, the pessary was removed, and she was told to keep on trying. Her husband was not examined. A full examination elsewhere 6 months later showed obstruction of both fallopian tubes, while the husband's semen contained only 1 million spermatozoa per c.cm., 80% of them with structural abnormalities, and only 5% motile. The position was explained to the couple and adoption was advised.

A woman of 24, seeking advice, after 2 years of marriage, at a provincial non-teaching hospital, was given a routine pelvic examination. Her husband's semen was also examined, but owing to the method of collection, which entailed keeping the semen for several hours in a rubber sheath, all his sperm were found to be non-motile. He was given 12 injections of testosterone propionate and then told further treatment

1. de Takats, G., Trump, R. A. and Gilbert, N. C. *J. Amer. med. Ass.* 1944, **125**, 840.
2. de Takats G., *Surg. Gynec. Obstet.* 1943, **77**, 31.
3. Macht, D. I. *Ann. intern. Med.* 1943, **18**, 772.

would not be useful. No second seminal specimen was examined and no postcoital examination made. A year later full examination showed the wife's uterus to be hypoplastic; she was treated with œstrogens and progesterone, and became pregnant.

A couple married for 2 years consulted their private doctor. The wife received an ordinary pelvic examination. The husband's semen, collected with faulty technique, was reported to contain no motile sperm, and on the strength of this he was given a course of injections of gonadotropins. Three months afterwards a second examination of sperm collected by a better method showed a more satisfactory result, but he was told he still needed a further course of expensive treatment. Actually in this couple the causes of sterility proved to lie mainly with the wife.

Such examples could be multiplied. Evidently modern methods of investigation and treatment are not yet widely studied or applied, even in hospitals. The work of the committee on human fertility of the RCOG, the biological and medical committee of the Royal Commission on Population and the central laboratory which the Family Planning Association hopes to set up in London should do much to promote a rise in standards.

KEEPING PENICILLIN IN THE BODY

THE systemic use of penicillin is still handicapped by the speed with which it is excreted in the urine. A continuous intramuscular or intravenous drip, or frequent injections, must be given to maintain a bacteriostatic level in the body fluids. In the early days, when every unit was precious, the excreted urine was sometimes recovered and used again, but the yield was variable and recovery was a laborious process.[1] Unless this is done there is a huge but unavoidable waste of material. A partial remedy has been put forward by Beyer, Woodward and their colleagues.[2] They have shown that if *p*-aminohippuric acid is given to dogs intravenously, so as to maintain a plasma concentration of 30–50 mg. per 100 c.cm., the excretion of penicillin is definitely delayed. Thus when 10,000 Oxford units of penicillin were injected intravenously into normal dogs, 60–98% of the amount injected was recovered from the urine in two hours; when the same amount was given to a dog receiving *p*-aminohippuric acid, only 30–37% was recovered during two hours, and the blood level of the penicillin was correspondingly raised and made more persistent. The *p*-aminohippuric acid is said to be remarkably non-toxic, the intravenous dose killing half the mice (LD 50) being 5·3 g. per kg. Beyer and his colleagues believe that penicillin is selectively excreted by the cells of the renal tubule into the lumen of the urinary tubes, and that *p*-aminohippuric acid limits this interference by the cells of the tubules. Whatever the theoretical explanation it sounds as though *p*-aminohippuric acid as an adjuvant of penicillin is worthy of clinical trial, to see whether the rate of excretion in man is depressed as much as it was in these experiments with dogs.

A CONFERENCE on the establishment of a world standard for penicillin opened at the Royal Society, Burlington House, on Oct. 16, with Sir Henry Dale, OM, PRS, in the chair. The delegates represent Australia, Canada, France, Great Britain and the United States, and observers have been sent by India, South Africa and other countries. The British delegates are Mr. C. R. Harington, FRS, and Dr. J. W. Trevan.

Dr. R. J. ROWLETTE, King's professor of materia medica and pharmacy at Trinity College, Dublin, lately president of the Royal College of Physicians of Ireland, and representative of the University of Dublin in the Senate of Eire, died on Oct. 14, two days before his seventy-first birthday.

Dr. JANET VAUGHAN has been appointed a member of the Royal Commission on equal pay.

1. See Florey, M. E. *Brit. med. Bull.* 1944, **2**, 11.
2. Beyer, K. H., Woodward, R., Peters, L., Verwey, W. F. and Mattis, P. A. *Science*, 1944, **100**, 107.

Special Articles

MEDICINE AND THE LAW

Patent Law Reform

INVENTIONS relating to foods and medicines are only partly the concern of the memorandum on patent law reform lately addressed to the Board of Trade by the Joint Chemical Committee. That committee consists of representatives of British chemical manufacturers (including ICI, the Distillers Company and Courtaulds), the Biochemical and the Chemical Societies, the British Association of Chemists, the Royal Institute of Chemistry, the Society of Chemical Industry, and the Wholesale Drug Trade Association. They agree to leave patents for foods and medicines to be dealt with as at present provided by section 38A (3) of the Patents and Designs Act, so that the Comptroller will continue to exercise his power of licensing the use of a patent and will thus supervise compulsory working. As to the improvement of the general law the committee wants to see a reduction of the number of invalid patents granted (an invalid patent wielded by wealthy concerns has its own "nuisance value") and to see the Patent Office standard of validity harmonised with that which the law courts apply. The committee also wants a new tribunal for litigants. In place of the High Court and the Patents Appeal Tribunal they advocate a special Patents Division of the High Court, consisting of three judges who have had experience of patent practice, with one or two persons selected from a panel of technically and scientifically qualified laymen. It is an ambitious proposal which the lawyers may be expected to fight.

To return to food and medicine, the main contribution of the memo is in the dissenting views of Mr. G. H. Frazer, who speaks for the Pharmaceutical Research Corporation of Great Britain. He thinks the pooling of patents, backed by a cartel agreement, enables the power of the law to enforce the power of the purse so that absolute monopoly is attained "however gross the exploitation of the public." He does not rule out pooling arrangements; without them, he says, the production of penicillin here and in the United States might have been impossible. But they ought not to keep newcomers out of the field or compel firms already engaged in the industry to adopt excessive price schedules or deliberately restrict output. In the pharmaceutical industry, he observes, the British affiliates of leading German chemical firms did not in fact manufacture any products here, although their agreements with their parent companies permitted it; they acted as agents for the sale of German goods while neither British nor German concerns would grant licences to British manufacturers seeking to start manufacture here.

There was the remedy under section 38A on paper, but British companies were the less anxious to spend money on protracted litigation with powerful rivals because of their impression that the courts were reluctant to grant compulsory licences, even where there seemed to be a cast-iron case of abuse of monopoly. Mr. Frazer does not object to the covering of alternative processes even when it is not intended to work them. But the interests of scientific progress, he considers, demand that the original discoverer of a new substance should have his protection limited to the receipt of a reasonable royalty and should not be able to use his string of largely unworked patents in alternative processes to stop everyone else from using any of those processes at all.

It has been suggested that restrictions on the scope of a patentee's monopoly would cause inventions to be kept secret and not protected. Mr. Frazer thinks little of this as regards new chemical substances. Chemical analysis can soon discover the composition of the compound, and the research staffs maintained by all big chemical manufacturers would soon penetrate the secret and devise a process for subsequent manufacture. To sum up, he thinks that section 38A has helped the pharmaceutical chemical industry inasmuch as the prospect of its being invoked has induced manufacturers to grant licences by mutual agreement. Voluntary licensing of patents is beneficial enough so long as the parties do not forget that the public also is concerned.

EVALUATION OF NUTRITIONAL STATE IN CHILDREN

WERNER KORNFELD
M D, PH D VIENNA

EDMUND NOBEL
M D VIENNA, L R C P E

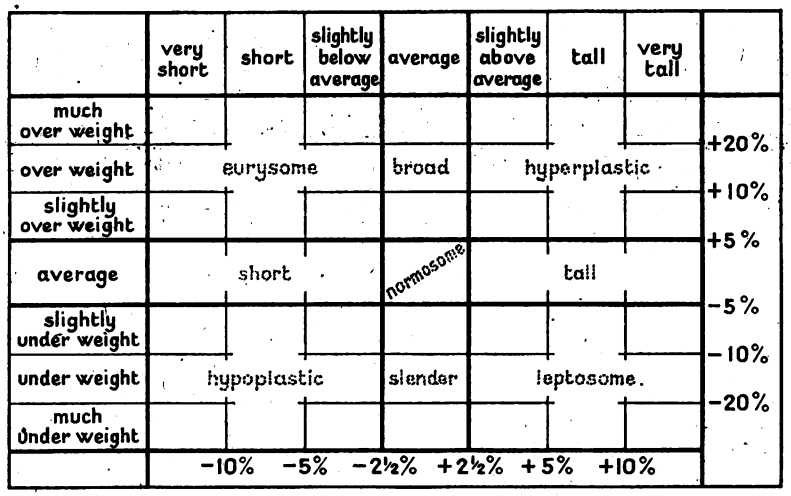
THE effects of this war will necessitate welfare measures, especially for children, on an unprecedented scale. After the last war the Amerikanische Kinderhilfsaktion (1919–22), and later other bodies backed by the Health Committee of the League of Nations (1933–34), did valuable work, in the course of which a need was recognised for reliable methods of estimating the nutritional state of children.

In relief work the comparative urgency of help for different regional and social groups has to be determined, and within such groups the most needy individuals have to be selected. For the first purpose we have used a simple height-weight-age relation (Kornfeld 1933, Nobel et al. 1937) which can be improved by using the "Pelidisi Index" of Pirquet.

This index is based on the assumption that, for appreciation of the nutritional state, the "sitting height" or stem length is a better basic measure than the standing height. It brings the weight, as a measure of masses, into a dimension comparable with linear measures. This is achieved by a formula in which the cubic root of the weight, multiplied by 10, is divided by the figure found for the sitting height. Tables for this index were given by Nobel (1936).

For the selection of the groups most urgently needing relief a simple classification according to the age-height-weight relation may suffice, and it can be made more complete by the use of Pirquet's Pelidisi index. But the question will arise, what standards of normality should be applied? Even before the war considerable differences were observed in different parts of Europe according to differences in racial stock, economic status, and living and working conditions.

We suggest that a first quick review of the basic anthropometric character of a given group of children may be obtained as follows. Their standing heights and naked weights are classified, in relation to age, according to a recognised evaluation table, and a mark is made, for each individual, in the appropriate section of the chart here reproduced. If the evaluation table is in fact appropriate for the particular population it will be found that the majority of marks are grouped around the centre of the chart, without any definite tendency towards one side or one corner. If the majority of marks are in the bottom left-hand corner, we know that for the particular group the mean values for height and weight are lower than those given in the evaluation tables which will need corresponding adjustment. If the majority are distributed over the lower part of the chart, but without a definite prevalence to right or left, we know that the table is applicable as regards the average height, but the children tend to be more slender—perhaps because of acute malnutrition, which has not lasted long enough to affect growth in height. (But actually we found that even a comparatively short period of malnutrition affects height as well as weight.) If the majority of marks are spread equally over the whole of the right side of the chart, we know that in this population the average standing height is greater than in the evaluation table, probably because of a difference in racial stock; and here again the table needs adjustment.



This chart contains 49 spaces. Using an evaluation table of height-weight relationships, a mark is made in the appropriate space for each child examined. Aggregation of the marks in a particular part of the chart indicates either that the group of children under examination is in an abnormal state (e.g., through malnutrition) or that the evaluation table is inapplicable to the particular population. The words in "ghosted" lettering cover the nine main sections of the chart.

When the table has been corrected according to the anthropometric characteristics of the population, as thus revealed, each child is reclassified, and his position on the chart will then give an idea of his nutritional state compared with the rest of the group under examination. The chart is thus useful both for showing how far a group differs from the normal, and for showing how far a particular child differs from his fellows.

Generally speaking a child, who in consequence of privation or neglect does not get enough food over a long period, will be definitely under weight; he will usually appear emaciated and his Pelidisi index will usually be low. The thickness of the subcutaneous fat as measured in the thickness of his skin folds in typical areas will be below the average. Not every thin and underweight child, however, is really undernourished, and that is where one of the most difficult tasks in selection starts. Also not every undernourished child shows the typical aspect of the thin child.

"Undernourished" means that this particular child has not had enough nourishment. How is this demonstrated in each case? Here the functional angle enters the picture. We must not consider undernourishment from a purely static or anatomical point of view. We know very well that there are children, living under ideal conditions, who are underweight and look skinny, but are perfectly healthy and functionally faultless, and have very good powers of resistance. On the height-weight correlation such children would fall within the "undernourished" and they can be separated from the really undernourished only by clinical examination, including examination of muscle tonus, skin turgor, and posture, and certain functional performance tests. Dynamometry and respirometry offer other possibilities for more detailed analysis of the functional state, but may not so easily find a place in mass examinations.

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The US War Department announced on Oct. 4 that tetanus had been virtually eliminated in the American armed forces as a result of compulsory immunisation of all officers and men. Not a single case of tetanus had been reported among completely vaccinated troops. There had been a handful of cases throughout the entire army, but these occurred only when the immunisation process had not been completed. In some instances men had developed tetanus before they had been vaccinated. The US Navy, which also requires tetanus immunisation, had no cases of the disease among sailors or marines wounded in combat up to Sept. 15, 1944.

"... A significant rôle in combating tuberculosis is played by vaccination with BCG vaccine. Its wide application resulted in a fall in tuberculosis infant mortality. During the four years following wide-scale introduction of the vaccine in Moscow and Leningrad the mortality among infants under a year decreased by 40%. It was also found that the tuberculosis incidence in infants was less than in a control group."—*Medicine, Moscow*, April, 1944, p. 4.

In England Now

A Running Commentary by Peripatetic Correspondents

WHEN the National Medical Service comes in I don't think I shall want to play. Any game where the players and their fans are at liberty to interfere with the referee, and at the same time the referee is expected both to control the players and to placate their fans, would be a bit too much like Italian water polo for my liking. But it seems a shame to write off all my very expensive training as a dead loss; the only alternative I can see is to withdraw my name from the register and to set up in business as a Quack. The drawback to this, of course, is that in most branches of the Craft of Healing you have to do grievous bodily harm to your patients with sharp implements. Even at sanatoria (some of them) they nowadays employ needles to insert air, gold, or insulin into the patients; and the patients (some of 'em) are beginning to expect and demand it. Dermatology, I believe, is getting just as bad. In fact, between you and me, the only safe opening for the Lay Worker is psychiatry. No needles, no night-work, no dangerous drugs, no death certificates. So why shouldn't I become a Lay Psychiatrist? I shall be able to charge what fees I like, reject those patients I don't like, and advertise. Registered colleagues will be called in (together with a JP and the relieving officer) to certify the psychotics I push over the border-line, and they will receive a guinea. Gratefully. ("Always pleased to help," they'll mumble a bit shamefacedly, "Any time you like. ... Day or night.") At the moment, I can't see any snags at all, but I wouldn't mind betting that the registered psychiatrists start bunging in dangerous drugs through needles the moment I get my name before the public on all the hoardings and theatre programmes. And after all, you can't blame them. Wouldn't you, in their place?

* * *

Forty years ago as a small boy among many boys on the touch-line of St. Paul's School football ground, misty in the veiled light of a December afternoon, with the school buildings fortressing in the background, I watched the Olympians of my own school, amid thud of foot and tackle and ripple and roar of cheers, steam rising from the scrum, battle with the great hairy warriors of this strange place, among whom I had been told at home was a son of my father's friend, Bishop Montgomery. I am reminded of this when I hear the Field Marshal on the wireless, giving one of his little talks, so obviously lineal descendants of the sweaty, lemon-scented, half-time exhortations, the gist of which is that you are doing well, but not so well that you can't do better in the second half. Thus I pondered on the attractive, perennial boyishness of professional soldiers and sailors, and my thoughts were led over dark waters.

No stage of an important mammal's life-history has been so studiously neglected and ruthlessly suppressed as the second-moult stage of the adult male human being. In truth he is the most aggressive and jealous of all creatures. He'll fight about almost anything—from the nature of the Trinity in the 4th century to abstract scientific theories in this. At Balliol they fight bitterly about Greek irregular verbs, and once at sea I met a bishop coming back from a Lambeth Conference who told me that he and another bishop after some theological tiff had decided that they would like to "debag" a third bishop. Not unfrock, mark you, but debag, a much harsher term. In short, when two or three late adult males are gathered together there will either be a scrap or it will be sublimated as a disparagement of some absent "friend." Proof can easily be obtained from non-militant expeditions, villages and the common-rooms of scholastic institutions. "Conscience," "matter of principle," "good of the country," "morality," "freedom," these are the words they toss to the women and children, so that they shall not do likewise. And don't quote the mild man at me; he, I know, is having the most awful scraps with phantoms and making the most devastating replies to imaginary people. Why this aggressiveness? That jade, Nature, would reply in two sentences. The poor ruddy ant got stuck in the Miocene simply because one of them couldn't do a damn thing without consulting 50,000 others. This new insect has got to be a self-sufficing unit, an individual. The politician, of course, doesn't see this. He won't learn from India and Ireland, who, obeying a longer wisdom, would much rather muck about on their own in their own middens than slave in the efficient Whitehall pigsties. Although the politicians don't see that, the innate wisdom that comes from their genetical constitutions and not from their intelligences will demonstrate it when the war is over. They'll all fight like—late adult males.

The trouble with Germany is not Hitler, but that there is only one of him. We average three to a parish council. But not so cruel, you say. I don't know—look at the things men will do for fun to pheasants and rabbits, who can't complain. Well, not so megalomanic then. I believe absolute power would make a threadworm megalomanic. Power corrodes the balance of judgment. but when all adult males are properly and naturally aggressive, power is a scarce commodity. The individual aggressive mechanism failed in Germany, that is why they are so docile behind an aggressor. Right, dismiss Corporal S. As you were. Well, with this composition a man in civilised life still has to pretend to be a peaceful curate, counter-jumper or carpetbag maker—and the strain is very, very ageing. Even the psychologists have found out what the cruder forms of inner conflict can do to a man. But the professional warrior is different. He can spend all his second half in fighting or preparing. arranging and managing fights, and openly enjoy it and be cheered for doing it. That is why "Monty" and his like seem to register on their clocks about half the miles they have actually done.

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The Japanese are what they are, and many of us have looked forward to seeing them get what is coming to them. But we could scarcely improve on some of their own devices for making themselves uncomfortable. judging by an account of their "neighbourhood associations" in the magazine *Fuji*. These associations are described as an extension of the family and an epitome of the nation; and as sociological experiments they evidently demand attention.

Mr. Mitsuo Hasegawa, it seems, is the leader of a neighbourhood association on the left bank of the Sumida River, not far from Tokyo, and 26 households writhe beneath his patriotic heel. The children of these families are born members not only of the neighbourhood association but of the Children's Society, also called the Early Rising Society. At 5.30 AM a drum is sounded and every member of the association—except those who are ill—must then leap from his mat or (in winter) off the stove. Visitors to the association, it is admitted, are much bothered by the drum so early in the morning: and people in other associations across the street have also been upset.

Mr. Hasegawa was from the beginning quite aware of these complaints. "Let them oppose what I do, if they want to," he said. "If it is a question of who will lose heart first, I let them see that mine is the stronger will." Thus by his indomitable persistence he has managed to get what he wanted.

The same thing happened over the shortage of hair-oil. Mr. Hasegawa thought it would be a good opportunity to get all heads shaved, so he called the boys together and told them so.

They agreed without a single voice in opposition, and in a twinkling there were nothing but beautiful shaven pates everywhere.

His style with smokers also had a grand simplicity.

"I called a conference of smokers and told them tobacco queues had started and it was impossible to get tobacco without queueing. 'My view is that it would be better simply to give up smoking. What do you think?' Without a single exception the 24 smokers present all agreed. ..."

One of them, indeed, laid his remaining cigarettes on the household altar and vowed never to smoke again.

Mr. Hasegawa has been equally efficient and successful in arranging the semi-compulsory purchase of national bonds, mothers' meetings, gymnastic meetings, and the joint purchase of all food—this last entailing a sort of relay race from house to house the moment the goods are delivered. ("Even though the summons comes in the middle of a meal, chopsticks are thrown aside.") We must yield him our admiration, but as liberators of the oppressed our task is unfortunately plain.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

THE House had an extra session on Monday, Oct. 9, to make progress with the Town and Country Planning Bill which is moving slowly and, like the Education Bill, consuming a good deal of parliamentary time. Since then there have been private conferences on the bill behind the scenes and an announcement of great alterations in the provisions for payment of compensation to landlords and especially owner occupiers. All this not only means more days of discussion but also puts all other legislation back. Clearly the social security legislation will be as slow, if not slower. The House is disappointed with this situation, which is only offset by the grand progress made in the war. Members were cheered to hear that the Prime Minister had gone to Moscow, accompanied by the Foreign Secretary, for private talks and staff consultations. The Polish prime minister has also gone, and Marshal Tito is said to be on his way. Those who know what a notable part Mr. Eden played in the recognition by the Allies of General de Gaulle's authority in France hope for another success with Poland.

As the fog of war clears up a fog of peace and armistice discussions settles down. And the House would like to see this dim atmosphere cleared. Meanwhile the bill to redistribute Parliamentary seats in the twenty-five largest constituences at once and to make provision for periodic redistributions of all seats in the future has passed its second reading, and other bills have made progress. The present session will end soon, and at the beginning of the new session the King's Speech will indicate the Government's bill of fare for 1945. Until we get this we are in the dark as to what is likely to happen. But it looks as though this session, which will probably be the last of this Parliament, will be dominated by armistice arrangements for Europe and social legislation. How much more will be possible is an open question. We can get on with proposals for the development of civil aviation because a measure of general agreement is possible. Lord Beaverbrook's statement in the House of Lords shows how interesting is the prospect before us. We can also get on with arrangements for demobilisation, resettlement, and the switch-over from war to peace production. The transition from war to peace also gives us the best opportunity to get on with the proposed National Medical Service by including changes in hospital organisation and by developing group practice and a new domiciliary service. It is to be hoped that the chance will not be missed.

FROM THE PRESS GALLERY

Beds for Tuberculosis Patients

ON the motion for the adjournment in the House of Commons on Oct. 10, Sir WALDRON SMITHERS called attention to the increase of tuberculosis in Kent and the lack of institutional accommodation for patients. He had visited a constituent of his, Mr. Hopper at Petts Wood, who was dying of the disease. Yet the patient's wife, her sister and two children, one aged nine months and the other five years, were all living in the same house, and liable to infection. Sir Waldron suggested that the available accommodation might be more economically used. He had been told by an expert that tuberculosis cases allowed to be free in their own homes, or in contact with the public, infected on the average 9 other people each, and the expert had added that it would take ten to fifteen years to break down the present firmly established vicious circle. Why should the admission of patients be strictly in accordance with the date of recommendation? Surely some consideration should be given to the state of health, age and home surroundings of the patient. He had received a letter from the medical officer of health for Kent saying that his object was to get the patients back to the labour market. That seemed to Sir Waldron a callous and soulless remark to make. The conditions at the clinic at Bromley were appalling. There were no beds, and the accommodation for patients was primitive. The tuberculosis officer was a splendid man and was heartbroken at the distress around him and his inability to help. When Mr. Hopper, at Sir Waldron's request, was taken in by the Brompton Hospital both the county medical officer and the Brompton medical officer said he was dying, but the hospital was able to make him comfortable in his last hours. Yet the Minister of Health, to cover up his tracks, had written to Sir Waldron saying that Mr. Hopper's condition was in the opinion of his advisers, worsened by his journey to the hospital. The medical officer of health for Kent said in a letter to Sir Waldron:

> "You will appreciate that the doctor at the clinic at Bromley is an officer on my staff, but as tuberculosis officer to the Bromley area he is not familiar with the questions of policy raised. In any event, as a subordinate officer on my staff, it would be improper for him to answer your questions."

Sir Waldron suggested this letter was a foretaste of a State-run medical service, a service run too much by people sitting in offices and tending to get out of touch with the realities of medical practice. If the Minister of Health had been strong enough, he would have got the necessary staff from the Minister of Labour and he would have taken action to see that such labour as was available was economically used. He thought that the health authorities of Kent were frightened of publicity. The medical officer of health had complained that Sir Waldron had shown a report of his to Mrs. Hopper, and said that if his letters were to be shown to a third party he must obtain the instructions of the members of his committee as to his future course of action. Sir Waldron concluded by saying that he thought the war bogy had been overdone: we had an enemy in the Germans, but another enemy was tuberculosis in Kent.

Sir HENRY MORRIS-JONES also thought that the remarks of the chief medical officer about his subordinate officer was characteristic of what was likely to happen in this country when we got a National Health Service under the State. There was a medical man who when asked his opinion was not allowed by his superior officer to give it. That sort of thing would have been quite impossible in a voluntary hospital. He agreed that the position in regard to the institutional treatment of tuberculosis cases was serious. It was time that the Minister of Labour released more women for domestic and institutional help.

Miss F. HORSBRUGH, Parliamentary Secretary to the Ministry of Health, in reply, pointed out that because institutional treatment was not arranged earlier for Mr. Hopper had made no difference to his recovery. But he was spreading infection, Sir Waldron interjected. Patients, Miss Horsbrugh continued, who would benefit most from sanatorium treatment and rest had to be admitted before other cases which, although distressing, would receive no lasting benefit from treatment. She agreed that there should be sufficient accommodation for both kinds of case, but the real difficulty was shortage of nursing and domestic staff. The pool of trained nurses had at present to be drained for service all over the world. There was a demand for more midwives, more mental nurses, more staff for sanatoria and more general nurses. The Minister of Labour had set up a national advisory council for the recruitment and distribution of nurses and midwives. But it was as important to get enough domestic workers, and the Minister of Labour had been asked to do more about this. The death-rate from tuberculosis was down practically to the figure for 1938—there was a small increase in the number affected, but nowadays the disease was being discovered earlier. The Ministry of Health and the local authorities were doing their best, and she believed that there was at this moment an economic use of the available facilities. The facilities were admittedly not great enough, but she hoped that when the war ended they would be able to get on with a bigger and better health service which would have the approval not only of the House of Commons but of the country as a whole.

SILICOSIS RESEARCH IN CANADA.—Major LLOYD GEORGE is aware of the experiments at McGill University, Montreal, on the treatment of silicosis by the inhalation of aluminium powder. These experiments are being closely watched, by his department and by the Medical Research Council, but the results are not yet sufficiently conclusive to justify the adoption of this treatment at British mines. (See THE LANCET, July 8, 1944, p. 50.)

QUESTION TIME

Psychiatric Treatment in Prisons

Replying to a question, Mr. HERBERT MORRISON said that the Prison Commissioners had appointed two experienced consulting psychiatrists to act as part-time medical officers at Wormwood Scrubs and Holloway prisons. The medical officers at all prisons had been fully instructed as to the types of case in which psychological treatment may be beneficial and these cases were transferred to Wormwood Scrubs or Holloway for assessment and treatment. The psychiatrist at Wormwood Scrubs was appointed in February, 1943. During 1943 he examined 60 male prisoners, of whom 42 were found to be unsuitable for treatment and 18 received full courses of treatment. The psychiatrist at Holloway began work in April, 1944; she had so far investigated 25 cases, of whom 7 were receiving active treatment.

EMS Hospitals

Sir E. GRAHAM-LITTLE asked the Minister of Health how many EMS hospitals were now administered by his ministry; how many of these were controlled by local authorities; whether the medical officers attached to these hospitals, but not forming part of the original staffs of the local authority hospital, came under the discipline of the hospital superintendent.—Mr. H. WILLINK replied: Hospitals in the Emergency Hospital Scheme are administered by their normal governing authorities and not by my department. The scheme now includes 1640 hospitals, of which 671 are controlled by local authorities. Medical officers attached to a local authority hospital are under the discipline of the hospital authority, which is generally exercised through the medical superintendent.

Temporary Houses and Model By-laws

Mr. A. C. BOSSOM asked the Minister if he was satisfied that the emergency houses, of which the prototypes were to be seen at the Tate Gallery, would be satisfactory from both constructional and hygienic points of view; and in what way they did not conform to his ministry's model by-laws.—Mr. WILLINK replied: These prototypes have been approved by the Burt Committee from the constructional aspect, and they will, I am advised, be satisfactory from the hygienic point of view under the conditions of licensed use in public ownership. They do not conform to the model by-laws in regard to height of rooms and ventilation under the ground floor, and questions may arise in regard to siting and the position of outbuildings.

Free Milk Scheme

Mr. W. R. D. PERKINS asked the Minister of Food whether he was aware that the wife of a private soldier with one child received 47*s.* 6*d.* a week allowances; and whether, in view of this recent increase, he would raise the present limit of 46*s.* for free milk.—Colonel J. J. LLEWELLIN replied: Under the Welfare (Foods) scheme those who are not eligible for free supplies of milk are able to purchase their supplies at the reduced price of 2*d.* per pint. There is no evidence that families with incomes above the present levels at which free supplies are permitted are unable to meet this small expense.

TUBERCULOSIS AND INSURANCE BENEFITS.—Sir W. JOWITT said that under the Government's new proposals for insurance benefits tuberculous people will be in the same position as other sick people.

PRODUCTION OF PENICILLIN.—Sir A. DUNCAN announced that a large plant for penicillin production now being erected in this country would be managed by the Distillers Company as agents for the Ministry of Supply, and would begin production next spring.

Mr. L. C. AMERY added that in India penicillin was at present produced only on a laboratory scale. The possibility of its manufacture was being investigated, but some considerable time must elapse before production could begin there. No difficulty was anticipated in meeting from elsewhere all Indian military requirements.

MEDICAL RELIEF FOR GREECE.—Mr ARTHUR HENDERSON said that plans had been made by the United Kingdom and United States authorities, in collaboration with the Greek government, for the introduction as soon as possible of relief supplies of food, clothing and medical supplies. UNRRA would act as agents of the military for the distribution of these supplies.

Letters to the Editor

"NERVOUSNESS" AND PENSIONABILITY

A LEADING CASE

SIR,—Mr. Gilbert Frankau has published his case as presented to the Pensions Appeal Tribunal. He enlisted in October, 1914, was at the battle of Loos a brigade-major and on the Somme and in Italy. After two years of foreign service came a breakdown and the grant of a pension in 1918. This was stopped in 1920, "aggravation having ceased," and he carried on with apparently some residual symptoms till, in spite of this history, he received a commission in the Air Force for administration and special duties. In 1941 he was invalided out for anxiety neurosis; a pension was refused and this successful appeal followed. The tribunal gave him a fair and patient hearing, and in his summing-up the chairman showed an unusual appreciation of the relevant psychological factors.

G. F. is, in my diagnostic pigeon-holing, an overscrupulous obsessional with an inner urge towards an impossible ideal, and I should expect to find symptoms beyond those revealed in his story. In a situation like that he met with in the Air Force, such a man tends to break down as he did; the sequence is common in civil life, and there was room for doubt whether his trouble was pensionable if only this war was to be regarded. The tremor described probably has a relation to some episode in the last war, being the kind of hysterical symptom that is often grafted on an obsessional state.

He took action, however, as a protest, declaring that "It was laid down at the very beginning of this war in documents never disclosed to the House of Commons that only the most exceptional cases of war neurosis should be pensionable." Whether this be true or not, such a facile way out of a chaotic situation is favoured by some of the most eminent. The chaos is expressed in the nomenclature, and this case at one time or another called forth the diagnostic appellations of shell shock, neurasthenia, chronic affective disorder, psychoneurosis, anxiety neurosis, war neurosis, nervous breakdown, nervous disability, and neurotic temperament. This last, the product of an unholy union between mythopathology and moral condemnation, was unknown to Galen; but Galen was no neurologist. We are now threatened with exhaustion neurosis and battle exhaustion.* Why not use an ordinary word and say *nervousness*? We can then give or refuse a pension for chronic nervousness, which would exclude insanity, mental deficiency, and behaviour disorders now ascribed to psychopathic personality. Neither patient nor public would think such a label indicated a mysterious disorder coming out of the unknown, and not even a member of parliament could make a bogy-word out of it.

The principle attacked by Mr. Frankau rests upon a belief that a "psychoneurosis" has a material aim, even though that aim may be unconscious, and that to remove the possibility of pecuniary gain (e.g., of a pension) is the first step in prevention or cure. The examination of hundreds of people at work, however, has shown me that nervous symptoms occur with great frequency when no such gain can be detected and the sufferers, often by great effort, carry on their work in spite of the symptoms. I have recorded that in this research I met men who suffered from nervousness due to the Old War but whose condition was unrecognised and unpensioned. They were at work, but I have met men disabled from work in similar circumstances. Moreover, the mere threat of another war sometimes caused a breakdown in men who had carried on thus without treatment or pension. On the other hand I have known the man who regarded a pension as a just reward for having "done his bit"; I knew, too, the drooping derelict who whines "I was an A1 man when I joined the Army, and look at me now!"

Observations made by me 25 years ago show that I recognised even then the difficulties of the situation. I wrote (*Psychoneuroses of War and Peace.* 1920) about men in hospital.

* I see in the *Lancet* of Sept. 2 an article on "Cardiac Neurosis as a Manifestation of Hypoglycæmia." What on earth is a neurosis?

Some were intelligent men eager for cure, others were lacking in any desire to help themselves or allow others to help them, and the worst among them were properly described as mental defectives (p. 38).

I have received letters from men whose good-will I have no reason to doubt and must confess to disappointment as to their progress, although on discharge they seemed fit to carry on their ordinary life. A minor illness or perhaps some excitement causes a set-back and the subsequent diagnosis and treatment are not often on the lines of any rational psychotherapy (p. 52).

The renewal of a useful adaptability to social demands is the most difficult and unsatisfactory problem of treatment (p. 53).

I also studied predisposition, taking as my standard that "with my present knowledge I would, on psychological grounds, have rejected the man on enlistment, with his previous history, as now known, placed before me." A classification of 415 cases resulted as follows :—

	Percentage of the whole	*Average service abroad in months*
1. Previous condition aggravated by warfare	19·5	12
2. Previous condition aggravated by strain of army life	6·5	10
3. Previous condition apparently unaltered	10·1	2·7
4. No predisposition; symptoms followed actual warfare	57·6	19
5. No predisposition; symptoms followed strain of army life	1·9	20·5
6. Weak herd instinct. [A euphemism for recognisable self-seeking or malingering.]	4·3	4

The negative correlation between predisposition and length of service abroad confirms the general accuracy of my estimate of that quality, and I noted that the good average service of group 1 depended upon the presence of members of one diagnostic class (that in which I place G. F.) "who sometimes withstood with great endurance the strain of war." The numerical preponderance of group 4, with a record of service that would perhaps compare favourably with that of any other group of ex-Service men, is to be noted when one is faced with a general condemnation of "war neurotics."

There are some favourable changes since these observations were made. Psychiatrists, in spite of influential opposition, have excluded from the Army numbers of men who would have come into groups 1, 2, and 3, though many still slip through. Treatment, too, has progressed. The method of abreaction was, to speak in meiosis, derided by the very best people in those early days. Now it is a commonplace and freely used close to the battle front, though I am credibly informed that it is still occasionally obstructed in this country by surviving obscurantists who prefer kick-in-the-pants therapy. Speaking as a clinician, I think speedy treatment by abreaction will arrest the consolidation of symptoms that used to occur so often, but psychiatrists using this method are still too few; for this and other reasons we may expect to be faced with large numbers of men more or less affected by the emotional stresses and horrors of war.

The ex-soldier with symptoms, or who has once suffered a relapse, is aware of his nervousness and finds it a handicap in the open labour market. If he belongs to my group 4 he rightly attributes it to his war service; add to this a sense of economic insecurity, whether in addition to or resulting from his condition, with a suspicion that his symptoms are belittled, and many a decent citizen is turned into a man with a grievance. It does not make sense to lay down as a first principle in the handling of the nervous ex-soldier (who, let us bear in mind, has often fought bravely and long) that "in his own interest" (for so the argument goes) he should not receive a pension.

London, W.1. MILLAIS CULPIN.

BACILLARY DYSENTERY

SIR,—Lieut.-Colonel Scadding, replying on Sept. 9 to my letter of July 15, considers that his statement, 'the type of dysentery current (in Middle East) was mild," was justified. Having carefully considered his comments, I still think that my suggested amendment, which reads "In a series of 1400 cases in which all potentially severe cases were treated with sulphonamide drugs, the course of the disease was mild," gives a more accurate picture of the true state of affairs. I would point out that although it may contain a "therapeutic implication," it is none the less a statement of fact. I agree that the point has no bearing on the theme of Lieut.-Colonel Scadding's paper, but his statement about the mildness of bacillary dysentery in Middle East might well be quoted out of its context when the general subject of sulphonamide therapy in bacillary dysentery is under review.

A disjointed argument will lead nowhere; and so we must agree to differ. I would like however to answer the final point raised by Lieut.-Colonel Scadding. It is one of the regrets of my life that we did not know of the action of sulphonamides in bacillary dysentery until our attention was drawn to it by the use of sulphaguanidine. Far from holding the opinion he suggests, I have little doubt that if we had made use of the preparations then available—sulphanilamide and sulphapyridine—the history of bacillary dysentery in those early days would have been very different, and many valuable lives would have been saved.

Fortunately, our difference of outlook on this question will settle itself automatically. If, in the course of years to come, and other than through the development of proved sulphonamide-resistant strains of organisms, bacillary dysentery again becomes a severe and killing disease in a community which is comparable to the military population of Middle East and in which early treatment with sulphonamides of all but the mildest cases is a routine measure, the honours go to Lieut.-Colonel Scadding. If on the other hand it continues to be, as it is now, a non-killing and in fact a comparatively trivial disease, I have no doubt he will be prepared to admit that my observations and deductions have not been inaccurate. I am well content to await the verdict.

B.L.A. J. S. K. BOYD.

RESERVATION OF MEDICAL STUDENTS

SIR,—I have been approached on several occasions by medical students whose reservations have been cancelled by the Ministry of Labour because they have failed in one examination in the medical course. The most onerous effect of this procedure is seen in cases where a student has failed in the second MB examination at a university but has passed the equivalent examination of the English Conjoint Board, and upon the latter achievement has been accepted for his clinical training at a London teaching hospital, and some months later—in one instance after the student had completed 9 months clinical training to the satisfaction of the hospital authorities—has been called up and forced to relinquish all prospects of qualification.

The Minister, in reply to myself (*Hansard*, July 29, 1943), described his procedure as follows—

> "One of the conditions for the continued reservation of a medical student is that he shall be periodically certified by the responsible authority of the university or other training establishment as making satisfactory progress in his studies. This restriction is necessary not only for some general reasons but because the number of places for medical students is limited and an unsatisfactory student is not only failing to qualify himself but is preventing someone else from doing so."

I submit, Sir, that this is putting too high a premium upon the result of one examination. There must be few of us who have not failed at some part of the very arduous preparation for the medical profession.

I have repeatedly pointed out in such cases to Mr. Bevin that the consequence of his regulations is to withhold from qualification a number of candidates for the medical profession and thus invalidate the success of schemes for postwar reconstruction which depend so largely upon securing an adequate number of doctors to work them. The demand is likely to be at least three times as great as the present supply, and, in as much as the minimal period for training a doctor is some six years, preparation for that demand should be put into operation now.

House of Commons. E. GRAHAM-LITTLE.

RECTAL SWABS IN THE DIAGNOSIS OF BACILLARY DYSENTERY

SIR,—In Khartoum Civil Hospital the rectal swab has proved valuable in the diagnosis of bacillary dysentery. It gives a higher percentage of positive results than plating direct from the stools. In the last 61 cases admitted a rectal swab was taken at the same time as a stool was passed and both were sent together to the Lee-Stack Laboratories. Stool and rectal swabs were both positive in 36 cases; the rectal swab was positive and stool negative in 21 cases; and in 4 the rectal swab was negative and stool positive. The corresponding figures in 79 positive cases reported in children by Cruickshank and Swyer (*Lancet*, 1940, ii, 803) were 36, 34 and 9. The following table gives details of the type of infection.

	RECTAL SWAB		DIRECT STOOL	
	Positive	Negative	Positive	Negative
Shiga	32	2	22	12
Flexner ..	20	1	14	7
Sonne ..	2	1	3	0
Schmitz ..	2	1	2	1

The ages of the patients ranged from 6 months to 60 years and most of them were natives of the Sudan. The higher percentage of positive results given by the rectal swabs may be accounted for by the fact that the intestinal flora in native stools is very profuse and quickly overgrows the bacillary organisms, especially in a hot climate. In young children the rectal swab has the additional advantage that it avoids delay in obtaining specimens for bacteriological confirmation, is less messy and is easier to handle than fæcal specimens.

R. M. HUMPHREYS
Instow, N. Devon. Senior Physician, Sudan Medical Service.

RAT-BITE FEVER DUE TO *STREPTOBACILLUS MONILIFORMIS*

SIR,—There was admitted to Purdysburn Fever Hospital, Belfast, on April 14th, 1944, a boy of 15 years as suspected typhoid. This city schoolboy while hiking on March 18th had been bitten over the terminal phalanx of his right index by a rat which he pulled off and killed. The wound healed readily with domestic dressing. Thirteen days later he became sharply ill with rigor, vomiting and headache, and his temperature when taken was 105° F. His temperature returned to normal after about three days and his symptoms disappeared. Two similar attacks followed periods of apparent normality before he was admitted to a general hospital on April 12 for investigation. There his Widal was found positive to a titre of $\frac{1}{160}$ to *Bact. typhosum* (H) and on this he was transferred for isolation.

On admission, although he was actually in an acute pyrexial phase, there was nothing outstanding to note in his clinical condition. He was dull, but detailed his story without confusion. He had had no disturbance of sleep, made light of his headache, and admitted rigors. His tongue was moist and lightly furred and he was constipated with a distended abdomen. There was a small well-healed scar where the rat had bitten but no tenderness or induration and no lymphatic involvement. There were no abnormal findings in heart, lungs or CNS, and no rash. His temperature was characteristically relapsing. At first relapse occurred at regular five-day intervals but later became irregular, tending towards shorter and milder attacks with longer free periods. Four-hourly recordings throughout his stay in hospital show no disproportion between pulse and temperature. The temperature rose gradually over two days to a peak with a sharp fall to subnormal terminating the relapse. The highest temperature recorded was 106·2° F. Loss of weight was not pronounced; in the free intervals his appetite was good. On only two occasions was albumin found in the urine. There was never arthritis and only a slight degree of muscle tenderness consistent with his protracted stay in bed. A rash was first present at his 26th day of illness and reappeared with every subsequent relapse. It was limited to the face, neck, shoulders and arms. It consisted of dusky red ill-defined spots $\frac{1}{4}$–$\frac{1}{2}$ inch in diameter, not raised and without induration or itching, and lasted for about two days each time.

Investigations included repeated Widal tests which remained positive to *Bact. typhosum* until 75th day. Stool and urine grew no typhoid organisms and a blood-culture in trypsin broth was sterile. The diagnosis of *Streptobacillus moniliformis* septicæmia was established upon four successive cultures of this organism from the boy's blood on Loeffler slopes and 50% serum-broth. In addition animal inoculation resulted in the death of a guineapig with recovery of the streptobacillus from its heart-blood and peritoneal fluid. Extreme leucopenia was a feature of the illness. The lowest count was 1200 per c.mm., and not until after clinical recovery did the figure rise above 4900. Serum tests for syphilis were positive, as was the Paul Bunnell reaction. The Weil-Felix was negative. No parasites were found in blood-films.

No specific treatment was considered until the diagnosis was beyond doubt. As spirillary infection was not established arsenical therapy was deferred, and following the experience of American workers that sulphonamides were without effect gold was chosen for treatment. The boy had received two intramuscular injections of 'Myocrisin' when, at his 50th day of illness, the organism was found to be penicillin sensitive. The gold therapy was discontinued and at the onset of the next relapse intramuscular penicillin was commenced. He was given 200,000 units in 48 hours. His temperature had returned to normal within 12 hours of starting penicillin, and during the remainder of his stay in hospital—14 days—was never above normal. In all he was 62 days in hospital with nine relapses during that period. He recovered completely without complication and has remained well since.

A full report of the case will appear in the next number of the *Ulster Medical Journal*, which is in the press.

Purdysburn Fever Hospital, Belfast. F. F. KANE.

THE WHITE PAPER REVIEWED

SIR,—Like Mr. H. R. Arthur, whose letter in your issue of May 27 I read with great interest, I have had nearly four years in a state-run medical service; and I am in general agreement with him. In fact, I must say that I was considerably surprised, when the white-paper was eventually published, by the amount of freedom which the national medical service described therein allowed.

Gordon Malet, writing in the *Spectator* of May 5, emphasises that "First and foremost, the doctor wants to be a free man." He goes on to enumerate the various freedoms:—

> "... Free to speak to his patients as it is sometimes his duty to speak to them, without thought of repercussions. Free to treat them as he believes best, not according to a pamphlet from Whitehall. ... Free, finally, to stand on his own two feet, sure of his position and of himself. ... If he is to serve his patients as he should, he must have no fear of the consequences."

It was, if I remember rightly, in a leading article in a contemporary medical journal, that the work of the Ministry of Health was described as "the forestalling of complaints rather than the achievement of progress." Such an attitude of a governing body *must* be guarded against in a state-controlled medical service. The Urban Practitioner who reviewed the white-paper in your issue of April 1 was fully aware of this danger. "A few mistakes," he wrote, "a few angry complaints and questions in Parliament and the borough-council chamber, and not only the defaulter but his innocent colleagues will find themselves disciplined and restrained, the range of their responsibility curtailed, their procedure dictated." I am sure that Mr. Arthur does not want the "different freedom" of which he speaks to involve this sort of thing.

Finally, I would like to quote one more writer, who, 60 years ago, when a step was being taken towards the control of medicine by the state, wrote:

> "I am more convinced than ever of the futility and worse of the Licensing system, and think, with Adam Smith, that a mediciner should be as free to exercise his gifts as an architect or a molecatcher. The Public has its own shrewd way of knowing who should build its house or

catch its moles, and it may quite safely be left to take the same line in choosing its doctor."

(Prefatory note, dated April 12, 1882, to *Horae Subsecivae*).

The circumstances now are different, but Dr. John Brown's contention that both doctor and patient should be free, the one to exercise his gifts and the other to choose his doctor, still holds good. Whatever freedoms may be sacrificed, both by doctor and patient, in accepting the national medical service, let us not sacrifice these.

Tanganyika Territory. THOMAS H. WHITE.

CLOSED PLASTER

SIR,—In the Spanish Civil War I held a responsible position in the Medical Corps of the Republican Army, and I should like to point out to Colonel Cutler that the reason why we used the closed plaster method was not because we were short of Thomas splints, as he suggests in his article. The closed plaster method owes its success to Dr. Trueta, who convinced the Consultant Army Surgeon that the method he was using with great success on civilian casualties could also be applied to the army. In December, 1937, a year and five months from the commencement of the war, Dr. Trueta's method was organised on a large scale and used by the military. The Medical Corps of the Republican Army organised first-class assistance for the wounded, and some of the Spanish methods have been emulatedin this present war —for instance, the blood-transfusion service and the use of forward surgical units. The Russians particularly took a great interest in our methods, and re-discovered the closed plaster technique after its use in the Spanish War. As Colonel Cutler mentions, they were already aware of this method, which had been practised by Pirogov, but I think I am right in stating that the Russians did not use this technique in the Great War (1914); after its success in Spain it was used in the Russo-Finnish War, and referred to in the medical reports as the "Spanish or Barcelona method."

Ancoats Hospital, Manchester. F. DURAN-JORDA.

EXPERIMENTAL TRACHOMA

SIR,—The statement in your annotation of June 17 (p. 794) that macaques are quite unreliable for trachoma research requires elaboration. If we can trust reports *M. rhesus* is probably the most reliable animal we have and has largely been used by Julianelle and others, but only 50% of the animals are susceptible and this necessitates their use in large numbers if negative results are to be significant.

You suggest that my statement that, because of the prevalence of spontaneous folliculosis in the grivet, "all previous experiments in which grivets have been used must be regarded as invalid" is unnecessarily drastic if reasonable precautions have been observed. Can we be too drastic in our demands upon experimental work? I think not. In any case, of the previous workers with grivets only F. H. Stewart (in the report of this laboratory for 1933, p. 142) urges the need for precautions. His rules may be summarised thus:

(1) No animal is regarded positive for trachoma unless follicles appear about the 20th to 30th day and cover the whole conjunctiva of the upper fornix;
(2) Animals with follicles to be avoided for experiments;
(3) All animals to be tested by non-trachomatous inoculation before use for trachoma experiments.

None of these precautions is sufficient. My experience shows that a grivet without spontaneous follicles may develop a crop covering the whole upper fornix at any time. If this occurred between the 20th and 30th days after inoculation it would completely falsify a trachoma experiment. Stewart's third rule is rather strangely put forward on the very page following a list of 69 experiments showing that spontaneous folliculosis is not produced by non-trachomatous inoculation. In view of these, the precaution seems pointless. In my experience, folliculosis seems unrelated to trauma and I do not consider Stewart's third precaution satisfactory. Thus, in none of the previous experiments on grivets have satisfactory precautions been taken and therefore they are indeed invalid. It is hard to see what other precautions could be taken against this disease since nothing is known of its ætiology.

Your statement that "the grey baboon (*P. hamadryas*) is a perfect experimental animal for trachoma" I have, alas, found untrue. Since publication of my paper on the grivet I have had opportunity to make a study of a small group of young *P. hamadryas* (the results will shortly appear elsewhere), which shows that this animal is just as susceptible to spontaneous folliculosis as the grivet and therefore just as unreliable.

You give an interesting hypothesis to explain the absence of inclusions in trachomatous monkeys but I cannot find any published work which supports this. A similar but shorter statement is made by Stewart (*Brit. J. Ophthal.* 1939, 23, 373) but also without experimental details or references. The matter has a great importance for some experiments of my own and I should be grateful for any references to published work or details of any observations.

Memorial Ophthalmic Laboratory, Giza, Cairo. JOHN BLAND, Pathologist.

CHOOSING THE STUDENT

SIR,—Miss Heim and Miss Timpany have drawn attention to discrepancies in our article on examination results and an intelligence test (*Lancet*, Aug. 26, p. 294). We regret that in the final draft when two tables were condensed into one to save space, a column of figures was incorrectly substituted. Table I, third column, which gives the distribution of scores obtained in 1942, when unlimited time was allowed for the performance of the test, should read:

Score	Distribution %
54–60	53
49–53	27
44–48	13
37–43	6
28–36	1

We apologise for this mistake, and hope that anyone interested in the original article will apply the necessary correction. The remaining figures have all been carefully rechecked, and do not require alteration, and our conclusions remain unchanged.

O. G. EDHOLM.
Queen's University, Belfast. Q. H. GIBSON.

TROPIC OR TROPHIC?

SIR,—In your issue of Sept. 30, Dr. Meyer argues in favour of the word gonadotropic and against gonadotrophic. The fact is that both are wrong. The pituitary hormone neither turns towards the gonads nor does it nourish them; it stimulates them, and should therefore be described as gonado*kinetic*. Similarly we should speak of the thyrokinetic hormone and so on. But I expect it is too late to point that out now.

Whitchurch, Bucks. RAYMOND GREENE.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED OCT. 7

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1932; whooping-cough, 860; diphtheria, 509; paratyphoid, 7; typhoid, 7; measles (excluding rubella), 2492; pneumonia (primary or influenzal), 628; puerperal pyrexia, 166; cerebrospinal fever, 24; poliomyelitis, 19; polio-encephalitis, 0; encephalitis lethargica, 1; dysentery, 390; ophthalmia neonatorum, 58. 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 Oct. 4 was 707. During the previous week the following cases were admitted: scarlet fever, 36; diphtheria, 12; measles, 12; whooping-cough, 18.

Deaths.—In 126 great towns there were no deaths from scarlet fever, 1 (0) from an enteric fever, 3 (0) from measles, 6 (0) from whooping-cough, 10 (1) from diphtheria, 59 (6) from diarrhœa and enteritis under two years, and 19 (3) from influenza. The figures in parentheses are those for London itself.

Northampton reported the fatal case of enteric fever. In the same week there were 25 deaths from diarrhœa in Glasgow.

The number of stillbirths notified during the week was 212 (corresponding to a rate of 31 per thousand total births), including 18 in London.

Obituary

JOHN CHARLES GRANT LEDINGHAM

KT, CMG, M B, D SC ABERD., F R C P, F R S

Sir John Ledingham, emeritus professor of bacteriology in the University of London, bacteriologist to the Lister Institute of Preventive Medicine for 38 years and its director from 1931 to 1943, died in London on Oct. 4 after a short illness. He was born in 1875 at Boyndie, Banffshire, the son of the Rev. James Ledingham. At Aberdeen University he took high honours in mathematics, physics, anatomy and anthropology, showing a width of interest which was reflected in his later researches. With a travelling scholarship he spent a year (1902–03) at Leipzig under Marchand, and on his return studied bacteriology first in D. J. Hamilton's department at Aberdeen and then at the London Hospital in Bulloch's laboratories. In 1905 he was appointed assistant bacteriologist in the serum department of the Lister Institute at Elstree, when George Dean was in charge. Next year, when Dean was transferred to the main institute at Chelsea as chief bacteriologist, Ledingham joined him there as assistant. He succeeded his chief as head of the department when Dean was appointed in 1909 to the pathology chair at Aberdeen. During the first world war he served as lieutenant-colonel in the RAMC; he was a member of the medical advisory committee in the Mediterranean area, and consulting bacteriologist to the Forces in Mesopotamia. For his war services he was made a CMG in 1918. In 1931, though retaining the post of chief bacteriologist to the Lister Institute, he became director in succession to Sir Charles Martin, who is still pursuing his researches in his retirement at Cambridge.

Press Portrait Bureau

The encyclopædic *System of Bacteriology*, published by the Medical Research Council in 1929 and succeeding years, owes much to Ledingham's care as associate editor with Dr. Paul Fildes, as well as to his own contributions and those of his staff. He was appointed a member of the MRC in 1934, and his expert knowledge and sound judgment have proved an asset to many of its committees, including the War Wounds Committee in the present war. He did much to establish and further the activities of the National Collection of Type Cultures, sponsored by the MRC and housed in the Lister Institute, and took steps to create the department of biophysics in the Institute. His juniors will remember him chiefly as the kind and able administrator and supervisor of research, but he continued throughout his life to be an active experimentalist. His first important paper appeared in 1904, when with Marchand he reported an obscure case which proved to be kala-azar, in a German returned from the Boxer campaign, thus demonstrating the existence of kala-azar in China. Before 1914–18 Ledingham's attention was centred on the mechanism of phagocytosis. He analysed the influence of temperature on the phagocytic act and on sensitisation of the bacteria, finding that within a wide range of temperature the degree of phagocytosis was fairly constant provided that fully sensitised bacteria were presented to the phagocytes; the experimental results were consistent with the view that phagocytosis proceeds as an adsorption phenomenon. He was among the first in Britain to direct attention to the epidemiological importance of the typhoid carrier state, and as a sequel to this work he published a book, *The Carrier Problem in Infectious Diseases*, with his colleague Sir Joseph Arkwright, who recalls his stimulating example and criticism, and his wide and detailed knowledge based on a remarkable memory. "His judgments on any new aspect of microbiology were formed from intimate acquaintance with the history and recent progress of the subject, and his opinions were strongly held but constantly under review."

In 1914 Ledingham initiated a new line of inquiry which reflects light upon the causation of purpura hæmorrhagica in man, by finding that a serum prepared by immunising with blood-platelets is capable, on injection into the animal species providing them, of producing a condition which closely resembles the human disease. During the years between the great wars he occupied himself with fundamental studies on viruses, and gave proof of the essential importance of the elementary bodies in virus diseases. These minute bodies, found in smallpox and fowlpox material, had been observed for a long time before but their significance was overlooked, because clear evidence of their ætiological rôle was lacking. By a special technique Ledingham obtained pure suspensions of these bodies from vaccinial or smallpox material, and showed that they were specifically agglutinated by the serum of animals infected with or convalescent from these virus diseases. Later he studied the morphology and conditions of growth of the curiously diverse forms of a group of organisms whose exact relationship is hard to define and which are represented by the causal agent of pleuropneumonia in cattle. In 1935 he showed, in collaboration with Prof. W. E. Gye, that a filtrable tumour-inciting agent could be separated from potent filtrates of avian sarcomas by high-speed centrifugalisation, and that the infective "agents" exist in the form of elementary bodies. After his retirement Gye provided him with facilities for continuing his researches in the laboratories of the Imperial Cancer Research Fund at Mill Hill. Ledingham was keenly interested in the application of knowledge obtained in the laboratory to preventive medicine—for example, he held strong views on the provision of clean and safe milk, and on the suppression of diphtheria by the active immunisation of young children. He was apt to become impatient with half measures and obstacles to progress, and used to remark that the time is not yet ripe for imposing health decrees on people against their will, since in matters of personal and public health the liberty of doing wrong and of failing to do right is still among the privileges of free-born Englishmen. He believed that progress is most likely to come from widespread public education in preventive medicine.

Sir John's record shows that he could concentrate on his work to some purpose, and that it was a deceptive air of leisure and even of nonchalance that he adopted for visitors to his bench. A clear perception of the interrelations of facts as they came to light enabled him to drive straight towards the final conclusions without wasting time in detours. His detailed knowledge in many branches of experimental medicine was impressive; he could remember the gist of papers he had read many years before, and would track them to their source with a certainty that seemed miraculous. He was a friendly and approachable chief to every member of his staff. Apart from his work and above all his other interests he was a lover of the country, and in the few war years before his retirement he got much enjoyment out of Lister Croft, the little rose-trellised cottage on the institute's estate at Elstree, and tending its plot of ground.

He leaves a daughter, who is entering on the study of medicine, and a son, now serving abroad in the RAMC.

S. P. B. writes: He was a shy and retiring man who did not readily reveal himself to others. Although he took his part at scientific meetings and spoke well and clearly in debate, he did this rather from a sense of duty than any natural inclination, for he was not endowed unduly with the gift of oratory. His qualities were not showy ones, and those he possessed he did not parade; it was more by example than anything else that Ledingham inspired his associates. Working with him one was early struck by the breadth of his interests and knowledge and his singleness of purpose. His approach to any problem was never a narrow one and his well-equipped mind, trained in a variety of disciplines, enabled him to see further than most of us. Research was his religion and his devotion to it knew no bounds. Many years ago when studying the Kurloff bodies, a subject which continued to engage his attention off and on throughout his career and on which he published one of his most recent papers, he sat up all through one night to observe these bodies in preparations on the warm stage. He had formed the opinion that these inclusions in the large

lymphocytes of the guineapig were parasitic in nature, but his efforts were unrewarded for the spirochæte-like structures in the inclusion, exhibited no movements and did not emerge from the cells as he thought they might. Added to these qualities was a transparent honesty and a complete scientific integrity; he hated anything savouring in the least of duplicity, it was the one thing guaranteed to arouse his anger. Otherwise he was the kindest of men whose disapproval was registered in the mildest of terms. It has to be admitted that his praise was equally restrained, and to those unfamiliar with him must have appeared to lack enthusiasm; for him to describe anything as "no bad" was quite high praise. Perhaps the characteristic which endeared him most to his colleagues, particularly to those who were just embarking on a research career, was his unselfishness. He was always ready to help them unstintedly, and there must be many like myself who owe him so much and retain for him an abiding affection.

CHARLES JOSEPH TRIMBLE

CB, CMG, LRCPE, LRCSI, DPH, DL, JP

The death at Preston on Oct. 8 of Colonel Trimble in his eighty-ninth year closes a life of activities which in their variety of interests can seldom have been equalled by a member of the medical profession. Family doctor, medical officer of health, soldier and administrator, in all these capacities he excelled, and at the time of his death he was a member of all the medical committees of the Lancashire County Council. Born at Castle Bellingham, co. Louth, the son of a medical man, he was educated at Queen's University, Belfast, and the RCSI before coming to Lancashire, where he married Miss Bessie Oram of Bury, took the DPH and began his life work in the Preston area. In the last war he was in command for four years of the St. John Ambulance Brigade Hospital, BEF. One who served under him in France and has since been associated with him for over thirty years writes: "It would be difficult to say which field of work was his predominant interest. On the various committees of the county council and through his wide knowledge of human relations he rendered valuable service; perhaps the tuberculosis service, which developed mainly under his chairmanship, may be considered a fitting memorial to his public work. On all his undertakings he brought to bear a keen and powerful intellect and by his enthusiasm and unsparing efforts ensured their success. Many honours were conferred upon him, and during the last war he was awarded the gold life-saving medal of the Order of St. John in recognition of his brave conduct and leadership during a period of great stress for the unit he commanded—a rare distinction. By his friends and colleagues he will be remembered for his loyalties, for his cheerful and generous nature, and for his gift of kindly humour."

WILLIAM ALFRED BREND

M A CAMB., M D, B SC LOND., M R C P, BARRISTER-AT-LAW

Dr. W. A. Brend, who died at Charing Cross Hospital after a long illness on Oct. 5 in his 72nd year, had devoted his life to the borderland where medicine and law meet and was recognised both in the courts and in the medical schools as an authority on forensic medicine. Son of Dr. William Brend who practised in Kensington he went to St. Paul's School and Sidney Sussex College, Cambridge, qualifying from King's College Hospital in 1902. At every stage he took scientific honours, ending with the gold medal in state medicine at the London MD. Then for a time he tried clinical practice, and used later to give a graphic picture of a GP thrown upon his resources in the quaint old hill-town of Brill in Buckinghamshire; but he was set on becoming a coroner and began to read for the bar, serving the Medico-Legal Society meanwhile as an energetic and resourceful secretary. He brought out a *Handbook of Medical Jurisprudence*, which ran through numerous editions. He was on the teaching staff of Charing Cross where his terse lectures, full of matter, secured a well-filled lecture room, and students recall his long forensic mouth and vigorous black hair, and his rather cold but not unfriendly way of surveying them. In 1914 the war changed the direction of his career. He was put in charge of a special medical board for functional nervous disorders, with the rank of major RAMC, and later became neurologist to the Ministry of Pensions. This experience he summed up in a Chadwick lecture (1942). As a referee under the Workmen's Compensation Act he was often in the county court, of whose procedure he was an outspoken critic. Legal decisions remained his absorbing interest; he was always to be found with a book in his hand, looking for someone to discuss it with. Libraries attracted him, he browsed in them, and it is a pity that after his excellent revision of Dixon Mann's *Forensic Medicine* in 1922 he did not continue to keep it up to date. Outwardly austere, he had a genial side for his fellow members of the Savage Club who enjoyed his dry humour, and among a circle of artist friends was apt to dissolve in a flow of good stories. Dogmatic in conversation, he listened to you quietly before he disagreed. He married Lillian, daughter of Dr. Gavin Clark, sometime MP for Caithness, and they had one son.

On Active Service

CASUALTIES

KILLED

Captain JAMES THORBURN DOYLE, MB LOND., RAMC

DIED OF WOUNDS

Captain H. A. WELLS, RAMC

DIED

Flight-Lieutenant ALFRED JOSEPH CHIAPPA-SINCLAIR, MRCS, LDS, RAFVR

MISSING, BELIEVED PRISONER OF WAR

Lieut.-Colonel M. E. M. HERFORD, MBE, MC, MB BRIST., RAMC
Captain C. C. MICHAEL JAMES, BA CAMB., FRCSE, RAMC

MISSING

Captain JOHN BUCK, MB EDIN., RAMC
Captain R. E. BONHAM-CARTER, MB CAMB., MRCP, RAMC
Captain PERCY LOUIS, MRCS, RAMC
Captain T. F. REDMAN, MB MANC., RAMC

WOUNDED

Captain N. R. CARLSON, MB LOND., RAMC
Captain J. R. KYLES, LRCPE, RAMC
Lieutenant A. G. WOOD, RAMC

MEMOIRS

Captain J. C. THOM, who was killed in Normandy at the age of 36, was the son of Dr. A. P. Thom of Murtle, Aberdeenshire, who is now in Australia. Jimmy Thom was twice athletic champion of Aberdeen Grammar School and twice champion of Aberdeen University. He gained his double blue in athletics and rugby and was captain of the XV in 1931–32 and represented the Atalanta Club at the International University Games held at Darmstadt in 1930. He had a slight figure for an athlete, a quiet, courteous manner, and a dark eye with a twinkle. He never forgot his friends, and in return took firm hold upon their affections. "I remember his eager help as a first-year student in a study of muscle action," writes Prof. R. D. Lockhart, "and how on his return from Australia, where he held several hospital appointments after graduating in 1934, he surprised me by producing in his usual quiet manner valuable osteological material collected on a long and adventurous trip into the Australian wilds alone. And this in response to my chance remark on the rarity of such specimens. When war broke out Thom was at Tennant's Creek in the south of Australia's Northern Territory. It is a far cry from Deeside to Central Australia, but he loaded his car with petrol and set south through the desert alone, determined to join his countrymen." Thom was evacuated with the BEF from France in 1940, and later posted to India, till he was given command of a hospital in Iraq. But he relinquished this post and the rank of major to join a battalion of the Gordon Highlanders the day before El Alamein, and through the North African and Sicilian campaigns he won the affectionate respect of officers and men both on and off the field. He tested himself by the experiences of his men—no car for him, even in the desert, when he could foot it with the rest. He landed with his battalion on D-day and was always on the spot and in the thick of things. He

received an immediate award in the field of the Military Cross for "his magnificent example and devotion to duty on June 12–13." He was killed the following month when a mortar shell struck his dugout, and he was buried in the front line in a cornfield south of Caen.

Flight-Lieutenant A. J. CHIAPPA-SINCLAIR was born in 1898, and took his LDS at Middlesex Hospital in 1919, the MRCS three years later. After holding appointments at the Dental Hospital, Great Portland Street, he entered general practice, and later became medical superintendent of the dental department at University College Hospital. He was commissioned as flying-officer in the medical branch of the Royal Air Force Volunteer Reserve in 1941. At his death on Oct. 5 he was serving as medical officer at a mobile field hospital overseas.

Notes and News

EATING AT A GLANCE

IN Canada—where they can still choose a diet drawn freely from dairy and orchard, where hens go on laying at the prewar rate, and housewives have to be urged, not on grounds of economy but in the interests of a balanced diet, to go easy on those palatable and popular sugars and fats—the nutrition division of the Department of Pensions and National Health at Ottawa, has drawn up a kitchen wall chart, telling of food. Simple pictures at the heads of coloured columns show the foods to choose from; and simple information about these foods and the way to use them is set out below. In the coming peace charts of this kind would be welcome to the British housewife; but for the present it would only make her lick jealous lips.

Royal College of Surgeons of England

At a meeting of the council held on Thursday, Oct. 12, with Sir Alfred Webb-Johnson, the president, in the chair, Dr. Rupert Willis, pathologist at the Alfred Hospital, Melbourne, was appointed as the first Sir William H. Collins professor of human and comparative pathology; Prof. Matthew Stewart was elected Moynihan lecturer for 1945; and Mr. P. H. Lovell was nominated as the fifty-second Jenks scholar.

Diplomas of membership were granted to the following:

Roy Astley, Frank Batley, M. F. Bethell, P. H. Friedlander, A. B. Hay-Bolton, Adrian Hill, J. G. Kendall, R. J. P. Pugh, I. B. Smith, and A. M. Walker.

University of Sheffield

Dr. I. F. S. Mackay has been appointed lecturer in experimental physiology, Dr. H. R. Vickers, honorary lecturer in dermatology, and Dr. D. P. Greaves and Dr. E. M. Spedding, temporary demonstrators in anatomy.

Faculty of Homœopathy

The first examination for the diploma of homœopathy (MF Hom) was held at the London Homœopathic Hospital in October. The following satisfied the examiners: Jeanie M. H. Hindmarch, F. R. Neubert, and W. H. Emslie.

Medical Society of London

Dr. Anthony Feiling will deliver his presidential address on Monday, Oct. 23, at 5 PM at 11, Chandos Street, W.1. He will speak on subjective disorders of sensation.

Nurses Preliminary Training

A new central preliminary training school for nurses was opened at Barnet by Lord Horder on Oct. 4. Local authorities are directly associated with it, and nine hospitals are coöperating in its maintenance. The Glebe House School contains 30 beds, and will provide a 10-week preliminary course for about 150 students yearly.

Royal Society of Medicine

Mr. H. T. Roper-Hall will deliver his presidential address to the section of odontology on Monday, Oct. 23, at 4.30 PM. He will speak on Jacobson's organ. On Oct. 24, at 4.30 PM, the section of medicine will meet to discuss gastritis. The opening speakers are to be Dr. T. Izod Bennett, Mr. F. Avery Jones, Dr. Mather Cordiner and Dr. P. E. Thompson Hancock. On Oct. 26, at 5 PM, at the section of urology, Mr. F. McG. Loughnane will give his presidential address on genital tuberculosis. On Oct. 27, at 4.30 PM, at the section of diseases in children, Dr. Helen Mackay, Dr. V. M. Crosse and Dr. John O'Reilly will open a discussion on the nutrition of the premature infant in the first month. On the same day at 3 PM, at the section of epidemiology and state medicine, Dr. S. W. Fisher will read a paper on medical aspects of coal-mining.

Middlesex County Medical Society

A meeting will be held at Chase Farm Hospital, The Ridgeway, Enfield, on Thursday, Oct. 26, at 3 PM, when Dr. C. Allan Birch will speak on medical emergencies.

Medico-Legal Society

At a meeting to be held at 26, Portland Place, London, W.1, on Thursday, Oct. 26, at 5 PM, Dr. Eric Gardner will read a paper on death in the bathroom.

Supplies of Dried Bananas

The Personal Service League has consulted the British Hospitals Association in regard to the distribution of a substantial gift of dried bananas. The league has accepted the suggestion that some of the dried bananas should be held in reserve for cases of cœliac disease or other emergency. Application for supplies may be made to the Personal Service League, 41, Lowndes Square, London, S.W.1. Telephone Sloane 6291.

Medical Honour

The MBE has been awarded to Mritunjoy Mitra, ship's doctor.

When the ship was sunk by a raider, Dr. Mitra was taken prisoner and, after being kept on the prison ship for 2½ months, was interned in prisoner-of-war camps in France and Germany. Whilst on board the prison ship, Dr. Mitra acted as doctor for the 343 prisoners. During his detention in Germany he attended Merchant Navy personnel and in addition had 1100 other prisoners under his care, mostly Orientals. He showed exceptional devotion in undertaking this work.

Dr. F. H. Rotherham is to build and equip a lecture theatre at the Grimsby and District General Hospital in memory of his son, Major E. B. Rotherham, RAMC, who was killed on active service last February. Dr. Rotherham is also to inaugurate an annual Rotherham lecture on a special subject in medicine and surgery.

Appointments

HUTCHESON, D. A., MD ABERD.: consulting physician to the Royal National Sanatorium, Bournemouth.

*PANTING, RONA M., MB MELB.: RSO at The Coventry and Warwickshire Hospital.

TAYLOR, G. O., MB DUBL.: examining factory surgeon for Maiden Newton, Dorset.

* Subject to confirmation.

Births, Marriages and Deaths

BIRTHS

AHERN.—On Oct. 11, at Plymouth, the wife of Lieut.-Colonel D. M. Ahern, DSO, RAMC—a daughter.

ANDERSON.—On Oct. 4, at Birmingham, the wife of Dr. H. Anderson—a daughter.

BURNFORD.—On Oct. 12, at Hove, the wife of Surg. Lieut.-Commander D. W. Burnford—a daughter.

CHAMPION.—On Oct. 10, at Leeds, the wife of Major A. H. R. Champion, MBE, RAMC—a son.

GELBER.—On Oct. 5, at Edinburgh, the wife of Second Lieutenant Ludwik Gelber, MB, Polish Parachute Brigade—a son.

GRACE.—On Oct. 10, at Beckenham, Kent, the wife of Major Michael Grace, RAMC—a daughter.

HUNT.—On Oct. 4, at Hindhead, the wife of Mr. Alan Hunt, FRCS—a son.

LEDLIE.—On Oct. 10, in London, the wife of Mr. Reginald Ledlie, FRCS—a son.

LESLIE.—On Oct. 9, at Bristol, the wife of Captain J. W. M. Leslie, RAMC—a daughter.

MACAULAY.—On Oct. 7, in London, the wife of Surgeon Lieutenant J. C. Macaulay, RNVR—a son.

MARTIN-JONES.—On Oct. 9, at Gerrards Cross, the wife of Major J. D. Martin-Jones, RAMC—a daughter.

ROWNTREE.—On Oct. 11, at Harpenden, the wife of Lieutenant Tom Rowntree, RAMC—a son.

SELLICK.—On Oct. 10, in London, the wife of Dr. B. A. Sellick—a son.

MARRIAGES

MARCH—SWAN.—On Sept. 12, at Lahore, India, Charles March, major RAMC, to Elizabeth Swan, QAIMNS.

RINEHIMER—HUNT.—On Oct. 5, at Leominster, John S. Rinehimer, captain US Medical Corps, to Angela Hunt.

SPENCER—BEHN.—On Oct. 9, at Fenham Newcastle-on-Tyne, Seymour Jamie Gerald Spencer, lieutenant RAMC, to Margaret Isabel Behn.

WILSON—GODWIN.—On Sept. 23, Henry Lister Wilson, MB, of Varteg, Monmouthshire, to Muriel Diana Wakefield Godwin.

DEATHS

GLOVER.—On Oct. 11, at Doncaster, Thomas Anderson Glover, MD EDIN., aged 71.

RITCHIE.—On Oct. 12, Andrew Graham Ritchie, MB EDIN., FRCPE, of Edinburgh.

ROWLETTE.—On Oct. 14, Robert James Rowlette, MD DUBL., FRCPI.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

SULPHONAMIDE DERMATITIS

FURTHER OBSERVATIONS

WITH SPECIAL REFERENCE TO TREATMENT AND PREVENTION

BERNARD C. TATE, M D CAMB. F R C P; LIEUT.-COLONEL RAMC
ADVISER IN DERMATOLOGY MEF - PHYSICIAN I/C SKIN DEPARTMENT, QUEEN ELIZABETH HOSPITAL, BIRMINGHAM

I. KLORFAJN M D BRUSSELS
CIVILIAN MEDICAL PRACTITIONER ATTACHED TO A MILITARY HOSPITAL, MEF

IN a previous paper we described epidermal sensitisation caused by local application of sulphonamides to the skin (Tate and Klorfajn 1944). A procedure for desensitisation was outlined, but the attendant reactions were often extremely severe. The method has now been modified so that complete desensitisation is achieved with a minimum of discomfort. A means of preventing this type of sensitisation has also been devised.

Since our first paper was written, several others have been encountered.

Livingood and Pillsbury (1943) reported 12 cases of cutaneous sensitisation after local application of sulphathiazole. The eruption provoked by subsequent oral administration of the drug was accompanied by constitutional symptoms, but there were no changes in the blood-count nor signs of hepatic or renal damage. The reactions recurred, but with diminishing intensity, when sulphathiazole was given a second and third time. In the light of our observations there can be no doubt that this decrease in the severity of the reactions was due to partial desensitisation.

Cohen, Thomas and Kalisch (1943) described 2 cases of sulphathiazole dermatitis, confirmed by oral administration of the drug, but with negative patch-tests. Weiner (1943), however, obtained positive patch-tests in 4 cases. In 3 of 4 cases reported by Shaffer, Lentz and McGuire (1943) some evidence of circulating antibodies in the blood was obtained by passive transfer tests, an observation which we, using a different technique, have so far been unable to confirm. Other cases of sulphanilamide sensitisation have been reported in the Middle East by MacGregor (1943) and Park (1943), whose attention had been directed to the condition by one of us (B. C. T.); Calnan (1943) and Willcox (1943) have observed similar cases in England.

It seems probable that this complication of topical sulphonamide therapy is relatively common. Sensitisation may be more specific than we have suggested: sulphadiazine given to 4 of Livingood and Pillsbury's cases produced a slight reaction in 1 only; and in 2 of Weiner's cases patch-tests to other sulphonamides were negative, although, as we have shown, this test as usually applied can be misleading. Nearly all our patients were sensitised originally to sulphanilamide: possibly this drug produces a wider range of sensitisation than sulphathiazole.

DESENSITISATION

The original procedure was to give relatively large doses by mouth, daily, persisting in spite of the resulting eczema and continuing until the reaction subsided. It became apparent, however, that the quantity of drug required varied with the degree and extent of sensitisation; and it was also found that, for each patient, there is a threshold dose below which no reaction occurs, and that amounts slightly in excess of this produce only mild symptoms. It therefore seemed probable that something between the minimum threshold dose and that producing a maximum reaction would desensitise with little discomfort to the patient, provided treatment were sufficiently prolonged.

Experience has confirmed this supposition, and the method has been successfully employed in 30 cases. Table I summarises the reactions in 5 representative examples.

The correlation between the degree of sensitisation and the quantity of drug required was more apparent than when large doses were employed. A point of equal importance is the duration of treatment—e.g., 3·0 grammes spread evenly over two or three weeks produces far more complete desensitisation than a larger dose given in one day. This was not fully appreciated at first because completion of the process was judged by faulty criteria.

Neither disappearance of the eruption nor the patch-test if applied while the drug is still being given are reliable guides to the end-point of desensitisation. Thus when the eruption had cleared an increased dose sometimes caused a recrudescence (cases 3, 4 and 5). Or if treatment is stopped as soon as the patch-test is negative and the skin clear, after an interval the patch-test may become positive again, and repetition of the same dose, or sometimes even a smaller dose, may cause a further reaction. This resensitisation increases for 7–10 days, but does not attain the original level. A further course again desensitises; but however high the dose, the process is completed only if treatment is continued long enough.

Optimum dosage.—0·125 g., twice daily, produced only slight or moderate symptoms in most of the patients, none at all in two (cf. case 1); but even this dose caused severe reactions in two (cf. case 5). Another patient now under treatment, whose strongly positive patch-test also evoked a slight generalised eruption, responded with a fairly severe reaction to 0·06 g.

It is clear then that the dosage which will desensitise in the minimum time with the least discomfort is a highly individual matter, depending on the degree of sensitisation, which cannot be measured accurately but must be judged by the effect of a test dose.

TABLE I—EFFECT OF DESENSITISATION WITH 0·125 G. TWICE DAILY

Case	Initial reaction	Amount of drug and period of administration	Reaction to large test dose later
1	nil	0·75 g. (3 days)	Moderate eczema in area of original dressings
2	Slight patchy eczema, subsiding by 9th day	3·75 g. (15 days)	nil
3	Moderate eczema face, neck, arms, hands, legs and feet	5·25 g. (21 days)	Slight erythema and itching
4	Moderate eczema arms, forearms, legs. Gone after 12 days	5·25 g. (21 days)	Slight vesicular eczema in areas of original dressings; œdema of hands; fainting attack 3¼ hrs. after first dose of 2·0 g.
5	Severe generalised eczema with œdema, subsiding by 8th day. Temperature 103° F. 2nd day. Depression and drowsiness, improving from 7th day. Leucocytosis and eosinophilia	5·25 g. (21 days)	Moderate generalised eczema; eosinophilia; raised ESR

0·125 g. is given as a preliminary test. It is continued, twice daily, if, as in most cases, only slight or moderate symptoms ensue, but reduced if the reaction is severe. When the resulting eruption has disappeared, or nearly disappeared, the dose is doubled, and when any further reaction has died down the amount is again increased. As soon as an increment fails to cause a reaction, the patient is tested with a large dose, 2·0 g. followed by two further doses each of 1·0 g. at 4-hourly intervals. Whether or not this provokes a reaction, treatment must be continued beyond this point if desensitisation is to be complete. If it does cause a reaction, the previous dose is increased; for example, if the dose before the test was 0·25 g., it is increased to 0·5 g. and the patient is re-tested when the skin is clear again. When the large test dose no longer produces any reaction, the dose which was being given immediately before this negative test is continued for a further 14 days. Treatment is then suspended for 10 days, and the patient is re-tested with a large dose to make certain that desensitisation is complete.

An increase of dose during treatment is not essential: some cases have been completely desensitised by continuing the original dose to the end; but the increments serve as a guide to progress and save time.

Precautions.—Treatment should not be started until any eruption from previous contact with, or administration of, the drug has disappeared; otherwise symptoms may be unnecessarily severe. Exposure to direct

sunshine may greatly aggravate the reaction and must be avoided. A check on the leucocyte count is, of course, advisable.

Constitutional disturbances during treatment.—These, when present, were commensurate with the extent and severity of the cutaneous reaction. Three patients had raised temperatures, reaching 103° F. in case 5, during the early part of the course, and another developed a temperature of 101° F. for a few hours on the 5th day. Slight rigors occurred in several cases about 3 hours after the first dose; and one patient (case 4) fainted 3¼ hours after the first instalment of a large test dose. Another suffered from deafness and impaired vision during the whole course of treatment, but unfortunately these symptoms were not investigated further. In one case there was slight mental confusion on the 2nd day of treatment; and intense mental depression developed in case 5, worst on the 6th day, but improvement was steady from the 7th day onwards. An attempt had previously been made to start desensitisation in case 5 when a fairly extensive eczema due to the original local applications was still present. Two doses of 0·125 g. caused rapid rise of temperature to 104·5° F., with great intensification of the eruption, and the patient became almost comatose, remaining very drowsy for several days. This is the only case, so far, which has given cause for anxiety since desensitisation with small doses was started. It emphasises the importance of delaying treatment until any existing reaction has completely subsided.

With larger doses, as originally employed, symptoms were similar but commoner and much more severe. The danger of giving the usual therapeutic doses to a sensitised patient is illustrated by the following:—

CASE 6.—Aged 25. After treatment for "desert sores" with sulphanilamide powder, applied twice daily for a week, he was admitted to a military hospital with a slight rash, the nature of which was not recognised. Sulphanilamide was given, 1·0 g. 4-hourly, and after 4·0 g. generalised eczema broke out. The drug was continued, and next day the patient became unconscious, remaining so for two days. (He has since been desensitised by small doses, with a moderate reaction only.)

A symptom of special interest is urticaria, seen in two cases when the dose of sulphanilamide was substantially increased after the usual eczema reaction had almost gone. Continued administration of this same increased dose, however, was followed by disappearance of the rash—i.e., the same principle of desensitisation was as successful in urticaria as in eczema.

Blood changes during treatment.—Changes in the blood-count, slight or absent in some cases but considerable in others, seem to depend, like the other constitutional manifestations, on the severity and extent of the cutaneous reaction. Early polymorphonuclear leucocytosis, followed by eosinophilia and increase of lymphocytes were the most constant changes. Platelets have varied from 200,000 to 700,000 per c.mm. The erythrocyte sedimentation-rate was increased in several of the more severe cases. Serum proteins, estimated in three cases, showed a slight relative increase of globulin.

The changes observed were not always strictly contemporaneous with the cutaneous manifestations. In some cases the eosinophil and lymphocyte count continued to rise for a time with improvement in the skin condition. Unfortunately pressure of routine work prevented examinations being made in all cases at the same time of day, as they must be for accurate comparisons and definite conclusions. Table II shows the changes in the blood-count in a highly sensitised subject (case 5).

Permanence of desensitised state.—It seems that if desensitisation has been complete, spontaneous resensitisation does not take place. One patient, examined 7 months after treatment, did break out in eczema after taking sulphanilamide, but the end-point had been judged solely by the patch-test applied immediately at the end of a course of 22 g. compressed into a week. Two months later however, after a further course, there were no signs of sensitisation. Three other patients who received longer treatment showed no reaction to the patch-test or to oral administration of the drug after 9, 7 and 6 months respectively.

An interesting point is that further local applications failed to resensitise two patients, each of whom had 40 dressings of 10% sulphanilamide cream applied, one to scratched lesions of dermatitis herpetiformis, the other to autophytic excoriations.

TABLE II—BLOOD CHANGES DURING DESENSITISATION OF CASE 5

Day of treatment	Dose in g.	Reaction	Total white cells	Polymorphs	Lymphocytes	Monocytes	Eosinophils	Basophils	ESR
			per c.mm	%	%	%	%	%	
2	0·125 b.d.	Eczema severe; temp. 102°F.	18,200	80	15	0	5	0	..
5	0·125 b.d.	Eczema severe; temp. normal	11,600	57	24	4	15	0	..
9	0·125 b.d.	Eczema subsiding	13,000	66	29	3	2	0	..
22	1·0 t.d.s.	Eczema reappearing	21,400	35	39	2	24	0	..
25	1·0 t.d.s.	Eczema subsiding	16,200	25	16	1	58	0	..
27	None	Skin nearly clear	15,800	8	28	0	62	2	..
30	,,	None	12,600	39	28	2	30	1	..
31	,,	,,	..	..	..	..	..	..	25
33	,,	,,	4400	28	41	3	27	1	4
35	,,	,,	8200	30	57	1	12	0	..

Group desensitisation.—In one case, when the eruption provoked by the initial small doses of sulphanilamide had subsided (i.e., before desensitisation was complete) a change to the same dose of sulphapyridine caused a slight recrudescence with œdema of the eyelids. This soon disappeared however, with further administration of sulphapyridine, and complete desensitisation to both drugs was achieved. It is not yet known how far the different sulphonamides are interchangeable in treatment, but it seems that if desensitisation to the original allergen is complete, any coincident sensitisation to other members of the group is also abolished.

NATURE OF SENSITISATION AND DESENSITISATION

(*a*) *Passive transfer tests.*—Examination was made for circulating antibody, by passive transfer, before desensitisation, both when the eruption was active and increasing, and after it had disappeared; and, in two cases, 10 days and 5 weeks respectively after desensitisation.

The serum under test was injected intradermally into a normal subject who, 24 hours later, was given 2·0 g. of sulphanilamide by mouth, followed by two further doses each 1·0 g. at intervals of 4 hours. The procedure was also repeated with two and three injections of serum into the same site at intervals of 24 hours, the test dose of sulphanilamide being given in each case 24 hours after the last injection. In one case, 24 hours after injection of serum from a highly sensitised patient, the site was lightly scarified and a sulphanilamide patch-test was applied for 48 hours.

Oral administration of the drug, rather than application of patch-tests to the sites of injection, was employed in most of these tests because it is a more delicate proof of sensitisation; the normal Prausnitz-Küstner technique may be more delicate still.

In no case was the slightest reaction seen at the site where the serum had been injected. Presumably, therefore, antibody was not present in the circulating blood, except perhaps in extremely minute amounts, either before or after desensitisation. It may indeed be tentatively concluded that if antibody is concerned in sensitisation it is produced by the epidermis, to which it remains fixed; further, that desensitisation may result from neutralisation of antibody but cannot be due to protection of the cells by formation of free antibody in the blood and tissue fluids.

(*b*) *Blood concentrations of sulphanilamide during and after treatment.*—Six doses of 0·125 g. of sulphanilamide were given at 12-hour intervals to sensitised patients, and the blood concentrations were estimated 3 hours after the 5th dose, and again 4 days after the 6th dose. In one case the procedure was repeated 14 days after the termination of a 9 days' course of 3·0 g. daily; in another, 5 doses of 0·125 g. were repeated after a full desensitisation course. (N.B.—The large doses employed in these estimations were for the purposes of investigation, not primarily for desensitisation.) The results in these two representative cases, with those in three normal controls, are shown in table III. All cases, including the controls, were examined to exclude renal disease.

The figures after the first series of small doses were significantly lower for the sensitised cases than for the controls, especially after the 4 days' interval. This disappearance of sulphanilamide from the blood was not due to increased urinary excretion, as estimations proved: the drug must have entered into some combination, presumably with antibody in the epidermis. In case 6, after the 9 days' course, the figures were much higher than before, and this time no reaction was provoked by these small doses. The concentration of free drug after the 5th dose, and of both free and total after the 4 days' interval, were, however, still less than in the controls; and it was therefore assumed that most but not all of the antibody had been neutralised. This was confirmed by subsequent administration of large doses which caused a further slight eczematous eruption. In case 7, after a full desensitisation course, the results were comparable with the controls and desensitisation was found to be complete.

Blood concentrations were also estimated on the 2nd, 5th, 9th and 11th days after completion of courses of 3·0 g. daily extending over 7 days in one case and 9 days in others. The results in 4 representative examples and 2 controls are shown in table IV.

In the normal controls the concentration of both free and total sulphanilamide fell steadily, but in case 6 there was an actual increase of total on the 11th day, and in cases 9 and 10 an increase of the free drug on the 9th day after the first course. An increase in the total sulphanilamide might represent the appearance in the blood of an

TABLE III—CONCENTRATION OF SULPHANILAMIDE IN BLOOD (MG. PER 100 C.CM.) AFTER FIVE OR SIX DOSES OF 0·125 G. AT 12-HOUR INTERVALS

Case	3 hrs. after 5th dose		4 days after 6th dose	
	Free	Total	Free	Total
6—Before \ 9 days' course /	0·28	0·52	0·03	0·1
After / (3 g. daily) \	0·28	1·0	0·14	0·27
7—Before \ full desensiti- /	0·3	0·44	0·08	0·15
After / sation course \	0·5	0·9	..	..
Control	0·33	1·0	0·2	0·55
Control	0·5	1·25	..	..
Control	0·45	0·9	0·2	0·5

allergen-antibody compound in course of excretion: an increase of the free drug must be due to dissociation of such a compound, which would presumably leave behind antibody still fixed to the epidermis. On this assumption it was predicted that in cases 9 and 10 a further course would produce fresh symptoms: this prediction was fulfilled. In case 6 the second course was in fact also accompanied with a very slight eruption. As would be expected from the figures, the reaction during the second course was greatest in case 10. This case also showed a slight increase of the free drug on the 11th day after the second course, and again a very mild reaction resulted from a third course. Some antibody may have remained in case 8, for the total sulphanilamide was the same on the 9th day as on the 5th day after the first course, and there was a very slight increase on the 9th day after the second course. The amount of residual antibody however, according to these figures, would be very minute, and, as was anticipated, no symptoms occurred during the second course.

Many other estimations have been made, which are all in general agreement. It is calculated that there may be an error of ± 0·02 mg. per 100 c.cm. in these results, but with due allowance for that, the figures warrant the

TABLE IV—BLOOD CONCENTRATIONS (MG. PER 100 C.CM.) 2–11 DAYS AFTER TAKING 3·0 G. SULPHANILAMIDE DAILY FOR 9 DAYS

Case	2nd day		5th day		9th day		11th day	
	Free	Total	Free	Total	Free	Total	Free	Total
Control A ..	0·36	1·2	trace	0·26	nil	0·12	nil	trace
Control B ..	0·7	1·8	trace	0·3	..	..	trace	0·11
6—1st course	0·5	1·6	0·1	0·5	0·09	0·22	trace	0·5
2nd course	0·6	1·3	trace	0·22	trace	0·18	trace	0·17
8—1st course	..	..	trace	0·1	trace	0·1	nil	trace
2nd course	0·28	1·0	nil	0·08	trace	0·15	nil	trace
9—1st course	0·25	0·87	0·07	0·22	0·09	0·15	0·08	0·12
2nd course	0·3	0·8	trace	0·09	trace	0·16	trace	0·1
10—1st course *	1·7	2·5	0·1	0·31	0·18	0·3	trace	0·15
2nd course	0·38	1·2	trace	0·2	trace	0·09	0·07	0·11

* Course lasted only 7 days.

tentative conclusions we have drawn. They afford a satisfactory theoretical basis for the clinical observations relating to desensitisation, resensitisation, and the importance of adequate duration of treatment.

PREVENTION OF SENSITISATION

If desensitisation results from neutralisation of antibody, it should be possible to prevent sensitisation by using up the antibody as fast as it is formed. It should, indeed, be safe to apply the drug locally provided it is given simultaneously by mouth in adequate doses; a hypothesis which can be proven only by treating in this way patients who are known to be susceptible of sensitisation. The following cases seem to comply with this condition:

CASE 11.—Aged 28. Admitted June 4, 1943, with generalised septic eczema following sulphanilamide applications to an eruption, probably seborrhœic dermatitis, of his right ear and side of the face. Partial desensitisation was carried out with a week's course of 21 g. between July 5 and 12, which caused a severe reaction. On Sept. 12 dressings of 10% sulphanilamide cream were applied to the face and scalp, which still showed signs of seborrhœic dermatitis, and next day, after the 3rd dressing, acute weeping vesicular eczema, accompanied with œdema, broke out on the face, scalp, neck, hands and forearms. Dressings were stopped, and on Sept. 14, when the eruption had also appeared on the legs and feet, 3 doses of 0·5 g. of sulphanilamide were given at 4-hourly intervals. On the 15th the weeping was much less and the œdema nearly gone. Oral treatment was continued, and in addition twice-daily dressings, to the whole affected area, were restarted. This combined treatment was persisted in for a week, and in spite of the local applications, improvement was steady. The dressings were stopped on Sept. 21 and oral therapy two days later. On Oct. 3 oral administration was started again, with 0·125 g. twice daily, and this caused a fresh generalised outbreak of eczema, though much milder than before, which was subsiding by Oct. 6 when the dose was doubled. Next day the dressings were again applied and continued for 3 days, in spite of which improvement was maintained. Oral therapy alone was then given to complete desensitisation.

Although this patient had been partly desensitised, the skin still reacted vigorously on Sept. 13 to local applications of sulphanilamide. The administration of 1·5 g. on Sept. 14 presumably neutralised the available antibody, and from then on, with continued oral administration, local applications could be made with impunity. The reaction provoked on Oct. 3 by a small dose, after a 10 days' interval, shows that desensitisation was far from complete when the dressings were applied: symptoms were prevented by the oral treatment.

CASE 12.—Aged 35. Admitted Dec. 4, 1943, with a severe spreading infective dermatitis surrounding a septic raw area where his right 5th toe had been amputated. Sulphanilamide

powder and dressings had been applied frequently. On Jan. 22, when the wound was still very septic though the dermatitis had disappeared, treatment began with 0·25 g. of sulphanilamide twice daily by mouth and 10% sulphanilamide cream locally. Acute weeping vesicular eczema broke out the same day on the whole area previously affected. The oral dose was doubled and the dressings continued, and by Feb. 2 no trace of eczema remained. The dose was then reduced to 0·25 g. three times daily, but no further signs of sensitisation appeared.

CASE 13.—Aged 27. Admitted with deep undermining spreading ulceration of the back of his neck following carbuncles. Bacteriological examinations (repeated) revealed *Staph. aureus* and *B. pyocyaneus*. On Aug. 5, 1943, twice-daily dressings with 5% sulphathiazole paste were started, all other treatments having failed to control the condition. Improvement was immediate and rapid until Aug. 10 when vesicular eczema broke out in the area covered by the dressings. 0·5 g. sulphathiazole, followed by two further doses of 0·25 g., was given on Aug. 11, and thereafter 0·25 g. was continued twice daily, the dressings still being applied as before. By the 15th the eczema was subsiding and it disappeared completely in spite of the local applications. On Oct. 10 the ulcers were almost healed, but again slight eczema broke out. The dose of sulphathiazole was increased to 1·0 g. three times daily, and next day, in addition to the local eruption, mild vesicular eczema appeared on the hands and chin. This had almost gone by Oct. 10 and again the skin cleared completely in spite of continued local treatment.

In both these cases, proved to be susceptible of sensitisation, local applications were made with impunity when preventive oral therapy was instituted. In case 13 some sensitisation did eventually appear, but a raised dose once more gave protection. Special emphasis is laid on the time required for sensitisation to appear in this case—5 days with local treatment alone, 8 weeks with combined therapy, and even then the degree was slight.

As would be expected, according to the neutralisation hypothesis, a certain minimum dose is necessary. Three patients receiving only 1 grain of sulphanilamide twice daily showed signs of sensitisation after 9, 11 and 18 days, but again increase of the dose was successful.

This is not, of course, prevention in the true sense: the method simply aims at desensitising as fast as sensitisation occurs. In case 11, it will be noticed, combined treatment failed to evoke any eruption even though a considerable degree of sensitisation was present. This is, however, not the same as the latent sensitisation which may develop, sometimes to a high degree, when local applications only are employed; a phenomenon illustrated by the following case:—

CASE 14.—Aged 35. Admitted Sept. 13, 1943, with infective dermatitis, which cleared completely with dressings of 10% sulphanilamide cream. On the 22nd 2·0 g. sulphanilamide was given, followed by two further doses of 1·0 g. at 4-hourly intervals. About 3 hours after the first dose œdema and redness of his forearms developed, and within 24 hours vesicular eczema was present. The eruption disappeared with continued administration of the drug.

Here sensitisation, produced but not made manifest by local applications, was revealed by subsequent oral administration of the drug. In the preceding cases the sensitisation produced and revealed by local treatment was abolished, and its reappearance prevented by oral therapy. The full significance of latent sensitisation will be discussed later: its occurrence emphasises the need for careful testing at the end of treatment in all cases receiving local therapy.

Optimum preventive dose.—0·25 g. twice daily is usually adequate, though larger amounts (0·5 or 1·0 g.) may be given with advantage when the lesions are extensive. In the rare cases where very lengthy treatment is necessary (e.g., case 13) it is advisable periodically to suspend local therapy, continuing oral administration, however, for a few days every week or so.

To ensure complete absence of sensitisation, oral therapy should go on for two weeks after completion of treatment, and the patient should be tested with a large dose after a further 10 days. But in practice continuation of oral therapy for one week seems to be satisfactory. No instance of sensitisation has been observed in over 200 cases treated by this method. (N.B.—When the depth of the lesion is such that the drug is absorbed in considerable amounts, as with large wounds and severe burns, oral administration is, of course, superfluous.)

Complications.—Sensitivity to sunlight, the only complication so far encountered, was seen in one case:

CASE 15.—Aged 31. After 4 days of combined therapy for impetigo, by which time his skin was almost clear, the patient spent 10 minutes in direct, intense sunlight. Twelve hours later he experienced irritation, and after a further 8½ hours there was an eczematous rash on all the exposed parts. Administration of 3·0 g. sulphanilamide on each of 2 successive days did not intensify the eruption. A further exposure to sun for ½ hour six days later caused erythema, but a longer exposure 3 days later still was without effect.

Drug sensitisation had not been actually manifest, but in other respects this case is similar to those described in our previous paper.

DISCUSSION

The phenomena of this type of sensitisation are most easily, though not necessarily correctly, explained by assuming that some new substance is formed by the epidermis to which it remains fixed. In accordance with common usage we have called this hypothetical substance antibody.

Desensitisation presumably results from neutralisation of the antibody with allergen. Strongly supporting this hypothesis are the correlation between the degree of sensitisation and the quantity of allergen required for desensitisation; and, more conclusive still, the disappearance of sulphanilamide from the blood after its administration to a sensitised patient (table III). Resensitisation and reappearance of the drug in the blood after too brief treatment show, however, that the reaction between allergen and antibody cannot be a simple neutralisation as between acids and bases. Its behaviour is that of a reversible reaction, governed by the law of mass action, the products of which are only slowly eliminated. It may be expressed crudely by the following equation:

$$A\ (\text{allergen}) + B\ (\text{antibody}) \rightleftharpoons C + D$$

B: fixed to epidermis. C + D: Products of the reaction, slowly excreted.

In the sensitised subject, after contact with the drug has ceased, and time has been allowed for its excretion, all that remains is B. If now A is added, by oral administration, the reaction proceeds rapidly at first from left to right, then slows down as C and D accumulate, until approximate equilibrium is reached. But if C and D are eliminated, even slowly, and the concentration of A is kept constant by continued administration, true equilibrium will never be reached: the reaction will proceed slowly until the whole of B is exhausted and desensitisation will be complete. As the reaction approaches equilibrium, the amount of chemical change, hence the quantity of energy liberated, becomes less and less until it is insufficient to produce symptoms.

With low concentrations of A, approximate equilibrium will be reached with a considerable quantity of B still present; and a substantial increase of A at this point will again drive the reaction rapidly from left to right, with the production of a fresh eruption (cf. cases 3, 4 and 5). With a high concentration of A, on the other hand, the amount of B still present will be very small when approximate equilibrium is reached; and the addition of a further amount of A, as in a patch-test, will be without visible effect. If, however, at this point, by discontinuing the drug, the concentration of A is reduced, the reaction proceeds from right to left, going on to completion since sulphanilamide is excreted fairly rapidly. A considerable quantity of B therefore accumulates once more (i.e., resensitisation occurs) and the patch-test becomes positive again. But the amount of reformed B must be less than that originally present, because some of the products C and D will have been excreted. Again this accords with the observed facts, and explains why treatment for only a short period reduces the degree of sensitisation but fails to desensitise completely, however large the dose. Clinical observation and estimations of sulphanilamide in the blood (table IV) show that this reverse reaction takes about 7–10 days for

completion. The time required for excretion of the allergen-antibody compound seems to be about 14 days, because, for complete desensitisation, this is the period over which, it has been observed, the drug must be continued after a large increase of dose has failed to cause symptoms—i.e., presumably after the whole of the antibody has been neutralised. The rate of this excretion may vary in different subjects; hence we have insisted on the final test.

When the drug is applied externally to a susceptible skin, it stimulates the formation of antibody with which it must immediately react. If the rate of formation of antibody is greater than the rate of excretion of the products of the reaction, the concentration of allergen remaining constant, it is obvious that the amount of antibody must steadily increase—i.e., the skin becomes more and more sensitised. At first, there are no symptoms, because the quantity of antibody, and consequently the amount of energy liberated by the reaction, is small. Indeed, if the rates of antibody formation and excretion of the products of the reaction remain unchanged, and the concentration of allergen is constant, the whole process may be gradual and continuous, never liberating enough energy to produce symptoms, yet causing an ever-increasing degree of sensitisation. If now the concentration of the drug is suddenly much raised by oral administration, the whole chemical system is upset. In terms of the equation, the reaction proceeds rapidly from left to right, and, because the quantities of both A and B are now large, much energy is liberated and symptoms occur, perhaps with explosive violence—their severity of course depending on the amount of chemical change. This explains the behaviour of case 14, and of those described by Tulloch (1943), in which a change from local to oral therapy appeared suddenly to produce sensitisation. Smaller increases of allergen, such as might accompany change of dressings, will cause correspondingly milder or more localised eruptions.

In preventive treatment the concentration of allergen (A) is maintained at a high level from the start, by oral administration. Again, as soon as the formation of antibody (B) commences, the reaction proceeds from left to right. Antibody is removed as fast as it is formed but the products C and D start to accumulate and a reverse reaction from right to left tends to occur. But if the concentration of A is kept high enough, and C and D are excreted even slowly, the velocity of the reaction from left to right remains for a long time greater than that of the reverse reaction, and so antibody does not accumulate in appreciable quantities. Should, however, the process continue long enough, a point may eventually be reached when the velocities of the two reactions are equal, and thereafter the concentration of B will slowly rise—i.e., the patient will become sensitised. The time required for this to take place will of course vary with the concentration of A and the rate of excretion of C and D, and inversely with the rate of production of B. Again this fits the observed facts (cases 11, 12 and 13).

If this hypothesis is correct, then abrupt cessation of treatment might, after some days, leave a certain degree of sensitisation. The products C and D will have accumulated in quantities depending on their rate of excretion and the rate of antibody formation. Withdrawal of allergen (A) causes a reversal of the reaction, so that a certain amount of antibody (B) is reformed. Case 11 affords an example. Symptoms were prevented by oral administration of sulphanilamide when extensive local applications were being made; but after suspension of treatment for 10 days a fresh eruption was produced by only half the previous oral dose. Hence it is always necessary to continue oral administration of the drug for at least a week after cessation of local therapy, and to test carefully for sensitisation—preferably after a further 7–10 days, but at any rate at the end of treatment.

The question naturally arises why local applications stimulate antibody formation while oral administration apparently does not. It is by no means certain, however, that the route by which the drug reaches the skin does, in itself, make any difference to its action. For instance, it is conceivable that, with very small quantities of the drug, increasing concentrations stimulate antibody formation up to a certain maximum, and that amounts in excess of this act simply as a hapten. If this were so, then, with local applications only, the antigenic power might well exceed the haptenic, since absorption through the skin is slow. It is also possible that something in inflammatory discharges combines with the drug, conferring on it antigenic properties, in which case the occurrence of sensitisation would depend on the relative quantities of free and combined drug present. With oral administration, only that small fraction of the drug coming into contact with the discharge would acquire antigenic properties; the bulk of it would act as hapten. This may explain why two patients, after desensitisation, were not resensitised by further local applications. Their original lesions were, it seems, highly septic and inflamed, while those present after desensitisation showed little sepsis and this disappeared very quickly.

It is unlikely that acetylation is related to antigenic power: with small doses (0·125 g.) of sulphanilamide, 60% or more appears to be acetylated in the blood, while with relatively large doses only 30–40% is acetylated. Yet desensitisation takes place in either case.

The relation of sunlight to sensitisation is not quite clear. Although sulphonamides may perhaps act as photosensitisers, the behaviour of case 15, in which apparent allergy to sunlight developed during preventive treatment, could be equally well explained by assuming that sunlight acted as a catalyst, increasing the velocity of the allergen-antibody reaction, and enabling it to proceed to completion. This explanation could also apply to the similar cases described in our previous paper, when such a possibility was not considered, desensitisation then being tentatively regarded as an irreversible neutralisation.

The constitutional symptoms which accompanied desensitisation in some cases—rigors, raised temperatures, fainting, blood changes, &c.—are essentially manifestations of anaphylactic shock. Their occurrence does not mean, however, that other organs besides the epidermis were sensitised. They were commensurate with the severity of the eruption and probably resulted from the systemic action of metabolites liberated from the epidermal cells, damaged in varying degree by the energy set free from the allergen-antibody reaction. The actual products of this reaction, it may be remarked, must be relatively harmless, for the degree of resensitisation seen after a short desensitisation course with high dosage proves that these products must in such cases still be present in considerable amount when symptoms have disappeared. The occurrence of urticaria in some cases may be due to dermal as well as epidermal sensitisation, though this is not certain; Lewis (1927) has shown that cell damage confined strictly to the epidermis can evoke an urticarial response.

Although no evidence of systemic sensitisation has so far been encountered, there is no guarantee that it will not develop, and the question arises whether this risk should be taken. For most infective dermatoses local sulphonamide therapy is not in our experience superior to other methods of treatment, but there are instances (e.g., case 13) in which it seems to be of great value; and since the main objection has been removed, by preventive oral therapy, its employment in carefully selected cases is considered justifiable.

We have confined our remarks to epidermal sensitisation to sulphonamides, but the method of desensitisation has proved equally successful in acriflavine and boric acid dermatitis; and the principles enunciated are, we believe, applicable to the wider field of allergy in general.

SUMMARY AND CONCLUSIONS

1. Epidermal sensitisation to sulphonamides, caused by their local application to the skin, can be successfully treated and prevented by giving the same drugs, in suitable doses, by mouth.

2. Practical methods of desensitisation and prevention are described.

3. The underlying chemical basis of sensitisation and desensitisation is discussed.

We wish to thank all who have coöperated in these investigations, especially Major H. Mavor, RAMC, and Major R. E. B. Hudson, RAMC, for blood-counts, and Mr. D. H. Mackenzie, BA, Friends' Ambulance Unit, for the biochemical estimations.

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DYSENTERY IN BRITISH PRISONERS OF WAR

H. BLOOM, M.R.C.S.; CAPTAIN R.A.M.C.

FROM October, 1942, to April, 1943, I was in medical charge of British prisoners in an Italian hospital. All had been captured during the second fortnight of June, 1942, during our disastrous retreat from Tobruk. They were herded into "cages" in various parts of Libya and Tripolitania, under Italian "administration," with no shelter and in semi-tropical heat. The diet, subminimal from the beginning, consisted mainly of about a handful of macaroni, 6 oz. of coarse brown bread, and a small piece of cheese, daily, and about an ounce of meat twice weekly.

Scarcely any attempt was made to provide sanitation. The few unprotected trenches dug in the camps were soon filled, and overflowed. Flies were pestilential. In some camps 90% of the men developed dysentery. Many of them became so weak from starvation and incontinence that they remained lying beside the overflowing "latrines." In one camp during July, 1942, 19 out of 3000 men died. In another, during the three months July to September, 100 died. This mortality, beginning within a month of the capture of men who were fighting fit, gives one some idea of the appalling conditions in North Africa.

Some of the worst cases were brought over to Italy in batches during October and November. They came in coal boats, tankers, and munition ships, under dreadful conditions, and desperately ill and emaciated. In Caserta hospital, out of an unknown number of entries, the deaths from "dysentery" alone, apart from wounds, were 36 in October, 1942, 45 in November, 42 in December, 10 in January, 1943, 4 in February, and 2 in March and April.

In all about 250 men passed through my hands. My work among them was greatly handicapped by the fact that I too was a prisoner. Prejudices had been inflamed needlessly, but when these were overcome I was given a completely free hand. Even the Italian diagnosis of *nefrite* for anasarca due to protein deficiency was dropped. At first my activities were viewed with grave, though polite, suspicion. Later, when I had learned to explain the men's needs in Italian, the Sisters of Mercy and Red Cross nurses obtained everything possible in a country sadly depleted of food and necessities by the occupying Germans. The only facility for investigation, apart from clinical study, was a laboratory, to which I was not allowed access, and which examined only fæces. The reports were made by an expert pathologist. The only reference book available was Hurst's *Medical Diseases of War*, and some copies of the *British Medical Journal* not of recent date.

STATE OF THE MEN ON ARRIVAL

When they reached us, all these men were extremely emaciated and weak. Many could not walk. They were all heavily infested with lice, to which they were remarkably insensitive. Their intense apathy to their surroundings, to the lice, and to the future was striking. The eyes were sunken, and surrounded by a peculiar waxy area corresponding to the orbital aperture. The predominating symptom in all was a severe dysentery, with tenesmus, and the passage of 20 or more motions a day, with pus, mucus, and streaks of blood. Many were incontinent.

A large number of them showed definite evidence of deficiency states. Œdema varied from swelling of the ankles to massive œdema of the legs, œdema of the face, and ascites in some. The skin of the shins was atrophied and pigmented, and the peripheral reflexes were absent. These were the gross symptoms, which appeared, on an average, three months after the onset of the dysentery, but in some cases within a few days. Other symptoms of vitamin deficiencies were coincident, or appeared during the next three months.

Here is a description of three cases coming under my observation fairly late in the illness.

CASE 1.—L/Cpl. A, aged 21. Normal weight 160 lb. Taken prisoner June 14, 1942. Intermittent diarrhœa, without blood or mucus, began July 15; became worse in October. Was given salts for one day, and became incontinent, with almost constant tenesmus. Began to lose weight rapidly. Regained sphincter control, but continued to pass 8 motions a day; no blood.

On Nov. 1 he developed diphtheria, and from that date was given a purely milk diet. Incontinence again in December, and ankles began to swell in January, 1943. Œdema extended very rapidly to his abdomen. On Jan. 30 he came under my care, together with an enormous quantity of tinned milk and invalid milk foods. Anasarca of the whole body and face extreme. Caput medusæ and distended thoracic veins seen through solid œdema. Abdomen tense with fluid, but nothing abnormal palpable except a tender descending colon. Cardiac rhythm tic-tac, pulse 140. Extensive bedsores of sacral region, hips, backs of thighs and legs; inner aspects of thighs ulcerated through continuous apposition. Elbows and knees could not be extended beyond 90° owing to contractures of the flexor muscles. Seborrhœic dermatitis of scalp and face, and pigmentation of skin of shins and arms. The unbroken skin of the back and abdomen was acutely hypersensitive; the first dressing produced reflex emptying of the bladder and rectum—a bedpanful of undigested milk curds.

Milk was discontinued. On a diet containing 8 oz. meat, cheese, some macaroni, but no bread, improvement was dramatic. The bandages fell away on the second day, revealing extreme emaciation. Rectum and bladder control was regained on 4th day, with small pultaceous motions. Fissures appeared at angles of mouth, and tongue was red, smooth and sore. All œdema, except of feet and buttocks, disappeared by end of February, but ascites was increasing.

An intensive course of sulphaguanidine beginning on Feb. 10 was followed by marked improvement in ulcerative colitis; two pultaceous motions daily. On March 9 he was given 1 c.cm. mercury-theophylline diuretic, causing great reduction in ascites, and next day 0·5 c.cm. with further improvement. Two large bullæ appeared on the left foot; trauma was definitely excluded. On March 15 a slight accidental injury to the shin drew blood very easily, but the clotting-time was apparently normal. On March 26 there were several petechial hæmorrhages on the abdominal wall. Chvostek's sign strongly positive. Ascites again increasing. He died on April 20.

CASE 2.—L/Cpl. B, aged 31; journalist. Had dysentery with blood for 10 days in January, 1942, on first arriving in Egypt, and later had an operation for hæmorrhoids. Was captured on June 2 and soon began to lose weight. June 12: 12 motions daily, without blood. Diarrhœa with further loss of weight continued until July 15, when he reported blood and mucus, and was given "salts." By October he was incontinent and extremely emaciated, and was admitted into Tripoli Hospital, where he was given eggs, steaks, 20 injections of emetine and 6 of lecithin. He gradually improved but did not put on weight. In November a "lump" on his right shin broke down into a large painful ulcer.

He came under my care on Feb. 7. I could encircle his thigh with one hand. Ulcer showing no signs of healing. Seborrhœic dermatitis of head, dry inelastic skin, pigmented shins, and œdematous ankles. First cardiac sound at apex very indistinct, but no other abnormalities. Abdomen scaphoid with nothing palpable except a tender, narrow cord of descending colon. Extreme depression.

Given diet containing 8 oz. meat, cheese, eggs and butter when available, porridge, lemon and oranges. Within a fortnight the ulcer was healing, his physical and mental condition had improved, and he was passing two pultaceous motions a day. Feb. 22: intensive course of sulphaguanidine. Feb. 24: sudden collapse, with passage of blood and mucus and incontinence. Recovery with stimulants, warmth, and 500 c.cm. of glucose-saline intramuscularly. Improvement after this was very slow, and he died on March 24.

Post mortem, heart, liver and kidneys were half normal size. Right suprarenal could not be found. Pancreas was a

SULPHONAMIDE DERMATITIS: REFERENCES

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quarter normal size. Mucosa of whole colon and lower half of ileum was strikingly atrophic. Musculature of colon was spastic.

CASE 3.—Pte. C, aged 31. Captured June 14, 1942. Diarrhœa without blood began on Sept. 1, after which his motions never returned to normal. Oct. 15: œdema of ankles and face. Jan. 20, 1943: jaundice, with shivering, night-sweats, abdominal pain, and four green liquid motions daily. Feb. 7: liver enlarged, fibrillation of heart, and hæmaturia once. Nursed flat on back. March 11: two liquid motions, black with altered blood. Dilated capillaries on face bled spontaneously. March 22: fibrillation improved to frequent extrasystoles. He received no specific treatment for cardiac condition. He gradually improved on meat, cheese, butter and eggs when available, and sulphaguanidine 1 g. daily. In December I was told he had recovered.

EVIDENCE OF VITAMIN DEFICIENCY

Vitamin A.—During November and December, 1942, 8 men in a block containing 58 developed a 10-day periodic fever which I considered was trench fever. In January, 1943, 11 of these men developed catarrhal jaundice which was then epidemic in the Middle East. This high incidence of intercurrent infections may suggest a lack of vitamin A. Of 24 other men questioned, 6 complained of night-blindness. Under these conditions, where lighting at night did not exist, there must have been many more in whom this symptom was present.

Vitamin-B complex.—Symptoms of *beriberi* were present in all the men, except Indians and South African natives; there were pains and tenderness in the limbs, loss of peripheral reflexes, and muscular atrophy (contractures in 1). Cardiac damage was apparent clinically in 8. An acute neuritis involving the pelvic visceral and somatic nerves was conspicuous in 3. Gross œdema was common, but may have been due to protein deficiency.

Many showed some or all the signs of *riboflavine deficiency*—fissures at the angles of the mouth, seborrhœic dermatitis, glossitis, vascularisation and congestion of the cornea, easy fatigue, and (in 2 cases) unequal pupils.

Symptoms of pellagra were often seen, including pigmentation and atrophy of the skin of the shins and wrists, and gastrointestinal symptoms which could not be separated from those produced by the ulcerative colitis. Many had a depressive melancholia, and did not write letters for months, which led to pathetic inquiries from relatives.

Vitamin C.—Some of the worst cases had hæmorrhage from the intestine and kidneys, and petechial hæmorrhages in the skin over various parts of the body, appearing several months after the onset of the illness, and during a time when the consumption of lemons and oranges was high. The mouth changes characteristic of scurvy were never seen, perhaps because most of the men were dentally fit. I can produce no observations on anæmia.

Vitamin D.—Only the most seriously ill showed deficiency of vitamin D. The teeth of several turned black. One man the day before he died had 6 attacks of tetany with carpopedal spasm. L/Cpl. A and Pte. C both showed a strongly positive Chvostek's sign, which disappeared in about a month under treatment with 'Calcolact' and vitamin D.

TYPE OF DYSENTERY

In none was the onset of dysentery heralded by fever. Very few started with blood in the stools; it came later, in streaks, and persisted (macroscopically or microscopically) for months, with pus and mucus. *Entamœba histolytica* was reported in all cases in the stools, but many other organisms coexisted in enormous numbers. Emetine had no influence whatever on the course of the dysentery, other than to cause the amœba to disappear from the stools. The major part of the infection, which was not amœbic and not specific, remained unresponsive to specific treatment. From the course of the disease, I regarded most of these dysenteries as mixed infections, implanted in men whose resistance to infection had been so shattered by starvation that even the normal saprophytes of the intestinal tract might become pathogenic.

THERAPEUTIC PROBLEMS

Many months after the onset of their illness, these men were continuing to receive the Italian *risso* diet of rice, cheese, milk, and coarse brown wholemeal bread, but meat was being withheld. It soon became obvious that the essential factor in treatment was the diet.

The brown bread was strictly forbidden, because it was found that the coarse grains acted as mechanical irritants to the inflamed mucosa. It was replaced by porridge, puddings, and other foods from Red Cross parcels, and the improvement in these men, compared with those who continued to eat the bread, was very obvious. In addition 8 oz. of meat was given daily, obtained from Red Cross parcels, and otherwise, by fair means or foul. On this regime not only did the bowel symptoms improve, but the symptoms of vitamin-B deficiency gradually disappeared. One of the most gratifying results was the lifting of depression and resumption of letter-writing.

Milk in large quantities was found to pass through the extensively damaged bowel in large undigested masses. This was proved time and time again when the frequency of the motions increased on a diet of Nestlé's milk, when I tried to give easily digestible fat in this form. The improvement in L/Cpl. B when given meat instead of milk was dramatic.

Concentrates of vitamins were almost unobtainable in Italy, and certainly not available to us. Vitamin deficiencies had to be made up in the diet, and from Red Cross food and invalid parcels—items from which were carefully selected. In these patients 'Bemax,' used as a source of vitamin B, was found to produce flatulence and increased motions. Lemons, oranges, grapes, tomatoes and other fruits were plentiful, and yet improvement was very slow. We had here, I considered, a vicious circle of disease, beginning with starvation, and followed by non-absorption of food and accessory factors from an extensively atrophied and ulcerated mucous membrane.

Local treatment by washouts of the colon had no apparent effect, except to remove large accumulations of iron (when this had been given) from a semi-paralysed gut.

Sulphaguanidine was received in February, 1943. Of 9 of the worst cases, still showing blood, pus and mucus in the stools, 7 improved immensely on an intensive course. The drug apparently has some toxic properties, but its great value is undoubted. It was also useful in cases given small doses over a period.

The extreme emaciation, dehydration, and toxic conditions often called for urgent measures. Intravenous glucose and saline, by long-continued drip, I never saw succeed, probably because the toxic heart was overwhelmed by a sudden influx of a comparatively large volume of fluid. But intramuscular injections of 250 c.cm. twice daily were well tolerated and gave good results, and some cases might have been saved by this means had it been started before actual collapse took place. The indiscriminate use by the Italians of intramuscular saline, even in cases of gross anasarca, at first prejudiced me.

Most of these men had received fairly large doses of salts, not only when first seen, but also when the inevitable exacerbation of diarrhœa occurred. The number of motions increased, with blood mucus and tenesmus. I was soon convinced that the indiscriminate dispensing of salts after labelling a man "dysentery" is a dangerous practice, and it was apparently very prevalent in North Africa.

Mercury-theophylline injections for anasarca produce dramatic results, and are apparently not contra-indicated by extensive disease of the bowel.

SUMMARY AND CONCLUSIONS

Clinical observations were made in an Italian hospital on about 250 British prisoners of war arriving from prison camps in North Africa.

On arrival they were emaciated and apathetic, and were suffering severely from dysentery, often with incontinence. They showed various symptoms and signs of vitamin deficiency.

The hospital pathologist found *Entamœba histolytica* in the stools, but the patients did not improve clinically under treatment with emetine. The dysentery may be attributed to mixed infection of the intestine in men weakened by starvation who had little resistance to organisms ordinarily non-pathogenic.

The relatively rapid development of vitamin deficiencies, and their persistence months after an adequate intake of vitamins had been secured, was probably the result not only of malnutrition but also of non-absorption from an atrophied and ulcerated bowel.

In the treatment of these chronic infections of the lower bowel diet proved the most important factor. Meat was much more readily assimilated than milk, even when the disease was very extensive. Milk in large quantities may be definitely harmful.

The condition of many of the men had been made worse by indiscriminate dosing with "salts." This is a dangerous practice.

Sulphaguanidine was remarkably beneficial.

My warm thanks are due to Prof. J. A. Ryle, of Oxford, for his advice in the preparation of this paper from my notes. Also to Lieut.-Colonel P. J. Richards, OBE, RAMC, who sent the notes to me from Italy.

FATTY DIARRHŒA IN CHRONIC AND RELAPSING DYSENTERY

HENRY T. HOWAT, MB ST. AND., MRCP
MAJOR RAMC

A SPRUE-LIKE syndrome characterised by stomatitis and steatorrhœa occasionally supervenes in the course of dysentery. Thus Manson-Bahr (1943) has shown that 40·5% of his 200 sprue patients gave a history of antecedent intestinal disorder. The relationship of organic colon disease to functional failure of the small bowel appears to have been minimised in recent discussions of the sprue syndrome.

While serving in the Middle East cases of chronic and relapsing dysentery of varied ætiology have been seen, in the course of which stomatitis and steatorrhœa developed. Earlier cases of which case 1 is an example, were seen in prisoners-of-war and other soldiers, many of whom, in addition to inadequately treated dysentery, gave a history of inadequate diet; later cases were seen in British soldiers whose diet had been balanced and well-controlled. In this group cases seemed to become more and more common; indeed, at one period in the dysentery off-season in 1943 six such cases were under supervision in one fifty-bedded dysentery ward. Cases 2–5 are consecutive examples from this group.

CASE-HISTORIES

CASE 1.—*Cæcal amœbiasis and dietary deficiency.*—A gunner who served throughout the siege of Malta. In the fall of 1941 he was treated in hospital for diarrhœa with blood and mucus in the stools. Intermittent diarrhœa persisted throughout 1942, chiefly confined to the early morning. He noticed in late spring that his stools, still numerous, had become pale and bulky, and he was admitted to hospital as a case of sprue. Emetine was given empirically with no benefit. When seen in August, 1943, there was well-marked steatorrhœa, with vegetative forms of *Entamœba histolytica* and *Trichomonas hominis* recovered from rectal swabs. A second anti-amœbic course was given. Considerable improvement followed large doses of nicotinic acid by mouth, and parenteral liver extract 'Campolon.' Relapse ensued when the liver extract was stopped.

CASE 2.—*Relapsing Sonne dysentery.*—A corporal who developed diarrhœa in East Africa in April, 1942, for which he had a course of sulphaguanidine. Recurrences in July, 1942, and September, 1942, in which Sonne bacilli were isolated, were treated by a second and a third course. Further sulphaguanidine was given in January, 1943, in an acute relapse of Sonne dysentery, followed by a short course of sulphapyridine for boils a month later. About this time he developed steatorrhœa, which was present in June, 1943. No improvement followed hydrochloric acid and nicotinic acid in large doses by mouth.

CASE 3.—*Dysentery, bacillary exudate, followed by amœbiasis and giardiasis.*—A private who had courses of sulphaguanidine in January and June, 1941, for dysentery with bacillary exudate. Intermittent looseness of the stools persisted till November, 1942, when he was in hospital and received a long course of sulphaguanidine for chronic diarrhœa. In February, 1943, he was admitted with steatorrhœa. Vegetative forms of *E. histolytica* and *Giardia lamblia* were found in the stools, and a full anti-amœbic course and mepacrine were given. In April, 1943, pale bulky fatty stools were being passed, containing cysts of *E. coli*.

CASE 4.—*Chronic diarrhœa with indefinite exudate.*—A private who had acute diarrhœa with blood and mucus in the stools in November, 1940, which recurred so severely as to require admission to hospital three times in 1941. Looseness persisted till March, 1943, when he remembered on questioning a period of several weeks during which his stools were pale and bulky in place of the usual watery diarrhœa. In July, 1943, he was given a course of some 200 grammes of sulphaguanidine in hospital for dysentery with indefinite exudate, followed by large doses of nicotinic acid by mouth. No pathogens were isolated in the stools. In August, 1943, steatorrhœa was reported.

CASE 5.—*Dysentery with bacillary exudate and giardiasis.*—A corporal who received sulphaguanidine in March, 1943, for an acute attack of dysentery. Relapses in June and July, 1943, showed a bacillary exudate, and two further courses of sulphaguanidine were given. When seen in August, 1943, for chronic diarrhœa, he was noted to have steatorrhœa, with vegetative forms of *Giardia lamblia* in the stools. Little benefit accrued from mepacrine, though it abolished the parasites, or from nicotinic acid and hydrochloric acid by mouth.

CLINICAL FEATURES

During acute phases, stomatitis and sore tongue attributed to nicotinic acid deficiency were usual; rapid relief followed nicotinic acid in large doses by mouth leaving the atrophic tongue. In British soldiers riboflavin deficiency was not seen, nor were œdema and skin hæmorrhages; one man however complained of temporary paræsthesiæ. Achlorhydria or well-marked hypochlorhydria was the rule. A mild hypochromic anæmia was a common feature but megalocytic anæmia was noted in only one long-standing case of this group. Varying degrees of asthenia and loss of weight were noted.

The stools were increased in number, bulk and weight, being offensive, greasy and frothy, of sprue type with excess of hydrolysed fat. Hydrochloric acid and nicotinic acid in large doses by mouth produced no alteration in the stools; in the few cases given parenteral liver extract in adequate dosage there was amelioration of the acute features. Relapse ensued when this therapy was not continued long enough. In less acute form the increase in bulk and frequency of the stools continued; pale, bulky, pultaceous motions being recorded typically on rising, before and after breakfast.

DISCUSSION

The introduction of parenteral crude liver extracts and the response to large doses in the treatment of sprue have led to the conception that the steatorrhœa is a manifestation of a specific deficiency of a vitamin of the B_2 complex. Which factor or factors may be involved, and the mechanism whereby such a factor mediates in the absorption of hydrolysed fat, are as yet unknown. Clinically in sprue and in those cases of fatty diarrhœa associated with colonic disease evidence of deficiency of various factors in the known B_2 group is sometimes seen, but in many cases multiple factors are involved which cannot be dissociated on clinical grounds; indeed, in our present state of knowledge it is not therapeutically necessary or advantageous to do so. The factors present in the B_2 complex are interdependent, and deficiency of one may lead to imperfect action of others.

In case 1, defective diet over a period of months was a factor in the production of a conditioned deficiency. The clue to the rôle played by the chronic diarrhœa may be found in the other cases described, in which the diet was adequate throughout. A feature was that they had been treated with large or repeated doses of sulphaguanidine, and in some the time relationship of the onset of fatty diarrhœa to such treatment was striking. This drug may be a factor in the production of a conditioned deficiency, by inhibiting the growth of commensal organisms in the bowel. It has been shown experimentally that sulphaguanidine and succinylsulphathiazole over long periods can reduce the natural flora of the bowel, thus inhibiting the synthesis of many factors essential to the host—e.g., thiamine, members of the B_2 complex such as pantothenic acid, folic acid

and biotin, riboflavin, nicotinic acid and inositol, and vitamin K (Mackenzie et al. 1941, Black et al. 1941, Wright and Welch 1944, Martin 1942). Indeed, it is likely that the host relies on this synthesis for the augmentation of the natural supplies of these vitamins. This process might prove to be one of the conditioning factors determining a deficiency. If so, the large-scale introduction of sulphaguanidine in the treatment of bacillary dysentery in the Middle East explains the apparent rise in incidence of fatty diarrhœa in dysenteric British soldiers which I observed in a large base hospital.

Such a mechanism could no doubt come into play without sulphaguanidine therapy in cases of chronic dysentery and ulcerative colitis where the natural bowel flora is altered. This mechanism can also be postulated (Black et al. 1942) in cases of hypoprothrombinæmia described in ulcerative colitis, due to conditioned deficiency in 1:4-naphthaquinone derivatives (Page and Bercovitz 1942), and again in a case of mine where the onset of frank pellagra was precipitated by an exacerbation of severe Flexner dysentery.

SUMMARY

Histories are given from cases of fatty diarrhœa supervening in the course of chronic or relapsing dysentery.

One of the possible mechanisms in the production of deficiencies in factors of the B_2 complex and steatorrhœa in chronic colonic disorders is discussed.

The long-continued or repeated use of sulphaguanidine in therapy may aggravate this mechanism.

Acknowledgements are due to Colonel J. Biggam for permission to publish this paper and to Lieut.-Colonel W. Melville Arnott for his advice and criticism during its preparation.

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SURGERY OF VARICOSE VEINS

HUGH R. ARTHUR, MB LOND., FRCSE
SQUADRON-LEADER, SURGICAL SPECIALIST, RAF

DESPITE much that has been written on the surgery of varicose veins, they still seem to present difficulty to young surgeons, and judging by the number of cases seen in the Service who require a second or third operation the operative principles are still inadequately appreciated. By considering 3 cases of recurrent varicose veins and the anatomy of the venous system at the saphenous opening, I hope to crystallise the essentials of a satisfactory technique.

CASE-HISTORIES

CASE 1.—This airman had severe varicose veins of both legs extending from the inner side of the calves to the saphenous opening in each groin. Simple ligature had twice been carried out on each leg and two scars were visible in each thigh, at about the junction of the middle and upper thirds. When I saw him the veins were completely patent in both legs and a cough thrill was transmitted down them as far as the knees (fig. 1A). From the history and the available notes it was clear that on each occasion the operation had been ligation in continuity of the main saphenous vein in the region of the mid-thigh, without injection. The veins had disappeared while he was in bed and recurred within a day or two of his getting up and about.

The obvious lesson of this case is that ligation in continuity is insufficient. It may sometimes result in permanent obliteration of the lumen but the risk of recanalisation is high.

CASE 2.—This patient gave a history of operation for varicose veins of the right leg some months ago, and a recent recurrence. He presented large varicosities in the lower leg (which transmitted a cough thrill), a tortuous dilated vein extending from the inner side of his knee to the saphenous opening, and a scar in the upper third of his thigh. Below the scar there was a fibrous cord, presumably representing the thrombosed main saphenous vein; above it a small saphenous varix was palpable (fig. 1B). He stated that there had been considerable reaction in the leg immediately after operation.

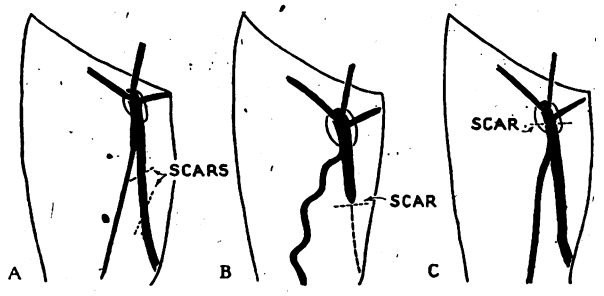

Fig. 1—Anatomy of recurrent varicose veins.

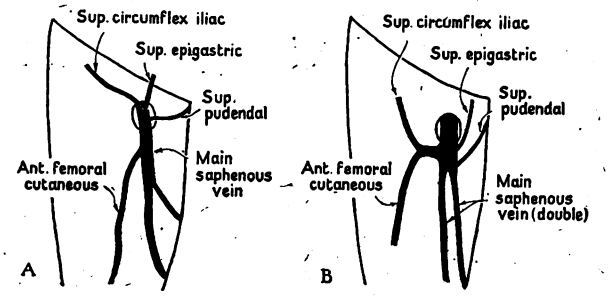

Fig. 2—Variations of normal anatomy at saphenous opening.

In this case, though ligature had been combined with injection and a satisfactory thrombosis of the main saphenous vein in the thigh had been obtained, the site elected for the operation was too low and the tributaries had been left unthrombosed above the ligature. Hence the recurrence through the anterior femoral cutaneous vein in the thigh and the renewed dilatation of the veins of the calf.

CASE 3.—This man reported to the surgical outpatient department for injection of veins still dilated after bilateral ligature injection. He had a scar in each groin where the saphenous vein had been ligated, but both veins were patent, and a cough thrill was transmitted in each leg down the main saphenous vein (fig. 1C). There had been little reaction in either vein after the operation and the veins had gradually become more obvious since the convalescent period.

Here the veins had been ligated as near to the saphenous opening as possible, but the ligation had been in continuity and the accompanying injection had not prevented recanalisation. The solution used was not recorded.

ANATOMY

The anatomy of these veins is variable: fig. 2 shows the two commonest arrangements. The four main tributaries, as shown, are always present, though their mode of union with the main vein varies. Fig. 2A illustrates the most usual finding. Sometimes two, and occasionally three veins form direct venous channels from the upper end of the long saphenous vein to the venous bed in the calf; they are the main saphenous trunk, which is sometimes double to within an inch or two of the junction with the femoral vein, and the anterior femoral cutaneous vein, which is a constant tributary to outer side of the saphenous vein near the fascial opening (fig. 2B).

TECHNIQUE

From a study of the 3 cases recorded, two facts emerge:

(*a*) Ligature in continuity, either alone or coupled with injection, will not guarantee permanent occlusion of the lumen of the main saphenous vein.

(*b*) Ligation of the tributaries is essential both to prevent a collateral varicose circulation being set up and to prevent persistence of the varix (if present) above the site of thrombosis.

On this basis we may now lay down the essential steps in operative cure of varicose veins.

1. After exposure of the saphenous vein in the groin, the four main tributaries must be dissected out, clamped, cut and ligated.
2. The main trunk must be explored to ascertain whether it is single or double.
3. The vein must be adequately injected.
4. A section of the vein should be removed, after the injection and ligature are complete, as near as possible to the union with the femoral vein.

If these four essentials are observed thrombosis will be satisfactory and there will be no recurrence.

A final question remains: should the saphenous vein be tied and injected at the inner side of the knee as well? This should be decided afresh for each case, for the answer depends on the extent of the varicosities below the knee and the technique used for the injection. If a fine ureteric catheter is passed down the vein at the time of the original ligature-injection in the groin and if the varicosities below the knee are small, further ligature may be unnecessary. But often it will be impossible to ensure the maximum thrombosis in the calf by this method, and in my view ligature at the inner side of the knee, again with removal of a small section of vein, is the more satisfactory proceeding. In either case it is wise to warn the patient that one does not expect to thrombose every vein and that a few dilated veins will almost certainly remain in the calf to be injected in the convalescent period. Fewer veins will require this secondary injection if the vein is tied at knee level as well as in the groin.

This operative technique has been strongly criticised by Atlas (1943) on two grounds: (1) that in a small proportion of cases the thrombosis has spread into the deep veins of the leg with resulting embolus formation; and (2) that the ureteric catheter may injure the venous wall and allow the sclerosing agent to leak into the perivenous tissues. The first of these criticisms is partially answered by the observation of Heller (1942) that the saphenous system is largely emptied into the deep veins of the leg via the deep communicating veins, rather than directly into the femoral vein at its junction with the saphenous. Heller also points out that in the flaccid limb the superficial veins may take 10 min. or more to empty. If he is right, injection of a quickly acting sclerosing agent into a recumbent relaxed patient will reduce to a minimum the risks of spreading thrombosis, for the solution injected will tend to be confined to the superficial veins.

My own experience suggests that monoethanolamine oleate ('Ethamolin') is the most suitable sclerosing solution; I have found that in performing bilateral ligature-injection at the saphenous opening, using a ureteric catheter, complete thrombosis into the calf is often present in the first leg by the time the groin operation is completed in the second leg, which makes it unnecessary to ligate at the inner side of the knee in that leg. In the last five years, treating an average of 4–5 cases a week by the technique described, I have never encountered either deep thrombosis or local necrosis due to spilling of the ethamolin—and I am not guiltless, on occasion, of allowing the solution to leak into the groin wound or of injecting it outside the vein. I differ from Atlas in thinking it a mistake to restrict injection therapy to ambulant patients, particularly in view of Heller's findings that the blood passes more rapidly from the superficial to the deep veins in the active leg.

SUMMARY

Three cases of recurrent varicose veins are recorded and analysed. The facts indicate that ligature in continuity, either alone or coupled with injection, and failure to ligate the tributaries, are fundamental errors leading to recurrence.

The anatomy of the venous system at the groin is discussed; the three main tributaries are described and the possible existence of more than one direct venous channel between the femoral vein at the fossa ovalis and the veins of the calf noted.

Four steps are essential for successful occlusion of the saphenous vein in the groin: (1) ligation of the four main tributaries; (2) adequate exposure of the trunk of the vein; (3) adequate injection; and (4) removal of a small section of the vein.

Injection by ureteric catheter at the time of ligation is advocated and the criticisms of this technique answered.

My thanks are due to the Director General of Medical Services, RAF, for permission to use these cases and publish this paper.

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PULSATOR TREATMENT OF CRUSH INJURY

D. V. MARSHALL, MB GLASG., FRCSE, FRFPS
MEDICAL SUPERINTENDENT, CITY OF YORK GENERAL HOSPITAL

IT seems worth while to record four cases of crush injury which occurred two years ago after an air-raid, for the results were unexpectedly good, and the apparatus used in their treatment—the Both respirator distributed by Lord Nuffield—is available in all hospitals in this country. I have had no opportunity of trying the method in further cases.

During the severe raids in the spring of 1941 I had under my care quite a number of patients who, having been buried under masonry and extracted after varying periods from 4 to 10 hours, came to hospital showing little in the way of external or internal injuries, and whose limbs soon after became numb and swollen, and about 48 hours after admission became suddenly ill and died the next day or later; blood being found in the urine some hours beforehand. In one of the last raids in Hull in which I attended casualties, I saw a patient with a very severe crush injury of one arm, and in the meantime I had read a suggestion that the condition should be treated by some form of pulsation. This patient's arm was so treated for about ten hours in a Both respirator before she was transferred to a hospital in the country. The patient said her arm felt very much better after the treatments, and her arm recovered quickly. This incident prompted me to treat all the crush injury cases which came under my care in York in the Both respirator. The respirator can easily be adopted for affecting the circulation in limbs or in half the body by altering the headplate so as to make the long axis of the oval lie in the transverse instead of the vertical plane. The original end of the apparatus can be partly cut out, and a plywood shield of the required size fitted inside or outside to support the sponge rubber.

As soon as possible after the diagnosis of crush injury had been made, the damaged limb or limbs were placed in the respirator and the pulsation mechanism was worked at the slowest rate provided for about half an hour. Four cases received treatment for this period every two or three hours in rotation. It was continued regularly, except during sleep, until the circulation of the affected parts seemed restored, as judged by the diminution of pain, return of warmth and colour, and loss of tension. They all recovered, and three of the patients said their pain was much reduced by the treatment and that they felt generally better; the patient who was injured least and who was mentally clearest was most emphatic on this point. The woman who was most severely crushed of all, and who complained of so much pain that we at first thought she had a fractured pelvis in addition to her leg injuries, did not experience relief, and found moving from the bed in and out of the respirator rather trying.

CASE-RECORDS

CASE 1.—A man of 58 was buried under the debris of his house for about 12 hours. A beam had been lying across his chest. On admission on April 29, 1942, he was semiconscious. Crushing of left arm with multiple blisters; bruises of right arm; both limbs very swollen. Œdema and abrasions in region of left eye and forehead. Given three pints of plasma. Chest also crushed. Very cyanosed and dyspnœic. Respirator treatment applied to whole body up to neck with immediate effect. Cyanosis and dyspnœa at once relieved and he felt better. X rays of left arm showed no fractures but there was still swelling and pain. Next day right arm and forearm tense and anæsthetic. Urinary output, 18 oz. Later X rays showed fractures of ribs. On May 1 right arm still

BIOCHEMICAL ANALYSIS PERFORMED IN THE DEPARTMENT OF BIOCHEMISTRY, BRITISH POSTGRADUATE MEDICAL SCHOOL, FROM SPECIMENS TAKEN BY DR. BYWATERS ON MAY 3, 1942, 5 DAYS AFTER THE INJURY

Case no.	Blood				Urine				
	Urea (mg. %)	Alk. res. (vol. %)	Hb. (%) (Haldn)	Chlor. as NaCl (mg. %)	pH	Urea (g. %)	Alb. mg. (%)	NaCl mg. (%)	Deposit
1	150	43	88	632	6·5	2·00	40	50	Granular and pigmented casts
2	46	40	84	572	6·0	1·40	10	100	Pigmented and cellular casts
3	235	32	89	548	7·5	0·86	200	350	Bacteria

anæsthetic but warm, and radial pulse good. Urinary output, 18 oz. Some hæmaturia. Blood-urea 111 mg. per 100 c.cm. On May 2 the urinary output was 47 oz., and it remained good subsequently. On May 3 blood disappeared from urine; sugar noted in urine and continued until June 12, possibly due to head injury or pressure on pancreas. Blood-sugar 123 mg. per 100 c.cm. On May 6 left arm movement still very poor but general condition rapidly improving. Dr. J. le Fleming C. Burrow diagnosed crush injury of left brachial plexus. Discharged from hospital on Oct. 2, but continued for many months as an outpatient, having physiotherapy for wrist-drop and lack of power in fingers and forearm of left arm and slight loss of flexion of the right fingers. He went back to work in December, 1943.

CASE 2.—A Royal Naval rating of 19, on leave, son of case 1 and extracted about the same time from the debris of the house, was very shocked on admission, and was at first thought to be suffering from a fractured pelvis and left ankle and crush injury of both legs including thighs and right arm. This was confirmed when no bony injury was shown in pelvis, femora or tibiæ radiologically. Treated in respirator, from waist downwards, about 3 hours after rescue. Very ill and at first looked as though might die, but recovered after complaining of much pain in legs, and having a chest complication of the pneumonic type. Pulsation treatment continued until April 4 when pulmonary condition became more important. Remained very ill until May 8, after which made rapid progress. Discharged from hospital on June 9, and now again serving in Royal Navy.

CASE 3.—A woman of 24 was in a basement of a house which probably received a direct hit. She was thrown on to her back, and a wall fell on her legs. Eight hours after admission on April 29, complained of great pain in both legs, and unable to move them at all. No bony injury shown in X rays. Three pints of plasma given. Placed in respirator from pelvis downwards about 7 hours after rescue. On April 30 complained of lumbar pain; urine contained blood and casts; bleeding continued until May 9. Very ill and remained so until hæmaturia ceased. On May 1, right calf, and left calf and thigh all affected, but on May 2 thigh was less tense, but still anæsthetic. Very little urine passed for first two days and blood and casts persisted for some days. Urinary output, of alkaline reaction, rose from 16 oz. on April 30 to 38 oz. on May 3, and continued satisfactorily thereafter. By May 10 could move right leg extensively without pain. but movement of left leg still very limited. After this date rapidly improved and discharged on May 25 able to walk about nicely.

CASE 4.—A man of 37, who was putting out incendiaries on the roadway when he was hit by debris from a nearby bursting HE bomb. A lump of clay pinned him down until help came about 5 minutes later. On admission on April 29 he was not very shocked and was fully alert and sensible; left leg below knee was very tense and painful, though it felt dead and could not be moved. Urinary output was good from the onset; no blood or albumin in urine. Leg put in respirator on April 30 as the injury was deemed to be crush injury, in spite of the short duration of the crushing. The first treatment gave him great relief, and the subjective improvement continued with subsequent treatment. It was discontinued on May 4, the circulation being apparently fully restored, and he was discharged on May 13.

It seems accepted that the kidney damage is caused by the absorption of toxin produced by some form of autodigestion occurring in muscle which has been crushed for some hours or otherwise subjected to very severe pressure. Most of the efforts in treatment have been concerned with preventing the renal damage by medication or treatments directed towards relieving the kidneys or preventing the toxin from getting to the kidneys in such large amounts after the damage has occurred. The treatment which I tried aimed at preventing the autodigestion or changes in the muscle by relieving or improving the circulation at the earliest moment.

SUMMARY

It is suggested that the fatal result of crush injury syndrome may be prevented by prompt restoration of the circulation in the affected part by the use of a mechanical pulsator. In four cases such treatment was successfully applied, using an adapted Both respirator as pulsator.

All these cases were seen by Dr. E. G. L. Bywaters and the diagnoses of crush injury were agreed to and confirmed by Mr. J. H. Conyers, a surgical colleague, and Dr. D. A. Slade, assistant pathologist.

THE SIMS TEST

MARY BARTON M.B. LOND.
B. P. WIESNER, D.SC. EDIN., PH.D. VIENNA
CONSULTING BIOLOGIST, ROYAL NORTHERN HOSPITAL

POSTCOITAL examination of the cervix represents the only means by which, in the investigation of sterility, the actual ingress of the sperms into the cervix can be established (Lane Roberts et al. 1939). However, the usual method, which consists in the removal and immediate examination of a loopful of cervical mucus (Huhner's test) is unsatisfactory. First, the quantity of mucus thus obtainable is nearly always inadequate for precisely assessing the condition of the cervical plug itself; secondly, it is impossible to obtain mucus from the upper level of the cervical canal. In attempting to improve the technique of the test we employed a glass syringe in order to remove sufficient mucus; but the ideal instrument for the purpose was found in the insemination syringe devised by Green-Armytage (1943).

Since developing the technique described below we found among the older writings a paper by Marion Sims, published in 1868, in which he describes the precise method which we are now using. Furthermore, in this brilliant study, Sims described in considerable detail the various cervical conditions and defined the important rôle of the cervix in insemination. His grasp of the whole subject and his insistence on the primary need for assessing male fecundity before treating a barren woman still may serve as a model of aim and method. His book on uterine surgery (1866) which deals with these matters evoked adverse comment by the *Medical Times and Gazette*, which described his procedure as "this dabbling in the vagina with speculum and syringe—incompatible with decency and self respect." In recognition of his work we suggest that the thorough postcoital examination of the cervix should be referred to as the "Sims test."

METHODS

The patients are asked to have intercourse during the presumptive ovulatory phase. The wife is asked to report 6–24 hours after intercourse, no bath or douche being permitted before the visit.

A bivalve speculum—wetted but not lubricated—is inserted. A small quantity of the vaginal pool is withdrawn for examination by means of a dry Green-Armytage syringe. The macroscopic condition of the untouched cervical plug (degree of protrusion, volume, &c.) is recorded at this stage. The cervix is then thoroughly swabbed with dry cotton-wool. The tip of the cannula attached to a newly cleansed syringe * is inserted into the cervical canal for a few millimetres. The lower portion of the plug is drawn up into the syringe; contamination by vaginal contents is avoided as far as possible by ending suction before withdrawal of the cannula. The contents are immediately ejected onto a slide and examined microscopically without delay on a cold stage. After the syringe has been cleansed, the cannula is slowly passed into the isthmus uteri nearly as far as the internal os, and the upper portion of the plug is removed by gentle suction and

* Before use, the syringe is cleansed with spirit and then rinsed with hot sterile water, which is expelled carefully.

examined in the same way as the first. After examination of the fresh mucus, films are prepared and stained (hæmatoxylin and Rose Bengal) for further examination.

The procedure is safe even during pregnancy; furthermore, the test does not preclude fertilisation, probably because an adequate number of sperms may penetrate the internal os during the interval between coition and test. Slight and passing hæmorrhage from the cervical canal sometimes occurs but is not clinically important nor does it interfere with the motility of the sperms.

OBSERVATIONS IN FECUND AND FERTILE COUPLES

We have employed the Sims test in several couples who were fecund as shown by the occurrence of pregnancy after a single intercourse (followed by the test) or after a short series of unprotected coitions. Also, records of about 100 fecund women married to men of varying degrees of fecundity are available, in addition to those studied previously by the Huhner method.

Usually the cervical canal in such women is filled, during the presumptive ovulatory phase, by a clear colourless translucent plug of moderate viscosity which protrudes for some distance from the external os. We have not obtained any specimens with an acid reaction to the usual indicators. Contrary to statements in French published work, the translucent plug may persist beyond the presumptive ovulatory phase, though its volume diminishes in the later stages of the cycle.

Variations in the appearance of the plug are not uncommon, and slight opacity and reduced volume are not incompatible with fecundity, though high female fecundity seems to be associated with the production of a voluminous and clear ovulatory plug. Furthermore, this plug on being expelled, or withdrawn with a syringe, is rapidly regenerated by the healthy cervix.

Microscopical findings.—(*a*) *Fresh specimens.* The appearance of the vaginal pool has already been described (Lane Roberts et al. 1939). It was confirmed in the present series that spermatozoa do not usually survive in the undouched vagina for the interval of 6 hours or more elapsing between coition and test. Vaginal examination is important, however, in order to establish the occurrence of ejaculation—a question which cannot be decided on the evidence of statements by the patient. The recent occurrence of ejaculation, in fecund couples, is shown by the presence of spermatozoa which though immotile show neither cytolytic nor hydropic changes and retain their typical staining properties.

The fresh cervical contents, both from the lower cervical canal and from the isthmus, contain certain cellular elements in varying numbers and proportions. First, there may be found, particularly in the lower plug, epithelial scales and transitional cells derived from the region of the external os. Secondly, Döderlein rods and other organisms may be present; but these are not characteristic of the healthy cervical plug and probably represent contaminations occurring on withdrawal of the cannula. Thirdly, cervical cells are found in varying numbers ranging from isolated inclusions to coherent mats, strands or conglomerated single cells. Fourthly, blood-cells are seen—probably resulting from slight lesions produced by the suction of the syringe. Lastly, spermatozoa are present in considerable numbers. Their actual density varies greatly in fecund couples. In the field usually chosen for examination of fresh films (obj. 23 times, oc. 12 times, tube 149 mm.), between 50 and 200 sperms fill each visual plane. A high proportion of these show full progressional motility, their speed being about the same as that seen in semen. Some sperms move either sluggishly or remain stationary, though tail and middle piece oscillate, and the sperm may revolve around its axis; many others appear to be dead. Even 24 hours after intercourse 20% or more of the sperms are still actively motile in most fecund couples. Spermatozoa may remain fully motile in the cervix for at least 4 days. The density of spermatozoa decreases towards the internal os; the proportion of motile sperms may increase in the same direction.

(*b*) *Stained films* show that the cervical cells vary in appearance according to the stage of the degenerative process to which they are subject. Some cells retain their original structure and show an intact nucleus. These young forms are probably rubbed off by the cannula and are not numerous during the ovulatory phase. Degeneration consists primarily in fragmentation of the nucleus, beginning with fine fissures in the chromatin and progressing gradually to the formation of clumps which may still cohere in the early stages of the process but tend to separate as degeneration progresses.

It is easy, in cursory examinations of fresh mucus, to mistake these terminal forms for polymorphs. They were found in every film in more than 200 healthy women examined at various stages of the cycle. These cells should be regarded as normal constituents of the cervical plug and a constant finding in Sims tests. A full description of them will be given elsewhere.

The spermatozoa, in such films, are found to have retained their characteristic staining properties. Abnormal spermatozoa and incompletely differentiated forms (spermatides, &c.) do not as a rule enter the cervix; highly motile microsperms represent an exception to this rule. Hence the cervical films do not fully reflect the cytological characteristics of the semen and their study cannot replace the usual examination of the semen.

OBSERVATIONS IN INFECUND COUPLES

Macroscopic observations.—The appearance of the plug in barren women may of course be the same as that of fertile subjects, for infecundity is often entirely limited to the male; furthermore, even severe abnormalities, and functional disturbances of the generative system (e.g., tubal dysfunction; cystic degeneration of the ovary) need not be reflected in disturbances of the cervical secretion. On the other hand, certain atypical conditions of the cervical plug are commonly found in subfertile or barren women. Thus, the plug may be limited to a small quantity of mucus which has the consistency of thick jelly. This type of plug never protrudes into the vagina and may be difficult to aspirate. The jelly-like plug may be limited to the isthmus so that only the lower canal is inseminated. In some women only a small quantity of mucus of unspecific appearance and containing many cells is obtainable at any time of the cycle; this finding is not pathological since it is quite common at certain stages of the cycle—e.g., at the end of the luteal phase or during the first days of pregnancy—but it is atypical in the ovulatory phase. Thirdly, the cervix may contain the mucopurulent type of plug associated with endocervicitis.

Microscopic findings.—The most significant condition revealed by the Sims test in infecund couples concerns the degree of invasion by spermatozoa, the proportion of surviving sperms and the depth of penetration. A fair population of spermatozoa may be present in the lower cervix, including a number of motile cells; but the isthmus may not be invaded at all or else contain but a few dead spermatozoa. Again, the cervical canal may be fairly densely populated by sperms which show but residual motility, if any, even 6 hours after intercourse. Lastly, spermatozoa are often very few or entirely absent. These findings may be made irrespective of the condition of the plug—i.e., a seemingly healthy and voluminous plug may show incomplete invasion although the semen contains numerous motile spermatozoa.

CAUSES OF INADEQUATE CERVICAL INVASION

Previous workers have shown, and we can confirm, that even a healthy cervix, producing a voluminous clear plug, may be inadequately inseminated, particularly where the semen shows oligozoöspermia (Seguy and Vimeux 1933). However, application of the Sims test in about 200 cases of sterility and subfertility revealed numerous instances in which the semen was voluminous enough to neutralise the vaginal pool, and was densely populated by motile and viable sperms; yet these failed to invade a normal ovulatory plug or to survive within the plug or to penetrate it fully.

CASE 1.—Sterile couple. Semen (2 specimens) seemingly fecund—e.g., 2 c.cm.; 60 million spermatozoa per c.cm.; very good initial motility and viability; few abnormal forms; abnormal head-forms 8%); isolated testicular cells only. Some small groups of agglutinated spermatozoa but no other evidence of infection. Sims test: 11th day of cycle; 12 hours after intercourse; typical ovulatory plug protruding from external os; no sperms found in either fresh or stained films. No evidence of endocervicitis.

CASE 2.—Sterile couple. Semen seemingly fecund (one specimen; previously also examined by other laboratories; 2·5 c.cm.; 40 million spermatozoa per c.cm.; 30% initial motility; slight variation of size and type of spermatozoa, about 4% only abnormal head-forms). Sims test: 13th day of cycle; 3 hours after intercourse (usual interval impossible to arrange); vaginal pool acid without motile spermatozoa; plug not voluminous but clear; only isolated immobile spermatozoa present in portio vaginalis; none in cervical isthmus.

CASE 3.—Secondary sterility. Semen presumed to be fecund, 4 specimens showing little variation—e.g., 120 spermatozoa per million c.cm.; 60% initial motility with high viability; slight anisozoöspermia; 9% abnormal head-forms. Sims test: 9th day of cycle; 6 hours after intercourse; plug voluminous, clear; lower canal densely invaded but most sperms immobile, a few with oscillatory tails. Sims test repeated in 5 out of 8 cycles with similar results. No evidence of endocervicitis.

CASE 4.—Sterile couple. Semen (3 specimens) gravely subfecund—e.g., volume 1·2 c.cm.; 1 million spermatozoa per c.cm.; high initial motility and viability; pronounced teratozoöspermia; 40% gravely abnormal head-forms; sloughing from germinal epithelium with numerous multinuclear forms. Sims test (repeated): 10th day of cycle, 14 hours after intercourse; slight cervical erosion; plug clear, non-cellular but of small volume; well-invaded cervical isthmus with about 20 motile sperms per plane. Conception took place shortly after this cycle, followed by spontaneous miscarriage.

CASE 5.—Sterile couple. Semen (2 specimens) subfecund—e.g., volume 1 c.cm.; 4 million spermatozoa per c.cm.; low and largely atypical initial motility falling to 1% in 8 hours; sperm picture dominated by incomplete or atypical differentiation of middle pieces and tails with high frequency (42%) of atypical head-forms; sloughing from spermatide and deeper layers. Sims test: 17th day of cycle; 14 hours after intercourse; good ovulatory plug; mean frequency of sperm per field; portio vaginalis, 4 motile, 4 vibratory, 12 immobile; cervical isthmus, 140 motile, 48 vibratory, 120 immobile.

It would seem that the capacity for cervical invasion which is essential for fertilisation cannot safely be deduced from the morphological characteristics of the semen. On the other hand the Sims result may be satisfactory while the semen shows subfecundity by its general and cytological qualities.

Among female factors, the failure of the cervix to secrete an adequate amount of, and the suitable type of, mucus is of primary importance. Retroversion may impede, and its correction may improve, cervical invasion. This may be due in part to the lack of contact between the protruding plug and the seminal pool of the vagina in certain anatomical conditions. Normally this contact serves as a path for the spermatozoa, which can be observed to ascend through the mucous plug immediately after emission has taken place. Where there is no protruding translucent plug invasion is invariably impaired. A purulent plug, on the other hand, may protrude without permitting invasion (Green-Armytage).

DISCUSSION

The application of the Sims test in fecund couples (5–10 minutes after emission) show that a certain degree of cervical insemination takes place very rapidly. Yet the total number of the sperms entering the cervix represents but a small though variable proportion of the total ejaculate—in some fecund couples no more than 1%. The healthy cervical secretion is a highly favourable medium for the survival of spermatozoa; the spermatozoa survive at least three times as long in cervical mucus as they do in their own seminal fluid at a comparable temperature. Receptivity of the cervix is apparently at its height during the ovulatory phase; but we cannot confirm the claim that the cervix will never admit spermatozoa in the pre-ovulatory or luteal phase of the cycle. In one fecund couple tested repeatedly throughout the cycle a very high degree of invasion occurred during the first day of menstruation though no douche had been used. But certain conditions of the cervix do at times prevent penetration by sperms—e.g., in early pregnancy.

The great importance of the plug as a medium for invasion and sperm survival suggests that orgasm may intensify cervical insemination since it is apt to increase protrusion of the plug.

Lack of cervical insemination (negative Sims test) represents a recognised cause of sterility not discoverable by other means than postcoital examination. But the cervix may be temporarily barred to spermatozoa through the absence of a suitable plug—a condition which may correct itself during a subsequent cycle. Repeated examination may be necessary for a definite diagnosis. Conversely, a densely invaded plug containing numerous motile spermatozoa, in both the lower cervix and the isthmus, demonstrates adequate insemination but does not exclude male responsibility since the semen may be infecund in other respects (teratozoöspermia).

We have no record of unaided conception taking place in cases where no live sperms were present in the isthmus 6 hours after intercourse; while conversely we have noted 2 cases where the isthmus contained many immotile and a few motile sperms only, 24 hours after intercourse, and the woman conceived. Again, fairly low counts (5–10 motile sperms per plane) are not incompatible with conception, though they are characteristic of subfecund couples. These observations suggest approximate rules for interpreting intermediate results. In applying this or any other test used in the investigation of sterility it must be remembered that fertility is subject to continuous gradation, and that degrees of insemination only measure the *probability* of conception; a lightly invaded cervical plug with a low proportion of motile sperms, though suggesting much lowered fecundity, does not permit the diagnosis of complete sterility.

The cause of inadequate insemination must also be considered. Not only must the female factors be weighed up but the results of the semen test must be taken into account. In no case must the Sims test be regarded as a substitute for semen analysis—except in so far as it may replace, in most cases, the in-vitro determination of viability.

Judging from our experience, the Sims test should replace the Huhner test but must not take the place of any other step in the analysis of impaired fertility. Since the test is simple and does not involve any discomfort to the patient it may be employed (at intervals of one or two cycles each) for routine control of the treatment of subfecundity.

SUMMARY

A development of the original method of postcoital examination of cervical contents, suggested by Sims in 1868, is described.

In highly fecund couples the characteristic ovulatory plug contains many motile sperms 24 hours after intercourse. Invasion may also occur at other stages of the cycle and in the presence of imperfect (e.g., opaque) plugs.

Infecundity is often associated with deficient invasion of the cervix caused by defective semen, inadequate or abnormal cervical secretion, or both.

Semen showing cytological characteristics of infecundity may procure adequate cervical invasion, and vice versa.

Repeated Sims tests may yield a valuable measure of the probability of conception, but they cannot replace any other step in the assay of fecundity.

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THE department of psychiatry of the Mount Zion Hospital of San Francisco has opened a psychiatric rehabilitation clinic for ex-Servicemen and women discharged from the armed forces on account of neuropsychiatric disabilities. The director of the clinic is Dr. J. Kasanin, and the chief psychiatrist Dr. Emanuel Windholz.

ANNOTATED BIBLIOGRAPHY OF MEDICAL MYCOLOGY.—The Imperial Mycological Institute, of Kew, Surrey, has prepared a list of all papers on medical mycology which were either published or noted by abstracting journals in 1943. Under each of the 218 references the reader is told where he can readily find an abstract or is given a brief summary of the paper. The bibliography is obtainable, price 5*s*. post free, from the director of the institute.

QUININE BLINDNESS

I. S. MCGREGOR
M D GLASG., F R C S E
OPHTHALMIC SURGEON,
GLASGOW ROYAL INFIRMARY

ARNOLD LOEWENSTEIN
M D PRAGUE

Tennent Institute of Ophthalmology, Glasgow University

MUCH work has been published on quinine blindness, but little of it comes before the general medical reader. Some textbooks say that blindness usually disappears after a day or two, either with complete restoration of central vision and a full visual field, or, in the more severe cases, with some permanent loss of peripheral field with preservation of a useful central field. It is not surprising therefore that there is little general knowledge of the effects of quinine on vision.

We shall describe the case of a healthy strong man who developed malaria in India 12 years ago, who had often had quinine without any toxic effects except tinnitus and transient deafness, and who, in a recent attack, was given about twelve doses of gr. 30 of quinine bihydrochloride in one day. He is now in St. Dunstan's. If such unfortunate results are to be avoided—and according to statistics on blindness they are not so rare—the view that quinine blindness is benign must be modified.

Ophthalmic surgeons do not know certainly how quinine acts on the retina and the brain. Deduction is made from clinical evidences and from the results of animals experiment, which are not always convincing. Treatment is often expectant. In our case it was routine but inadequate, for the man became blind. He did not lose his eyesight because he had an idiosyncrasy: he lost it because he was given massive doses of quinine. The main theme of our communication is that the prevention of profound visual symptoms is worth while, because of those so affected some become blind.

CASE-RECORD

A man of 37 was treated in sick quarters for malaria with quinine bihydrochloride gr. 30, 2-hourly for 24 hours, from 8 AM on Dec. 27, 1942. On the night of Dec. 28 he was blind and deaf. On the evening of the 29th there was no perception of light; deafness was improving; he was mentally lucid but apathetic, memory good; pupils dilated and immobile. Admitted to hospital. Milky retina with cherry spot at macula, milkiness extending to the periphery, vessels normal, discs normal. Treatment by magnesium sulphate, forced fluids and fluid diet, protein shock (100×10^7 TAB), glucose freely. On Dec. 30 milky appearance receding; paracentesis left cornea. The right cornea had central opacity of old dendritic ulcer. Veins of fundus fuller after paracentesis. Dec. 31, protein shock repeated; still forced fluids. Some unrest of pupil border noted but no real reaction to light. Jan. 1 routine physical examination negative. BP 110/70 mm. Hg. Milky appearance of retina still present. Jan. 2, 1943, still no perception of light. Mag. sulph. every second night. Jan. 3, discs pale, pupil smaller but no reaction to light. Jan. 4, play of reflexes around macula in left eye suggesting some swelling still. Pupils smaller. On slit-lamp examination pupil contracts a little to light and the curious concertina movement of pupil margin is very evident. Jan. 6, arteries of fundus getting narrower. Discs very pale. Still blind. Gives history today of malignant tertian malaria contracted in Lahore in 1928. Since then had at least a dozen attacks in India and Palestine for which he was given quinine. He has had prophylactic quinine in addition. He cannot see a light or locate it when shone into his eyes but can vaguely discern the stripes in nurse's print frock. He remains peculiarly untroubled, or apparently unconcerned and patient in his plight. Jan. 9, can see the chimney pots through the window. Still cannot locate a light shone in front of him. Jan. 11, visual acuity (VA), left 1/60, right 6/9. Cannot recognise colours well but appreciates that red is darker than yellow. Reads Jaeger 12 unaided and Jaeger 2 with + 2·00 dioptres. Jan. 12, Hb. 80%; red cells 4,600,000; white cells 6400 per c.mm. Visual fields charted. Jan. 14, pupil reaction to light feeble and variable. Abnormal movement remains. Can recognise colours and name colour of the spots on Ishihara plates but cannot read the numbers. Jan. 15, fundal arteries very narrow and discs very pale, left macula still shows abnormal reflexes around it. Spectroscopic tests for colour appreciation satisfactory. VA, right 6/60, left 6/6. Dark-adaptation very poor. Jan. 26, VA, right 6/60, left 6/5. "This man still gropes his way insecurely along the hospital corridors uncertainly like a blind man though he is able on occasions to see 6/5 Snellen with his left eye. Behaves like retinitis pigmentosa patient where the field is reduced to near fixation-point. His field by ordinary methods is too ample for this behaviour." Jan. 28, erythrol tetranitrite gr. ½ twice daily. Jan. 29, Prof. Noah Morris suggested full intake of vitamin B complex and vitamin C. Accommodation still defective. Jan. 30, retinal fold above left macula. Disc bluish white. Calibre of arteries extremely reduced but no cholesterol changes in the walls. Feb. 1, fields, 2 and 3 isopters; for white remain much as when first charted; isopters almost coincide. Fields for blue with the same angles are of similar extent. Homatropine to right eye dilates pupil. Feb. 2, eserine contracts right pupil to half its original size. Cocaine to right pupil dilates it slightly. Wassermann reaction negative. Feb. 4, fields again examined on campimeter, and show with 5/2000 white scotomata outside 10°, and with 2/2000 white scotomata between 5° and 10°. A sieve-like field, not of uniform perceptual quality. Otolaryngologist reports auditory and vestibular function within normal limits. Feb. 10, pupils more active, contract fully to pilocarpine. VA, right 6/60, left 6/5. Feb. 18, some calibre variation of arteries. Retrobulbar injection of 1 c.cm. acetylcholine produced no change in vessels.

On Feb. 20 he was dismissed from hospital to report in a month. Did not report and we were informed two months later that he had been admitted to St. Dunstan's. Mr. Robert Davenport, of St. Dunstan's, stated that after some months there his fields of vision were close to the fixation-point. VA, right 6/12, left 6/24. Left eye had a fine corneal opacity. Before the patient left St. Dunstan's, "His fields were of course no better but he was beginning to use them skilfully and was much less the blind man, although really for practical purposes he was such." He is receiving a 100% pension for optic atrophy (quinine toxæmia.) Mr. Davenport quoted two further cases recently coming under his notice of permanent visual disability after ingestion of quinine.

DISCUSSION

Ballantyne in 1917 emphasised the paradox of quinine blindness—that as vision recurs the arteries get narrow, a fact often noted since that time. Nevertheless we still read that quinine blindness is caused by narrowing of the retinal vessels on spasm. This conception should disappear once and for all from the textbooks, especially as it is likely to lead to treatment along useless lines. The changes in the retinal arteries seem to be organic though unfortunately the pathology is not known, since the material does not come to histology. There is no clinical evidence of spasm of the arteries in quinine blindness.

Quinine is a tissue poison. It can arrest the movements of the phagocyte, depress the action of the heart, and under experimental conditions excite and then depress reflex activity; it can kill many micro-organisms in a dilution of 1 in 500. Tissue oxidation is impaired by the alkaloid. Giannini (1934), experimenting in dogs with quinine bichlorhydrate, found that the endothelial cells were swollen so that the lumen of the small arterioles was blocked. He quotes Behse as finding the same endovascular damage with foci of thrombosis. He believes that the vascular spasm suffices to produce the blindness. De Bono (quoted by Giannini 1934), working on similar lines, thought that the retinal ischæmia due to endovasculitis was not enough and that there was a direct action of quinine on the retina. When we consider the delicacy of the auto-oxidation processes of the retina which maintain its high oxygen consumption by the activity of labile colloidal systems of enzymes and the sulphydryl molecule, it is easy to understand a direct poisoning of the retinal elements by quinine. The result, in physiological arrest, is fleeting blindness, and in graver cases death of the retinal cells. In these cases there may be no early ophthalmoscopic signs.

In other cases, as in ours, the retina has a milky appearance with a cherry-coloured spot at the macula, but without narrowing of the arteries or alteration of the colour of the disc in the early stages. This is often called œdema of the retina, but the common conditions associated with œdema of the retina are kidney disease,

the toxæmias of pregnancy, and methyl alcohol poisoning. In those the appearances are quite different. Œdema is not milky white. The condition which resembles the quinine fundus is retinal infarction. The retina is normally pellucid in life, and when a retinal artery, which is an end artery, is blocked by embolism or thrombosis the retina becomes milky and opaque and a cherry-coloured spot appears at the macula. The explanation of the cherry-coloured spot is either that the retina is thin at the macula and the choroid colour shows through, or that the macula derives its blood-supply largely from the chorio-capillaris and not from the retinal arteries. How does this accord with what we know of the histopathology of quinine poisoning? In the dog, Giannini and Behse before him, as we have said, have found swelling of the endothelium of the small vessels of the retina blocking the lumina. Widespread peripheral block would produce the same ischæmia as a complete block of the main vessel. We think the milky opaque retina in quinine poisoning is a result of ischæmia. Experimentally in the rat the retina deprived of blood-supply survives only about 20 minutes (Guist 1926). The retina in quinine poisoning therefore is endangered, first by the direct action of quinine on the nerve-cells, and secondly by vascular endothelial impairment in those cases which show a milky or opaque retina.

It is likely that the retina and not the optic nerve suffers primarily. The retinal folds, abnormal retinal reflexes, pigmentary changes at the macula and the behaviour of the visual field in our case were all features of a retinal rather than a nerve lesion. The fields were interesting. The field was roughly 25° vertically and 30°–35° horizontally from the fixation-point, and the isopters 3/330, 7/330 and 10/330 were almost coincident. The significance of such a steep-sided field is that it is unlikely to improve: and it did not improve. The damage was early and there was little change after a two months' stay in hospital. Furthermore, even when central vision was so good the man walked about the hospital corridors, groping his way like a blind person with outstretched hands, an unusual state of affairs with 6/9 vision and such a field. When we analysed the field further on the Bjerrum screen it was found that the quality of his field was poor. It had scotomata within the isopters indicated when small test objects of 2/2000 and 5/2000 white at 2 metres were used. It was a "sieve-like" field. This type of field is, as far as our evidence goes, compatible only with a retinal lesion, and the field was deficient within itself close up to the fixation-point, as campimetry revealed. This adequately explained his behaviour, and put him in the category of blind people.

Whether one layer of the retina suffers more than another directly from the poison is still a matter of doubt as we have no convincing histological evidence. Ballantyne (1940) thinks the rods suffer largely, because peripheral vision is chiefly affected and night-blindness is a usual sequel. The damage may be done at the synapses or to the ganglion cells. The ganglion cells of the retina are claimed as casualties in toxic diseases of the retina. The histological evidence of this should be scrutinised in view of the facts we were able to establish after examining normal human retinas from each decade. We found that the size, shape, lipoid content and nuclear characteristics of ganglion cells changed with age and with the situation on the retina (Lowenstein and McGregor 1943).

Quinine dosage should be cautious. It is important to begin with small doses in patients who have not taken quinine, lest they are hypersensitive; gr. 5 six hourly would suffice. Thereafter the maximum dose should be within the limits laid down in the textbooks—e.g., gr. 30 daily by mouth for a month (Carmichael Low and Hamilton Fairley 1941). There is no justification for massive doses within a short time in view of the visual catastrophe we have described. When visual symptoms appear quinine should be stopped immediately.

When blindness has occurred treatment should be early and vigorous if it is to be any use. The first essential is to dilute the poison, and to that end fluid exchange should be pushed. Copious drinks, purgation, intravenous saline and glucose, and thecal drainage are the most important measures. We regret that we were not more active in this direction. Adequate vitamin B and C intake may aid tissue oxidation; 200 mg. of each should be given daily for at least a fortnight. The important thing is not to regard quinine blindness as a harmless symptom but to take energetic measures to avoid it; and when established to institute immediate and maximal fluid exchange.

SUMMARY

A case of quinine amaurosis is described in a patient with no idiosyncrasy who received massive dosage of quinine salts and eventually became so blind as to become a suitable patient for St. Dunstan's.

Evidence of damage to the retinal cells by quinine with the production of a scotomatous or "sieve-like" field is given, and the milky appearance of the retina is attributed to the ischæmia produced by toxic swelling of the endothelium of the small vessels.

Treatment is designed to effect early and vigorous fluid exchange—locally by paracentesis of the cornea and emptying of the anterior chamber for the first few days, at least in one eye; generally by purgation and copious drinks, intravenous saline and thecal drainage. The processes of oxidation in the retina should be facilitated by a generous intake of vitamin-B complex and ascorbic acid.

To avoid such catastrophes quinine dosage should be cautious and the drug should be stopped at once if visual symptoms arise.

We should like to thank Mr. Robert Davenport for his letter about this patient's progress at St. Dunstan's.

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Reviews of Books

Maternal Overprotection

DAVID M. LEVY, MD. (Oxford University Press. Pp. 417. 30*s*.)

CHILD guidance clinics must eventually be judged not by the urgency of the need they try to meet, but by their preventive and therapeutic successes: the best of them would also be judged by their research contributions. Few of our clinics have so far provided the material for any such judgment. In this book one of the most famous and well-staffed of child guidance clinics—the former Institute for Child Guidance, New York City—offers an honest and valuable review of its work on a problem of great importance in the psychological adjustment of children. Instead of taking some common psychiatric assumptions about this matter for granted, Dr. Levy has had the rich case-material of the clinic sifted for "pure" cases of excessive maternal devotion and solicitude, and has analysed in these the effect upon the children's social maturity of prolonged breast-feeding and similar manifestations of the mothers' attachment. Many of the problems in these children—sleep, sex, control of micturition, feeding habits—are reviewed; and the rôle of their fathers, almost always submissive, amiable and ineffectual minor figures in the family drama, is described as well as that of the demanding mothers. A significant and candid chapter on treatment and outcome indicates that direct psychotherapy of the over-protected children was uniformly unsuccessful, irrespective of the psychiatrist's experience and skill; psychotherapy of the over-protective mothers had been left almost entirely to the social workers of the clinic, and was likewise as a rule ineffectual, though advice and change of the child's environment had considerable success. In accounting for the failure of psychotherapy carried out by the social worker, Dr. Levy considers that the dimensions of the problem were not realised and that the rôle of psychotherapist cannot be combined with that of counsellor and educator. In spite of the failure of psychotherapy (which was not the only treatment given) the results in these cases were not on the whole unsatisfactory. In follow-up studies made 9–12 years after the 19 treated children of the over-protected group had attended the clinic, 2 were successfully adjusted,

15 partially adjusted, and only 2 unimproved. The detailed case studies recorded give, however, a vivid and better notion of the problems and the outcome than any statistics can. The book is a model of the retrospective analytic studies that will help to establish child guidance on a secure basis, free from extravagances, and of great avail in preventing the development of those serious psychopathic maladjustments which bring harm to the subjects and to society. The study also throws light on normal mental hygiene and the upbringing of the healthy child.

Aniacinamidosis

The Common Form of Niacin Amide Deficiency Disease. W. KAUFMAN, PH D, MD. (Yale University Press. Pp. 62.)

Dr. Kaufman believes that insufficiency of nicotinamide is widespread and that a vast number of non-specific signs and symptoms are often due to this cause. Among these he includes a great number of psychological manifestations, as well as a form of joint trouble, indistinguishable from hypertrophic and atrophic arthritis, in which 50–100 mg. of nicotinamide, given three times daily, leads to progressive restoration of mobility. The amount of nicotinamide needed is influenced, he believes, by atmospheric conditions, exposure to sun, phase of the menstrual cycle, changes in basal metabolic rate, ingestion of other accessory food substances and of alcohol, and indulgence in muscular work. He considers that the human requirement of nicotinamide is 150–350 mg. daily and that those suffering from the deficiency are unlikely to obtain enough from their food without drastic change of food habits, which may be impossible in war-time. That deficiency is prevalent among the civilian population of the USA, and probably among the Forces also, is deduced from a study of 150 private patients, but there is no description of the diet or mention of income level.

The Physical Basis of Personality

V. H. MOTTRAM, MA CAMB. (Pelican Books. Pp. 124. 9*d*.)

THE age-old question "What is this thing called 'I'?" is still engrossing. That it is unanswerable hardly matters if in seeking the answer we learn something more about ourselves and the world we live in. Professor Mottram outlines here what we know already—much or little—and tells how some have interpreted that knowledge. From the first page he is on terms of friendship with his reader, writing with his accustomed directness, wit and judgment, and with beautiful modesty. The chapter headings might suggest that this is just another of those little books, for non-medical readers, about cells, chromosomes inheritance, the nervous system and the endocrines; but it is soon clear that this one deals at least as much with philosophy as with physiology. Professor Mottram's reverence for scientific method does not forbid him to conceive of perception other than sensory: he suspects himself of an inward ear, and, in his "Recapitulation and Coda," betrays a feeling for some unutterable counterpoint which escapes his eighth nerve. Are we predestinate, our every act determined by what has gone before? Perhaps: but he gives us some reasons why we need not be driven to this sterile and disheartening conclusion.

Varicose Veins, Hæmorrhoids, and other Conditions

Their treatment by injection. R. ROWDEN FOOTE, MRCS, DRCOG, physician in charge of injection clinic, Royal Waterloo Hospital, London. (Lewis. Pp. 119. 12*s*. 6*d*.)

MORE than half this small book deals with varicose veins, and the remaining sections with the injection of hæmorrhoids, hernia, varicocele, bursa, ganglion, nævus, and anal fissure. The therapeutic approach is maintained throughout the book, pathological features being only discussed incidentally. The various clinical tests for venous insufficiency are described in detail, with the indications and contra-indications for injection. Sclerosing solutions favoured are 'Lithocaine,' 'Ethamolin,' quinine and urethane, sodium morrhuate, and twin injection of quinine and urethane with lithocaine; and their scope and advantages are outlined. Operation is required for cases which show incompetence of the valves of the internal saphenous vein in the thigh. Mr. Rodney Maingot describes the surgical procedure he employs—namely, ligation at the saphenofemoral junction, with simultaneous injection of the vein distally. The operation requires a stay in hospital of about 48 hours, all patients being encouraged to walk a little after the first 6 hours. The benefit derived by ulcer cases is understated, for Dr. Foote advises continuous support of the leg by crêpe bandage or elastic stocking, whereas if the ulcer is soundly healed with a firm pigmented scar support is no longer necessary. The injection treatment of hæmorrhoids and of hydrocele are well described, but practitioners would do well not to attempt them without special experience, for serious complications have followed. The injection treatment of hernia is condemned, varicocele is noted as presenting special difficulties, and with ganglia there is danger of the sclerosing process extending into a joint or tendon sheath.

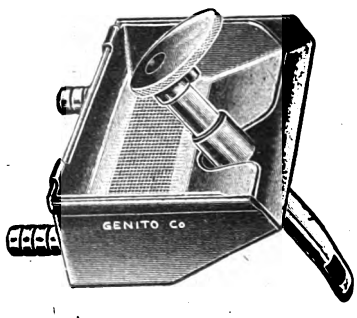
The second series of Sir ALMROTH WRIGHT'S "Studies on Immunisation" (Pp. 256. 25*s*.) have now appeared as the fourth volume in the collected researches from the inoculation department of St. Mary's Hospital, which Messrs. Heinemann are in process of publishing.

New Inventions

DRAINAGE BOX FOR PUNCH PROSTATECTOMY

PATIENTS who have previously had a suprapubic cystostomy are often referred for "punch prostatectomy." The device described here is of value in such cases.

The drainage box lies in the abdominal wall between the sinus and the symphysis pubis. A straight tube passes from the box through the suprapubic sinus into the bladder. This tube passes in a direction away from the pelvis. The natural direction of a suprapubic sinus is towards the pelvis, but the skin of the abdominal wall is sufficiently lax to allow the tube to lie easily in position. The tube must be directed towards the fundus of the bladder because otherwise it would interfere with the movements of the resectoscope. Where the sinus is too small to admit the tube, dilatation must be performed, uterine dilators being very suitable for the purpose. There is a generous opening at the vesical end of the tube. The external end has a device for partial or complete closure, and is also made to fit a suction syringe. A perforated tray lies over the box and catches excised pieces of tissue. Two large tubes provide an outlet for fluid from the box; this is directed by rubber connecting-tubes to the usual receptacle which lies between the surgeon and the operating-table.



The device much simplifies the operation of punch prostatectomy. Without it, the operator must interrupt his resection of tissue or coagulation of vessels each time the bladder fills. Time is then wasted while the bladder empties. During this phase pieces of excised tissue sometimes jam in the instrument and must be removed by suction syringe or specimen forceps. Using the drainage box the flow is always in one direction and excised tissue passes into the perforated tray. The flow is for the most part automatic but requires the supervision and occasional intervention of an assistant. When pieces are reluctant to leave the bladder suction may be applied by syringe.

The main advantage of the instrument is a considerable reduction in the duration of the operations, often a factor of great importance. Using the normal technique of perurethral resection I require at least three-quarters of an hour to resect 40 grammes of tissue. This can be done in less than thirty minutes using the drainage box. In addition to cases referred with a suprapubic cystostomy, the beginner may find the box useful in the second stage of a deliberate two-stage operation. It will not, however, justify attempting perurethral prostatic resection without a long apprenticeship in cystoscopy and urethoscopy and some experience with an expert in the operation.

The instrument was made for me by the Genito-Urinary Manufacturing Co. I am indebted to Mr. Schranz for advice.

Glasgow, C3. T. L. CHAPMAN, FRCS.

THE LANCET

LONDON: SATURDAY, OCTOBER 28, 1944

The Problem of Ageing

THAT old age itself is a disease, many would deny: but if it be conceded that it is a natural degeneration, a decline in functions and tissues, it is so like a disease that it is evidently as much a matter for the doctor as for the philosopher, the economist and the administrator. Yet doctors have devoted to the causes, nature and treatment of this process far less research than to those of many an ailment that can neither kill nor corrode. Of late there has been a quickened interest, expressive of the uneasy concern which begins to trouble the whole of our infertile generation. The Royal Commission on Population has its medical and biological committee, which will doubtless consider the investigation of old age to be as much one of its problems as the methods of furthering healthy conception and birth. It is impossible, however, for any such committee itself to compass the range of medical inquiry called for in this neglected field. Much independent research, collation of material, and adequate support, both financial and scientific, are needed. In the United States the Josiah Macy Jr. Foundation has given notable help, not least in sponsoring the indispensable compilation edited by E. V. COWDRY. The Nuffield Foundation has set up in this country a Survey Committee, which largely through its medical subcommittee is likely to be the chief agency for stimulating, coördinating and supporting the medical study of senescence. No foundation can take the place of competent investigators who themselves decide what lines and methods of inquiry they believe promising: but a central organisation, actuated by an enlightened policy for encouraging research, can do much towards attaining the disinterested ends it thus sets before itself. So long as all doctors who are already studying the matter assist the Foundation by communicating the results of their work or its general tenor, the risks of wasteful duplication and needless isolation can be minimised, the gaps in any large research programme perceived, and help be given where it is needed. Now that the Nuffield Foundation is taking up its own quarters at Mecklenburgh Square, the survey committee may well become a major influence in furthering research on the problems of ageing.

In old age medical and social problems are inseparable. Infirmity may enforce idleness, and bereavement loneliness; the idleness and the loneliness together may lead to self-neglect, insufficient food, and deterioration both mental and physical. Timely correction of a handicap, on the other hand, and readjustment of tasks may enable the ageing person to remain an active, self-supporting, happy member of the community. If those in the prime of life who are handicapped by disease and injury are to be retained in employment, as the Disabled Persons Employment Act, 1944, lays down, there is much justice, as well as national and individual advantage, in the same principles being applied to the aged. BEVERIDGE wrote in his report: "The natural presumption from the increasing length of life is that the length of years during which working capacity lasts will also rise, as health improves, as by freedom from want in childhood and by freedom from want and idleness in working years the physique and the courage of the citizens are maintained." He thus repudiates acquiescence in a hastening decrepitude that might be avoided: "many are too early old, and before the date of age. Adversity stretcheth our days, misery makes Alcmena's nights, and time hath no wings to it." Such a view demands as corollary that allowance be made in industry for the waning powers or the special handicaps of old age—deafness, bad sight and the like. Whereas the young who are crippled, blind, deaf, nervous or slow can be trained to develop skill which will compensate for what they lack or at least make the lack less disabling, the aged cannot be taught new tricks, their infirmities are permanent. With them it is not a question of rehabilitation, but of adjustment: jobs must be found adjusted to their now limited powers, and they must adjust themselves to their changing condition without that sharp break called retirement, which is at first often welcomed as marking release from the burden of earning and working, but later often regretted as the beginning of an unfriended, melancholy, slow and aimless tedium. It is better that something should be asked for from the aged, so long as it is not more than they can contentedly give; "ne postulantur quidem vires a senectute . . . itaque non modo quod non possumus sed ne quantum possumus quidem cogimur" is CATO MAJOR'S complaint in the *De Senectute*, and it may be hoped that social medicine and industry will take heed of it. Provided always that in positions where freshness is all, the old are not left to clog and petrify affairs; for we have it on wise authority that men of age object too much, consult too long, adventure too little, repent too soon, and seldom drive business home to the full period, but content themselves with a mediocrity of success. Although admittedly life can only be lived forward, we have KIERKEGAARD'S authority (in Mr. Ustinov's new play) that it can only be understood backward.

Foreign Bodies in War Wounds

EXPLOSIVES have so largely replaced cold steel in modern warfare that a single wound, unless it be a groove, almost certainly points to a retained foreign body. Double wounds are usually perforating wounds but they may indicate two retained missiles; and multiple wounds in one area warn the surgeon that when he inspects the X-ray plate he will see the snowstorm effect which will be a severe test of surgical enterprise. Foreign bodies vary as much as bacteria in their pathogenicity. The most benign foreign body which a man can harbour is a bullet, since it is heat-sterilised during its flight, smooth, and does not disrupt soft tissues outside its path or carry in such bits and pieces of the outside world as manured earth or clothing. Jagged fragments from mines, shells, grenades and bombs do not possess these advantages, and their most lethal effect in men who reach surgical aid is to drive before them shreds of soiled clothing. Large pieces of wood, stone or lead glass are more likely to be inherently infective and are less easily seen by X rays, while small bits of these substances, especially of glass, are usually invisible to the

radiologist. Phosphorus-bearing missiles are probably the most difficult of all foreign bodies to treat because they must be removed whatever the surgical hazard. Fortunately most of the foreign bodies with which the military surgeon must cope are metallic, radiopaque, and free from phosphorus.

Ideally all foreign bodies should be removed as soon as they have entered the tissues; not even the surgeon in the forward area is sufficiently near the firing line to attain such perfection. But without removal of the agent which caused it no penetrating wound has received full treatment, and the statement, sometimes seen in field medical cards, that the wound was excised but the missile not recovered is a contradiction in terms. The primary task of forward operating however is to treat the wound as thoroughly as the condition of the patient, the military situation and the facilities available allow; the causal fragment will often be recovered incidentally without difficulty. But there are wounds which cannot be treated properly unless the surgeon knows where the foreign body is and can plan his incision appropriately and foresee what difficulties he is likely to encounter. As OGILVIE [1] says, foreign bodies should be left behind because the surgeon considers that the wisest policy, not because he has no idea where they are. In earlier campaigns in this war it was common for forward surgeons to have to operate without the assistance of X rays and it was surprising how often, particularly in men who reached the forward surgical unit late with suppuration established, the fragment could be felt and recovered. Without X rays, wounds near joints, of the buttock and of the abdomen were a great anxiety, though the resulting harm was more often to the surgeon's peace of mind than to the patient's wound. Today most field surgical units have X-ray facilities to produce those rough plates which are all the forward surgeon requires. At the advanced base hospital foreign bodies are usually extracted because wounds continue to suppurate. The primary object of operation is now to remove the foreign body, and many refinements for localisation are at hand. First among these are good X-ray plates assisted by marking of the entry wound and by suitably placed indicators on the skin, as BRAILSFORD [2] has recently described. Facilities for stereo films are also available. Fluoroscopy can be practised by a radiologist who is properly protected, and the use of metal pointers under the screen followed by marking of the skin with ink is often useful. Fluoroscopy may also help by showing movements of the missile in relation to surrounding structures. KIRSCHNER [3] has suggested that where small fragments are involved a hollow needle should be introduced down to the fragment under fluoroscopy and methylene-blue injected round it for the subsequent guidance of the surgeon. At the advanced base there is time and scope to work out the depth of foreign bodies from the surface by those ingenious methods which sometimes give more pleasure to the radiologist than help to the surgeon. Localising probes of many ingenious types have been invented, though they do not seem popular among British surgeons. These probes vary from the porcelain affair of LARREY'S day, which took a black smudge if rubbed on a lead bullet, to the modern porcelain probe which carries the tuning coil of a wireless set and can be made to buzz when it reaches the vicinity of a metal body of any kind. So enthusiastic are the Germans about a radio-frequency probe of this type named the Bolo-scope that SCHLAAFF [4] has been unable to resist removing with its aid fragments in more than 99% of the 1200 penetrating wounds he has treated. FARMER and OSBORN [5] have described a similar device in these columns which will detect a sixpence at ½ inch but they did not think it sensitive enough to give the surgeon much help. All probes suffer from the disadvantage that the missile once located must be approached in the line of the probe. Surgical anatomy will often suggest a better route for removing a foreign body located by radiography.

After a wound has healed, foreign bodies are removed because their presence is either giving rise to symptoms or is likely to do so. The most certain indication for removal at this stage is suppuration around the fragment, which must therefore be removed unless the dangers of the surgical approach make a persistent sinus preferable. The benefits of removal are most problematical in those cases where future trouble from a foreign body is expected. Suppuration, hæmorrhage or continuing fibrosis are the dangers predicted, but no statistics on the actual results of leaving healed-in foreign bodies have yet been produced. Most surgeons hold that a missile over ½ inch in diameter should be removed from the tissues but there are many old soldiers in good health who carry about larger pieces of metal than this. Metallic fragments under the skin should be removed if they give rise to annoyanee, as they often do. Fragments in contact with arteries are probably dangerous because they tend to erode the vessel, and sometimes give rise to pain. Those lying against nerves which are functionally intact may give rise to delayed neuritis or neuralgia; in joints they should be removed as a likely cause of osteoarthritis; near tendons they may cause fibrosis with limitation of movement. D'ABREU and his colleagues [6] advise removal of foreign bodies over ½ inch in diameter from the thorax because they fear abscess formation and hæmorrhage, though SALISCHEV [7] does not think that lung complications need treatment till they arise. Fragments in the peritoneal cavity should seldom be removed unless of gross proportions, since they are likely to be wrapped round in dense adhesions. Foreign bodies in the brain, especially if lying deeply, should not be touched. Despite all the injunctions, advices and directives there can be no general rule applicable to all cases. The official *Field Surgery Pocket Book* says, "It is difficult to give a categorical answer to the question of whether a buried missile should be removed, for the decision depends on many factors." A categorical answer is not merely difficult, it is impossible.

1. Ogilvie, W. H. Forward Surgery in Modern War, London, 1944.
2. Brailsford, J. F. *J. int. Col. Surg.* 1944, **7**, 85.
3. Kirschner, M. *Der Chirurg.* 1940, **12**, 597. Abstr. in *Bull. War Med.* 1943, **3**, 368.
4. Abstr. in *Dtsch. med. Wschr.* 1944, **70**, 461. See also, *Lancet*, 1941, i, 699.
5. Farmer, F. T., Osborn, S. B. *Lancet*, 1941, ii, 517.
6. D'Abreu, A. L. Litchfield, J. W., Hodson, C. J. *Ibid*, 1944, ii, 265.
7. Salischev, V. E. *Khirurgiya, Moscow*, 1943, nos. 5–6, p. 48. Abstr. in *Bull. War Med.* 1944, **5**, 17.

Mr. ERNEST HEY GROVES, emeritus professor of surgery in the University of Bristol and for twenty-eight years editor of the *British Journal of Surgery*, died at Bristol on Oct. 22 in his seventy-third year.

Health and Social Change

ALTHOUGH the requirement that each medical officer of health shall write annual reports implies a conception of dynamic social study, most inquiries into the relationship between social conditions and health have been static.

MORRIS and TITMUSS's paper on the recent history of rheumatic heart disease [1] is important because it relates a change in the state of public health to a social change. It is a dynamic study. Having previously demonstrated a clear association between poverty and a high death-rate from rheumatic fever or rheumatic heart disease, they have now tried to discover how the mortality from juvenile rheumatism was affected by the economic depression. Taking as their basis the "normal" years 1927–29, they follow the mortality through the slump to the period of recovery in 1936–38 in the 83 county boroughs of England and Wales, and they relate it to the incidence of unemployment in each of these areas. In passing it may be mentioned that this presented considerable difficulties, because of changes in boundaries, because the areas covered by different authorities (e.g., the local authority and the Ministry of Labour) do not coincide, and because age-composition could be derived only from the decennial census. Studies in social medicine would be facilitated by greater uniformity in the compilation of official statistics and an extension of statistics to meet the essential needs of the subject. The attempt now being made to apply sampling methods to morbidity studies offer a possibility in this direction.

Comparing the findings in the different county boroughs, MORRIS and TITMUSS demonstrate a definite relationship between the rheumatic mortality-rate and the extent of unemployment. This is the static relationship between the two. Comparing the mortality in different years, when unemployment was high and when it was low, they are able to show a positive correlation if the mortality-rates are "lagged" for a period of three years; that is to say, it seems that the effects of a rise of unemployment on the mortality from juvenile rheumatism, and heart disease arising from it, do not reach a maximum for three years. But the effects of a reduction of unemployment during the period of recovery are less conspicuous: the mortality-rates from rheumatic heart disease failed to fall to the extent that was expected. To explain this the authors suggest "that with the partial lifting of the depression the more permanent diverse factors such as bad housing and the proportion of low-paid workers were no longer overshadowed and reassumed their influential rôle in determining the course of the death-rate. These factors retarded the decline in mortality which set in towards the end of the 1930's." Perhaps the expected correlation might have been established if the study could have been continued beyond 1939. But is it in fact reasonable to suppose that there will be symmetry between the slump and the recovery phase? The period between 1925 and 1929 may be regarded as "one of the biggest booms in economic history," [2] and this long period of prosperity was sufficient to create physical reserves which may have delayed the rise in mortality until three years after the rise in unemployment figures. Apart from this, however, the rate of physical recovery need not necessarily be the same as the rate of decline. The depression was characterised by its traumatic onset, with violent reductions in wages and sudden increases in the numbers of unemployed, whereas the recovery phase was characterised by re-employment at a slower rate and at low wages, wage rates being very often little above (and occasionally below) the rates of unemployment benefit or public assistance. On finding work again, the unemployed man might have a long period before his standard of living reflected any improvement, for he often had to pay debts, make up arrears of rent, and buy clothes and tools. Another factor which may to some extent invalidate the use of the unemployment figure as an index is the probability that the incidence of mortality is higher in the poorest groups of the unemployed and that their experience of unemployment is more intense than that of the unemployed as a whole. The "long-term" unemployed, as they came to be called, who had the worst employment record during the boom, were very often the first to become unemployed in the slump and the last to be re-employed in the period of recovery. If this was so, and if this group was responsible for a large proportion of the mortality, it is unlikely that the mortality-rates would recover at the same rate as the total employment figure. A correlation might be found, however, between the mortality-rate and the numbers of "long unemployed" out of work at all stages of the trade cycle.

It appears then that our knowledge of the relationship between social conditions and health would be increased if instead of having to rely on the unemployment rate as our index of poverty, we had a more sensitive index which took into consideration such factors as nutrition, housing accommodation and real wages. An index of total morbidity like that now being developed for the Registrar-General's department by the Wartime Social Survey used with this social index would make possible a more complete assessment. But these utopian suggestions in no way detract from our appreciation of MORRIS and TITMUSS's study, and we look forward to their further observations on the medical consequences of the slump.

1. Morris, J. N., Titmuss, R. M. *Med. Offr*, Aug. 26, Sept. 2, Sept. 9, 1944.
2. Robbins, The Great Depression, London, 1934.

Annotations

HARVEY AND THE WRITERS

WHEN the new wine of the Renaissance came to set men thinking along fresh audacious lines, doctors were not among the first to snatch the cup. In art, music and literature new schools sprang up, new subjects were discussed and set down on paper or on canvas; but the doctors plodded on and the voice of Aristotle, proclaiming the experimental method, fell faintly on their sluggish ears. Some who were not doctors heard it. Francis Bacon caught his death chill when stuffing a fowl with snow on Highgate Hill, intent on proving that animal tissues could be preserved by cold; and Bacon was Harvey's patient. In medicine Harvey was the first to hear it; perhaps his patient was also his doctor, if a doctor is one who teaches. By that time the wine of the Renaissance was old, and none the less potent for that: we owe to Harvey this deep intoxication with the experimental method, which has meant and will yet mean so much to science. Whether his influence, as Sir Edmund Spriggs suggested in his Harveian

oration,[1] also favoured a gradual approach to more truth in literature is not so easy to say. It would be hard to find truth more honoured than in Shakespeare's work; Rabelais presented symbolic truth of another kind, and Bacon had his own shrewd knowledge of men: and these were Harvey's precursors. Among his contemporaries were Sir Thomas Browne and John Bunyan; Harvey may have influenced their taste for truth, but it seems unlikely. Writers of the artificial comedies and novels of the Restoration and eighteenth century were yet to come; so were the many nineteenth and twentieth century hacks who addressed themselves to the thalamus rather than the cortex, and whose concern for truth would lie on an old-fashioned threepenny-bit.

If authors have shown as a whole a growing regard for truth since Harvey's day, there have at least been plenty of exceptions. But a contention is none the worse for being debatable and Spriggs supported his with ingenuity and the knowledge won from wide reading. Harvey's works are in medieval Latin, so that though he may have influenced thought he can hardly have affected style. But he was a good letter writer, "direct, informative, human." The orator quoted from some of the doctors who have shown a taste for writing since his day, and reminded the company of many others. Among English writers Smollett, Goldsmith, and Keats come at once to mind, with Schiller in Germany and Turgeniev in Russia. Stretching his theme a little, he recalled that many notable writers were associated in some way with medicine; thus Stendhal owed much to a doctor grandfather, while Flaubert was a medical student and a doctor's son. The case he made out for the advantage, to a writer, of a scientific training was plausible and gave the opportunity for a genial and informed review of letters since Harvey's day.

THE WELL-COOLED LARDER

WE have heard a great deal in recent times about the installation of refrigerators in new houses and it has been stated positively that the emergency houses are to be so equipped. There are some difficulties in the use of refrigerators in small houses. In the first place, the apparatus has a mechanism which requires careful handling and the natural curiosity of small boys may tempt them to interfere with its working. Secondly, refrigerators have an awkward tendency to become unwholesome unless they are kept thoroughly clean; and thirdly, there is the problem of size and the family needs. The large refrigerator is of great value but it uses a fair amount of power; and a very small refrigerator is apt, like the slum, to become overcrowded and unpleasant. Quite recently Messrs. Frigidaire have introduced the idea of cooling down a good-sized larder with plenty of shelf area to a temperature below 50° F. This is done by means of an air-conditioner worked by a small motor which is reputed to run for years without attention. The walls of the larder must, of course, be insulated and the room has to be fitted with a standard door air-sealed with a rubber gasket. The air inside the larder is not changed except when the door is opened; it is merely circulated by the cooling apparatus. The idea is attractive because it gives much more space at a reasonably low temperature suitable for keeping most foods, including milk. As the motor requires no attention and could be well enclosed, there is less likelihood of interference by the mischievous. On the other hand, the lagging of a room providing 25–30 cubic feet and the use of an air-sealed door suggest a certain amount of expense, and the door at any rate provides opportunities for mismanagement. It would not be wise to give unqualified approval to such a scheme until comparative scientific tests have been made. Both expense and effectiveness require careful study. Presumably, for example, the air in the larder will be fairly well saturated and a temperature between 45° and 50° F. might encourage the growth of moulds. The proposal, however, deserves careful examination and testing in actual use with a variety of foods.

1. Delivered in the board-room of the Royal Infirmary, Manchester, on St. Luke's Day.

RECORDING OF CANCER CASES

THE National Radium Commission has been responsible since its inception for a system of registration which included all cases of cancer treated with radium at the commission centres. It is therefore right that the commission should organise the registration of all the cases of cancer applying for treatment through the approved schemes under the Cancer Act. The commission centres have been asked to put the system into use for a trial period beginning on Oct. 1, 1944, and record cards, with an explanatory booklet, have been issued.[1] These have been drawn up with great care and they offer an excellent opportunity of obtaining the accurate clinical and pathological records on which statistical analysis must be based. The various difficulties which may arise have been foreseen. The registration cards will be numbered serially and each unit to which they are issued will have to account for every number it receives, thus ensuring that no case once registered can be overlooked. Allowance is made for cases registered which afterwards prove to be benign, and when a patient is not treated in the registering unit the reason must be given. The amount of work involved in the registration of great numbers of cases must be a serious consideration both for the individual centre and for the central bureau, and the need for competent registrars with adequate clerical staff must be met. It is evidently intended that cancer registrars shall be appointed who will be important members of the team. These registrars must possess a wide knowledge of the manifestations of the disease, and will have to be well grounded both in the surgery of malignant disease and in radiotherapy. Every effort has been made to ensure that correct terms are used and headings subdivided to meet all contingencies, but there remain many borderline cases in which only an experienced observer can decide which is the correct category.

On the foundation of these records a great structure of clinical research will be built. The success of present methods of treatment will be assessed and new methods will be evolved and tested. For this purpose statistical sampling is needed, and the difficulty of obtaining comparable samples is well known. The usual method of dividing cases into groups for sampling has been to use clinical findings to distinguish stages, usually four, ranging from early to late. Even when the greatest care is taken the interpretation of clinical findings varies greatly from centre to centre and even from clinician to clinician. The commission has therefore preferred to separate the condition of the primary growth from that of the secondary lymph-nodes. The primary growths are entered as "early" or "late." In general an "early" growth is one limited to the organ of origin, but for the common sites—breast, uterine cervix, mouth and skin—clear definitions are given. For "mouth" an unusual step has been taken in defining an early growth as one which has an estimated maximum diameter of less than 4 cm., those familiar with the problem of accurately recording lesions inside the mouth will agree that this is a satisfactory compromise. Secondary lymph-nodes if present are described as mobile or fixed, and the number of lymph-node areas affected must be mentioned. Pathological findings on material removed at operation do not affect the clinical records but the results of histological examinations are entered. A subheading "indeterminate" is allowed because of the known difficulty of making a definite diagnosis from fragments of material obtained

1. Ministry of Health. Treatment of Cancer. Directions for the use of Record Cards.

by biopsy of rare or atypical tumours. The decision whether a case is to be registered as malignant or not must then rest on the clinical diagnosis. Under the heading "treatment" the centre must note whether the intent is radical or palliative. Clear thinking before treatment is begun is the best safeguard of the patients' interests, and this obligatory decision may do much to ensure that the correct method of treatment is chosen.

Finally the centres are requested to use the Medical Research Council code numbers for the classification of sites,[2] a step which will aid in the completion of morbidity statistics. The whole scheme is an interesting experiment in large-scale statistical research on cancer, and it is to be hoped that after the trial period it will be adopted by every hospital treating cancer not only in the United Kingdom but in the Empire.

AMŒBIC HEPATITIS AND LIVER ABSCESS

ACUTE hepatitis is the commonest complication of intestinal amœbiasis and usually produces a clinical picture so striking as to present the teacher with a veritable show-piece for differential diagnosis. The patient is feverish, with acute liver tenderness, referred shoulder pain and associated signs at the base of the right lung. His anxious look, flushed cheeks and sweating facies reflect his anxiety. From the laboratory aspect there is usually little to guide the physician, except the almost invariable leucocytosis. The finding of *Entamœba histolytica* or its cysts in the fæces is useful as confirmation, but not essential for diagnosis, since they are more often absent than present. But all clinicians would agree that the miraculous response to emetine therapy is diagnostic.

The symptoms and signs are ably summarised by Rachmilewitz [3] of Jerusalem. The hepatic pain, which is rarely well described in textbooks of tropical medicine, is almost always present and is mainly responsible for bringing the patient to his doctor. It extends over the entire liver and is intensified by deep inspiration, coughing, sneezing or sudden movements. The way in which the patient tries to protect his liver is so typical that hepatitis may be suspected by his carriage or the manner in which he turns in bed. He appears to carry his liver in his hands, or like a footballer with the ball tucked under his arm. The radiation of the pain to the right shoulder may be so prominent as to be mistaken for rheumatism of the joint; rarely it is referred to the left shoulder. The slightest pressure on the liver brings on the pain. Other areas of tenderness are over the clavicular insertion of the right trapezius and between the clavicular and sternal origins of the right sternomastoid. As a rule there is limitation of movement of the right diaphragm, often with râles and a pleuritic rub over the base of the right lung. Occasionally signs of right pleural effusion may be elicited. Differential diagnosis presents a pretty problem. Cholecystitis, which is also associated with pain in the right hypochondrium and sometimes also with referred shoulder pain, is almost invariably accompanied by dyspeptic symptoms, whereas in amœbic hepatitis they are rare; jaundice of some degree is to be expected in cholecystitis, and Murphy's sign may be a useful pointer. Acute infective hepatitis before the appearance of jaundice may resemble amœbic hepatitis, and so may a perinephric abscess. One of the commonest errors of the novice in tropical diseases is to mistake the pain of hepatitis for a ruptured gastric ulcer. The associated signs at the base of the right lung may be taken for low-grade pneumonia or for a pleural effusion of pulmonary origin, so attention is distracted from the liver. Unfortunately, too, there is a residuum of cases of chronic amœbic hepatitis with no pyrexia, pain or leucocytosis, but with gross enlargement of the liver, either upwards or downwards. The blood-sedimentation rate is commonly raised, but the reaction to emetine therapy appears to be the surest guide in such cases. X ray of the base of the right lung may show doming and limitation of movement of the right diaphragm, and sometimes a pleural effusion, but often only obliteration of the costophrenic sinus. The true pathology of amœbic hepatitis is not clear. That there is invasion of the veins of the portal system from amœbic ulcers in the large intestine is generally conceded, but whether there is actual massive embolism of the liver parenchyma by *E. histolytica* or a generalised inflammatory reaction, which is essentially a defensive process, is still controversial. All gradations can be recognised between amœbic hepatitis and amœbic liver abscess.

The minutiæ which enter into the diagnosis of amœbic or "tropical" hepatic abscess would fill a volume. Sometimes the bulging liver, characteristic facies and clinical syndrome may be so typical as to be unmistakable. But there are others, more especially the "silent" liver abscesses, which may tax diagnostic acumen to the utmost. Patrick Manson once remarked that the chief aid to diagnosis is to keep the idea of liver abscess prominently in mind. There is hardly a tropical fever for which amœbic abscess may not be mistaken, and tuberculosis, malignant and hydatid disease, ascending pylephlebitis, cholangitis, cholecystitis and a dozen other abdominal conditions come to mind. But the silent abscess may wax and eventually eat away the greater portion of the liver without affording any ascertainable signs of its presence until it is discovered on the post-mortem table. The therapeutic test of emetine injections, usually so helpful in acute hepatitis, often fails in frank hepatic abscess. It is only in the early stages of pus formation that emetine is likely to be effective, so the treatment of amœbic abscess of the liver still lies in the province of the surgeon. Secondary infection with some intestinal organism is common, and there appears to be some special connexion between hepatic amœbiasis and the *Bacterium enteritidis* of Gaertner. The X-ray appearances may be decisive, but they fail to locate an abscess in the centre of the liver unless, as sometimes happens, it contains a transparent gas vesicle, and a picture of the outline of the abscess cavity can seldom be obtained unless it is calcified. There may be no previous history of dysentery and no evidence of amœbic infection from fæces examination. Sometimes too there is no pyrexia, no leucocytosis, and no pain to warn the patient of the presence of an abscess till sudden rupture into the pleura, bronchus, stomach or some adjacent viscus raises the alarm, and by then it may be too late to save the patient. Such happenings have been recorded many times in the past, and two examples of unsuspected asymptomatic amœbic abscess are reported by Walters and colleagues [2] in naval patients returning from the South Pacific naval zone. Both had been invalided with the diagnosis of filariasis. In both the amœbic abscess was diagnosed only when it perforated into the subdiaphragmatic region. On perforation in both cases there was a sudden aching pain in the right shoulder, the right costovertebral region and the lower part of the right chest, associated with pyrexia and rigor. Radiography revealed progressive elevation of the right half of the diaphragm and loss of the acute cardiophrenic angle. A pronounced leucocytosis was present. Emetine therapy proved a failure. The right subdiaphragmatic space was exposed through subcostal incisions, when the abscess in the liver was found to communicate with the subdiaphragmatic abscess. Drainage was followed by complete recovery. Walters and his colleagues recommend that emetine should be tried whenever amœbic abscess is suspected; if symptoms or liver enlargement persist aspiration should be carried out, and open surgical drainage should

2. *Spec. Rep. Ser. med. Res. Coun., Lond.* 1943, no. 248.
3. Rachmilewitz, M. *Acta med. orient.* 1944, **3**, 35.

2. Walters, W., Watkins, C. H., Butt, H., Marshall, J. M. *J. Amer. med. Ass.* 1944, **125**, 963.

be used only when perforation into the peritoneum or dleura is actual or impending, or there is pyogenic contamination.

INTERNATIONAL UNIT OF PENICILLIN

A LONDON conference convened by the Health Section of the League of Nations has reached agreement on the standardisation of penicillin. Sir Henry Dale, PRS, who presided over the discussions, stated last week that the international unit agreed upon will be "the specific penicillin activity contained in 0·6 microgramme of the international standard," but particulars of the standard have not yet been announced. The members of the conference included R. D. Coghill, R. P. Herwick and M. V. Veldee (USA); Sir Percival Hartley, C. R. Harington and J. W. Trevan (Great Britain); and Dr. Trefouel (director of the Pasteur Institute, Paris), with Dr. Raymond Gautier, officer in charge of the Health Section. Sir Alexander Fleming and N. G. Heatley were among those attending as advisers.

Special Articles

NORMAL DEATH-RATE OF THE NAVY

MAJOR GREENWOOD, D SC LOND., F R C P, F R S
PROFESSOR OF EPIDEMIOLOGY AND VITAL STATISTICS, LONDON UNIVERSITY
E. LEWIS-FANING, B SC, PH D LOND.
MEMBER OF THE MEDICAL RESEARCH COUNCIL'S STATISTICAL STAFF

MOST men and all statisticians, when they see a chronological arrangement of index numbers brought down to date, are stirred by a desire to know what the index will be in some future year. When those now oldish were young, and biometric technique novel, many thought that, if one could fit some mathematical function so closely to the arithmetical data that the "curve" virtually reproduced the data, then the curve would be a good prophet. The idea was naive because, inter alia, the functions which were most easily fitted, and usually fitted best, were polynomials, and so, applied to such indices as death-rates, must eventually give absurd values—negative death-rates or death-rates of more than 100%—and these of course did *not* contribute to the success of those going into business as prophets.

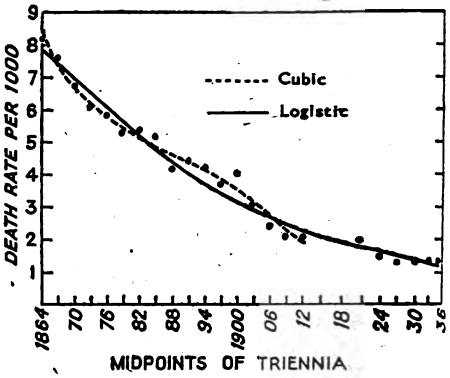
Some 20 years ago, the late Raymond Pearl and L. J. Reed suggested a more sensible plan—to use a mathematical function which could not give absurd results. The function they suggested had, unknown to them, been proposed almost a century earlier by a Belgian mathematician, Verhulst, as suitable for describing the growth of populations. It is usually called, in honour of Verhulst, the Logistic Function. Its equation is:

$$y = \frac{A + B\,e^{kt}}{1 + e^{kt}}$$

where A, B and k are constants, e the Napierian base and t the number of units of time measured from a convenient origin.

Evidently if k is negative then, with positively increasing t, y will approximate to A, while if t increases in absolute value but is negative in sign (viz., is going backwards in time) y will approximate to B. In Verhulst's use—the study of population growth—k would of course be positive. The graph of the curve is like a capital S with the letter tilted over, and the top and bottom elongated. This is a much more hopeful instrument of prophecy; we can form some sort of guess as to maximum rates of mortality in the past and be quite sure that even in a new world a death-rate will not be less than zero. It is true enough that the form is rather too simple in its symmetry to be likely to be quite satisfactory; still it is worth a trial.

The official annual, the *Statistical Report of the Health of the Navy*, provides data from the middle of the 19th century to 1936. The death-rates from disease in peace years are valuable indices, although they are only index numbers. A civilian can (apart from the relatively minor disturbance of migration) pass out of the official statistician's sight only into the grave; a naval rating can be invalided out of the Service or retire from it. But the index number relates to a population the age and sex composition of which does not change much in peace-time. It is an index number which has decreased greatly over the last 80 or 90 years. In 1859 the rate was 11·8 per 1000; in 1936 2·00. If one of the usual polynomials is fitted to a range of the data—we tried the triennia from 1863–65 to 1911–13 the resultant curve fits the observations very well; but used for prophetic purposes the polynomial is too optimistic. It requires, for instance, that the death-rate of 1921–22 should be 0·92; the rate for that year was actually 2·02 and was still 1·40 in 1935–36. Again the polynomial was impossibly pessimistic for death-rates before 1850. We accordingly tried the logistic method.



The work of Hodge[1] led us to think that the upper asymptote of mortality in the Navy would be (in peace-time) about 16·0 per 1000 per annum. The rate of mortality from disease in 1830–36 was 11·8. In 1810–12 (war-time) 38·3 according to Blane. Hodge estimated that the war-time excess was about 16 per 1000. It seems reasonable to regard the extra risk (of disease) as about doubling the rate so that the order of magnitude of the peace-time risk would be 16–20 per 1000 150 years ago. It is probable that going further back would not mean reaching higher rates, because, as various writers have pointed out, the ships did not keep the seas for such long continuous periods. We then proceeded empirically, and, after a considerable amount of arithmetical work using various trial values, found that with A = 0·40, B = 15·40 and k = − 0·03947 good graduation was obtained. The table and figure show the results. Of course, over 1863–1911, the cubic gives a better fit; equally, of course, the postwar values of the logistic are better. But it seems fair to say that the logistic, with its biological reasonableness, does not falsify the data, and that its prophecies are credible—

NAVAL MORTALITY FOR DISEASES (PER 1000)

Triennia	Actual rates	Logistic*	(Diff.) Act. − calc.	Cubic†	(Diff.) Act. − calc.
1863–	8·23	7·90	+ 0·33	8·30	− 0·07
66–	7·60	7·46	+ 0·14	7·43	+ 0·17
69–	6·77	7·02	− 0·25	6·77	0
72–	6·10	6·58	− 0·48	6·26	− 0·16
75–	5·93	6·16	− 0·23	5·96	− 0·03
78–	5·39	5·74	− 0·35	5·52	− 0·13
81–	5·40	5·34	+ 0·06	5·23	+ 0·17
84–	5·21	4·96	+ 0·25	4·97	+ 0·24
87–	4·24	4·59	− 0·35	4·71	− 0·47
90–	4·44	4·24	+ 0·20	4·44	0
93–	4·25	3·92	+ 0·33	4·15	+ 0·10
96–	3·72	3·60	+ 0·12	3·84	− 0·12
99–	4·07	3·32	+ 0·75	3·50	+ 0·57
1902–	3·15	3·05	+ 0·10	3·13	+ 0·02
5–	2·49	2·80	− 0·31	2·74	− 0·25
8–	2·16	2·57	− 0·41	2·35	− 0·19
11–	2·11	2·36	− 0·25	1·95	+ 0·16
		Σ(diff.)² = 1·8479			Σ(diff.)² = 0·8585
..					
20–	2·02	1·83	+ 0·19	0·92	+ 1·10
23–	1·51	1·68	− 0·17	0·66	+ 0·85
26–	1·37	1·55	− 0·18	0·46	+ 0·91
29–	1·40	1·43	− 0·03	0·30	+ 1·10
32–	1·40	1·32	+ 0·08	0·19	+ 1·21
35–36	1·40	1·27	+ 0·13	0·11	+ 1·29
		Σ(diff.)² = 1·9695			Σ(diff.)² = 7·9573

* $y = \frac{0{\cdot}40 + 15{\cdot}40e^{-0{\cdot}03947t}}{1 + e^{-0{\cdot}03947t}}$. Origin at 1864.

† $\log y = 0{\cdot}67281 - 0{\cdot}02415x - 0{\cdot}00107x^2 - 0{\cdot}0002369x^3$. Origin at midpoint of actual series (1863–1913) = 1888.

1. See Greenwood, M. British loss of life in the wars of 1794–1815 and in 1914–18, *J. R. statist. Soc.* 1942, 105, 2.

that the index ought to be less than 1·0 before 1950 but will not be under 0·5 for a long time to come.

The interest of this is not wholly arithmetical. Taking the observed figure for years after 1926 down to the war it will be seen that there is no improvement. One naturally thinks of the possibility that new conditions of science in a machine age or perhaps changes in the stamina of entrants have introduced some new hazard. That is a possibility but the facts are not incompatible with a different interpretation—that one has now reached the last lap of the secular race and improvement must be slower and slower.

SOCIAL DISORDERS

VIEWS OF MEDICAL WOMEN'S FEDERATION

MEDICAL women are often asked for their opinions on the reported increase in venereal diseases, and the Medical Women's Federation has now issued a statement emphasising the relation of these diseases to social and personal maladjustments. Doctors, the Federation holds, must not only treat individual patients but must educate public opinion in medicosocial questions so that these may be approached with understanding and sympathy. The statement continues :—

It is realised that the war has brought out splendid qualities in many people, and that young people in particular are displaying magnificent courage, endurance and selflessness; yet at the same time, partly as a result of the very conditions calling forth such qualities, it is clearly seen that there also exists an accompanying state of serious social malaise. Social disorders are associated with a failure to develop and practise an ideal of conduct, as well as with a lack of discipline and sense of personal responsibility. Such conditions are likely to lead to an increased state of unrest and a diminishing degree of happy satisfaction in life.

Among the signs of social malaise and disorder are found :

1. A lowering of the standards of honesty and of consideration for others.
2. An increase in delinquency, including juvenile delinquency.
3. A more widespread and growing habit of indulgence in alcohol among young people.
4. The loosening of family ties.
5. Sexual incontinence, promiscuity, an increase in soliciting, and a consequent rise in the incidence of venereal disease.
6. The toleration of a low standard of certain types of reading matter and of public entertainment.

We believe that an acceptance of materialistic ideals as the main standard for living has led to spiritual poverty and unthinking egoism. The sense of insecurity of life, the loss of home background and other dislocations of war have added to the confusion. The immediate satisfaction of an impulse is often accepted as justifying any action. This is seen in the increase of petty misdemeanours, and still more in irresponsible sex relationships.

We believe that continence (apart from marital relationship) is the ideal for both sexes if the vitality of the race and the happiness of individuals is to be ensured. We condemn the view that incontinence is not detrimental so long as precautions are taken against disease and pregnancy. It is now recognised that continence is not harmful to either sex.

All primitive urges supply the energy for man's activities; in order that they may find effective and satisfying outlets, certain basic wants must be met. These include stability of family life, education in its widest sense, scope and training for suitable work, encouragement in the right use of leisure, opportunity for independence of thought and creative activities, and development of that spiritual outlook which alone can secure an active, happy and ordered society.

For the achievement of this ideal, the Medical Women's Federation presents the following as minimal essentials :

1. The recognition of the vital importance of home and family life with opportunities for early marriage, and the provision of good living conditions within reach of all.
2. Training from an early age in the development of personal moral responsibility and social obligation.
3. Religious training both at home and at school.
4. Physical training together with instruction in the functions, hygiene and control of the body.
5. Training in the understanding and expression of the emotions.
6. Extension of education into adult life. This should include the teaching of parentcraft to both sexes, and opportunities for manual and creative work.
7. The encouragement of a high standard of literature and public entertainment, and of appreciation of beauty in Nature and Art.
8. The provision of suitable opportunities for social contacts and recreation.
9. Adequate provision for the disabled and for those who are inherently irresponsible.

The Federation is fully aware that there is nothing new or revolutionary about such recommendations, but considers that they should be given due weight in the formulation of proposals for the prevention and control of venereal disease and other social disorders.

DEVELOPMENTS AT THE ROYAL SOCIETY OF MEDICINE

PLANS for enlargement of No. 1 Wimpole Street were mentioned in these columns on Sept. 30. The new top floor will have a large room equipped for examination of patients; the second floor will be altered so as to include an additional library as big as the present library; a third meeting room will be added; and there will be better common-rooms and committee-rooms. For these purposes the Society has opened a building fund, hoping that subscriptions will enable a start to be made as soon as a building permit is obtained. The appeal is for £50,000 which would obviate debt repayment at the expense of normal income.

The additions are wanted not only because the number of fellows is three times what it was when the house was built in 1910 but also because new services are now rendered by the Society, involving new techniques of providing information.

Library.—The library can no longer be described as "closed," for access is given to any worker "in or near medicine" whose need is demonstrated to the secretary or librarian. Coöperation with other libraries is planned under a Central Medical Library Bureau, now being formed, in which some 30 medical organisations are already interested.

An ampler service of information to fellows and to the profession at large has been made possible by means of the photostat, the book-film, and the precision enlarger; for the days are now past when it was necessary to visit a library in order to draw on its stores of information.

Where a film-reader is available, the use of microfilms is more convenient than reproduction by photostat. For the benefit of medical officers overseas, the Society has sent out 13 film-readers (2 of them to US medical formations), so that microfilms reproducing scientific articles may be read on the war fronts. The experience gained by circulating microfilms in this way will be valuable in peace-time. The library's equipment already includes apparatus for the preparation of book-films, and the photostat service is being augmented by a special camera which can make book-films, and also make prints from these in sizes suitable for dispatch to fellows who have no film-reader at their disposal.

Medical organisations in liberated countries are being approached in the hope that the Society can help them to replenish their libraries and also fill gaps in its own.

Cinema film library.—The increasing importance of the cinematograph film in medicine, and the need for better use of existing films no less than for guidance in making new ones, has led the Society to set up a library of medical films. This work is being developed with the coöperation of the Scientific Film Association and other bodies. In this connexion the Society gratefully acknowledges the gift, from Messrs. Kodak, Ltd., of the whole of their library of medical films, and it hopes that other institutions and individuals will follow suit in order that a comprehensive and efficient central adminjstration may be set up.

It is now a commonplace for lectures and discussions in the meeting-halls to be illustrated by silent films, and a sound-film projector is being acquired for future use.

Inter-Allied meetings.—Since the outbreak of war the Society's house has been open to medical men in the Allied Forces and special facilities have been provided for them at meetings, in the library, and in special conferences on war medicine held in camera and sponsored by the Directors General. The Society has also helped Allied medical men individually who were in need of contacts in British medicine.

HARVEIAN FESTIVAL IN MANCHESTER

Manchester gave a warm reception on Oct. 18 to the Royal College of Physicians when the memory of William Harvey was honoured for the first time away from London. Sir Edmund Spriggs who entitled his oration the Harveian Method in Literature approved the choice of Manchester as the home of so much literary, scientific and industrial progress. Lord Moran sent from Moscow a message regretting his absence from an occasion which showed how medicine generally was becoming All England. An audience of a hundred or more included Sir Walter Cobbett, chairman of the Royal Infirmary. After the oration the Senior Censor presented to Brigadier J. A. Sinton, VC, IMS, the Bisset Hawkins medal, awarded triennially for outstanding work in advancing sanitary science. Among the guests at the festival dinner in the evening were the Lord Mayor, the Dean of Manchester, the City MOH, and the Town Clerk on the eve of taking over the county. Dr. A. T. Wilkinson, nestor of the Manchester FRCP's at the age of nearly 92, was unable to be present.

MEDICINE AND THE LAW

Criminal Responsibility Again

THE great gulf fixed between the medical and legal views of criminal responsibility is an old story. Expert witnesses in our criminal courts may submit evidence that the conduct of an accused person is recognisably due to mental abnormality requiring specialised treatment and that imprisonment will effect no cure. The judge at assizes will nevertheless find himself obliged to instruct the jury in old-world tests of criminal responsibility—tests so rigid that the number of persons whom the law allows to be irresponsible is small. Having safely got its verdict of "guilty" (accompanied perhaps by a sympathetic recommendation to mercy because the accused is felt to be, in the popular as well as in the medical sense, really insane), the court may sometimes bind the prisoner over on condition that special treatment is undergone. This course, however, usually depends on the existence of relatives who will undertake that the treatment is followed and will perhaps pay for it. Otherwise there is a sentence of imprisonment and probably a judicial comment that the prison authorities will doubtless give attention to the case and furnish such treatment as it requires. As our learned contemporary the *Solicitors' Journal* points out, however, in a paragraph entitled Crime and Psychotherapy in its issue of Oct. 7, prison authorities are properly equipped with facilities for hospital treatment in obvious cases, "but are not usually provided with facilities for treatment of the more subtle types of ailment which do not come within the category of positive insanity."

The *Solicitors' Journal* draws attention to this matter in the light of a prosecution reported in the *Scots Law Times* of Sept. 23. Counsel for the accused pleaded "guilty" to various charges under the Criminal Law Amendment Act and urged that the offences were the result of mental illness. Two psychiatrists testified that cure was possible but said that no facilities existed for the appropriate treatment in prison; detention in a prison would, when the sentence had been served, merely release the prisoner still a potential danger to the public. The court was asked to release him on probation with a condition that he undertook to place himself under the supervision of a psychiatrist. The judge took the orthodox legal view and inflicted a sentence of 18 months' imprisonment. He declined to distinguish between this case and many others which had come before his court; to try the suggested experiment would be unprecedented; in law the offences were crimes and must be punished in order to vindicate the law, protect the community and deter others. He did, nevertheless, direct that the evidence which he had heard should be laid before the prison authorities for such action (if any) as lay within their power.

Thus the gulf between progressive medical opinion and the traditionalism of the law-courts remains as great as ever. Yet we may note hopefully, and with gratitude to the *Solicitors' Journal* from whose paragraph we have taken the liberty to quote, that it is a legal journal which draws attention to the distance which still separates the two views.

In England Now

A Running Commentary by Peripatetic Correspondents

TEMPORARY houses can be pleasant enough, no doubt, and are certainly likely to be equipped on a standard higher than that found in any houses for working people before the war. Their physical drawbacks are well recognised—they are likely to be cramping to the family, and they are not particularly winning examples of architecture. There is a psychological drawback too: those who live in a temporary house may have but a temporary feeling for it—they may see themselves as migrants in the act of moving on to something better, and may never give the house that care and kindness which people are usually willing to spend on their homes. Even the deep-rooted English taste for gardening may be blighted by this restless atmosphere, and we may live to see colonies of shabby dwellings set in derelict back yards. Can this be avoided by taking thought now? In the first place, must a house lack good design merely because it is temporary? Evidently some fear that if these houses are too pleasant they will be allowed to outlive their allotted span. Presumably this fear could be ended by legislation which ruthlessly denied any extension of licence for a temporary house beyond the limit of its desirable life; once this was accepted the house might well be as beautiful and as roomy as we can afford to make it. Any measure enforcing such demolition, however, must commit us at the same time to an adequate building programme, so that temporary houses are steadily replaced by better and even more attractive homes.

The sense of impermanence induced by the word "temporary" might be countered by fostering house-pride. The Ministry of Information and the BBC have shown us how to interest people in gardening, fuel economy, good feeding and many other aspects of house-management which acquire national importance during a war. This kind of friendly encouragement might well be continued in peace-time. Shortage of domestic help during the war has taught many of us that household care is the responsibility of all the residents. A campaign addressed to both sexes of all ages might help to establish us among the house-proud nations, to the benefit of health and self-respect. Prefabricated houses, like the mushrooms to which they are endlessly compared, will be white and neat when they spring up: but they too will be subject to wear and tear. It will be a pity if they are allowed to assume the raffish repulsive air of a tousled mushroom. Perhaps the task of arranging a campaign in house-pride should fall on a new government department—a Ministry of Housing and Home Care.

* * *

"You're colour-blind," he said, when I was being examined for my medical at the beginning of the war. "Oh rot," I told him (I knew the eye specialist well in civil life). "No doubt about it at all. You're red-green blind. The Ishahara test shows that all right." "Well, I don't believe it. No-one's ever told me that before. D'you mean to say I can't tell the red lights from the green at the traffic lights? I can do that as well as you can. And as a surgeon I never have any difficulty in telling the colour of the stuff I splash about at operation. And a green field looks perfectly green to me." I was getting a bit irritated, and a bit nervous that they might not let me into the RAMC, for at that time we were all keen and full of illusions. Also, I had always rather pitied those freaks of humanity who are colour-blind (like Dalton, who couldn't spot a red soldier in green grass) and thought how much of beauty in this world they must miss: and here was me supposed to be one of them. "Well you're certainly partially colour-blind," he

rsisted. "It's in the finer gradations you'll slip up. or example in a poor light you couldn't say for certain hat the colour of a girl's jumper is—just what tone of d it is, whether it's mulberry or mauve or claret or hat. If would all look rather brown to you." Later I began to believe him, and I embarrassed several rls by staring at their jumpers. They used to turn bout and think I wasn't nice to know. And those furiating little red tees—there weren't quite so many ainful scenes on the golf course after I took to the llow. But it has only recently dawned on me why have always been a bit of an ass at histology and icrobiology. Fancy-coloured nuclei used to beat me; nd coming to think of it, I doubt if I have *ever* seen a bercle bacillus stained with Ziehl-Neelsen. This aises an important point, for a keen and earnest student ike me) could easily be failed in his bacteriology exam hrough not being able to see what he is looking at, and here is quite an argument for testing students for olour-blindness before they start squinting down nicroscopes. It could be done at the physical examnation carried out by the better medical schools on all ommencing students, along with their height and weight nd other irrelevant matters. And you, dear reader, mugly reading away and thinking how beautifully normal you are compared with this poor fish—you had better go and do this Ishahara test too. You never know. And if you really must have your tubercle bacillus spotted go to a lady pathologist, for women, you will recall, never (well, hardly ever) are colour-blind, because Nature, though cruel, is not so cruel as all that.

* * *

The *Marie Curie* film has at last reached our outpost of England. With memories of Eve Curie's magnificent biography I went dubiously to see it, certain that Hollywood had smeared its austerities with sugar. There was some sugar, certainly (those ear-rings were a pity), but not enough to turn the stomach; and the rest of the film made up for them. In some ways it is almost a documentary, but not quite, for it does not stick closely to facts. These have been tinkered with until they show the inner story truly in the same way as a good diagram can simplify and light up a difficult bit of surgical technique. Thus if Marie and Pierre seemed uncommonly slow off the mark in guessing that a new element must be hidden in pitch-blende residue their havering underlined the audacity of this guess. And if Marie, with unscientific despair, believed she had failed when the radium lay before her as a stain on a saucer (a thing which never happened at all) she made us all realise what a very little radium you can expect to get from a great deal of pitch-blende. The hard life of the young student, the miseries of the shed in which this gigantic work was carried out, and the full home life were all well suggested. I was sorry, though, to see nothing of that Polish childhood.

* * *

It was a hundred years ago on Monday that Robert Bridges, physician and poet laureate, was born at Walmer, near the South Foreland. He was 38 before he gave up the practice of medicine to become a poet, and not until the last of his 85 years did he publish the lovely *Testament of Beauty*, whose melody and teaching are his legacy to us all.

> "Ideas and influences spiritually discern'd
> are of their essence pure: but in the lot of man
> nothing is wholly pure; yet all hindrance to good
> —be good and evil two in love or one in strife—
> maketh occasion for it, by contrast heightening,
> by challenge and revelly arousing Virtue to act."

* * *

Brenda, one of my girl-friends, is eleven and has a strong jaw. Two miles from anywhere on a very hot day I overtook her striding determinedly down the main road with arms rigidly thrust out in front and both hands firmly grasping an injured rook. She accepted a lift, rather weakly for her I thought, and as she got into the car the bird seized the occasion to peck us both sharply more than once. No information being vouchsafed I plucked up courage and asked for some. "Perhaps you wouldn't mind telling me," I ventured, "where you might be going with that bird?" "To see Tuppy," she replied. "It can't fly or even walk and I want her opinion about it." Tuppy is 10. "Wouldn't it be better to ask Rachel?" I suggested. Rachel is 12 and a natural vet. She has a kind of alacrity in curing sick animals. Brenda pondered the suggestion. "Yes," she agreed, "I'd like Rachel's opinion too, but I must see Tuppy first. I'm glad I met you, I'm rather late already." At the corner of Tuppy's lane I set Brenda down. She thanked me civilly and I watched her small ramrod figure till it turned the corner. Even if you cut out the second consultation with Rachel, I reflected, you will have a four-mile walk home probably with that ungrateful bird doing its best to bite you all the way. Rather British, I felt.

* * *

A mother and her daughter aged about 15 were talking in the bus, and the mother mentioned psychoanalysis. "What's that?" asked the daughter. "It was invented by a German called Frood," was the reply. "It is used in schools, and the teachers find it very interesting, but it is very bad for the children."

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

AN answer to a parliamentary question this week showed that there are forty ambassadors, ministers and chargés d'affaires accredited to the Court of St. James's. There are also fifty-five ambassadors, ministers and chargés d'affaires accredited to Allied governments of occupied territories domiciled in London (seventeen of whom are also accredited to the Court of St. James's). When to these are added experts working on committees, visitors from other lands and refugees, the foreign population of Britain must be great indeed. London is perhaps the most active international centre in Western Europe and the personal contacts made by British people with representatives of almost all nations in the world are bound to have a far-reaching effect in the future. Parliament only makes official contact with this diplomatic world. Unofficial contact is limited to those who live in the social world in which this diplomatic society moves. Peering through the fog of war members of the House wonder whether these contacts are intimate and direct enough. So much depends on international organisation for the future of men and women in this land as in all other lands of the world.

Parliament is experiencing great difficulties in getting on with the Town and Country Planning Bill. At the beginning of the week the Government view, stated clearly by the Leader of the House of Lords, was that the bill would have passed through all its stages by Friday. But the bill will need two more days in the Commons next week, and if the Tory revolt is not quelled and there is still further delay there will be a first-class crisis. Mr. Arthur Greenwood for the Labour Party has already said that the limit of compromise has been reached and unless the bill goes through, with the new clauses on compensation which the Government has moved substantially unchanged, the Labour Party, the Liberal Party and presumably the young Tories will vote against it. It is to this disturbed atmosphere, in which an electric storm might precipitate an election or at least a dissolution of the coalition, that the Prime Minister will return from Moscow. This postponement has knocked the parliamentary time-table on the head. The Social Insurance plan was to have been discussed during the first week in November. That seems impossible now though Sir William Beveridge has been elected to Parliament ready to make his maiden speech. The delay also puts off the National Health Service debates and yet this session must be wound up and a new session begun in November. Congestion of business and obstruction of business by those no longer willing to obey the coalition whip are no good auguries for a fruitful new session.

GOODENOUGH REPORT.—Dr. E. SUMMERSKILL asked the Minister what steps he proposes to take to implement the recommendations of the Goodenough report, including the wider admission of women to the medical schools.—Mr. WILLINK replied: The committee's recommendations are under consideration and I hope to be able to make a statement soon.

QUESTION TIME

Ingredients of New National Loaf

Sir E. GRAHAM-LITTLE asked the Minister of Food what were the ingredients of the new national loaf; what proportion of the wheat grain and the wheat germ respectively was retained in the flour from which it was prepared; and what proportion of this flour went into the composition of the loaf as compared with other ingredients.—Colonel J. J. LLEWELLIN replied: Apart from water, yeast, salt and various improvers which are the recognised adjuncts of bread-baking, the national loaf is made from national flour, which is milled solely from a pure wheaten grist except in a few areas where the inclusion of 2½% rye is authorised. Imported white flour is being mixed into national flour at the rate of 5% of the output, and calcium is added at the rate of 7 oz. per 280 lb. of flour. In addition the baker may use potatoes, potato flour and fat as permitted in the Bread (Control and Maximum Prices) Order 1943. From Oct. 1 the extraction of national flour from wheat has been 82½% and when milling to this figure approximately 75% of the available germ is retained in the flour. Approximately 97% of the dry ingredients of national bread is flour.

Tuberculosis Grants

Mr. JOHN LAWSON asked the Minister of Health if he would explain the policy of his department in withdrawing the special tuberculosis grant from a sufferer of this complaint when it was found the condition was static or increasing, seeing that the need of the applicant for greater consideration grew as he lost physical strength and was less able to supply the necessary nourishment through his own endeavour.—Mr. H. WILLINK replied: The purpose for which the special scheme was introduced was to encourage the undertaking of remedial treatment at an early stage of the disease. Funds for this purpose, in the absence of other existing powers, have been provided as a war service and can therefore be applied only to cases in which treatment is likely to restore or improve working capacity. Replying to further questions Mr. Willink added that he was fully aware of the difficulties that arose from the policy, which was instituted some time ago. But he had re-examined it and he believed it was the best they could do with the present extreme shortage of medical personnel.

Promotion of Married Women Doctors

Captain PRESCOTT asked the Minister what disqualifications and/or disabilities attached to the establishment or promotion of married women doctors either in the local government service or in the Ministry of Health; and whether he would consider the advisability of recommending the removal of such disqualifications and/or disabilities.—Mr. WILLINK replied: There is in all Government departments a ban on the establishment of married women civil servants. This is removable in exceptional cases where it is considered that the efficiency of the department would suffer by the loss of the officer's services. When a woman doctor in my department is retained after marriage there is no disqualification as regards promotion. The abolition of the ban in the Ministry of Health is a general service question within the province of the Treasury. There is no statutory bar to the employment by local authorities of married women medical officers but the question is one entirely within the discretion of local authorities and I have no information as to the practice followed by particular authorities. I believe, however, that a similar rule to that in force in the civil service is commonly applied in local government service though it has been widely relaxed during the war.

Doctors in Defence Areas

Mr. P. W. JEWSON asked the Minister whether he had taken steps to provide an adequate increase in the number of medical men in defence areas from which the ban had now been lifted, causing the return of the population; and whether the needs of these areas would be provided for before the winter set in.—Mr. WILLINK replied: The local medical war committees, whose function it is to ensure an adequate medical service in their areas under present war conditions, are keeping the situation under review. I understand that no special difficulty in these areas has so far been brought to notice, but if and when the need arises the committees will no doubt make recommendations to the Central Medical War Committee in the normal way.—Mr. JEWSON: Is the Minister aware that the local committee in Great Yarmouth has made a recommendation and that the Central Committee have refused to carry it out?—Mr. WILLINK: I am not aware of that, but the Central Committee looks at the situation over the whole country, where there is a general shortage of practitioners.—Mr. JEWSON: Is the Minister aware that already over 8000 persons have returned to my constituency and that the few remaining medical men are not of an age to cope with the extra work?—Mr. WILLINK: I am sure that in the circumstances the local committee will make a further recommendation.

Use of Artificial Limbs

Mr. W. H. OLDFIELD asked the Minister of Pensions whether the promise of Jan. 20 last had now been fulfilled and full-time instructors appointed at all arm-fitting centres to give ample tuition in the use of artificial arms and their attachments; and whether he would consider the appointment of instructors to teach men with high amputations or double amputations of lower limbs to walk correctly.—Sir W. WOMERSLEY replied: Full-time instructors have been appointed at two arm-fitting centres and there is a part-time instructor at a third. The latter will, I hope, shortly be replaced by a full-time instructor who is at present being trained for the post. Tuition in walking is given by the limb makers during the construction of the limb and subsequently by the limb surgeons. Replying to a further question Sir W. Womersley said he thought it better that the surgeon should supervise the job, because the limb had to be made specially to fit the man and it was better that the surgeon himself should see that it fitted properly.

Anæsthesia Cylinders

Mr. GEORGE STRAUSS asked the Minister of Health whether his attention had been drawn to the recent death of a 2½-year-old child in Bath during an operation as a result of the use of a badly marked nitrous-oxide anæsthesia cylinder; and whether he would see that such cylinders were identifiable by coloured bands in a prominent place instead of paper labels as at present.—Mr. WILLINK replied: The British Standards Institution have appointed a committee to consider what measures can be adopted to distinguish more readily than at present between the various medical gas cylinders used in connexion with the administration of anæsthetics, for the purpose of avoiding the repetition of such a tragedy. My department is represented on this committee.

Silicosis in South Wales

Mr. G. DAGGAR asked the Home Secretary whether he was aware that, in Abertillery and district, men suffering from silicosis were unable to receive compensation payment because of the absence of facilities to appear before medical boards, although not fit to follow their employment since April of this year; and would he expedite these examinations.—Mr. HERBERT MORRISON replied: I am aware that the number of applications to the Silicosis Medical Board for certificates under the Pneumoconiosis Compensation Scheme for coalminers in South Wales and Monmouthshire has, for some time past, considerably exceeded the capacity of the board and in consequence delay has been unavoidable. In recent weeks additional doctors have been appointed to the board in South Wales with a view to expediting the examinations, but I am afraid that some time must elapse before the arrears are overtaken.—Mr. DAGGAR: May I ask the Minister if he is aware that quite a number of these men are not entitled to national health insurance, and they therefore become a charge on the unemployment assistance board?

Mr. MORRISON: I will give that point consideration.

Malaria among Refugees in Mauritius

Mr. T. E. HARVEY asked the Secretary of State for the Colonies whether, especially having regard to the effect on their health of the climate and incidence of malaria in their present position, the Jewish refugees now interned in Mauritius could be removed to Palestine, or, failing that, to a more salubrious place than Mauritius.—Colonel O. STANLEY replied: I regret that in present circumstances it is not possible to remove these refugees from Mauritius. I am satisfied that the government of Mauritius is doing everything possible for their comfort and welfare and that the antimalarial measures taken since their arrival have steadily reduced the incidence of the disease. Generally their health is good.

Letters to the Editor

CHRISTMAS AND THE RMBF

SIR,—Once again it is my privilege to appeal to your readers throughout the country to remember the beneficiaries of the Royal Medical Benevolent Fund during this coming Christmas. These beneficiaries are aged or infirm medical practitioners, their widows and dependants, and as an old man myself—now in my 100th year—I have their welfare much at heart.

It has been my custom for many years to appeal for Christmas gifts on their behalf, and a large sum must be raised if we are to give £3 to each, as we would like to do, and as we succeeded in doing last year. If my colleagues could read the warm expressions of gratitude which are received each year they would feel that their contributions have been well spent, and I am confident that they will respond again as in other years.

Donations, large or small, should be marked "Christmas Gifts" and sent to the hon. treasurer, Royal Medical Benevolent Fund, 1, Balliol House, Manor Fields, London, SW15.

THOS. BARLOW,
President.

POSTURE AFTER ABDOMINAL OPERATION

SIR,—After operation abdominal cases are generally nursed in the Fowler position. The patient is propped up into a semi-sitting position with the knees bent in order that the pelvis may act as a basin. By gravitation, fluid (serous, serosanguineous or purulent) collects in the pelvis where the lymphatics are able to deal with subsequent infection and surgical drainage is more readily accomplished. It is stated that patients are both more comfortable in this position, and breathe better.

It is my belief that everything about this position is wrong—indeed, that it is harmful rather than helpful—and that the postoperative abdomen should be nursed flat or even with the head lower than the feet. Considerable clinical confirmation of this view has been accumulated. The principle of gravitational drainage within the peritoneal cavity is open to question both clinically and experimentally, and the localisation of pus is more likely to be controlled by a combination of the local situation and lymphatic absorption. Even if one were to accept this theory of drainage, with our present drugs the production of pus in the peritoneal cavity is at a minimum, and certainly what is produced is well localised to the involved region. To maintain the Fowler position and to make the patient more comfortable one places an obstruction to the venous return of the extremities in the form of a pillow under the knees. Surely this is asking for venous stagnation, the forerunner of thrombosis and embolism. The patient is said to breathe more easily in this orthopnœic position—might not this be open to question? It is true that the patient who is no longer breathing well with the thorax does so much better sitting, but this is mainly because he now breathes with the abdomen; conversely the patient no longer breathing with the abdomen must breathe with the chest, better accomplished flat or with the head down. To say that the patient is more comfortable belies experience, since one has only to observe the twisted trunk, flexed neck and propped knees of the Fowler in the next bed to the patient flat without pillow, trunk straight, neck a little extended and knees straight to appreciate which of the two is more comfortable.

No-one will disagree that the venous return from the lower limb is better lying than sitting and the lying position requires no support under the knees. One must add that with the diaphragm in expiration the vena-caval opening is greatest and certainly the diaphragm rises higher when lying than when sitting. The problem of breathing or lung aeration is a complicated one involving not only physiology and anatomy but also local pathology. To simplify this as much as possible we must separate breathing into abdominal and thoracic, realising that it is really a combination of these two (forgetting for the moment the accessory mechanisms). Abdominal breathing is, of course, accomplished by the diaphragm, which in turn is dependent on movement of the abdominal wall; thoracic breathing is made possible by the bucket-handle rib action and costal flaring due to rising abdominal viscera. Certainly a man whose abdominal wall has been traumatised by both missile and surgeon breathes more with his chest—best accomplished with the head lower than the feet than the reverse. Furthermore, bronchial drainage is more difficult sitting than lying down. In regard to comfort, I have felt, in a considerable series of cases, that the patient was quite comfortable lying until he was well enough to be inquisitive of his surroundings (or well enough for the Fowler position).

Ideally then, the abdominal case after operation should be nursed with the foot of the bed raised slightly for a day or two, without pillows, and for the next five or six days flat. We have then accomplished increased venous return, lung aeration and bronchial clearance, and lessened the unnecessary nursing of the patient.

W. T. MUSTARD.

SPINAL ANÆSTHESIA FOR CÆSAREAN SECTION

SIR,—In your annotation of Oct. 10, 1942 (p. 432), you referred to the results of 121 cæsarean sections I had performed under spinal anæsthesia (*J. Obstet. Gynæc.* 1942, **49**, 247). In this series there was no maternal mortality referable to the anæsthetic, and the uncorrected infant mortality from all causes was 4·06%. In a second article recently published (*Ibid*, 1944, **51**, 4) I have recorded a further 82 cæsarean sections carried out under spinal anæsthesia, in which there has again been no maternal death referable to the anæsthetic. The infant mortality in this series was 2·4% (all the infants, 83, were born alive, but 2 died of atelectasis). The two series total 203 cæsarean sections, of which 200 have been carried out under heavy 'Nupercaine' (Ciba). In the second paper I have again referred to the multiplicity of drugs which have been used for the induction of spinal anæsthesia for cæsarean section, many of which have been related to the cocaine group, to which pregnant women appear to be peculiarly susceptible. I pointed out again that heavy nupercaine is not related in any way to the cocaine group, and that such a susceptibility is not one to be feared when using nupercaine. The technique of administration has been essentially the same in the whole series, but the amount of heavy nupercaine injected in the later cases has been almost invariably 2·25 c.cm. as against 2·5 c.cm. or more in the earlier series. The only addition to the technique has been that, after the spinal injection has been given and the patient placed in the Trendelenburg position, the legs are flexed at the hips, to eliminate the lumbar curve, thus ensuring that the solution travels to the required height. In the light of extended experience I stated that our confidence in heavy nupercaine as a safe and suitable drug for use in spinal anæsthesia in selected cases of advanced pregnancy remained unshaken. Since the second paper was written a further 38 cæsarean sections have been performed under heavy nupercaine, with no maternal mortality. Two infants were lost, one being stillborn, the mother having a combined toxic accidental hæmorrhage and placenta prævia, and the other dying 6 hours after birth of atelectasis.

The total number of cæsarean sections under spinal anæsthesia up to date is therefore 241, among which there has not been a maternal death referable to the anæsthetic. Two mothers have been lost, one from pulmonary embolism on the 11th day, and one from sepsis on the 10th day. This gives a total overall maternal mortality from all causes of 0·83%. Of 244 infants delivered, 9 were lost, a fœtal mortality of 3·7%. Since many of the operations were done for conditions in which the life of the fœtus was already threatened, including 42 cases of placenta prævia, this must be sufficient proof of the claim that spinal anæsthesia carries no risk for the child. There has been considerable prejudice against the use of spinal anæsthesia in pregnancy. I am strongly of the opinion that fatalities may have been due to the use of unsuitable drugs, unsuitable technique, or wrong selection of cases. It would be interesting to hear whether heavy nupercaine has been used by other obstetricians, and what the results have been.

Croydon Obstetric Service. RUFUS C. THOMAS.

FOOD RATIONING AND SUPPLY

SIR,—In your annotation of Sept. 2 (p. 320) it is stated that "Eire has had to face a serious shortage of wheat, and for the first years of the war had to resort to a bread made from 100% extraction flour. This loaf was not fortified with calcium, and an increase of rickets in Dublin seems to have been the unfortunate result of this omission." In view of the implications it is necessary to examine this statement carefully. In the first place it is not quite correct to say that the 100% loaf was introduced during the first years of the war. As I pointed out in a letter to your columns (*Lancet*, 1944, i, 516) this loaf came into use for the first time in February, 1942. Between January and March, 1941, the percentage extraction varied from 80% to 95% and remained at the latter figure for nearly a year. It is important to bear this in mind for it can, I think, be assumed that during this period the bran normally removed from the flour was now added to it. The main effect of the increase from 95% to 100% was probably the introduction of the germ. It would appear, therefore, that from January, 1941, to December, 1943, the main "rachitogenic" elements of wheaten flour were incorporated in the bread of this country.

No-one denies the validity of the experimental work of McCance and Widdowson on the rôle of phytic acid in preventing calcium absorption, but the question at issue here is whether, in actual practice, the introduction of wholemeal bread in Eire was responsible for an increase in rickets. There is no doubt that rickets has increased in recent years. This is apparent from the Dublin figures quoted in your article (*J. med. Ass. Eire*, June, 1943), although these figures do not appear to cover more than two or three years at the most. In this department we have records of cases of rickets extending over the past fourteen years which are of some interest. From 1931 to 1934 the average number of cases seen at the child welfare centres each year was 31. From 1935 to 1938 the average was 2·5. From 1939 to 1942 it was 4, while in 1943 the figure rose to 16. Studying these figures serially one is struck by the steady decline from 1931 (in which year 45 cases were seen) until 1938 (when the figure was only 2). At first sight these records appear to confirm the supposition that the wholemeal loaf was responsible for the recrudescence of the disease in 1943. *Post hoc ergo propter hoc.* But before we can accept this explanation several questions arise.

(*a*) How are we to account for the great prevalence of the disease during the period 1931–34 (average 31 cases) when we know that during this period "pure" white bread only was used in the vast majority of cases?

(*b*) What is the explanation of the continuous and marked decline from 45 cases in 1931 to a single case in 1937?

(*c*) How is it that abnormal incidence of rickets did not begin to make itself felt until late in 1942 and throughout 1943 although the rickets-provoking elements were being offered to the population since the beginning of 1941?

(*d*) Lastly, since Dec. 13, 1943, flour has been of 82½% extraction (the 90% of wheaten flour in this mixture being of 85% extraction) but in spite of this lowered extraction there has, apparently, been no reduction in rickets. During the eight months ended Aug. 31 last 15 such cases were recorded by this department (as compared with 16 cases during the whole of 1943).

I am well aware, of course, that bread is not the only factor concerned in the production of rickets, but the point has been made (and it has been much stressed in the public press in this country) that the wholemeal loaf has been responsible for the increase of the disease. I must, therefore, leave the answer to question (*a*) above to the protagonists of this argument. The answer to question (*b*) is simple enough. There is no reason to doubt that it is connected with the increasing attendances at the welfare centres, coupled with the liberal distribution of cod-liver oil and other antirachitic preparations such as 'Ostomalt,' 'Virol,' malt-and-oil, &c. In addition there was a very extensive distribution of cod-liver oil at the city poor-law dispensaries. The answer to the question (*c*) is bound up with that just given. After the outbreak of the war all imports of cod-liver oil and proprietary antirachitics ceased. Existing stocks dwindled away so that by December, 1941, cod-liver oil was no longer obtainable. This was the position until December, 1943, when a consignment was landed at this port from Newfoundland, which made its appearance on the market in January of this year at a prohibitive price. Supplies of the proprietary articles are still unobtainable. It is surely of some significance that the period of depletion of these substances corresponds more or less accurately with the period of increased incidence of rickets. This seems to provide the answer to question (*c*).

As regards question (*d*); on the basis of the claims made for the white loaf one would have expected a definite reduction in rickets after the introduction of the lower extraction flour, but, as pointed out above, this simply has not happened. The only explanation I can offer is that it is not a question of bread at all, but one of fats. We know that the present consumption of cod-liver oil is only fractional compared with prewar years, that fats of all description are in short supply, and that butter, milk, eggs and cheese seem to be beyond the purchasing capacity of the poor generally. These facts would account for the present persistence of rickets as well as its appearance in 1942, and it would seem that its prevalence has not been related to the extraction of flour at all. If this assumption is true it would be a most irrational policy to make a bad diet still worse by depriving it of some of its more valuable constituents instead of making good its obvious deficiencies.

One can quite see the point of those who argue that in the absence of cod-liver oil and sufficient quantities of milk the wholemeal loaf may possibly be more unsuitable than the white loaf, but *that* was not the point made by the public press in its campaign against 100% flour. Taking the wholemeal loaf as a part of a balanced diet, is there any question as to its nutritive superiority over white flour? There is now on sale in this country a proprietary article which is simply bran. It is retailed at 2*s*. 6*d*. a packet of about six ounces, for which sum at least a stone of bran can be purchased from any retailer of milling products. (May I remind your readers at this juncture that in my letter of April 15 I showed that there was a 300% reduction in the sale of laxatives in this country between the years 1940 and 1943). Another well-known article has been on sale for many years which has rightly been extolled by its proprietors for its nutritive and health-promoting properties. It is simply wheat germ. In the manufacture of white flour both the germ and the bran are removed and they are then sold to the public at enormously enhanced prices. Is there any scientific justification for this procedure? Taking into consideration the nutritive qualities of the former and the physiological function of the latter it seems to me clear that the white flour suffers serious deterioration in the process of manufacture. Would it not have made for scientific accuracy, in dealing with the prevention of rickets, if the public had been informed that it was not so much a question of the kind of bread used as one of a sufficiency of cod-liver oil, milk, butter, &c., to neutralise any ill effects likely to arise from increased amounts of phytic acid in wholemeal flour?

Public Health Department, Cork. J. C. SAUNDERS.

PENICILLIN UNITS

SIR,—In the 18th and 19th century, when the rhythm of life was more leisurely and time was at a lower premium, scientists yet achieved an economy of words, combined with the perpetuation of great names, by calling their units of potential, resistance, radium emanation, &c. by the elegant titles of volt, ohm, curie. Is this not an admirable precedent to follow in the case of the quasi-astronomical unitage of penicillin which you referred to on p. 522 last week? One "florey" would roll easily off the tongue, and would signify 10,000 Oxford units of penicillin; one "fleming" would just as euphoniously mean a million units of penicillin. Even when penicillin will be supplied in milligrammes the single practical dose can be expressed as a florey (= *abcde* milligrammes); the total being expressed as a fleming (= 100 *abcde* milligrammes). These would suffice for the clinician; the manufacturer and supplier might still have to employ the "mega fleming," meaning a million million units. In any case, the use of the logarithmic exponent in medicine is threatening to raise its head; is it too late to do something to discourage it?

Uxbridge. L. FATTI.

HE HEART IN RHEUMATOID ARTHRITIS

R,—Your annotation of Oct. 14 adds valuable irmatory evidence for those who uphold, with such cians as Jonathan Hutchinson and Poynton, the ary theory of the rheumatic diseases, based on logous clinical, bacteriological, histological and bio- nical findings in rheumatic fever and the rheumatoid e of arthritis. Two questions constantly recur as atable points: (*a*) is the coexistence of the rheu- oid type of arthritis and rheumatic carditis a ncidence or a somewhat rare combination of two inct clinical entities; (*b*) are they present con- rently or was the chronic arthritis preceded by te or subacute rheumatism? Any evidence which firms the thesis expressed by Poynton that "rheu- tisms" are more allied to one another than to any er diseases and that they are a "family group ong diseases due to some common weakness" will loubtedly assist in solving the problem of the rheu- tic diseases.

The number of borderline cases lying between acute umatism and the rheumatoid type of arthritis lends ght to the unitary theory and goes to suggest that e are different manifestations of the same under- ng disease process—a variable tissue response to the ne noxious agent. Since sufferers from rheumatoid hritis do not die of this disease but from other ises an insufficient number of post-mortem studies rheumatoid arthritis has probably been responsible lack of progress in this direction.

At present I have in hospital four cases of rheumatoid hritis coexisting with rheumatic carditis and mitral nosis, and taking 100 consecutive cases of the rheu- toid type of arthritis I find that 8 cases have had existent rheumatic carditis and although only 3 of se cases give a definite history of rheumatic fever s is not an unusual experience.

I have notes of 22 cases where rheumatic carditis ainly with mitral stenotic valvular lesions) has co- isted. This is in striking contrast to the extremely gh incidence of rheumatic heart disease discovered, mittedly on the comparatively small number of cases ailable, by the autopsy studies of Young and Schwedel 944) and Bagenstoss and Rosenberg (1941) where e incidence of carditis was 65% and 56%. In a similar udy by Bayles (1943) it was only 22%.

These and other studies suggest that in a large mber of cases of slow progressive joint involvement isting cardiac lesions may be clinically silent and herefore escape recognition. Should opportunities for utopsy studies in cases of arthritis become more adily available they should go far to establish, as oung and Schwedel have already postulated, a "rheu- atic state," probably highly dependent on age, with arying degrees of vulnerability of the heart and joints different subjects.

Wimpole Street, W.1. PHILIP ELLMAN.

HEREDITARY FAMILIAL TELANGIECTASIS

SIR,—Squadron-Leader Campbell's report in your sue of Oct. 14 stimulates me to put another example of his rare condition on record. The family history elates that the patient's father had died of an unknown lness when our patient was still a child. His mother ad had repeated attacks of epistaxis which in later ears had somewhat improved. One brother and one ister were said to suffer from a similar complaint but o details are here available. His own twins died soon fter birth and his only surviving daughter was alive nd well. He first came under hospital observation in 933 when he was 47 years old. He had had repeated ttacks of bleeding from nose and lips and several æmatemeses during the preceding year. There was no ndigestion, no history of alcoholism, and apart from microcytic anæmia no abnormality was detected in the lood, or on barium meal examination.

When I saw him in 1943 he was severely anæmic (Hb. 30–60%, colour-index 0·33–0·62) having had a number of urther hæmatemeses. Altered blood was persistently present in his stools. The bleeding and coagulation times were then normal and so was the platelet count. The fractional test-meal showed no free acid, and the total gastric acidity was low. Radiological examination of his stomach revealed no abnormality and the urine was free from red cells. On examination multiple hæmangiomata were found in the anterior two-thirds of his tongue and also on lips, cheeks, the conjunctival surface of one eyelid, and in the pharynx.

He improved with rest, diet and iron, but had to be readmitted a few months later after further severe hæmatemeses which necessitated repeated blood transfusions. He had no nose bleeding then. In July, 1943, Mr. Norman Tanner kindly performed a gastroscopy and reported: "The gastric mucosa is pale, thin and finely irregular. All over the mucosa are seen red areas like purpuric spots, the highest at the cardia, the lowest at the pylorus. They are bright red and not raised above the surface. As many as 8 are seen in one field, their size varying between 0·1 and 0·4 cm. in diameter. The picture is that of telangiectasis. The rest of the stomach is normal." On rectal and sigmoidoscopic examination no telangiectases were detected in the lower bowel.

He was again discharged much improved but a few months later we heard that he had had another severe hæmatemesis and that he had died at home. Autopsy was not performed.

The interesting point in this case is the scarcity of telangiectases in the skin and their abundance in the mucous membrane of the upper digestive tract. There were repeated hæmorrhages from the stomach over a period of nearly 12 years which became progressively worse and finally killed the patient at the age of 57 years. The familial history is here not so well supported as in Campbell's case but seems nevertheless to be beyond doubt.

Fulham Hospital, W.6. H. WOLFSOHN.

BIOLOGICAL OR CULTURAL?

SIR,—A peripatetic correspondent on Aug. 5 was scornful of the idea that the differences between Germans and ourselves are biological rather than cultural. Since there are admittedly biological differences between Mongolians, Negroes, Europeans, and the other great classes of mankind, surely the probability of similar, if less noticeable, differences existing between the different races of Europeans cannot be scouted? Are the physical characteristics of races in Europe to be regarded as merely cultural?

Worksop, Notts. M. HAYDON BAILLIE.

CHOOSING THE STUDENT

SIR,—It is probable that the best doctors eventually choose themselves, but nevertheless it is opportune to consider some kind of formal selecting mechanism if only for the following reasons:—

1. To reduce training wastage.
2. To raise the level of the final output.
3. To explore the possibility of finding a successful selection method for such a complex job.

At present there seem to be three almost rival schools of thought on this subject which represent (*a*) the good picker or spot diagnostician, (*b*) selection by "aptitude" tests and (*c*) selection by committee.

Now, any procedure which is adopted should surely attempt to integrate the good points of all these methods and should avoid the narrow outlook of "either one method or the other." Personal bias can and does sway any single man, be he dean or headmaster or combination of both. Some men are good pickers and some bad, and there seems, on the face of it, to be little correlation between ability to pick and choose and professional aptitude. It has been known ever since ancient Greek times that dictatorship *could* be a satisfactory form of government, but this does not blind us to the shortcomings of the principle of the method.

The ultimate aim of any selection technique must be to choose students who will, in time, become good doctors, but this means that first of all it is necessary to define clearly what is meant by a "good doctor" or by "professional aptitude." Secondly it argues a careful follow-up, say at six and twelve years after the original selection, to discover if the method works and to validate its various parts. It is difficult to believe that aptitude tests alone can have much success in selecting for a profession which is so wide and in which so much depends upon the subtle interaction of personal traits, and in which "aptitude" itself still lacks definition.

It will be necessary, therefore, to avoid some of the possible shortcomings of such tests and to ensure that :—

(*a*) It is known what is being tested.
(*b*) This is not some narrow semi-mechanical trick of little importance to the job as a whole.
(*c*) There is adequate control by comparing the findings both with those obtained from an unselected group and with those from a number of doctors of known ability.

A wide selection procedure should be designed to consider the maximum amount of systematically obtained information, both about the candidate's past activities and about his present bearing and performance.

The kind of seed to be sown is now being discussed and it is likely that the number of sowers will have to be increased in the future, but before the greatest yield can be gathered methods for sieving the soil must be more scientific than they have been in the past.

R. C. BROWNE.

LANCECTOMY

SIR,—This delicate operation, which has been causing your Peripatetic Correspondent much experimental research (Oct. 7), may be prettily performed with the aid of an instrument found behind every practitioner's lapel—a pin.

The pin is dragged across the integument so as to leave a depressed longitudinal scar. Press with a thumb on either side of the mark and—hey presto! out pops *The Lancet* much as might a sebaceous cyst.

This simple technique should prevent this minor operation becoming a major one. No longer should our Saturday breakfast-tables be littered with the tattered—and frequently buttered—shreds of *The Lancet's* peculiarly fibrotic war-time capsule.

E. G. SITA.

*** Good results are also reported by readers using (*a*) a wooden golf-tee, and (*b*) a hairpin.—ED. L.

Public Health

War-time Balance Sheet

IN the 2nd quarter (April–June) of 1944 the birth-rate of 19·3 per thousand of population was the highest for that quarter since 1925 (last year 17·5). The infantile death-rate fell to 43 per thousand related live births, 11 below the ten-year average, and the lowest ever recorded. The actual numbers were: 199,326 births registered, with a proportion of 1061 boys to 1000 girls (ten-year average 1056); 7936 deaths under one year. Births exceeded deaths by 83,801, corresponding increases in the 2nd quarters of 1941, 1942 and 1943 being 7,228, 50,674 and 67,802. The general death-rate of 11·2 compared with 10·9 of a year ago and the ten-year average of 12·0. But the total of 82,215 marriages was up by only 95 on last year's figure, and fewer by 23·460 than the previous five-year average.

Infectious Disease in England and Wales

WEEK ENDED OCT. 14

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 2152; whooping-cough, 897; diphtheria, 567; paratyphoid, 7; typhoid, 9; measles (excluding rubella), 3088; pneumonia (primary or influenzal), 655; puerperal pyrexia, 174; cerebrospinal fever, 43; poliomyelitis, 24; polio-encephalitis, 0; encephalitis lethargica, 1; dysentery, 358; ophthalmia neonatorum, 64. 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 Oct. 11 was 698. During the previous week the following cases were admitted: scarlet fever, 26; diphtheria, 17; measles, 8; whooping-cough, 22.

Deaths.—In 126 great towns there were no deaths from enteric fever or scarlet fever, 3 (1) from measles, 6 (0) from whooping-cough, 6 (0) from diphtheria, 48 (10) from diarrhœa and enteritis under two years, and 21 (2) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 215 (corresponding to a rate of 31 per thousand total births), including 14 in London.

Obituary

T. H. ARNOLD CHAPLIN

MD CAMB., FRCP

Dr. Arnold Chaplin died on Oct. 18 at Bedford in his 81st year. Born at Fulbourn, Cambs, he was educated at Tettenhall College and St. John's College, Cambridge, and qualified from St. Bartholomew's Hospital in 1889. He then went straight to Victoria Park and became a chest physician of distinction, well remembered for his creosote inhalation chamber which mitigated the horrors of bronchiectasis before the advent of thoracic surgery. With Sir Andrew Clark and W. J. Hadley he wrote a textbook on *Fibroid Disease of the Lung* (1894) which is now a classic. He took a consulting-room in Finsbury Square and built up a City practice, holding important positions in shipping and insurance circles. But he was jealous of filling up his whole day with clinical work when he wanted time to read and write books, and at the end of the last war he resigned his position at the London Chest Hospital to become Harveian librarian to the Royal College of Physicians of which he had been a fellow since 1902 and FitzPatrick lecturer in 1917. With his wife's help he produced an illustrated version of Munk's roll of fellows with scores of engraved portraits, a beautiful piece of work. And in 1924 he was Harveian orator. For the general reader his name will be associated with Napoleon at St. Helena. He had an encyclopædic knowledge of the exile's life at Longwood and after bringing out studies of his last illness and death, and of Thomas Shortt, PMO of the island, he summarised his researches in *A St. Helena Who's Who*, with dates and biographical details down to postmen and maids, invaluable to the student of the period.

Chaplin came of East Anglian dissenting stock and had a sturdy independence of disposition. He was a precise and scholarly physician of the old school, meticulous in all that he did—his only diagnostic aid was the wooden stethoscope and he used Latin for his instructions; but he was a shrewd judge of men and affairs, with a critical outlook and a quiet dry humour. Impostors failed to get past him and enthusiasts found him a little damping: to the serious student he was a real friend and he applied to the art of medicine a learning which had no use for anything shoddy.

His wife, a daughter of Dr. J. H. Robertson, died in 1938 after thirty years of married life. They had no children.

ARTHUR FRANCIS STABB

MB CAMB., FRCP

Dr. A. F. Stabb, who died on Oct. 3 at Stroud after a long period of ill health, had been obstetric physician to St. George's and Queen Charlotte's Hospitals and examiner in midwifery for the RCP and the Apothecaries. After qualifying in 1889 with distinction from St. Thomas's he was for several years resident at Addenbrooke's, Cambridge, before starting on a long and useful career in obstetrics and women's diseases.

He retired some twenty years ago to live a country life.

REBUILDING OF FAMILY LIFE AFTER THE WAR.—A conference on this subject will be held by the National Association of Maternity and Child Welfare Centres and for the Prevention of Infant Mortality at Friends House, Euston Road, London, NW1, on Nov. 23 and 24 under the presidency of the Minister of Health. On Nov. 23 the theme is to be building up the family; the speakers will include Prof. James Young (social and health services), Dr. C. Fraser Brockington (the viewpoint of rural areas), Dr. Jean Mackintosh (education as it concerns the family), Dr. Helen Standring (family life during the mother's confinement), Dr. Innes Pearse (the family club). On the second day Mr. Willink will give his presidential address at 10.30 AM, after which the theme of broken family life will be considered. Dr. A. B. Gardiner is to speak on illegitimate children, and in the afternoon there will be a discussion on substitute homes. Further information from the secretary of the association, 117, Piccadilly, W1.

On Active Service

CASUALTIES

MISSING, PRESUMED KILLED

rgeon Lieutenant PETER SLADE CUTHBERTSON, MRCS, RNVR, HMS *Eclipse*.

rgeon Lieut.-Commander HUGH DE LANCEY NOEL DAVIS, BM OXFD, DA, RNVR, HMS *Charybdis*.

rgeon Commander HUMPHREY DE BOHUN KEMPTHORNE, DM OXFD, DOMS, RN, HMS *Charybdis*.

MISSING

aptain JOHN HOWARD KEESEY, MB CAMB., RAMC

ajor GUY RIGBY-JONES, MB CAMB., FRCSE, RAMC

WOUNDED AND MISSING, BELIEVED PRISONER

aptain G. F. H. DRAYSON, MB EDIN., RAMC

AWARDS

CB

ajor-General R. E. BARNSLEY, MC, MB CAMB., KHS, late RAMC

CBE

olonel A. N. T. MENECES, MB LOND., RAMC

MBE

lajor D. B. JAMIE, MB ST. AND., RAMC

lajor A. A. M. NOLAN, IAMC

Captain M. L. PANJANI, IARO (medical)

Captain M. L. SUDAN, MB, IAMC

MC

lajor J. G. B. DE VINE, MRCS, RAMC

lajor R. W. JONES, MB EDIN., RAMC

aptain J. L. NICOL, MB ABERD., RAMC

lajor D. R. SANDISON, LRCPE, RAMC

aptain K. B. FRASER, MB ABERD., RAMC

aptain T. G. GRAY, MB ST. AND., RAMC

Captain P. G. GRIFFITHS, MB MANC., RAMC

Captain C. C. LAIRD, MB LPOOL, RAMC

Captain W. W. MARSDEN, MRCS, RAMC

Captain JOHN THOMPSON, MB MANC., RAMC

Captain G. E. WODEHOUSE, RCAMC

Lieut. F. S. COOPER, RAMC

Lieut. LEO DALLAIN, RCAMC

MENTIONED IN DESPATCHES

Major-General Sir PERCY TOMLINSON, KBE, CB, DSO, FRCP, KHP, late RAMC

ieut.-Colonel T. E. A. CARR, MB MANC., RAMC

Lieut.-Colonel P. D. JOHNSON, MRCS, RAMC

Major T. S. R. FISHER, MB CAMB., RAMC

Major A. D. STOKER, MB EDIN., RAMC

Captain A. G. H. CLAY, MB CAMB., RAMC

Captain B. N. BLAGGAN, MB, IAMC

Captain J. W. A. CRABTREE, MB CAMB., IAMC

Captain S. N. BASU, MB, IAMC

Major A. LAKSHMINARAYANAN, MB, IAMC

Captain M. K. AKHTAR

Captain S. K. GHOSH, MB

Captain F. M. KHAN

Captain U. P. MUKHERJEE, MB

Surgeon Lieutenant G. A. GOULD, RCNVR

The Minister of Labour has appointed a commission, presided over by Sir Harold Morris, KC, to ascertain whether the extension of the working hours of juveniles in the textile and allied industries from 44 to 48 a week is still justified.

Mr. R. A. Butler, the Minister of Education, will speak to the Society of MOHs School Group at the Town Hall, High Holborn, WC1, on Friday, Nov. 3, at 2.30 PM on the place of the school medical service in the education services of the future.

Dr. F. J. Bentley has been appointed a senior medical officer in the public health department of the London County Council.

Dr. Bentley, after qualifying in 1922, held resident house appointments at his training hospital in Newcastle-on-Tyne before coming to London as house-physician at the Great Ormond Street children's hospital. After taking the MRCP he entered the service of the MAB and became a deputy medical superintendent. Deciding finally on a public health career he joined the staff of the LCC in 1930, after a spell with the Surrey County Council. For the next ten years, as a divisional MO, he was occupied with the reorganisation of the tuberculosis scheme, consequent on the passing of the Local Government Act of 1929. In 1940 he was transferred to the special hospitals division where his work was chiefly in making hospital arrangements for infectious disease, tuberculosis and children. In the following year he was promoted principal asst. MO in the newly formed combined division, dealing with all general and special hospitals, and with the work of the pathological laboratories. He was elected FRCP in 1937.

Notes and News

EXPLAINING THE CASE

THE National Association for the Prevention of Tuberculosis has just issued three useful booklets for patients: *Good Luck*, packed with sensible advice for the patient leaving the sanatorium; *Dust Diseases: their Cause and Care*, addressed to workers, management and trade unions, containing a clear account of the preventive measures necessary in factories and mines, and the procedure to be followed by those seeking compensation; and *Learning to Live*, an encouraging account of the training courses available to tuberculous patients both in and out of hospital. A fourth booklet, published in conjunction with the British Pædiatric Association, is addressed to health visitors and sets out the main facts about milk-borne tuberculosis, lung infection, the tuberculin reaction and the dangers of contact, the last illustrated by some sufficiently impressive examples. All four booklets are written with expert brevity and clearness; and their message is couched in friendly but not fulsome terms.

PENICILLIN IN RAT-BITE FEVER

THE work done at the Mayo Clinic by Heilman and Herrell, showing that *Spirillum minus* infections in mice respond to penicillin (see *Lancet*, Oct. 21, 1944, p. 540), confirms the previous report of E. M. Lourie and H. O. J. Collier of Liverpool, who found that penicillin was more effective than neoarsphenamine in mice infected with *Sp. minus*; they also showed that experimental relapsing fever responded more readily to penicillin than to neoarsphenamine (*Ann. trop. Med. Parasitol.* 1943, **37**, 200).

GUIDE TO SCOTTISH HOUSING

THE Secretary of State for Scotland in his circular to local authorities on *Housing in the Transitional Period after the War* arms them for the forthcoming offensive on housing. He admits that in the past the standard of occupancy in Scotland was too low. The living-room was counted as a sleeping place, two children under 10 counted as one adult, and infants were discounted altogether. In future, the circular affirms, in local authority houses only bedrooms are to be counted as sleeping places and all children treated as individuals. Thus a two-bedroom house with three apartments can house four people and a four-bedroom house with five apartments can house eight people. This new standard will be applied not only to new houses but also to existing ones as soon as practicable. Mr. Johnston invites local authorities to concentrate on building the larger types of houses at least to begin with for, he reminds them, between the wars 73·7% of the houses provided by local authorities were of three apartments or less.

JOINT BOARDS: VIEWS OF NALGO

WHILE supporting in general the white-paper proposals for a comprehensive medical service, the National Association of Local Government Officers opposes the plan to place all hospital services under the control of joint boards. A resolution of the national executive council of NALGO states that the transfer of hospital administration to joint boards would be a retrograde step: it would divorce hospital administration from that of the other local-authority health services; it would weaken the direct democratic control of municipal hospitals by local authorities, tending to supplant it with bureaucratic control; and it would diminish the vitalising influence of local pride. On the other hand, the association considers that there is a case for joint boards to undertake the *planning* of hospital and health services. These planning boards, it suggests, should be elected by the local authorities within the area they cover, and should include representatives of the medical profession and the voluntary hospitals. Each board would plan comprehensively the health services of its area and would deal with subsequent changes in the plan. It would submit its proposals in the first place to the individual local authorities administering the various services and, although its recommendations would not be mandatory upon these authorities, it would have power to submit any recommendations not accepted to the Minister of Health. Those proposals, NALGO believes, would attain the objects of planned, coördinated and efficient hospital and health services without removing them from local control or depriving them of local interest.

The association, with 130,000 members, represents the bulk of professional, technical, and administrative officers of local authorities throughout the country.

University of Cambridge

On Oct. 20 the following degrees were conferred by proxy:

MD.—F. H. Coleman.

MB, BChir.—Alexander Comfort; G. I. C. Ingram, R. H. Boardman and Peter Venables.

MB.—E. B. Pawson.

Royal College of Physicians of London

Dr. Cecil Wall will deliver the FitzPatrick lectures at the College, Pall Mall East, SW1, on Tuesday, Dec. 12, and Thursday, Dec. 14, at 2.15 PM. He will speak on the history of the English medical profession.

Royal College of Surgeons of Edinburgh

At a meeting of the college on Oct. 18 the following office-bearers were re-elected for the ensuing year: president, Prof. R. W. Johnstone; vice-president, Mr. J. W. Struthers; secretary and treasurer, Mr. K. Paterson Brown; members of the president's council, Mr. James M. Graham, Sir John Fraser, Dr. G. Ewart Martin, Mr. Francis E. Jardine, Mr. W. Quarry Wood and Mr. Walter Mercer; representative on the General Medical Council, Mr. Henry Wade; convener of museum committee, Mr. W. Quarry Wood; and librarian, Dr. Douglas Guthrie.

The following were elected to the fellowship after having passed the requisite examination: Hjalmar Hubert Atkinson, MRCS, Philip Hulme Beales, MRCS, Hugh Michael MacCarthy, LRCPI, and Mary Savory, MB CAMB.

Society of Apothecaries of London

On Friday, Nov. 3, at 2.30 PM, Colonel Elliott Cutler, chief consultant in surgery to the United States Army in the European Theatre of Operations, will deliver the first of a series of lectures to be held at Apothecaries' Hall, Blackfriars Lane, Queen Victoria Street, EC4, during the winter. He is to speak on military surgery in 1944.

Society of Public Analysts and other Analytical Chemists

On Wednesday, Nov. 1, at 3 PM, at the rooms of the Chemical Society, Burlington House, Piccadilly, London, W1, D. W. Kent-Jones, PH D, and M. Meiklejohn will speak on microbiological assays of riboflavin, nicotinic acid and other nutrient factors. W. N. Aldridge will also describe a new method for the estimation of microquantities of cyanide and thiocyanate.

Society for Relief of Widows and Orphans of Medical Men

At a quarterly court of directors held on Oct. 11, with Dr. R. A. Young, president, in the chair, the death was reported of a widow who came on the funds of the society in 1929 and had received £1925 in grants on behalf of herself and son. Her late husband had paid in subscriptions £52 10*s*. It was decided to make a Christmas present to each widow next December. Membership is open to any registered medical man who at the time of his election is resident within a twenty-mile radius of Charing Cross. A new list of members is shortly to be printed and the secretary would like to be notified of any recent change of address at 11, Chandos Street, London, W1.

Royal Society of Medicine

At the section of history of medicine on Wednesday, Nov. 1, at 2.30 PM, Dr. Philip Argenti will read a paper on Emanuel Timorni of Chios and Dr. H. P. Bayon on the medical career of Jean Paul Marat. On the same day, at 5 PM, at the section of surgery, Sir James Walton, Mr. Jennings Marshall, Mr. A. C. Perry and Dr. Horace Evans will open a discussion on the treatment of duodenal ulcer. On Nov. 2, at 4.30 PM, at the section of neurology, Mr. Harvey Jackson will speak on orbital tumours. On Nov. 3, at 10.30 AM, Mr. L. Graham Brown will give his presidential address to the section of otology on conclusions based on twenty-five years practice in mastoid surgery. On the same day, at 2.30 PM, at the section of anæsthetics, Mr. W. Etherington-Wilson will speak on spinal block and show a film demonstrating spinal block in the young. Dr. J. Alfred Lee will also speak on serial spinal analgesia. At the same hour, at the section of larnygology, Mr. C. Gill-Carey is to give his presidential address. Afterwards there is to be a discussion on medical aspects of rhinology, when Dr. Geoffrey Evans, Mr. Simson Hall and Dr. J. D. Rolleston will be the opening speakers.

Sir ROBERT ROBINSON, D SC, FRS, has been appointed chairman of the Water Pollution Research Board.

Conference for Potential Patients

The Socialist Medical Association and leading tr unionists have organised a conference to be held to Saturday, Oct. 28, at 2.30 PM, at 26, Portland Place, Lond W1, when workers will be given an opportunity to exp their views on the health service of the future. The medi speakers will include, Dr. Horace Joules, Dr. Haden Guest, and Dr. David Frost.

Royal Institution of Great Britain

On Dec. 8, at 5 PM, Lieut.-Colonel E. F. W. Mackenzie, director of water examination for the Metropolitan Wa Board, will give the Friday evening discourse. His subj is to be London's water-supply, safeguarding its purity peace and war. The courses of lectures on Tuesdays bef Christmas include plant viruses and virus diseases by F. C. Bawden (Nov. 21 and 28 at 5.15 PM) and mod developments in chemical therapeutics by Sir Henry Da OM, PRS (Dec. 5, 12, 19 at 5.15 PM). Further particulars fr the secretary of the institution, 21, Albemarle Street, Lond W1.

On Friday, Nov. 24, at 5 PM, Major A. J. CAMERON, I T. ROWLAND HILL and Major J. O. OLIVER are to speak the clinical society of the Royal Eye Hospital, Southwa on foreign service experiences.

The Ministry of Health reminds whole-time public heal medical officers who are of military age that before applyin for any other post they should first obtain the permissi of the Minister (see circulars 2818 and 2881).

Appointments

DREW, G. R. H., MB EDIN.: MO, Nigeria.

HORN, L. J., MB SIDNEY, FRCS: surgeon to the Ebbw Vale Gener Hospital.

MCHUGH, GEORGE, MB GLASG.: MO, Gold Coast.

STEVENS, T. RUSSELL, MB CAMB., FRCS: medical referee for th county-court districts of Blandford, Bournemouth, Brid Dorchester, Lymington, Poole, Ringwood, Swanage, Weymouth, Wimborne Minster and Yeovil (circuit No. 55).

Births, Marriages and Deaths

BIRTHS

BAIRD.—On Oct. 17, in Belfast, the wife of Surgeon Lieute T. T. Baird, RNVR—a daughter.

BROOK.—On Oct. 15, at Barnstaple, the wife of Dr. S. G. Brook a son.

BULMAN.—On Oct. 18, at Cambridge, the wife of Captain J. F. Bulman, RAMC—a son.

HENDERSON.—On Oct. 17, at Woking, the wife of Dr. Ro Henderson—a son.

MARTIN.—On Oct. 20, at Newport, the wife of Captain P. W. Martin, RAMC—a son.

MURRAY-LYON.—On Oct. 17, in Edinburgh, the wife of Lieu Colonel R. M. Murray-Lyon, RAMC—a daughter.

NEWBY.—On Oct. 14, at Birmingham, to Dr. Margaret New (née Strange), wife of Robert W. Newby—a son.

PATTERSON.—On Oct. 16, at Bedford, the wife of Dr. C. F. Patterson—a daughter.

PENISTAN.—On Oct. 18, in London, the wife of Dr. L. J. Penist —a daughter.

ROCHE.—On Sept. 26, at Dundee, the wife of Major G. K. T. Roch MB, DA, RAMC—a daughter.

ROWE.—On Oct. 17, in London, the wife of Dr. A. J. Edgcom Rowe—a son.

WILLIAMS.—On Oct. 13, at Swansea, the wife of Major Bernard Williams, FRCS, RAMC—a son.

WYLIE.—On Oct. 15, at Oxford, the wife of Dr. J. A. H. Wylie a son.

MARRIAGES

BAIRD—JENKINS.—On Oct. 17, at Bidborough, James Tertiu Baird, MB, of Girvan, Ayrshire, to Maureen Joy Jenkins.

CHIPPINDALE—STEVENSON.—On Sept. 28, at Ranikhet, India Derek Chippindale, lieutenant Sikh Regiment, to Rut Marian Stevenson, MB, captain RAMC.

STRATHIE—WESLEY.—On Oct. 14, in London, David Murra Strathie, surgeon lieutenant RNVR, to Margaret Wesley.

DEATHS

CHAPLIN.—On Oct. 18, at Bedford, Thomas Hancock Arnol Chaplin, MD CAMB., FRCP, aged 80.

GIBSON.—On Sept. 30, at Brisbane, John Lockhart Gibson, M EDIN., FRACS, aged 84.

GROVES.—On Oct. 22, at Bristol, Ernest William Hey Groves, M MD LOND., D SC BRIST., LLD BELF., FRCS, FRACS, aged 72.

HOPTON.—On Oct. 19, at Gerrards Cross, Bucks, Reginald Edwa Hopton, LRCPE.

MARSHALL.—On Oct. 16, at Laxfield, Suffolk, Arthur Lunsde Marshall, MB CAMB., aged 83.

RANKIN.—On Oct. 18, in Cairo, George Douglas Rankin, MB DUBL Sudan Medical Service.

THE FILM IN MEDICAL EDUCATION*

I. PLANNING

CEDRIC J. LONGLAND MB LOND., FRCS
RONALD MACKEITH DM OXFD, MRCP

THE present great film industry has grown up out of the film's capacity to entertain. During its forty years, as it has increased in size and influence, there have been great advances in directors' filmcraft and in technical methods, and also the film has given us an important instrument for scientific research and a most valuable one for teaching. It may prove as important an advance in teaching methods as was the introduction of the printed book to supplement demonstration and the spoken word. The great value of the film as a rapid teaching agent has been demonstrated in the extensive use made of films by the Services and in factories here and in the USA. "Yet academical circles in England have hardly noticed this new weapon."[1] With the present shortage of teaching staff, the urgent need for doctors, which will not cease when the war ends, and the necessarily great length of the medical curriculum, such a useful teaching method should be neglected no longer. In brief, the method is available and the opportunity is here; it requires imagination and thought to bring to medical teaching the inherent benefits of the film.

PRESENT USE IN TEACHING

In 1938 the British Film Institute, who have done a great deal to advance the use of the film in education, sent a questionary to all medical schools in Britain asking for information about the use of films in teaching during the preceding year. The BFI kindly allowed us access to the replies, which give the only available picture of the use of films in this country.

Of the 10 London schools who replied, 3 made no use of films at all; the others used a few, chiefly in physiology, obstetrics and surgery. Of 8 schools outside London replying, 3 used no films. In Edinburgh and Liverpool a number of films in medicine, materia medica, orthopædics and surgery were employed; elsewhere their use was almost confined to physiology. Some medical schools did not answer the questionary. Some of the gaps have been filled by questioning people who were students at these schools. Their answers confirm the replies to the questionary—that very little use of films in teaching medicine was made at that time. Nor has there been any great change since 1938. After studying the replies one is left with the impression that not only is the film little used but that those teaching medicine show very little appreciation of its possibilities. The attitude of students questioned is the reverse of this. They are very interested and the few films they have been shown impressed them deeply. Postgraduate students are even more keenly interested in medical films.

Since there is a keen interest in teaching films among medical students, we will consider some possible explanations of the failure to use films.

1. *Lack of accommodation* is not a possible excuse; indeed many of the lecture-theatres in medical schools are provided with projection rooms.
2. *Expense* should not be allowed to interfere with improvements in teaching methods, for £200 for a first-class sound projector is a small item in equipping a medical school. At present projectors are difficult to obtain, but when the projectors used by the Services are disposed of after the war some should be earmarked for medical schools.
3. *Lack of time with present long curriculum.*—Films should occupy some of the time at present used for other teaching methods, and because the film is a very efficient method its use will lead to an economy of time.
4. "*The film cannot replace the teacher.*"—It is not meant to; to quote Prof. Winifred Cullis, "the film can supplement his teaching and perhaps stimulate him." We would put this more strongly, that the film gives the teacher a most valuable method of instruction.
5. *Inadequate supply of films.*—The films now available have two chief defects—they do not adequately cover the subjects of the curriculum and most of them are of poor teaching quality. But these defects do not explain the failure to make use of what good films are available.
6. *Difficulty in obtaining information about existing films.*—This is an urgent problem and is further considered below.
7. *Reluctance of teachers to change their methods,* chiefly perhaps because of a lack of appreciation of the value of the film for teaching.

The last two factors, and especially no. 7, are the chief reasons why films are so little used and hence are responsible for the poor demand for films which has been an important cause of the poor supply.

SUPPLY OF FILMS AND INFORMATION

It is impossible to give a complete survey of existing films on medical subjects, since many have been taken by private individuals and are not known about or listed anywhere. Several bodies in this country have collected information and from this it is clear that present resources are quite inadequate. But a list of films, even if all of them were available for loan or hire, which many are not, is of little value unless it gives information on the content and quality of the films. This is an essential for any useful catalogue.

Royal Society of Medicine (1, Wimpole Street, London, W1).—This summer the RSM have decided to set up a medical film library and Messrs. Kodak Ltd. have offered to hand over their medical films to it. The RSM also propose to make a catalogue of available films.

Scientific Film Association (c/o Royal Photographic Society, 16, Princes Gate, London, SW7, and 2, Newton Place, Glasgow, C3).—In November, 1943, the Scientific Film Association was started with committees in England and Scotland. Its aims are to promote the making and showing of scientific films and to collate and publish information on them. There is a medical standing committee with several subcommittees including one on medical education. Information is being collected with a view to the publication of a list of medical films criticised and graded according to content and merit. The SFA and the Scientific Films Committee collaborate on the viewing of films.

Scientific Films Committee (Association of Scientific Workers, 73, High Holborn, London, WC2) publishes a list of scientific films, all of which have been viewed by experts and graded. This graded list is revised regularly and supplements are issued between revisions. Detailed critiques of the listed films are also available. The list is useful but the number of medical films included in it is small, though there are biological films and some in elementary physiology and anatomy as well as health propaganda films and others on wider aspects of medicine such as nutrition and housing.

British Film Institute (4, Great Russell Street, London, WC1) published, in 1936 and 1938, two fairly comprehensive lists of British medical films, and one small supplement in 1940. Some of the films listed are not available for loan or hire; most of them have not been viewed by the BFI medical panel, and the list gives very scanty information of the content of the films, and no opinion on their merits. The value of most of these films for teaching is doubtful. Recently (1942) the films department of the British Council viewed some of the films but found none worthy to be sent to South America for showing to medical audiences and only half a dozen worth considering for re-editing.

British Medical Students Association (BMA House, Tavistock Square, London, WC1) in July, 1944, made a comprehensive list of films on medical and allied subjects. This includes no grading of the films for content or merit.

Central Council for Health Education (Tavistock House, Tavistock Square, London, WC1) publishes an up-to-date list of health propaganda films with fairly detailed notes on their content and suitability.

Central Film Library (Imperial Institute, South Kensington, London, SW7), an official body, houses the Empire and GPO film libraries and the films made for the Ministry of Information and the British Council. These include various health propaganda films and the medical films made in association with the Ministry of Information.

* Report submitted to Medical Planning Research.
1. Annotation in *Lancet*, 1941, ii, 569.

Scottish Central Film Library (2, Newton Place, Glasgow, C2) has a large library of educational films in addition to copies of those in the Central Film Library, but there are few medical films in this collection.

Films Committee of the Physiological Society of Great Britain (secretary, Prof. J. Yule Bogue, Haycroft, Hartley Road, Altrincham, Cheshire) has a film library which is used by departments of physiology throughout the country.

GBE (Gaumont-British Equipments, Tower House, Woodchester, near Stroud, Glos.) have a number of films in elementary sciences, including a series covering the biology syllabus for medical students.

Kodak Ltd. (Kodak Works, Wealdstone, Harrow, Middlesex) have been furthering the use of 16 mm. medical films for over 15 years and have established libraries in Bombay and Capetown. The Kodak library of medical films, some of which are very good, is still open and issues a catalogue.

The Services.—According to Cameron,[2] "great use is made of colour films in training the newly commissioned army medical officer." This is probably true to a greater extent of the US Army. These libraries may be a useful source of films, but little information about them is at present available.

Other Sources, such as Technical Products Ltd., British Commercial Gas Association and many private owners of films are to be found in the SFC, BFI and BMSA lists, but there are also many films not included in any of the above lists.

As to subject matter, the largest number are on surgical subjects; but, taking figures from the BFI list to illustrate the point, 62 of the 64 films listed are records of operative procedures, and only 2 give a wider view of their subject, by including anatomical, clinical and surgical aspects. The teaching value of most of these films is very limited, since many of the operations filmed are chiefly of postgraduate interest. In medicine half the films listed are on neurological subjects, but even so, such important subjects as cerebral tumour and syphilis are scarcely represented (and what a valuable film could be made on the subject of aphasia!). In obstetrics, judging from titles only, for we have been unable to view more than a few of the films, there appears to be a fairly useful selection. Public health and hygiene films are in fairly good supply. These films have been made for laymen, but they have an emphasis on the preventive applications of medicine in child health (e.g., "Defeat Diphtheria"); in industrial medicine (e.g., "Men in Danger"); and in sanitation (e.g., "The Filter," "Housing Problems"); and their use would interest the student in a subject which has been rather treated as a step-child despite the lip service that has been paid to it.

The biology films include the solitary but shining example of a series of good films planned to cover one subject—the Gaumont-British biology films. Anatomy and physiology have only a few elementary films available, with the exception of the Harvey film on the circulation of the blood, belonging to the Royal College of Physicians.

To sum up, medical films at present constitute a small set of haphazard illustrations which only deal with a small part of the ground there is to cover. Too many of the films have been made by specialists wishing to record some special point or procedure, and hence these films, lacking context and continuity, are only of restricted use for students or for doctors in other branches of medicine. Many of the films are of poor teaching quality. Film-making is a highly skilled affair and the specialist in medicine, when he has an idea of what he wants a film to show, should get the help of an expert in film-making, and preferably of an expert in making instructional films. There is difficulty in obtaining information about films and about their content, their suitability and their distribution; here the lists of the SFC, the SFA and the RSM will be valuable. There are no central distributing agencies to facilitate the supply of films, though the Central Film Library is acquiring an important collection and the RSM medical film library should be most useful.

2. Cameron, W. M. *Brit. med. J.* 1942, i, 230.

MEDICAL FILMS ABROAD

There are far more medical films available in the United States than in Britain. The American College of Surgeons publishes lists of approved films, both medical and surgical (2500 to 3000 films have been viewed and 600 films with a total of 650 reels have been approved). These lists give no details of subject matter. The Wistar Institute in Philadelphia publishes reviews of anatomical and biological films. The Biological Photographic Association publishes annual reports on biological motion pictures. Some pharmaceutical firms and some film companies publish lists of films. The medical journals contain frequent references to films. For example, the *Psychological Bulletin* in 1938 and again in 1942 included "A review of 16 mm. films in psychology and allied sciences" by L. F. Beck. Two years ago the Health and Medical Films section of the American Film Centre was started to promote the film in medicine. In June, 1942, after a conference held under the auspices of the American Medical Association, a committee on motion picture in medicine was set up to coördinate activities. From the report of this conference it appears that the supply of medical films in the States suffers from defects similar to those noted above for this country. But we could get many very useful films from the USA. A similar committee is urgently needed over here.

An effort in the direction of international coöperation was made some years ago, when in 1928 the International Institute of Educational Cinematography was founded at the suggestion of the Italian government. Among other things it conceived the idea of compiling a cine-medical encyclopædia that would demonstrate in about 100 films the best practice in medicine, surgery and public health to medical practitioners and students. Through the Health Organisation of the League of Nations, the member states made inquiries in their own countries as a preliminary to the selection of the best films. The scheme collapsed when Italy left the League, but the League made a valuable contribution in 1933 when after a conference it was arranged to remove customs duties on films certified as of educational character, though many countries, including it is believed Great Britain, did not ratify the agreement and medical organisations in these countries have therefore not been able to secure benefits from the League of Nations' proposals.

In the last months a few science films have arrived from Russia. There are a few French films on biological subjects available.

HOW FILMS COULD HELP IN MEDICAL TEACHING

It is difficult for those of us who have not been taught with films to visualise their full scope and the considerable influence on medical education which their use is likely to have. The best way to get an idea of the possibilities is to see a good medical film such as "Malaria," made in 1941 by Arthur Elton and Grahame Tharp with the Shell Film Unit.

The film is an extension of the eye and so "presents reality in a readily received form and especially with the help of sound it can concentrate attention to the fullest." The sound film is the most potent force for the enlightenment of the man in the street who *can* read but does not easily learn by reading. To say that the medical student has learnt to study from books is to disregard the special qualities of the film. "It can take the audience to any place or object and can show relations difficult to convey otherwise; it can give to the space and time dimensions whatever values are best (by using distant views, close-ups or microscopy on the one hand, or speeding-up or slow-motion on the other). Where a dynamic process needs to be taught, the moving film is essential; no blackboard diagram, no lantern slide can take its place" (from the SFC Memorandum on the Scientific Film). Cases of chorea and athetosis may be brought together before the student at any time. The injured man can be followed from the dangerous condition of his work, through his treatment and rehabilitation to the goal of full working ability. The growth of tissues in culture can be made vivid and real by speeding it up, at the same time as it is magnified. For the medical student the film is especially useful because by combining seeing and hearing (or reading) it

prevents knowledge being acquired in words alone. The present system of teaching medicine depends too largely on remembering words, and most students memorise better on a visual basis.

The film is not a perfect extension of the eye. As Lauwerys points out, a very complete picture may be made from which the student may draw his own conclusions, or a more abstracted one involving some incompleteness and distortion but making the generalisation more obvious. Prof. Winifred Cullis suggests that the fact that a film has more in it than can be assimilated at its first showing is as a rule a good quality.

The use of fast and slow motion, colour, animated diagrams and graphs; the use of skilful cutting or the inclusion of dramatic episodes to drive points home; the avoidance of possible by-effects of badly arranged photography are all aspects in the province of the skilled film director. Animated diagrams will be a vivid and useful feature of most films.

There has been some controversy on Sound *v.* Silent films for teaching. Silent films are cheaper and easier to make and to show; they are certainly adequate for many purposes and many teachers at present prefer to make their own commentary or lecture. One of us feels strongly that it would be unwise to plan chiefly for silent films for economy or any other reason. In certain cases sound is essential—imagine a film on physical examination of the heart or lungs—and the combination of sound with sight makes for a more vivid impression. Sound films may be run silent,[3] either for the teacher to make his own commentary or for a student to run it through on his own when revising. The student who is used to the highest standards of movie production may object to instruction by what he feels to be an old-fashioned type of movie.

We do not claim that after sitting through a cycle of film shows students will automatically become wise doctors, only that the film is a stimulating and time-saving teaching method which will help the student to get hold more quickly and more securely of the immense amount he has to learn. One cannot lay down rules as to how films are to be used. Some will be run through, discussed and run through again. Others may be stopped at intervals for elaboration of one diagram or picture. To get the best value from films they should be available for the individual student to run through for revision at his own pleasure, either on the classroom projector or on a simple viewing apparatus. In the latter case he may have to do without sound but an occasional subtitle with a handbook would make a sound film easily understood. Films are expensive and easily damaged by inexpert handling, and the casual issue of films might be impracticable. The best way would be to arrange that film projection facilities should include projection to small groups of students (say 3–10) who make a concerted request for a given film.

For postgraduate teaching films would certainly be welcomed by a group most of whom are at an age when learning is less easy. The film is especially useful because it can be duplicated and shown to a large number of audiences, who may not easily get to London for a course.

There are foreground films which demonstrate clinical pictures or show "how-to-do-it"; and there are background films of wider scope correlating various facts to establish larger principles or to show relationships of medicine to other fields. But it is a cardinal advantage of the film that these two aspects can be combined. Up to now there have been too many films of restricted scope. Elton and Tharp's "Malaria," and Rotha's "Blood-Transfusion" are examples of the good use of the wider treatment possible.

SUGGESTED PLANS[4]

To bring progress to the present rudimentary and haphazard methods of using medical teaching, information, coördination and guidance are needed; not just more and more films. Film production by many different bodies seems desirable. For example, if the different universities and medical schools were encouraged to make (or to have made for them) their own teaching films, competing in quality, but not for subject matter, with those of each other and of other bodies, a variety of excellent films should result. By contrast, information about existent films and about the technicalities of their production, coördination of proposed film production and guidance as to the films most urgently needed should come from a central body, and it is here that should be housed the comprehensive central library.

The fuller use of films in medical education requires planning if waste of effort is to be avoided. There should be a central coördinating body for the film in medicine with medical education as one of its chief interests. The guiding principle of the central body must be to exploit and develop the film in the interests of medicine. It should include representatives from the Royal Colleges, the MRC, the medical schools, the RSM, the SFA medical committee, the BFI, the SFC, the Physiological Society, the British Council, the Ministry of Health, the Ministry of Information (a very important film-making body at present), some of the leading documentary producers, and representatives of commercial producers specialising in instructional films and the associations of cinema technicians.

Possibly the Royal Society of Medicine and the SFA medical committee, which is already in existence with a wide range of representatives, will between them set up this necessary coördinating body. Some of its functions would be the following.

Information on medical films.—A catalogue of available films should be prepared (and kept up to date) with notes on the films' content and qualities. The experts' detailed critiques should also be available, giving reports from the medical and cinematic standpoints with special reference to teaching qualities and perhaps suggestions from the expert viewing panel. Films made for teaching will in most cases have an accompanying pamphlet of teaching notes. The graded list and detailed critiques of the SFC and the film reviews of the BFI and of the Scottish Educational Film Council may be taken as examples. The SFA has issued a memorandum on the viewing of films.

Coöperation with other countries.—The Central Body would coöperate with similar bodies in USA, USSR and other countries, exchanging information and films, possibly in conjunction with the Health Organisation of the League of Nations.

Guidance in production of new films.—Many medical teaching films will probably be made in the next few years. Coördination is necessary to avoid duplication. Furthermore, medical teachers and specialists must say on what subjects films are most needed. Would-be producers should be able to get technical help from specialists in medical and film worlds. Advice could be given on submitted scripts, but the production of a film should be in the hands of an individual, not of a committee.

WHO IS MAKING FILMS?

Making medical films is a job for the best medical teachers and the best film directors, with where necessary the full resources of a big studio.

The production of good films can be expensive, especially if sound is to be recorded. (*a*) The films made by individual enthusiasts often suffer from defects due to inadequate technical resources as well as to lack of specialist experience. (*b*) Other films have been made for their prestige value by commercial bodies with large resources—"Malaria" by Shell film unit, the nutrition film "Enough to eat?" for British Commercial Gas Association, the anæsthetics films of ICI, and so on. (*c*) Commercial production provides some more—e.g., those of Kodak and Gaumont-British Equipments. In a few cases GBE make a theatrical version of a film, for wide distribution in cinemas, from the instructional version. But a large number of films are made for instruction only, and GBE have found that in peacetime, with overseas sales, a first-class instructional film is commercial to produce, though it takes time to show a profit and the film must be good. At the moment the Government-sponsored films, made by the films division of the Ministry of Information and for the British Council, are providing some excellent new medical films.

From these various sources, with the increasing interest in films, it should not be difficult to get a useful

3. It should be remembered that sound films *cannot* be run silent in a silent projector.
4. In writing this part, the report of the Conference on Motion Picture in Medicine held in USA in June, 1942, has been of great value.

number of medical films made if overlapping is avoided. If the production of a number of first-class films is continued for a time, as appreciation of this teaching method spreads a large and world-wide circulation will be reached, and then there should be less difficulty in getting the films produced commercially. But while the market for, say, biological films may be large and remunerative, it is unlikely that it will be commercially profitable to make good films for the smaller more specialised audiences. These films are needed and under the stimulus of war it has been found worth while to lay out public money on them. If, as is contemplated in the Goodenough report, £2,000,000 is spent on assisting medical education, it would seem justifiable to set aside a fiftieth part of this sum for medical films, to be made by a variety of agents including the universities and other medical bodies as well as by the Ministry of Information and British Council whose present output justifies their continuing to make films after the war.

An increasing demand will lead to the setting up of regional medical film libraries, probably in the university medical schools in conjunction with their present book libraries. The Royal Society of Medicine, which has the best medical library in Britain, might well, in conjunction with the Central Film Library, form a central medical film library, coöperating with the regional libraries.

The British Film Institute, the Scottish Film Council and the Film Council for the South-West have done a great deal to promote the best use of films in teaching in schools. Their application in teaching medicine would repay study. It is also necessary to induce "teachers of medicine to realise the value of motion pictures." The only way to introduce films into medical teaching is to plan at first for them to supplement present-day methods. Any more grandiose scheme will not get anywhere. The medical student and the postgraduate student are very keen, and not only for any novelty value that lies in teaching films. The method and the opportunity are here. Any time devoted to thought and imagination about the use of the film in teaching medicine will be well spent.

II. PRODUCTION AND SCOPE

BRIAN STANFORD, MRCS, DMR, FRPS

ONCE it has been decided that a film shall be made, someone must be found to make it. The persons available can be divided into amateur and professional, and both have been used successfully.

CHOICE OF UNIT

Most of the films made in hospital before the war were made by students or technicians who had a knowledge of photography and found a progressive teacher to provide the small funds they needed. These films were usually accurate, but for the most part taken without a script prepared beforehand, and with very rudimentary lighting technique. Hence they were often difficult to understand, and so came to be regarded as a waste of money. Occasionally a really useful film was prepared, but they were so rare that they tended to be forgotten, the more easily because films were not a routine medium for teaching. Sometimes the teacher planned the film and got someone to make it for him—Messrs. Kodak's medical unit did useful work in this way—but they were to some extent limited by the instructions given them, and could not often take responsibility for the plan of presentation of the film. Within the last year skilled advice has become available to the enthusiastic amateur film-maker. The Association of Scientific Photography (Tavistock House North, Tavistock Square, WC1) is forming a clinical section and will give advice on technical problems of cinematography, and the Scientific Film Association will advise on, or refer to suitable professional units, requests for help in preparing scripts or in editing films; so the simpler amateur productions will in future be able to compare favourably with the professional.

The presentation of a film is of paramount importance. A film can be absolutely flawless so far as its facts are concerned, and can be well lit and photographed correctly, and yet be difficult to understand or boring to watch. In either event it is a bad teaching film. It is here that a professional unit scores. The director of the unit has spent years learning and practising just that—how to present subject matter so that it holds the attention. Even a prosaic description of a routine technique can be presented so as to fire the imagination and be beautiful to watch; such a description will be remembered. Even a medical subject can be æsthetically pleasing, as witness the sequence where a bronchoscope is passed in the half-darkened theatre in "Surgery in Chest Disease." Again, "Open Ether Anæsthesia" was a first-class film throughout; at the end one's æsthetic sensibilities had been pleased as well as one's knowledge increased. It seems likely that only a professional unit with experience of other work can produce films of this quality.

There are several film units which have already made medical films; most of them are small ones specialising in the presentation of documentary films. (They can be contacted either through the Films Division of the Ministry of Information or Film Centre Ltd.) Such units collaborate with the doctors, prepare a script with them, and then, when the script is agreed to, go ahead and shoot it, preferably without interference. The director then assembles and edits the shots and presents a finished film to the doctors for approval or minor alterations. This is very satisfactory so long as the film deals with subject matter which the director can understand himself; he then passes on his newly acquired knowledge to the students via the film. But there must come a stage, for example in a complex operation, when his knowledge cannot be adequate. He must know the full significance of the operation, the disposition of the various structures; he must be able as the operation advances to foresee what will happen next, what minor variation may be expected and must be prepared for. And if something unexpected happens he must be able to take immediate advantage of it on his own initiative. Only a doctor can do this, and so it follows that at times a doctor must be in full direct charge of the unit. The surgeon performing the operation cannot do this because he cannot project his eye into the viewpoint of the lens: and his main, in fact his only, concern will be for the patient, especially in moments of stress. It is often just those moments of stress—the tricky parts of the operation, the swift movements, the deep manœuvres—that are most required to be portrayed in the film. The difficulty has been met by operating on a cadaver, but the results were not sufficiently convincing, partly because of the absence of flowing blood, and partly from the loss of elasticity of the tissues, which is obvious even on the screen.

So we see that just as no doctor has sufficient experience of films to enable him to direct with professional film skill, so no director has sufficient experience of medicine to enable him to direct with professional medical skill. Yet it would be just as foolish for a doctor to attempt to learn film-making as it would be for a director to learn medicine; in both cases the training is too long and the experience of constant practice is required. The solution surely lies in a doctor-director-technicians team working together as a permanent stable unit, each member with his sphere of influence clearly defined in theory. The team should be small, perhaps only four persons; mobile, perhaps shared by several hospitals; and able to undertake any kind of medical work whether straight, instructional or propaganda. They should not confine themselves exclusively to medicine, but by taking out occasionally into the general run of films some of the precision they have learnt in medicine they will contribute to the general trend of film-making and bring advances back with them into medical films.

LOCATION

If the subject matter of the film and necessary accessories can conveniently be taken to the studio this should be done. It enables a more stabilised set-up to be maintained, and a greater sense of continuity results. A series of films on allied subjects, taken under the guidance of different doctors, can be more uniformly presented, and the director and his assistants, working "at home," will produce a smoother film.[1]

1. It is not generally realised how much lighting is used high up round the margins of the set from specially constructed galleries. This lighting technique is impossible in most hospitals, and films taken there will suffer accordingly.

If it is necessary to go "on location" to a hospital it is an advantage to have a ward set aside for the unit, in which the patient can be placed and properly lit, and other patients added to give atmosphere when needed. It is advisable to work mainly by electric light, even in an operating-theatre capable of being fully flooded with daylight. Continuity may at any time require a repeat take under adverse weather conditions, and controllable lighting has become an accepted convention even for outdoor shots; there is no excuse for adopting daylight on ground of expense. Even sequences showing limb movements or posture when walking, which could justifiably be taken outdoors, should be taken under studio conditions to concentrate attention on the subject.[2]

Scope of a Medical Film

Medical films can be divided into three broad classes, according to the audience for whom they are planned—(*a*) medical students or medical auxiliaries; (*b*) post-graduate doctors; and (*c*) the general public. Each of these audiences may be addressed from one or two viewpoints: (i) factual instruction in established technique (teaching films); and (ii) presentation of suggestions or broad ideas (propaganda films). There is an immediate unlimited need for medical instructional films for all three classes of audience; for medical students now, for the general public of Europe in the days of liberation, and for the doctors disbanded from the Forces. These films, meeting present-day needs mainly as instructionals, will need to be followed not only by further instructionals addressed to students and doctors as technique advances but also by propaganda films addressed to the public to enable them to appreciate the strides made in medicine, and to encourage them to use to the full the preventive medicine facilities which will be available under a new health scheme.

TEACHING FILMS

Any medical teaching film must be prepared to answer the question: "Could this demonstration have been made just as effectively on the subject during the training of the student." If the answer is 'Yes' then the film should not have been made. The medical film, like any other instructional, must constantly exploit its peculiar advantages to the full—its advantages in time, space and scale, as well as its advantages as a permanent record. If it does not need to do so, then it is redundant.

For medical students and medical auxiliaries.—There has been since the outbreak of war a new factor in the training of students. The dispersal system of our hospitals is so arranged that the student cannot follow a patient through from arrival in the outpatient department until his return home. He sees outpatients at one stage of his training in one hospital, operations at another, and convalescence at a third. There is thus a need for films showing a "normal" progress of a patient through a few typical common diseases, with stress laid on continuity of treatment, to undo the inevitable impression that the progress of disease is marked by clear-cut stages. It is probably this apparently disjointed treatment scheme that has led to the recent stress on the need for rehabilitation; a discovery that discharge from hospital is only an arbitrary stage in the course of an uncompleted return to health.

After the war the medical instructional film addressed to students will play an increasingly important part in in his education. For example, it is becoming widely agreed that only one student can observe with benefit any one operation. Good films taken of routine standard operations can be projected at leisure and commented on fully during the projection; and tedious and time-consuming repetition of the technique adopted in opening and closing the abdominal wall, common to many operations, should be made the subject of one film and omitted from all others, and more time given to the actual local technique. Colour film in universal use will do away with the main bar which has existed hitherto to the use of films, and it is to be expected that stereo projection of operations will become a commonplace.[3]

For postgraduates.—Most doctors now in the Forces are discovering for themselves new techniques to deal with new spheres of human disorder, and are forgetting their peace-time requirements. The film cannot easily reach them, scattered all over the world, but a few specialised training films were prepared for them when they joined up. The Forces are progressive in their use of instructional films for their own immediate needs, but there is scope for interchange of films between the medical corps of the various branches, and the several allies.

Doctors returning from the Forces will want to see all the films prepared for students. But they will also want some films taken especially for themselves. A considerable proportion of the younger men will want to see an exposé of the specialist activities open to them and of the facilities available for training. There is a great dearth of specialists, and a series of films written each by a specialist with the object of attracting doctors into his own specialty would help the doctor in his choice when he returns. Training back to civilian practice will not be so easily helped by films, since it is the art rather than the science of medicine which tends to atrophy with disuse, and the art cannot be taught by an instructional film.

For the general public.—For the relief organisations preparing to go to liberated Europe there is an urgent need for films on elementary field hygiene[4] and the training of medical auxiliaries. In general the refugees in this country will provide a nucleus of skilled doctors, but they will be busy doing medicine on arrival and will have little time to train orderlies and lower grade assistants afresh; yet a large amount of the routine work must fall to such persons, who are now ignorant of scientific medicine. While the doctors now in Europe will have to relearn parts of their skill by working with those doctors now preparing to go over with the relieving armies, the orderlies could be trained by films, which should demonstrate the theory underlying the practice, for there will be no dearth of willingness to learn intelligently rather than by rule of thumb.

In England the general public is largely ignorant of medicine, and it has been suggested that the profession purposely keeps it so. To this the profession replies that if this is true it is in their best interests, since the public must not be frightened. But the degree of fright which the public takes at medical matters largely depends on how far they have been educated in such things. Elementary instruction in, for example, cancer, along the lines of the films now issued on VD or tuberculosis, would bring many cases to the doctors at an earlier stage of ill health; this should be prepared now, for the Cancer Act will enable much better facilities to be offered for treatment as soon as the war stops. Again, a series of films on elementary hygiene, widely displayed, would prove a fine investment to a community now contemplating a free medical service for all. And even elementary expositions of the physiology of the eye, the ear, or tactile sensibility would be widely acceptable to the general public, as is shown by their interest when presented with these subjects as VADs or at first-aid classes. Progressive medical opinion is taking an interest in these possibilities (vide Professor Ryle in the *Lancet* of June 3, 1944).

2. "Intravenous Pentothal" (part II) suffered in comparison with "Open Drop Ether" from a mixture of electric and daylight shots. The soft tone-range of the electric shots showed up even more than usual the harshness of the uni-directional daylight scenes taken in the theatre which were cut in with them. This distracted attention from the information the film was presenting as well as offending the æsthetic sensibilities. I can offer no modern examples of orthopædic films taken outdoors, but remember well films taken privately "in the hospital grounds," where undivided attention on the limb movements of the subject was impossible owing to a changing background of drains, windows and tree-trunks.

3. It is in small groups, of some 20–40 persons, that stereo-projection with the use of polarising spectacles has its maximum efficiency. These spectacles, or any other equipment which new cinematic techniques may require, may be loaned or hired out by the medical school much as they now provide microscopes.

4. A film should be made on the effects of nutritional disturbance on adults and children. This will be correlated with the material which will later exist for demonstrating the effects in adult life of starvation in youth. A script on this subject should be prepared now, and not left to be made up years later from the editing of newsreels and private films.

PROPAGANDA FILMS

Under the heading of propaganda come the films which not only demonstrate facts but also plead a cause. One series that immediately comes to mind should be made by Parliamentary parties and medical bodies to demonstrate and argue the case for their version of a suitable National Health Service; and the campaign just suggested for improving the general knowledge of the public could also be classed as propaganda. But other fields lie open: the requirements of a tuberculosis scheme, the positive health aspects of regular exercise, the value of routine individual medical examination, the danger of patent medicines, or the value of a food distributive trade trained in hygiene. Again, a factual presentation of the value and drawbacks of milk pasteurisation would give the public a clearer view of the issues at stake.

It is hard to say where factual presentation stops and propaganda begins. A subject which is factual to a believer is propaganda to a non-believer. But propaganda need not even be open, it can be veiled, and it is here that the choice of director and script-writer becomes of supreme importance. The documentary film profession are imbued as a whole with a strong sense of civic duty, and will not produce a film in which they do not believe. If a unit strongly in favour of, say, state medicine were to be asked to make a film putting the case for private practice they might refuse altogether; or they might make it in spite of their feelings. But if they did the film would probably not be convincing, even though the script was; by subtle shades of acting and cutting the whole argument can be nullified, and yet the sponsor be unable to say where the reversal of argument has taken place. But if the right unit is chosen, the film can be shattering in its power of argument, as was *World of Plenty*.

To what extent may one misrepresent or omit in order to convey a message? This problem has to be faced afresh each time, and parties with different interests will come to different conclusions. It is for this reason that some organisations have felt the need for appraising films, and have issued lists of those they recommend. The most important of these is the film appraisals subcommittee of the Association of Scientific Workers, which views all films having a scientific basis to decide whether they are scientifically accurate. This organisation however views its films from another aspect also: whether the film has a message in keeping with the trade-union policy of the association. The Scientific Film Association, which also appraises films, has no such political criteria.

The misrepresentation of truth may be intentional, or it may be accidental. A committee of doctors who have prepared and approved a medical film which is accurate from their viewpoint may not notice its inaccuracy from another viewpoint.[5]

Another form of propaganda is one which exaggerates. For instance, a film describes a successful local experiment in terms that suggest it has been widely adopted; this is a fault which we have seen in films concerned with child education, where the sponsor writes his script full of aspiration for the widespread adoption of his scheme, but has only one school which reaches up to his standards. His argument would not suffer if he made it clear that this was only a report on a successful experiment which should be applied generally; and the general validity of the film would be greatly enhanced. There is some evidence that the new films on rehabilitation may suffer from a similar exaggeration. It cannot be condoned, yet it undoubtedly helps to create a demand for widespread adoption of the scheme portrayed. Whether the end justifies the means is open to argument.

5. *Surgery in Chest Disease* was prepared for the British Council to demonstrate to doctors in other countries the high standard of interdepartmental coöperation required in the treatment of a patient. That it did excellently. But it also conveyed the impression that here in England we have reduced to a minimum the dangers of lung cancer by skilled surgery. Nowhere in the film did it mention that only one in ten of these cases are suitable for operation. Again, *Defeat Tuberculosis*, which was intended for public showing, illustrated accurately a method of treatment for advanced tubercle. But it left the lay audience with the impression that this was the usual method of treatment for all cases, whether advanced or not, which is not so.

CARBON TETRACHLORIDE NEPHROSIS

J. R. FORBES, M D LOND., M R C P
SURGEON LIEUT.-COMMANDER; MEDICAL SPECIALIST, RNVR

THE following cases of acute renal damage, resulting from the amateur use of carbon tetrachloride for cleaning clothes, are reported not only for their clinical interest but also to emphasise the dangers of this agent.

COURSE OF EVENTS

Three French petty-officers, all members of the same mess in a Fighting French submarine depot ship, were admitted to a Royal Naval hospital during the first week of January, 1944. Subsequent inquiry showed that in the previous October someone in the mess had discovered the virtues of 'Pyrene' fire-extinguisher fluid (almost pure carbon tetrachloride) as a remover of grease and oil from clothes. All the dozen or so men in the mess were engaged on engine repair or similar dirty work, and their clothes naturally got extensively soiled. They all fell into the habit of giving their clothes a regular dry-clean about once a week, applying the pyrene fluid to the garments with a rag. In this way they used up two refill tins (about 4 pints) in about three months. All this cleaning took place in a cabin about 25 ft. by 10 ft., ventilated by a door and five scuttles. Bearing in mind, however, the fact that it was an English winter, whose chills and vapours are not popular with a nation unaccustomed to them, it seems not unlikely that this ventilation was seldom in action.

Nothing untoward occurred at first, and the amateur dry-cleaning proceeded apace until about Christmas. At that time some of the men were taken ill with symptoms of headache, general malaise, backache and vomiting. There was a good deal of influenza about, and they were diagnosed as suffering from this complaint. Most of them recovered satisfactorily after a week or two on the sick list. One man, however, had other symptoms in addition to those described.

CASE 1.—This man complained of extreme anorexia and thirst, and stated that he had attacks of double vision. Finally, on Jan. 5, he had a sudden severe epileptiform seizure, and was at once admitted to hospital. During the next 48 hours he lay in a state of restless coma, punctuated by frequent generalised convulsive fits. Urine analysis revealed a heavy albuminuria, with abundant leucocytes and red cells, but no casts. A clinical diagnosis of uræmia was confirmed by the finding of a blood-urea of 356 mg. per 100 c.cm. Under treatment with sedatives and intravenous alkaline fluids the patient improved, ceasing to have convulsions and becoming fairly rational and coöperative. But soon it became manifest that pulmonary œdema was setting in, and the left side of the heart began to fail. In spite of all efforts he died from heart-failure, mentally clear to the end, on Jan. 11, 6 days after admission. At no time during his illness was there jaundice, nor was his liver palpable.

Meanwhile, on Jan. 7, two of this patient's messmates had been admitted to the same hospital ward. Both of them had been ill for several days, with the prevailing headache, anorexia and vomiting (case 2 had slight hæmatemesis) and in addition had been observed to have albuminuria.

CASES 2 and 3.—Clinically, the two men seemed to have typical, moderately severe acute nephritis. Their urine contained albumin, numerous red cells and leucocytes, epithelial cells and granular casts. Case 2 was the more ill, having, in addition to a degree of renal uræmia, considerable functional azotæmia due to dehydration from prolonged vomiting. His blood-urea at one time reached the extraordinary figure of 746 mg. per 100 c.cm., urea-clearance being reduced to less than 10% of normal function. In spite of these alarming laboratory findings, his clinical condition never suggested uræmia, and he was never drowsy or mentally abnormal. With appropriate treatment, as for acute nephritis, including ample fluids, he improved steadily; the blood-urea and urea-clearance figures became normal, the urine cleared up completely, and after 46 days in hospital he was discharged to sick-leave, apparently cured. Case 3 was not severely affected, his blood-urea never rising above 120 mg. per 100 c.cm. He also improved steadily, and left the hospital, apparently recovered, after 25 days.

At no time during their stay in hospital did either of these men present any clinical evidence of liver damage. They were instructed to report in 3 months' time for re-examination to determine their fitness for further submarine service, but they had meanwhile sailed for the Mediterranean.

During the time the 3 men were in hospital, although some toxic cause for their illness was suspected and steps taken to exclude poisoning by metals such as lead, the real agent was not discovered. This was because the history of exposure to carbon tetrachloride was not then forthcoming, and because there were no signs of liver damage. It was not until the kidneys of case 1 had been examined histologically that the sinister influence of carbon tetrachloride was suspected.

POST-MORTEM FINDINGS IN CASE 1

Autopsy by Surgeon Commander T. W. Froggatt, RN, elicited the following significant facts :—

Heart: dilated; right side distended with blood; cloudy swelling of myocardium. Lungs: intensely congested and œdematous in all parts. Liver: nutmeg appearance; microscopy revealed severe central lobular necrosis, with very little associated fatty degeneration. Kidneys: large, swollen and pale; subcapsular surface smooth; cortex pale; medullary portions dark and congested. The left kidney weighed 9·5 oz., the right 8·5 oz.

Sections of the kidney were sent to Dr. W. W. Woods, consulting pathologist to the Navy, who reported as follows :—

There is no sudanophil fat, but there is severe albuminous degeneration, particularly in the first convoluted tubules. In some of these tubules the appearance is that of ordinary severe albuminous degeneration (cloudy swelling), the cells being very swollen and bulging into the lumen. In others, however, there is a suggestion of a rather different change because the tubules are dilated and the cells small, indicating regeneration, although no definite karyokinesis could be seen. This change is severe in some of the second convoluted tubules, where the epithelium is no more than a flattened rim about the lumen, and there is pyknosis and karyorrhexis. There is albuminous degeneration of the parietal epithelium of Bowman's capsule and a good deal of granular debris in Bowman's space. The glomeruli themselves are normal. In the lumen of the first convoluted tubules there is much granular debris, perhaps an exaggerated amount of what is ordinarily seen in cloudy swelling. But in the second convoluted and in the tubules of the medulla there are granular casts made up of minute eosinophilous bodies which are evidently shrivelled red blood corpuscles, and there are brown granular casts of altered blood. In the middle and upper parts of the medulla there are areas of congestion, rarely hæmorrhage, and in most of these areas there is inflammatory infiltration with lymphocytes and plasma cells which may be classed as histiocytes, though some of them suggest hæmocytoblasts. In some of the congested vessels in these areas of inflammation there are numerous lymphocytes and large round cells in the blood in the lumen. There is slight focal fibrosis in the cortex, but I think this is an old change of little importance and not related to the fatal illness. In a few arcuate veins there is a slightly organising thrombus. There is slight hypertrophy of the intima of the arteries, but no definite hypertrophy of the media.

Conclusions.—The renal and hepatic changes are in keeping with chemical poisoning. The fact that other men in the ship had a similar illness suggests the possibility of poisoning by a volatile chemical, possibly carbon tetrachloride from pyrene fire-extinguishers, or methyl chloride or methyl bromide from a refrigerator out of order.

DISCUSSION

Carbon tetrachloride is widely employed in industry as a solvent for gums, resins and fats, for dry-cleaning clothes, and for removing oil and grease from machinery. Its uses as a fire-extinguisher and as a vermifuge for ankylostomiasis are well known. Its toxicity, both in liquid form and when vaporised, has been attested by many reports of accidental poisoning, some of them fatal. Carbon tetrachloride is probably even more toxic than its near relative chloroform; and being a heavy gas when vaporised (5·3 times as heavy as air) tends to accumulate in dangerous amounts in the lower parts of rooms when ventilation is inadequate. Thus 1 c.cm. of liquid carbon tetrachloride yields 257 c.cm. of vapour at room temperature, and 5000 parts of vapour in a million parts of air is recognised as the minimum concentration required to produce toxic symptoms.

Its toxic action on the liver is well known, but the effect on the kidneys is perhaps less widely realised though cases of toxic nephrosis have been reported. Boveri (1929) described the case of a young man engaged in cleaning greasy clothes in a small room; after exposure to the vapour continuously for two days he developed jaundice and nephritis, but recovered. Other cases of renal damage from the use of carbon tetrachloride for cleaning purposes have been recorded by McGuire (1932), Franco (1936) and Smetana (1939). Dudley (1935) described four such cases in men exposed to the fumes of pyrene extinguishers, used in confined spaces aboard ship for putting out fires. Other writers have reported similar renal poisoning arising from other uses of carbon tetrachloride.

Pathology.—The changes found at autopsy in case 1 are fairly typical of those commonly found in cases of fatal poisoning. The brunt of the attack is borne by the liver, where central lobular necrosis is found, and by the kidneys, where necrosis of the tubular epithelium, especially that of the first convoluted tubules and of Henle's loops, is the rule (Smetana 1939, Ashe and Sailer 1942). In addition, a varying degree of epithelial destruction of the adrenal cortex is described.

Pre-existing fatty changes in any organ enhance the destructive action of carbon tetrachloride. Alcoholic persons appear to be more susceptible to its effects. (Case 1 was reputed to be a heavy drinker.) Old age and malnutrition likewise predispose to poisoning; but our 3 men were all aged about 30, vigorous and well nourished.

Diagnosis.—In these 3 cases it is probable that repeated inhalation of small doses of the vapour over a period of some three months produced a degree of chronic poisoning, and that a final heavy bout of dry-cleaning just before Christmas proved the last straw. In retrospect it seems not unlikely that the "influenza" which afflicted the other men in the mess at about the same time was really a mild poisoning by the same agent.

Prognosis.—The immediate mortality naturally depends on the dose and method of administration. Other factors in prognosis, such as chronic alcoholism, have already been mentioned. The likelihood of permanent renal damage in patients surviving the acute stage appears to be slight. Simon (1939) described a case of carbon tetrachloride nephrosis, with severe uræmia, who recovered clinically but died ten months later from pulmonary tuberculosis. At autopsy no sign of any permanent renal damage could be found. This is what one would expect from the pathological changes in the acute stage. The glomeruli are damaged functionally, but not anatomically, and the tubular epithelium, though severely damaged, is capable of complete regeneration. In case 1 it seems likely (since his uræmia was lessening after the first 48 hours in hospital) that if he had not died from heart-failure he would have recovered from his renal damage.

Treatment.—In the absence of the correct diagnosis in the acute stage, the 3 men were treated as ordinary cases of acute nephritis with azotæmia. Some writers have advocated the use of glucose and calcium. Miller and Whipple (1942) showed in dogs that methionine (a sulphur-containing amino-acid) was of value in preventing liver damage by chloroform. As the mode of action of carbon tetrachloride on the liver is comparable with that of chloroform, Beattie et al. (1944) used methionine in a severe case of carbon tetrachloride poisoning with success.

Prevention.—Pyrene fire-extinguishers are labelled with a prominent warning about the risk from their fumes in confined spaces. In the present instance, all blame for the mishap must rest on the men concerned, since several of them could read and speak English well; moreover, the fluid was being used in an improper manner, and not for its intended purpose. Steps are being taken to prevent any similar abuse of fire-extinguishers in the Royal Navy.

SUMMARY

Three cases, one fatal, of acute nephrosis from the inhalation of carbon tetrachloride vapour are described. The chemical was used, improperly, as a cleaning agent.

The pathology, diagnosis, prognosis and treatment of such cases are discussed.

I am indebted to Surgeon Rear-Admiral F. J. D. Twigg, RN, for permission to publish this report, and my thanks are due to Surgeon Captain S. Bradbury, RN, and to Surgeon Captain A. Fairley, RN, for their help and advice in the preparation.

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SEGMENTS AND BLOOD-VESSELS OF THE LUNGS [1]

A. B. APPLETON, M D CAMB.

PROFESSOR OF ANATOMY, UNIVERSITY OF LONDON, AT ST. THOMAS'S HOSPITAL

IT is now generally recognised that the division of the lungs into lobes is a superficial one, and that there are smaller units known as "bronchopulmonary segments" (Glass 1934) or "territories of ventilation" (Lucien 1936). Each segment is ventilated by only one air-tube, and this air-tube ventilates no other segment. The fissures of lungs show considerable variation without any underlying difference in the pattern of the segments, since the usual fissures may be wanting or incomplete, and other fissures or clefts are apt to be found at the junction of any two segments. At an early stage of development external indentations separate most of the segments and only a few become deepened as fissures.

The segment is not merely an anatomical and physiological unit: abscesses, for example, tend to be localised in segments. Moreover, since the plane of contact of adjacent segments can often be opened up with ease, it has sometimes been found feasible to remove a single segment by operation.

The varying appearances presented on bronchoscopy and in bronchograms have made evident the extent of individual variation in the pattern of the bronchial tree. Brock (1942) claims to have shown, by injections, that there are considerable individual differences in the extent of a given segment; and differences do indeed exist. Published maps of the segments show considerable differences—compare those of Foster-Carter and Lucien—apart from questions of terminology. A comprehensive survey of the variations is needed to interpret the individual as contrasted with the generalised or average lung.

In what follows the published data have been supplemented by the results of study of 100 lungs, 50 of each side, by detailed dissection of bronchi, arteries and veins, and by studying the development of the lung in embryos of 9 mm. and upwards in length. Bronchoscopic appearances have been inferred by direct inspection of orifices through the cut ends of bronchi. Detailed results will be published elsewhere. The names used have been selected on the basis of convenience and distinctive character.

BRONCHIAL TREE AND BRONCHOPULMONARY SEGMENTS

Right upper lobe.—The upper lobe bronchus usually divides into three bronchi ventilating corresponding segments—pectoral, apical and posterior (fig. 1) Though, however, three openings into the upper lobe bronchus are commonly seen, they are not necessarily these same three; there may even be four openings (figs. 1 and 2), separated by main and secondary keels. The differences arise primarily in two ways: the first axillary branch of either the pectoral or of the posterior bronchus may open directly into the upper lobe bronchus (fig. 1B and C; fig. 2C and D); or two of the three bronchi (pectoral, apical and posterior) may share a common opening into the upper lobe bronchus (fig. 3B), or, if a secondary keel is overlooked, they may appear to share a common opening (fig. 1B and C; fig. 2A, B, C, D).

Since either the pectoral axillary or the posterior axillary bronchus may open directly into the upper lobe bronchus, the segments ventilated through them will then have a status independent of the three main segments. These axillary segments can be infected by "aspiration" and form the site of local abscesses. This apparently can occur even when their bronchi are merely side branches of the pectoral or posterior bronchi respectively. These two axillary segments are, then, worthy of representation in maps of the upper lobe. Neil, Gilmour and Gwynne (1937) have recognised one of them (the pectoral axillary); Glass described the two segments together as though they were a single segment, a condition which has not yet been described—i.e., they have never yet been found sharing a common stem that ventilates no other part of the upper lobe. Some of the variations in appearance of the orifices into the upper lobe are illustrated in figs. 1, 2 and 3. It will be seen that similar appearances can be associated with different patterns of the bronchial tree. Further, the arrangement of the orifices cannot be accurately anticipated by the study of bronchograms; it may differ, even though the general pattern of the bronchi appears similar. But the previous examination of a bronchogram should be of assistance if employed for the subsequent interpretation of the arrangement seen with the bronchoscope, for the chief difficulties of interpretation turn on the question whether axillary bronchi open *directly* into the upper lobe bronchus. An answer is provided if we can distinguish from the bronchogram whether one of the axillary bronchi is directed towards the upper lobe bronchus or whether the axillary bronchi are both secondary branches from the posterior and spectral bronchi.

Right middle lobe.—This lobe occasionally shows a vertical fissure which separates the generally recognised axillary (lateral) and medial segments. There may be, on the other hand, a horizontal cleft, which divides the medial part into upper and lower segments. This cleft is liable to be mistaken for the true horizontal fissure, if the latter is at the same time absent (fig. 4). Two consequences of this arrangement deserve note. First, the "upper lobe" will appear to receive a bronchus from the middle lobe bronchus. Secondly, if an attempt is made to open the apparent "horizontal" fissure with a view to performing lobectomy the separation will be found obstructed by a branching of a middle lobe bronchus far in front of the hilum.

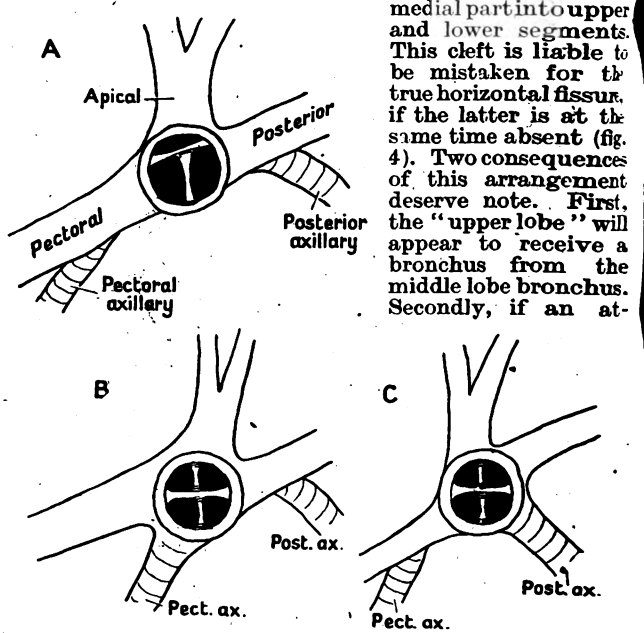

Fig. 1—Variations in branching of right upper lobe bronchus: types with horizontal keel. Types (B) and (C) are liable to confusion; both may be confused with type (A) if the upper keel is overlooked.

Left upper lobe.—The internal pattern of this lobe is comparable with that of the combined upper and middle lobes of the right side (cf. Ewart 1889); it differs only in details. The pattern of the orifices opening into the left upper lobe bronchus is however very different from

1. Abstract of two Hunterian lectures delivered to the Royal College of Surgeons, April, 1944.

that of the right side since this bronchus serves as a common stem for all bronchi of the lobe. Commonly it divides into *ascending* and *lingular* bronchi (fig. 5C) which are distributed in general like the bronchi of upper and middle lobes of the right lung; thus the ascending bronchus divides into pectoral, apical and posterior (the two latter sharing a common stem much more often than on the right side), while the lingular provides three branches—upper, lower and axillary bronchi. Two orifices are thus commonly recognisable opening into the upper lobe bronchus, separated by a horizontal keel. This same bronchoscopic appearance, however, is often associated with a different arrangement of the bronchus; for, as Foster-Carter pointed out, the pectoral bronchus may open below the keel and not above. Previous examination of a bronchogram should permit recognition of this variation.

In some lungs bronchoscopy of the upper lobe shows, instead of a single keel separating two orifices, a slit-like aperture between two keels (fig. 5D). Three orifices are thus visible, the middle one in all known examples opening into the pectoral bronchus. A variant of this is a "trefoil" arrangement of orifices (fig. 5E).

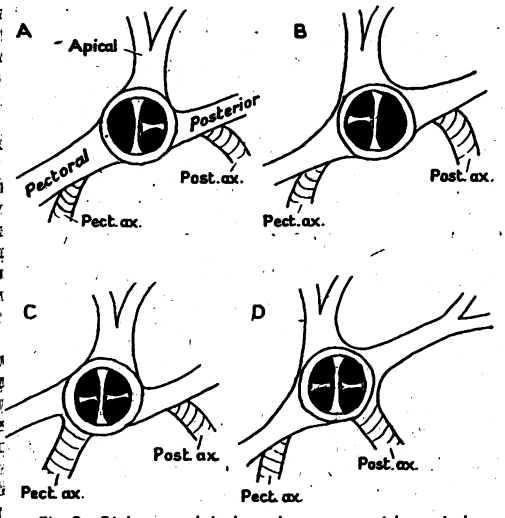

Fig. 2—Right upper lobe bronchus: types with vertical keel. If only the vertical keel is seen, all these are liable to confusion. If secondary horizontal keels are seen, types C and D still appear identical on bronchoscopy.

Right and left lower lobes.—The maps provided by recent British and American authorities do not at first sight conform to the classical accounts of the bronchial tree, in which a stem bronchus is described as having a series of ventral and dorsal branches, plus a medially placed cardiac bronchus (Aeby 1880). Now comparative anatomy shows that the human lung has undergone a reduction of the basal portions (i.e., of the lower dorsal and ventral segments), while the upper lobe has become exaggerated in size. Further, a re-examination of the development of the bronchi shows that Aeby's account is substantially correct. The anterior and middle basic bronchi of the lower lobe are found to be well-developed bronchi of the ventral series; the dorsal segment (Nelson 1932) is the first dorsal one, while the posterior basic segment comprises the remaining ventral and dorsal segments.

There is a *cardiac segment* in the left lung as well as in the right, though it is not shown in most of the maps of segments (apart from that of Lucien 1936); it is commonly larger on the left than on the right side, though it often shares a common stem with the anterior basic bronchus. Both cardiac segments may extend further forwards than is generally shown—viz., to the interlobar or even on to the costal surface. A cleft marking off this segment is sometimes seen on the mediastinal surface, and exceptionally it has been found on the costal surface.

BLOOD-VESSELS

Attention will be directed primarily to the distribution of pulmonary vessels with reference to broncho-pulmonary segments. Arteries and veins present very different relationships. The arteries accompany minor bronchi very closely, the two together forming an arterio-bronchial axis to the segment. Two or more arteries may enter a single segment, but when they do they are distributed with different bronchi within the segment. The larger veins, unlike the arteries, are situated in the

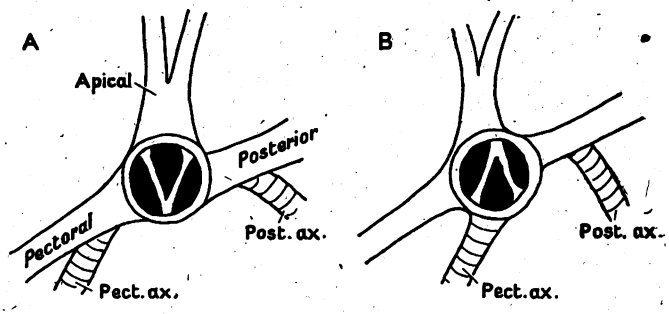

Fig. 3—Right upper lobe bronchus: types with trefoil keels. (A) The three openings are commonly the same as those of fig. 1 (A). (B) A type with three openings which are not the same as in A.

connective-tissue planes between the segments and collect blood from adjacent segments.

Right pulmonary artery.—The upper division of the right pulmonary artery commonly provides arteries for the pectoral, apical and posterior segments, but it is not the sole supply of the upper lobe; one, two or three *ascending* arteries also enter the lower part of this lobe from the lower division (cf. Narath 1901). These ascending arteries join company with some of the bronchi in the pectoral and posterior segments. Their size varies inversely with the corresponding segmental arteries of the upper division; an ascending artery may indeed provide for all the bronchi of one of these segments. As a rule, about half of the posterior segment is supplied from an ascending artery, and a smaller part of the pectoral segment from another ascending artery. The presence of a large posterior ascending artery can be readily recognised if we open up the oblique fissure; if the artery is thus ascertained to be small we may infer that the upper division of the pulmonary artery will be the main supply of the posterior segment.

The artery to the dorsal segment of the lower lobe usually arises very close to the posterior ascending artery, and sometimes shares a common stem with it. An ascending artery for the upper lobe has been encountered arising in common with the middle lobe artery.

Different appearances in the way in which branching of the upper division occurs are due to the following variations: (1) early division of the pectoral artery into two; (2) early division of the apical artery into two; (3) presence or absence of a "recurrent" branch to the posterior segment. A recurrent branch, when large, passes backwards directly above the upper lobe bronchus just within the lung—i.e., next to the reflection of visceral pleura on to the root. Exceptionally a pectoral branch is lacking, and a large ascending branch from the inferior division then replaces it. The lower division of the right pulmonary artery is the sole supply of the middle lobe (generally by two branches) and of the lower lobe, in addition to contributing to the supply of the upper lobe, as stated above.

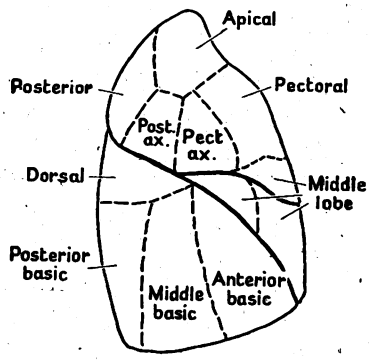

Fig. 4—Supernumerary fissure in right middle lobe: an exceptional and misleading appearance, simulating the horizontal fissure. Segments are shown mapped out.

Left pulmonary artery.—This artery, in arching over the left upper lobe bronchus, provides arteries for the apical and posterior bronchi. Now, the artery for the pectoral bronchus occasionally arises anteriorly before the arch; more often it arises afterwards, and it is then below the origin of the artery of the dorsal segment of the lower lobe. In this situation care is needed if we wish to preserve the pulmonary arterial supply intact to the one lobe when the other is removed. The lingular artery usually arises after the main artery has arched over the bronchus; it then passes forwards below the bronchus. The way in which the artery for the

pectoral segment arises can be readily ascertained by inspection of the main artery and its branches in the depth of the interlobar fissure.

Veins.—The larger collecting veins lie on the periphery of the various segments. They are therefore found between segments, on interlobar surfaces, or on the mediastinal aspect of the lungs. On the costal and diaphragmatic surfaces large veins are generally absent; the blood is collected into the veins that lie between segments or on interlobar surfaces. Since the veins that run in the connective tissue planes between segments drain the adjacent segments, it follows that these vessels form an anastomosing system throughout the lobes, and where fissures are incomplete, from one lobe to another. In conditions in which the pulmonary arterial supply fails, the venous anastomoses may contribute to the vitality of these (respiratory) portions of the lungs, which are not ordinarily served by bronchial arteries.

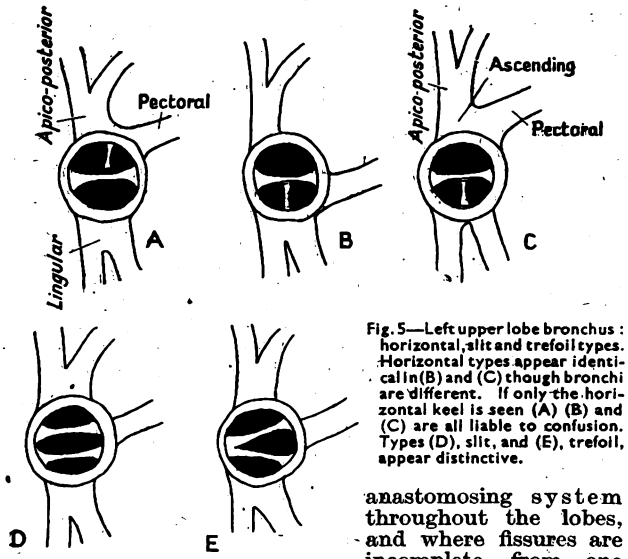

Fig. 5—Left upper lobe bronchus: horizontal, slit and trefoil types. Horizontal types appear identical in (B) and (C) though bronchi are different. If only the horizontal keel is seen (A) (B) and (C) are all liable to confusion. Types (D), slit, and (E), trefoil, appear distinctive.

Two further aspects of this venous arrangement deserve comment. If an intersegmental plane is opened with a view to a partial lobectomy, the tributaries of a collecting vein in the plane must of necessity be divided on one side or the other. Again, when a fissure is incompletely developed, the adherent region is like an intersegmental plane, inasmuch as veins from both lobes are connected along the zone of union. Not infrequently indeed a large vein is found passing from one lobe to another if an incomplete fissure is extended artificially. The commonest situation for such a communicating vein is in the posteromedial part of the right oblique fissure; a large vein may carry blood from the dorsal segment of the lower lobe to the *inferior* pulmonary vein. It is the latter variation which has been mistakenly described as a "superior pulmonary vein" running down behind the root of the lung.

Rare variations of the arteries and veins of the lungs have been recorded, but none has been found in the present series (Batts 1939, Cleland 1941, East and Barnard 1938, Ingalls 1932, Hyrtl 1839).

SUMMARY

Individual variations in the relation of segments, bronchi and bronchial orifices require consideration for the interpretation of findings in a particular lung.

Arteries and veins show definite relations to the segments, but there is considerable variation in their mode of connexion to the large vessels in the roots of the lungs.

The variations have been investigated by the dissection of 100 lungs and by a study of embryonic development.

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Rh ANTENATAL TESTING

A SUGGESTED NOMENCLATURE

JOHN MURRAY, MB CAMB.
ASSISTANT PATHOLOGIST EMS, AND THE MIDDLESEX HOSPITAL

THE importance of the Rh factor in determining the onset of fœtal hæmolytic disease has been well established by the work of Levine and others (1941 and 1941), Boorman and others (1942) and Race and others (1943), who showed that over 90% of mothers of erythroblastic babies were negative when tested with human anti-Rh sera similar in action to the sera of rabbits immunised with Rhesus monkey erythrocytes, described by Landsteiner and Wiener (1940).

The present investigation was undertaken to find out whether a routine determination of the Rh group would be of value in antenatal clinics, and it was hoped that the work might shed further light on some of the more difficult problems in connexion with Rh estimation. With the assistance of several well-tried human immune sera it was proposed to detect Rh-negative mothers, to ensure that should they need transfusion they would receive Rh-negative blood. It was also decided to test for the presence of any irregular antibodies in their serum. The cases were unselected, every antenatal mother being bled at her first attendance at the clinic, which in the great majority was in the third or fourth month of pregnancy. At the outset only three drops of blood were obtained from each patient at their first attendance at the clinic and suspended in 1 ml. of sterile normal saline. On being received at the laboratory the cells were washed and resuspended in saline to give a 1% suspension, and were then tested with a single serum with the unwanted α or β antibodies inhibited by group-specific substance if necessary. The few which failed to react were tested with a second serum and those which still failed to react were tested with a third. This method was used to conserve the valuable sera. The bloods which gave negative readings with three sera were reported as Rh-negative. A sample of whole clotted blood was obtained the next time the patient attended for the cells to be re-tested with further Rh antisera. The patients' sera were then tested with cells from members of the laboratory staff, including six known positive and two negative controls, to disclose the presence of antibodies. In only one case did the repeat using the sera anti-Rh, anti-Rh_1, anti-Rh_2 and anti-Rh make the result "positive" instead of "negative," and this was the rare type Rh″.

When about 90 tests had been carried out, a classification of subgroups of Wiener (1943) then unpublished was kindly shown to me by Race and Taylor, and the system of testing was altered to make the most use of the sera; from this point all cells were tested with four different types of sera, in every case with at least two sera of each type.

For the second hundred tests a larger sample of blood was taken and the investigation was extended to include the examination of Rh-positive mothers' serum for antibodies, because it was now clear that the Rh-positive mothers, although much less likely to do so, might also develop Rh antibodies, or the factors AB, MN or P might provide the antigenic stimulus in them. It was also decided that all the bloods should be re-examined just before parturition, in case antibodies had then appeared.

TECHNIQUE FINALLY ADOPTED

Collection of blood and preparation of serum and cells.—From all patients except the first hundred 2–5 c.cm. of whole

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blood was obtained in 3 × ½ inch centrifuge tubes by venipuncture. At the laboratory the tubes containing the blood were centrifuged and the serum pipetted off and heated in the 56° C. waterbath for 20 minutes to inactivate the complement. The red-cell suspensions were prepared by shaking the clot with saline and the suspended red cells were taken off and

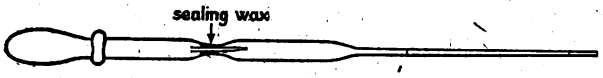

Fig. 1—Throttled pipette (Wright and Colebrook) for measuring small quantities of serum. Length about 8 in.

washed twice more with saline. If tests were not made immediately, the serum was stored frozen solid until the time of testing.

The patients' sera were each tested against a minimum of five different lots of red cells designed to cover the known Rh genes and also groups A and B. While it was thought that these numbers were inadequate and that each serum should be tested against about three times this number of different cells (since there is great variation in the strength of reaction of cells of identical genetic make-up), the amount of work involved was found to be prohibitive. However, all doubtful tests were recorded and repeated with sixteen lots of cells. Before being Rh-tested the patients' cells were ABO-grouped in order that appropriate sera could be selected.

Agglutination technique.—In the method now used the tests were made in small rimless test-tubes (Durham's) measuring

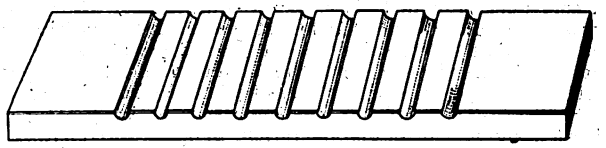

Fig. 3—Multiple grooved slide (5 in. by 1 in.) permitting examination of several sediments side by side.

2 in. × 0·2 in., since the large tubes and original quantities described by Landsteiner and Wiener (1941) were wasteful of sera. Each test was made by carefully mixing 0·0125 ml. of serum with an equal quantity of 1% red-cell suspension in the bottom of one of the small tubes and then shaking the mixture. To make the measurement of these small quantities easier throttled pipettes (fig. 1) were used as described by Wright and Colebrook. The tubes were stood in glass-bottomed wooden racks (fig. 2) made from the solid wooden blocks holding fifty tubes in use by the blood-transfusion services.

The tubes were incubated for 2 hours in the air incubator and the reactions were then read by withdrawing very gently about half the sediment and about half the fluid from each tube with a fine Pasteur pipette and blowing out carefully on to one partition of the multiple grooved slide (fig. 3) so as to disturb the agglutinates as little as possible. When charged the slide was rocked once gently to fill each chamber and the sediment was examined under the low power 2/3 in. of the microscope with the stage very slightly tilted, so that the mixture moved gently by. Even the smallest agglutinates were detected by this method when none could be seen on the flat using an ordinary microscope slide. The danger of diagnosing rouleaux as true agglutination may be enhanced by this method, though strong rouleaux-formers are readily recognised. (Several pronounced rouleaux-forming sera were found in the present series.) The eight-chambered slide was of great assistance in assessing any very weak reactions, since it afforded comparison of several sediments side by side. Any doubtful reading was recorded as (?) and tests were repeated before a decision was taken. Finally, in assessing the results of the various sera, each of those marked (?) was recorded as negative unless there was evidence of agglutination with another serum.

The diagnostic sera were diluted with normal saline before testing, each serum being diluted differently according to titre. For example, an anti-Rh′ serum from a group O donor of titre 1/512 was diluted and inhibited with secretor saliva as follows—1 drop serum, 1 drop A saliva, 1 drop B saliva, 2 drops saline using the same pipette, giving a dilution of 1 in 5. With titres over 1/1000 dilutions of 1 in 10 produce good reactions even with weakly reacting cells. For some difficult readings, centrifuging for a minute at low speed (about 1000 revs.) brings out a clearer result

In this investigation, however, the centrifuge was used only when the patients' sera were being tested for antibodies, since a weak reaction was more likely to be discovered by this method.

Recently a waterbath and centrifuge technique described to me by Wiener (personal communication) has been tried in parallel without as yet giving superior results, but it takes less than half the time and there is little chance of the contents of the tubes drying up. The centrifuge must be used with discretion in determining Rh subgroups, since it may produce false positives due to a trace of some antibody other than the one being operated. Thus with anti-Rh_1 and anti-Rh_2 sera the centrifuge is better avoided unless the titre is extremely low, because with high titred serum from Rh-negative women the presence of a weak standard anti-Rh antibody in either might be demonstrated by centrifuging.

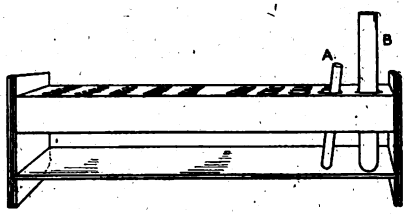

Fig. 2—Wooden rack used in agglutination tests. Length 7 in. A, tube used in present series; B, tube used by Landsteiner and Wiener (1941).

RESULTS

ABO groups.—The results of ABO-grouping of the 200 antenatal cases showed them to be a representative sample of the populace—group O, 73 cases (36·5%); group A, 89 cases (44·5%); group B, 30 cases (15%); and group AB, 8 cases (4%). No examination was made for subgroups A_1, A_2.

Rh groups.—In this investigation for ease of description the cells were named after the sera with which they react according to the numbering below. It is proposed that the phenotype of cells should be recorded in this manner (see Murray 1944). Thus cells which react with sera 1 and 3 are called Rh_{13}.

TABLE I—NUMBERING OF SERA ADOPTED IN PRESENT SERIES
Only the four sera, 1, 2, 3 and 1 + 3, were used

Serum no. . .	4	3	2	1	1+3	2+3
Reaction of Europeans (%)	80	84	30	70	87	87
Old term . .	St	anti-Rh	anti-Rh_2	anti-Rh_1	anti-Rh′	anti-Rh″

The statistical value of the series would have been greatly benefited by the use of serum no. 4 (St of Race and Taylor); this was impossible because of the very small quantity of serum available at that time. So far

TABLE II—PERCENTAGES OF SUBGROUPS FOUND IN THIS INVESTIGATION COMPARED WITH THOSE OF WIENER AND OTHERS AND RACE AND OTHERS

Phenotype		Sera				Wiener et al.	Race et al.	% in second hundred of present series
Race et al. Wiener et al.	Suggested name	84% 3	30% 2	70% 1	87% 1+3			
rh	(Rh_4)	−	−	−	−	12·75	16·59	11·0
Rh_1	(Rh_{13})	+	−	+	+	50·0	50·42	51·0
Rh_2	(Rh_{234})	+	+	−	+	15·5	16·02	10·0
Rh_1 Rh_2	(Rh_{1234})	+	+	+	+	17·0	14·29	16·0
Rh_0	(Rh_{34})	+	−	−	+	2·5	0·65	4·0
Rh′	(Rh_1)	−	−	+	+	2·0	0·65	7·0
Rh″	(Rh_{24})	−	+	−	−	0·25	0·92	1·0
Rh′ Rh″	(Rh_{124})	−	+	+	+	. .	. .	. .
Rhy	(Rh_{12})	−	+	+	+	. .	0·69	. .
* Rh_z	(Rh_{123})	+	+	+	+	. .	. .	. .

* Using the sera 1, 2, 3 and 1 + 3 it is not possible to distinguish Rh_z from Rh_1 Rh_2. The presence of an Rh_z gene can only be determined in a suitable pedigree using serum 4 (St or anti-Hr) in addition to the above sera. Race and others, using serum 4, were able to differentiate homozygous Rh_1 cells from Rh_1 rh

I have been unable to produce immune rabbit sera by the inoculation of O Rh-negative cells.

The results of Rh grouping in the second hundred cases of the present series are compared in table II with those of Wiener and his colleagues (1944) and of Race and others (1943, 1944). With these four sera, 25 or 12·5% gave negative reactions and were therefore Rh_4 or negative. Of these negative reactors the sera of two contained Rh antibodies, one of which was a 70% or no. 1 serum, from a woman with a history of transfusion from her husband after a previous post-partum hæmorrhage, and the other a 84% or no. 3 serum. Neither of these antibodies showed any increase in titre towards the end of pregnancy. No detectable Rh antibodies were found in this series in the sera of Rh-positive patients.

DISCUSSION

In the present series 26·2% positive reactions were obtained with no. 2 sera (30% or anti-Rh_2), and this would suggest that the no. 2 sera in use were missing occasional cells containing Rh_2 gene. This has been borne out by an examination of 40 bloods in parallel with sera kindly sent by Wiener from New York, and it was found that a weak reaction was given by Wiener's anti-Rh_2 in two cases, where three no. 2 (anti-Rh_2) sera were negative. This weak reaction may, on the other hand, have been due to the presence of some serum 3 (ordinary anti-Rh) in Wiener's anti-Rh_2, but if they were true reactions they would account for the slightly low figure for Rh_2. One more positive reaction was obtained with Wiener's anti-Rh (84%) than with my no. 3 in the same series.

If the object of an antenatal investigation were only to detect Rh-negative mothers, then the investigation could have been maintained on the original lines with blood obtained by finger prick and with only two sera—anti-Rh′ (1 + 3) and anti-Rh″ (2 + 3)—with no test of patients' sera for antibodies. But the more complete examination for genetic make-up and the presence of antibodies will ultimately be of valuable clinical assistance, as will an examination of the husband's cells when the mother is Rh_4 (Rh-negative), to enable us to forecast possible genotypes of the unborn infants and the likelihood of incompatibility. For a statistical evaluation it is proposed to wait until a much greater number of tests are completed and the obstetrical outcome is recorded. It is then hoped to correlate the clinical and serological findings.

Since this paper was written the sera of four subsequent "Rh-positive" mothers have been found to contain Rh antibodies.

SUMMARY

Rh tests showed that 12·5% of 200 unselected consecutive antenatal mothers were Rh-negative.

The value of examination of expectant mothers' sera is seen in that 2 of the 25 Rh-negatives had anti-Rh antibodies.

The incidence of Rh subgroups in cases 101–200 is shown to fit well with the findings in New York.

A numerical classification of subgroups is proposed.

I would like to thank the obstetrical department of the Middlesex Hospital for their coöperation.

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PHARMACEUTICAL SOCIETY OF GREAT BRITAIN.—At 7 PM on Thursday, Nov. 9, at 17, Bloomsbury Square, London, WC1, Mr. A. L. Bacharach, FRIC, will speak on the properties and uses of penicillin in relation to pharmacy.

TETANY AFTER EXTENSIVE GUT RESECTION

J. A. COSH, MB CAMB.
LATE SENIOR HOUSE-SURGEON, ROYAL HANTS COUNTY HOSPITAL, WINCHESTER

IN the following case the patient survived for a year after an exceptionally extensive resection of gut, but developed late metabolic complications.

CASE-RECORD

A tailor, aged 67, was admitted to hospital in the early hours of March 1, 1941. He had always been in good health. At 8.30 on the previous evening he had been seized with very acute abdominal pain, worst to the right of, and just above, the umbilicus. He had since vomited repeatedly. He was pale and rather restless, making attempts to vomit and obviously in severe pain. Blood-pressure 130/90 mm. Hg, pulse regular, rate 84 per min. The abdomen was not distended or rigid, but was extremely tender generally, especially to the right of the umbilicus. The lungs and heart were normal. A diagnosis of high intestinal obstruction was made, laparotomy decided upon, and an intravenous drip saline set up.

Operation was begun at 3 AM on March 2 under general anæsthesia. A long right paramedian incision was made: a little free fluid was found in the peritoneum but it was not bloodstained. The whole of the ileum, lower jejunum and cæcum were dusky blue and showed no peristalsis. Pulsation could not be felt in the mesenteric vessels, and thrombosis of the superior mesenteric artery was diagnosed. Resection was performed between the lowest loop of healthy jejunum and the middle of the transverse colon: side to side anastomosis was then made and the abdomen closed. It was judged that not more than 3 feet of jejunum had been saved.

Progress.—The patient's condition was satisfactory considering the nature of the operation, and a drip transfusion of a pint of stored blood was given. On March 3 fluids were given by mouth and the intravenous saline was stopped. Next day MacLean's diet was started. From this time onwards the patient improved generally, although he invariably had 3 or more fluid motions daily. He was discharged home on April 11.

Throughout the next 8 months he maintained fairly good health but continued to have intractable diarrhœa, with 4–6 fluid motions per day. His weight dropped from 11 stone to 6 stone and his strength was poor. In December he began to vomit, usually once or twice a day and diarrhœa continued. By the end of February he was vomiting 6–8 times per day and began to complain of painful cramps in his arms and legs, twitching of his face, and pain in the chest.

Readmission.—When readmitted on March 3, 1942, the patient was severely wasted and dehydrated, with generalised tetanic spasm of the limbs and face. The legs were extended and feet plantar-flexed, and the arms were crossed over the body with bilateral "main d'accoucheur." BP 115/70 mm. Hg, pulse 92, respirations 12 per min. The tetany was ascribed to alkalosis caused by the long-continued vomiting and diarrhœa. Accordingly an intravenous drip saline was set up, warmth applied, and ammonium chloride gr. 30 given four-hourly by mouth. Within 7 hours the spasms had completely gone, although Chvostek's test was positive, and Trousseau's test positive in 1 minute. After this, no further evidence of tetany was seen. Blood-urea on March 4 was 62 mg. per 100 c.cm. The intravenous saline was stopped after 2 litres had been given and fluids were continued by mouth. Ammon. chlor. was continued in rather smaller doses. On March 7 the serum calcium was 7·2 mg. per 100 c.cm.; hæmoglobin 94%, red cells 4,750,000 per c.mm., colour-index 0·98, white cells 9600 per c.mm. (polymorphs 90%, lymphocytes 5·5%, monocytes 4·5%). On March 9, calcium gluconate gr. 20 t.d.s. and 'Radiosteloum' 1 capsule t.d.s. were given by mouth. On March 10 a fractional test-meal showed complete achlorhydria with no response to histamine. Later acid hydrochlor. dil. min. 30 was given t.d.s. and the patient was put on a low-residue diet. In spite of this, fluid motions continued to be passed 6–8 times per day, with no apparent response to tinct. opii and bismuth by mouth. There was no further vomiting. The patient's condition gradually deteriorated: he became weaker and more emaciated and eventually died on March 23, 1942.

Autopsy.—The anastomosis was in good working order, though bound down by adhesions in the right iliac fossa.

The remaining jejunum measured less than 3 feet. No disease of the aorta was seen, although there was some atheroma of the coronary vessels; the left coronary artery was exceptionally large and the right only vestigial.

DISCUSSION

It is astonishing that this patient managed to survive so radical a resection for 12 months, during which time his small intestine consisted solely of duodenum and 3 feet of jejunum. Absorption of fluid must have been limited, for almost half of the large intestine was also absent. Calcium is absorbed principally in the upper part of the small intestine, chiefly as calcium chloride, and absorption is favoured by an acid medium. Achlorhydria would in this case be an unfavourable factor. Whittaker and Bargen [1] reported on the postoperative progress of a series of cases of resection or exclusion of the colon with ileostomy. Many of their cases suffered from severe postoperative diarrhœa which often did not clear up until 3 months after the operation. In 8 of their cases investigated there was a postoperative fall in serum calcium, in 2 cases severe enough to produce tetany. In one case tetany only occurred on one occasion, 6 months after operation. In the other case tetany occurred repeatedly and was associated with intractable diarrhœa; autopsy revealed ulceration of the ileum.

In the case reported here the tetany was rapidly and permanently relieved on March 3 by the administration of ammonium chloride and intravenous saline; yet on March 7 the serum calcium was as low as 7·2 mg. per 100 c.cm. and calcium therapy had not then been started. This suggests that tetany was not due entirely to a low serum calcium. Possibly the patient had adjusted himself to a low serum calcium without going into tetany [2] as might happen if the serum calcium were gradually lowered in the presence of a negative calcium balance. Protracted vomiting and diarrhœa then produced alkalosis, depressing the ionisation of the already depleted soluble serum calcium, and precipitating tetany. Measures taken to combat alkalosis then rapidly relieved tetany. Unfortunately, owing to war conditions, no facilities were available for investigating the patient's calcium balance or alkali reserve.

I should like to thank Mr. B. H. Pidcock and Dr. C. B. S. Fuller, of the Royal Hants County Hospital, for permission to publish this case.

SURVIVAL AFTER REMOVAL OF TWENTY FEET OF INTESTINE

C. C. HOLMAN, MB CAMB., FRCS
SURGEON TO NORTHAMPTON GENERAL HOSPITAL

THE following case-history may lighten the anxieties of other surgeons who have to undertake resections on the heroic scale. At the time of operation, imperfect acquaintance with the published work led me to take a gloomy view of the patient's prospects.

A married woman, aged 56, who had undergone abdominal hysterectomy 10 years before, and removal of the breast for carcinoma 6 years before, woke with acute abdominal pain at 2 AM on March 1, 1943; she did not vomit. Later in the morning a message was sent to her doctor, but he did not see her till 1 PM. He gave immediate orders for her removal to hospital, where I saw her at 4 PM. She was a small thin woman in rather poor condition. She did not complain much of pain, but the lower abdomen was distended, tense and very tender on palpation.

Operation was performed at 5 PM. Dr. F. F. Waddy gave the anæsthetic, and I was assisted by my house-surgeon, Mr. I. V. Hankins. An intravenous glucose-saline drip was started during the operation. A foul odour was apparent on opening the abdomen, and a mass of gangrenous gut presented. On bringing this outside, a fine adhesion was found connecting a loop of small intestine to the left side of the pelvis. Round this adhesion the cæcum and mobile ascending colon, together with nearly all the small intestine, had rotated to form a volvulus. The gut was gangrenous and the mesenteric vessels thrombosed. A few feet of the proximal jejunum was normal, so I resected the gangrenous mass, which included the cæcum and ascending colon. Lateral anastomosis was performed between the jejunum and transverse colon. The patient's condition was very poor during the operation, but improved on her return to the ward. Mr. Hankins and I measured the small intestine removed against the side of a three-foot sink, much as a draper measures ribbon. We found there was 19 ft. of small intestine, as well as the cæcum, ascending colon and some of the transverse colon.

Much to our surprise, the patient made a good recovery. The intravenous drip was continued for 48 hours. On March 5 the bowels acted 12 times, on the 7th only 6 times, and by the 12th they were acting only 3–4 times in the 24 hours. She was fed on a low-residue diet with plenty of carbohydrates and little fat. In the early days she was given mist. kaolini et morphinæ *NWF*; later she was given iron. She went home on March 25 in fair health and weighing 6 st. 6 lb., her bowels acting about 4 times a day. By May 7 she had gained 2 lb.; she was troubled with flatulence and her bowels usually acted only once daily. By Oct. 19 she had gained more weight and was actively engaged on parish work as a clergyman's wife. On Feb. 15, 1944, she weighed 7 st. 7 lb., "a little more than before her operation." Her bowels were acting once a day but were liable to be upset if she took fruit or vegetables. Her diet was: breakfast, egg, bread and butter and marmalade; lunch, what was going, with a moderate amount of potatoes; light tea; supper, soup, bread and cheese.

Investigations (Dr. F. A. Knott) on March 22, 1944, showed that her stool was semi-formed but slightly pale owing to a mild excess of unsplit neutral fat. There was no excess of split fat or of carbohydrate; only a few undigested muscle-fibres were present. Pus and blood-cells were absent and there was only a slight excess of intestinal mucus and epithelial debris. Cultures contained the usual fæcal organisms without any evident distortion of the flora. Blood-count: hæmoglobin 82%, red cells 4·5 million per c.mm.; colour-index 0·91, white cells 6800 per c.mm.; differential count normal. A few of the red cells were slightly pale and irregular in shape but the blood-picture showed nothing else abnormal.

On Sept. 16 she was said to be still keeping well.

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CELLULITIS
DUE TO A HÆMOLYTIC STREPTOCOCCUS TYPE C

B. PORTNOY, MD MANC.
MAJOR RAMC, COMMANDING A MOBILE BACTERIOLOGICAL LABORATORY

R. REITLER, M D
MEDICAL OFFICER IN CHARGE OF GOVERNMENT HOSPITAL LABORATORY, HAIFA

IN a small outbreak of cellulitis we observed 27 similar cases occurring within a short time in a limited area.

The patients complained of malaise, and after 3–4 days had pain, usually in one or other pectoro-axillary region; at this stage examination revealed only slight local swelling and tenderness. Within the next 3 days the part involved became hot and tender and the overlying skin red. The process tended to spread locally; there was no raised edge but the line of demarcation of the affected area was fairly distinct. The lymph-glands in the immediate vicinity were slightly enlarged and tender. The toxæmic manifestations and high temperature (up to 104° F. and in one case 106°) were rather alarming. In the treated cases, after a week or 10 days' sulphonamides therapy, the lesion was sufficiently localised for surgical intervention. On incision, innumerable small pockets of pus, varying from pin-heads to 5 mm., were found between the skin and deep fascia, and in addition several larger pockets up to 2 in. diameter. The infected part was a honeycomb containing thick pus—about ½ pint was removed. Pus continued to drain for about a week, after which there was uneventful convalescence.

In 16 cases the lesion was in a pectoro-axillary region, in 6 in the groin, in 3 cases in the neck and in 2 below the knee. In each case only one region was affected. Of the 27 patients 22 were males, mostly aged 18 to 30 (youngest 6, oldest 60). Except for 5 soldiers, they were all Arab civilians.

Autopsies were not obtainable in the 4 fatal cases, but 21 of the others were investigated.

BLOOD

White-cell counts showed moderate leucocytosis (up to 20,000 per c.mm., 82–92% polymorphs) and a pronounced Arneth "shift to the left." In 20 cases the granulo-

cytes showed toxic and degenerative changes (even before much sulphonamide had been given). Red-cell counts and hæmoglobin estimates revealed a rapidly occurring anæmia, with a colour-index of unity. A typical count was 3·5 million cells with 65–70% Hb; one case had a count of 2 million and 40% Hb only a week after the onset. Nucleated cells were often seen, with aniso- and poikilo-cytosis, and reticulocyte counts were raised (up to 12%). The reticulocyte count and excess of nucleated forms are evidence of hæmolytic anæmia. Numerous examinations for malarial parasite were negative.

BACTERIOLOGY

The technique used for the isolation of the hæmolytic streptococcus which proved to be the causal organism was as follows:—

The skin over the lesion was painted with tinct. iodi after cleaning with surgical spirit. Sterile isotonic saline (2 c.cm.) was drawn into an all-glass 5 c.cm. sterile syringe, and after passing the needle once or twice through a flame it was pushed into the tissues to a depth of about 3 cm. About 1 c.cm. of the saline was then injected into the tissues and the plunger immediately drawn back to create the maximum negative pressure in the barrel. A few drops of the injected saline thus re-entered the syringe and mixed with the saline remaining in the barrel. The contents were then sprayed on to blood-agar plates and incubated. This procedure can be carried out in the early stages before pus is formed.

After 24 hours' incubation every one of the cultures examined consisted of a pure growth of hæmolytic streptococci. Blood-culture was carried out in 12 cases and 4 yielded the hæmolytic streptococcus. In all these cultures (including the blood-cultures) the organism belonged to type C (Lancefield). In the later stages the organism could be demonstrated in direct smears. No other organism was isolated except *B. pyocyaneus* in one case, and this was almost certainly a contaminant.

The organism.—Stableforth (1938) believes that type C hæmolytic streptococcus should be subdivided into subgroups a, b and c. According to his findings, subgroup c is found only in horses, being the causative organism of "strangles" (*Strep. equi*). Subgroup c (*Strep. pyogenes equi*) was cultured mainly from suppurative and inflammatory lesions in horses, and occurs sporadically in dogs and cows. Subgroups a and c were never found in man, but subgroup b was found in some mild infections in dog and man. We were unable to ascertain the subgroup of the organism we isolated, but certain features were noted.

On 5% rabbit-blood agar it produced marked β-hæmolysis and on microscopy appeared as medium-sized chains (4–12 members). No growth took place on 10% bile-agar except for one strain which produced feeble cultures. It fermented lactose and salicin but not sorbite, æsculin or mannite. Because of lack of reagents the full Edwards (1932) test for differentiating human from animal strains could not be carried out; but the fact that sorbite is not fermented suggests that the organism is primarily of human origin.

The pathogenicity of type C for humans is usually described as "low" (Topley and Wilson 1938). Lancefield and Hare (1935) say that there is no evidence that this organism is of importance as a cause of human disease, although Plummer (1935) studied 2 cultures from puerperal fever and 3 from cases of erysipelas. Certainly in our cases the organism was highly pathogenic, producing 4 deaths.

Animal experiments.—Mice usually died 24–72 hours after intraperitoneal inoculation with either saline recovered from the cellulitis area (as described above) or, in some cases, with whole blood from the patient early in the illness. Hæmolytic streptococci of the same type were easily demonstrated in the splenic emulsions. One mouse recovered but showed no immunity to a second such inoculation. Emulsions of spleens from infected mice were much increased in virulence after 3–4 passages; splenic emulsion in saline then caused cellulitis on injection into the groins of guineapigs. Otherwise the guineapig was resistant.

TREATMENT

In 22 cases drugs of the sulphonamide series were administered by mouth, 40–60 g. being given in the first 7–10 days. Of the 5 untreated cases (these did not come into hospital) 4 died. It therefore seems obvious that sulphonamides should be exhibited without delay once the diagnosis is established. Surgery was carried out in all cases with localisation, and it is noteworthy that localisation, when it did occur, appeared first in the area which had been "needled" when searching for the causal organism. Repeated transfusions of whole blood were given in 4 cases with Hb below 50%.

EPIDEMIOLOGY

More than half the patients came from area 1, containing, within 5 miles of each other, villages A (2000 inhabitants), B and C (each of 200 inhabitants). Area 2 includes villages near a fairly large town (D); it is about 60 miles from area 1. The cases were distributed as follows:—

Area 1—Village A	..	13	
„ B	..	2	
„ C	..	1	
Area 2—Town D	..	7	
Village E	..	2	
„ F	..	1	
„ G	..	1	

Two of the men were brothers living in the same house, and another 2 were clerks working at the same desk.

As type C hæmolytic streptococcus is usually an animal strain, we decided to investigate animals in the area. With the help of the local veterinary officer, we examined 12 cows and their milk, but with negative findings.

Most of the males in area 1 were employed in road-making, and it is possible that the streptococcus is either inhaled with contaminated dust or rubbed into a very small abrasion in the epidermis; the outbreak ceased when the rainy season commenced. The exact mode of entry of the organism is obscure. If it had entered an abrasion on an extremity (the usual cellulitis history) one might have expected the classical picture of a lymphangitis streaking up an arm or leg. The question of infection via the digestive tract has been considered above. The evidence for the causation of pathological lesions by inhalation of fine sprays of streptococci is inconclusive.

While these investigations were in progress, sporadic cases of classical cellulitis following infection via an abrasion were seen in two hospitals. These showed classical lymphangitis spreading from the point of entry of the organism to the site of the lesion with early involvement of lymph-glands. In 9 such cases hæmolytic streptococci were isolated and these all proved to be type A (Lancefield).

In answer to our inquiries about previous outbreaks in the country, Dr. I. Itayim of the Department of Public Health informed us that streptococcal cellulitis (usually localised in the pectoro-axillary region) had been observed in the summer of 1940 in his district, mainly among labourers engaged in roadmaking; the type of organism was not determined. It seems likely therefore that such small outbreaks occur from time to time and it would be of interest to ascertain whether they are all caused by a type C hæmolytic streptococcus. If so, the peculiar uniformity in the clinical manifestations (cellulitis without classical lymphangitis) would have to be attributed to this particular organism.

SUMMARY

Within a short period 27 cases of cellulitis were seen, chiefly in Arab villagers. The condition appeared to be a primary cellulitis without lymphangitis.

The 21 cases investigated yielded a hæmolytic streptococcus type C (Lancefield) which has not hitherto been considered pathogenic to man. Its mode of entry is obscure.

Of the 5 patients who did not come into hospital and did not receive sulphonamides, 4 died. The other 22 were treated with sulphonamides and surgical drainage where necessary, and they all recovered.

We are indebted to Lieut.-Colonel P. Carney, Major J. Dudley-Rose and the medical officers of the Government Hospital, Haifa, for their full coöperation in the completion of this investigation.

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RAPID TEST FOR THE SERODIAGNOSIS OF SYPHILIS

F. RAPPAPORT F. EICHHORN
BEILINSON HOSPITAL, PETAH TIKYA, PALESTINE

IN trying to determine the part played by mastic in this test [1] we gradually diminished the amount used. We found that neither the scope nor the efficiency of the reaction is altered when this reagent is omitted, provided enough serum protein is added. Evidently the mastic acts only as a protecting colloid. Furthermore we found that any Kahn antigen can be used for this reaction, even one which is not suitable any more for carrying out the original Kahn method. It is only necessary to titrate the antigen before use.

Reagents.—(1) Kahn antigen is saturated with Scharlach R [2] and shaken vigorously for 10 min. Then it is filtered and to 8 parts of this coloured antigen 2 parts of non-coloured antigen are added. (2) NaCl, 9·0 grammes; $Na_2HPO_4 \cdot 2H_2O$, 0·35 g.; distilled water to 100 c.cm. (3) Physiological saline solution (0·9%).

Titration of antigen.—To a series of test-tubes each containing 0·25 c.cm. of Kahn antigen 0·9, 1·0, 1·1 and 1·2 c.cm. of salt solution (reagent 2) are severally added. The mixtures of antigen thus obtained are then tested with known positive and negative sera. The amount of salt solution which gives the clearest results is recorded, and the same ratio of Kahn antigen to salt solution is used for the preparation of the final antigen.

Preparation of the antigen for use.—0·5 c.cm. of Kahn antigen (1) is placed in a test-tube and the necessary amount of reagent (2), generally 2·0 c.cm., is added drop by drop while the test-tube is shaken. The antigen is then ready for use. If required, smaller or larger quantities of Kahn antigen and salt solution can be mixed provided the above ratio is maintained. The antigen thus prepared is stable only for 2–3 days and must be kept at high room temperature, the optimum being 20–25° C.

The technique of O-rapid test (without mastic) is:

For serum.—Place 2 drops of serum in a small test-tube (either active or inactive serum can be used) and add 1 drop of the antigen. Shake gently for half a minute and add 2 drops of physiological saline solution (3). Shake gently for several seconds and centrifuge at high speed for about 2 min. Read after tossing the tube gently. In a positive case a heavy red precipitate appears; in negative cases the solution remains unchanged. A very strong positive reaction shows the flocculation even before centrifugation.

For cerebro-spinal fluid.—Place 4 drops of CSF in one small test-tube and 6 drops in another; add 1 drop of non-syphilitic serum and 1 drop of antigen to each tube, shake for 1 min. and centrifuge at high speed. The reaction is positive if, after gently shaking, big red particles are seen floating in the liquid medium; in negative cases the fluid remains unchanged.

In both tests, the M-rapid test (with mastic) and the O-rapid test (without mastic), inactivation of the serum is achieved by the addition of the hypertonic salt solution (reagent 2). The final salt concentration to which the serum proteins are exposed is as follows:—

M-rapid test.[1]—0·5 c.cm. antigen, plus 2·5 c.cm. 9% NaCl, plus 1·6 c.cm. water, equals 4·6 c.cm. About 0·1 c.cm. is lost by retraction due to alcohol; the 2·5 c.cm. 9% saline solution contains 0·225 g. NaCl; therefore 4·5 c.cm. of the antigen-saline mixture contains 0·225 g. NaCl—i.e., 5%. On addition of an equal amount of serum, the final concentration of NaCl is 2·5%.

O-rapid test.—0·5 c.cm. antigen, plus 2·0 c.cm. 9% NaCl equals 2·5 c.cm. About 0·1 c.cm. is lost by retraction due to alcohol; 2·4 c.cm. of the antigen-saline mixture contains 2·0 c.cm. of 9% saline solution (0·18 g. NaCl); and therefore a concentration of 7·5% NaCl.

The two rapid tests are equally sensitive—and the choice between them depends on circumstances.

The M-rapid test requires reagents of an adequate quality, whereas the O-rapid test can be carried out with any Kahn antigen. The M-rapid antigen, kept on ice, is stable for a long time, whereas the O-rapid antigen keeps only 2–3 days. The flocculi of the M-rapid test are easier to observe than those of the O-rapid test.

1. Rappaport and Eichhorn, *Lancet*, 1943, i, 426.
2. The test may also be performed without addition of a dye.

When the CSF is to be tested in a case where the serum gives negative reactions it is advisable to perform both the M(mastic)-rapid test and the O-rapid test. So far we have tested 98 CSFs of which 14 were positive and the rest negative with both tests. With none have we found any discrepancy between the two methods.

Medical Societies

NUTRITION SOCIETY

AT a meeting of the Scottish Group, held at Dundee on Oct. 7 under the chairmanship of Dr. W. T. MUNRO, a discussion on

Diet and Tuberculosis

was opened by Miss I. LEITCH, D SC, of the Rowett Institute. She reviewed the literature of the subject and recalled the experiences recorded after the last war. The present position was surveyed by Dr. J. S. WESTWATER of the Department of Health.

Dr. R. Y. KEERS (Tor-na-Dee) said that although malnutrition was a factor in lowering resistance there was no unequivocal evidence that it was the sole or even the most important precipitating cause. War-time diet, as far as the tuberculous subject is concerned, is not deficient in nutritive properties. The patients at Tor-na-Dee are drawn from a section of the community in which malnutrition is not encountered, yet this section has not been spared in the rising incidence of tuberculosis. Among these patients the common factors were increased hours of work and a curtailment of the time usually devoted to rest, and in no instance has dietetic deficiency played an obvious part. Dr. Keers thought that the war-time diet is perfectly satisfactory for the patient under treatment. Recently he carried out an investigation to find out whether a larger consumption of fat would be beneficial. Patients who received extra fat showed a more rapid gain in weight than did the controls during the first four months, but at the end of nine months there was little difference between the groups. This experience showed that there is nothing to be gained and even something to be lost by attempting to force the intake of fat beyond that which the patient can ingest and assimilate completely. The dietetic treatment of tuberculosis demands no more than a full well-balanced intake. Cod-liver oil is not essential and should be reserved for those whose digestion is sound.

Dr. STUART LAIDLAW (Glasgow) pointed out that although there had been a considerable increase in notification of tuberculosis the death-rate from this disease was little changed. He also noted that the number of deaths from acute bronchopneumonic tuberculosis had decreased during the war. He thought that, while the calorie intake available to the tuberculosis patient was satisfactory, an additional allowance of protein would certainly be helpful in aiding recovery.

Reviews of Books

Human Constitution in Clinical Medicine

GEORGE DRAPER, MD, associate professor of clinical medicine, College of Physicians and Surgeons, Columbia University; C. W. DUPERTUIS, PH D, physical anthropologist, constitution clinic, Presbyterian Hospital, New York; J. L. CAUGHEY, jr., MD, associate in medicine at the college. (Hamilton. Pp. 273. 21*s*.)

WHEN treating his patients the general practitioner takes into consideration—often unconsciously—not only the hammer's blow but the genetic, congenital, constitutional, social and psychological factors which make up the anvil's ring. He knows his man and without realising it is the modern exponent of holism in a specialist world. This remarkable book may be regarded as the hitherto silent total of a GP's experience analysed, examined, and subjected to statistical treatment. Beginning with the obvious fact that no two people suffering from the same disease ever display exactly identical clinical pictures, the authors consider in turn the various known causes for the variation—genetics, the vagaries of growth, the mosaic of an[illegible] anthropometry and somatotypes, the phys[illegible] variations of autonomic response and the influe[illegible]

psychic trauma. The result is a book which should be read by the student (and will be with the greater appetite because it is quite useless for examinations); by the GP who will find much of his subconscious knowledge illuminated and sanctified by science; by the bright young MRCP who knows his Price, but little else, by heart; and by every specialist who engrossed with one viscus is in danger of forgetting the proximity of others.

Artificial Pneumothorax in Pulmonary Tuberculosis

T. N. RAFFERTY, MD, formerly resident physician Detroit Municipal Tuberculosis Sanatorium, Mich. (Heinemann. Pp. 192. 21s.)

THIS is no book for a novice wishing to embark on collapse therapy without other guidance. It does not cover the actual technique which, as the author says, is well covered elsewhere. "It is unfortunate," he adds, "that the belief has been allowed to grow in some quarters that the mere ability to introduce air safely qualifies one to administer pneumothorax. . . Nothing could be further from the truth." Statistics of results may be misleading if they cover cases well handled and those other cases in which indications and management have been not so good. Dr. Rafferty, analysing published work, comes to the conclusion that there are not now, and may not be for some time, any statistically sound data indicating the real effect on prognosis of properly administered collapse therapy. The rest of the book is therefore devoted to a discussion of the basic principles governing choice and management of cases. This is presented clearly, without that authoritative dogmatism which so often confuses medical writing. His review of recent work is critical, and his conclusions bear the stamp of personal experience. Particularly valuable are chapters on the minimal lesion, primary thoracoplasty, and the tension cavity. Workers in this country may question the importance attached to tracheobronchial tuberculosis, but his summary of American work on the subject is useful. His clear-headed chapter on effective and ineffective pneumothorax is followed by one equally good on closed intrapleural pneumonolysis. A chapter on the physiological mechanism of artificial pneumothorax would have added to the value of this discussion.

New Inventions

SIMPLIFIED SHOULDER ABDUCTION SPLINT

BEFORE the beginning of this war I had devised and used a light abduction splint for convalescent cases which no longer require the support of an abduction splint of the common type, or of a thoracobrachial plaster, and for those injuries around the shoulder which only involved soft tissues, or such bony ones as did not require traction. My reasons for introducing this light splint were those of economy and the disadvantages of any heavy closed support in a very hot and constantly humid climate. When war conditions called for immediate and drastic economy I began to use this splint for all cases requiring abduction. Minor modifications and additions were at once devised to allow traction when indicated.

The splint is light, and is easily applied with the patient standing, sitting or lying, conscious or unconscious. Little movement of the patient is necessary, and little help from assistants. The Cramer wire employed can be used again and again, and if it is wanted for some other purpose it is available after simple straightening; only one piece of broad Cramer wire is used for each splint.

The material I use for the adjustable bands is 'Newar,' a coarsely woven band made of soft strong 2½ in. wide by ⅛ in. thick. This material is used in place of springs in beds in this country. Each band has a buckle at one end and a corresponding series of holes, reinforced by lining with any available strong cloth, on the other. Figs. 1–4 show the application of the splint. Fig. 5 shows the bands. Recently it has been impossible to obtain metal buckles, and I now use tapes tied through holes on each end of each band.

Extension can be had by adding to the wire supporting the arm at the elbow a bend another piece of Cramer wire bent up to a right angle and projecting about 3 in. or more, according to the type of traction to be employed. To this added part the attachments for traction can be made.

Where a case is likely to need abduction the bands are adjusted on the patient before he is brought to the operating theatre. At the end of the operation it is

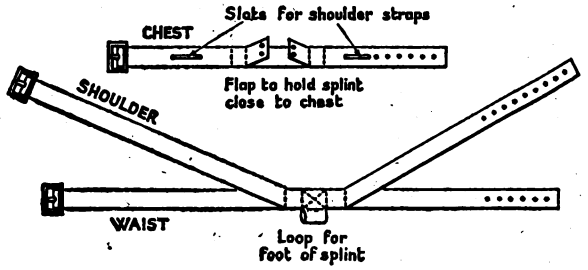
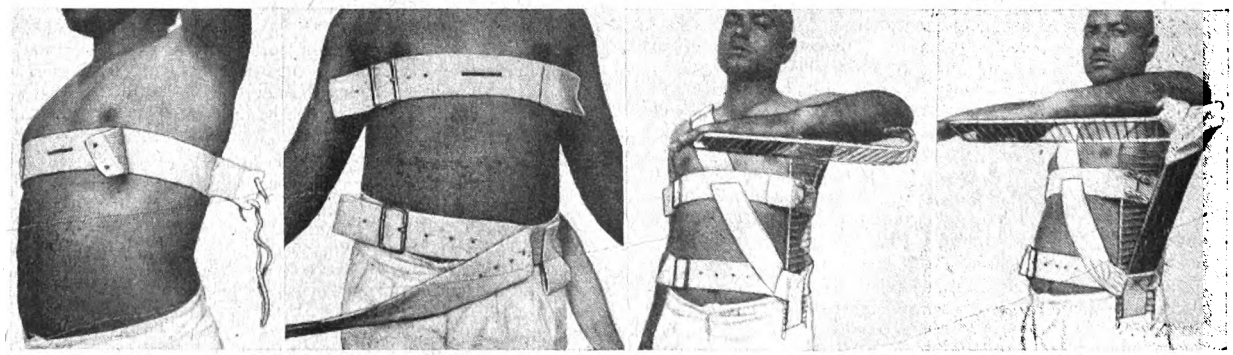


Fig. 5—Pattern on which bands are made.

then simple to place the Cramer wire in position without the least disturbance to the patient, or fear of displacing the bony alignment. Nursing the patient in this splint is very easy. He can lie down comfortably without displacing the arm and the splint. I have also found it useful for abduction in cases where there is a gunshot wound of the chest, upper extremity, or shoulder and scapular regions; with multiple wounds of both upper extremities, two such light splints can be applied to the same patient with perfect comfort. In cases with chest wounds as well as wounds of the upper extremity, inspection and aspiration of a hæmothorax are not materially interfered with by the presence of the splint.

A. T. ANDREASEN, FRCSE, FRSE
Lieut.-Colonel, IMS.
India.



1 2 3 4

Fig. 1—Chest-band, showing flaps to enclose upright of Cramer splint. These flaps lace together over the upright.

Fig. 2—Waist-band applied. The model holds out front and back crossers bands to show their attachment to the waist-band. The supporting loop of material for the foot of the Cramer upright is shown in the attachment of waist- and shoulder-bands.

Fig. 3—Cramer wire in place, unpadded to show bends. At the axilla the anterior band is an angle, the posterior one a smooth curve; thus the support of the upper arm is brought forward to give anterior shoulder flexion. External rotation can be obtained by arranging the angle of the forearm part suitably.

Fig. 4—Reinforcement by a piece of wood, its length being determined by the degree of abduction necessary.

THE LANCET

LONDON: SATURDAY, NOVEMBER 4, 1944

Opportunity for Films

THE use of the film in medicine is of respectable age. Dr. A. PIJPER, describing its application to biology, recalls that "Dr. Braun of Vienna filmed the mammalian heart in 1897, and in the same year Schuster of Berlin filmed the abnormal gait of patients. The next year, 1898, saw the filming of the first surgical operation, by Doyan, the famous French surgeon." Yet in a review of a new film in 1941 we had to admit that academic circles in England "have hardly noticed this new weapon."

What advantages has the film to offer as a teaching medium? First, it appeals chiefly to the eye, and, as Lord HORDER has remarked, we "are most of us visualists rather than auditives." Secondly, it is free from limitations of time and space. It can show, within a period of minutes, the disease environment, the onset, the signs and symptoms on entry to hospital, the treatment adopted, and the function of the patient when recovered. It can show all these at any time, for any disease, to fit a planned teaching programme; there is no need to call the patient back and ask him to describe "in his own words" how he felt on such and such a day. And he can be presented on different occasions with the emphasis on different aspects of his case—for example the clinical, the medicolegal or the epidemiological. Such repeated showings in different contexts not only help to fix the material in the mind (just as a textbook must be read repeatedly to obtain all the information in it); they also show that we are dealing with people, and not with a disease which happens to be fixed to a person. The film which can enlarge microscopic objects can also compress hours into seconds, so that developmental processes can be displayed clearly and with emphasis; or it can magnify seconds into minutes. With the aid of the film, demonstrations by the best teachers can be available all over the country. Complex experiments will always work on the screen; so students are not kept waiting by some vagary of the biological material. And, best of all, everyone can see clearly and simultaneously.

As MACKEITH and LONGLAND suggest on another page, the potentialities of the medical film are not being realised, because there is no single body to coördinate existing activities. A clearing-house is needed to collect information about existing films, to improve facilities for borrowing them, to draw up a list of subjects on which films are most urgently wanted, and to prevent waste of effort: if a central body of this kind received notice of prospective films before energy and thought had been expended on them, it would be able to advise the sponsors whether the subject was already being covered in a film, and when two independent sponsors suggested the same subject they could be introduced and offered the chance to pool their resources. If, after the war, the Films Division of the Ministry of Information can be built up into a permanent organisation it could undertake these advisory functions; but failing this it seems desirable that some national body, such as the Ministry of Health or the Medical Research Council, should form a medical films section. If this happens they would do well to enter the field in earnest, and in order to make the best use of their funds should devise a long-term plan and form a film unit of their own, employing it continuously. (That such a scheme can be successful was proved by the success of the old General Post Office unit.) Further, once they had started they would probably act also as coördinating and distributing centre, and from the medical teachers' viewpoint this centralisation would be ideal.

Meanwhile, there seems to be no lack of activity around medical films; most of the essential requisites—loan library, technical advice, reference files, impartial evaluations of merit, facilities for copying, and finance for new films—exist in embryo form in different places. But a central body is required to preside over their birth and infancy, and to bring them up in one happy family. This is a task worthy of the paternal interest of one of the philanthropic trusts.

Emergency Rations

THE committee on the care of shipwrecked personnel,[1] set up by the Medical Research Council in 1941, insisted that water is of more importance than food in preserving life. Without water a man has little chance of living more than 10 days, while in a lifeboat a shipwreck survivor would probably not last as long; the longest recorded survival is 11 days. The body requires each day nearly a litre of water to cover the unavoidable losses from skin and lungs, and in the urine. The daily intake of water has to be a relatively large proportion of this figure if the body is to avoid the unpleasant consequences of "water debt." Experiments carried out in England, in which men on lifeboat emergency rations drank various amounts of water, showed that there was little difference in condition between the men receiving 200 c.cm. of water daily and those receiving none; but as the water ration increased the good effect became relatively more striking, and at 700 c.cm. a day in some cases the body-weight remained steady. In general it was found that a man could keep in fairly good condition on 500 c.cm. a day. The same conclusion has now been reached by American workers. Both British and American recommendations are that a minimum daily intake of 500 c.cm. should be aimed at.

IVY and his collaborators mention two methods for removing salt from sea-water, and similar methods have been explored in this country. Thus a process similar to the one referred to by IVY as the 'Decalso' (Permutit, USA), which uses mixed ion adsorbents, was being employed in the analysis of biological material in the summer of 1942,[2] and was, as far as is known, first applied to the purification of sea-water at that time. It has since been adopted by the RAF and the Fleet Air Arm. The MRC committee recommends reliance on stored water, and

1. Some of the results of the work initiated by this committee are included in War Memo No. 8, "A Guide to the Preservation of Life at Sea after Shipwreck" (HMSO, 1943). Results of work on similar lines by American investigators have recently been published (Ivy, A. C., Futcher, P. H., Consolazio, W. V., Pace, N., Gerrard, E. J. *Nav. med. Bull. Wash.* 1944, **42**, 841. *J. Amer. med. Ass.* 1944, **125**, 494) confirming, in general, the advice given by the Medical Research Council.
2. Platt, B. S., Glosk, G. E. *Biochem. J.* 1942, **36**, 10.

War Memo No. 8 gives a plan by which this can be utilised most efficiently. On the first day adrift, provided there is no excessive sweating, no water should be drunk, for the body contains a litre or more of "spare" circulatory water. Thereafter water should be issued at the rate of 500 c.cm. a day until the last 500 c.cm. (per man) is reached. At first sight this seems a rather liberal allowance when the supply is so limited, but the procedure is justified because men are rarely adrift for more than a week without being picked up. Early in the war men were dying of thirst in lifeboats carrying an ample supply of water, owing to a mistaken notion that it was necessary to calculate the water ration on a period as long as 60 days. Experiments in England and more recently in USA have shown the value to the man on the raft of small supplements of sea-water, permissible only when the ration itself is practically salt-free. *War Memo No. 8* did not recommend sea-water supplements, owing to the danger that the safe limits might in practice be exceeded; but it did allow rinsing the mouth with sea-water, and with frequent rinsings a considerable supplement is in fact obtained since with each rinse about 10 c.cm. of water is retained. IVY and his co-workers in America, on the other hand, started to exploit this ability of the body to take sea-water; they developed various salt-free liquid rations—e.g., tomato juice and consommé—which were to be diluted with sea-water in the ratio 5 parts of liquid to 1 of sea-water.

If the man on the raft can be allowed some food it will spare his body tissues, and, whatever his daily ration of water, will prevent his condition deteriorating so rapidly. But food to supply full calorie requirements cannot be carried without jeopardising the water-supplies. Moreover, in the British experiments it was found that men with a water intake down to 500 c.cm. a day would not tolerate a daily food intake supplying much more than 500 calories, and indeed some subjects failed to take even this much. The American workers and the MRC memo aim at a calorie level of this order. Emergency rations in existence before the war, based on experience only, also had about this calorie value. The way in which these 500 calories are provided is based on principles soundly established by experiment and experience:

1. Protein is contra-indicated because when it is metabolised urea is produced which requires extra water for its excretion—e.g., after an ounce of pemmican there is a 50% increase in the rate of urine excretion over the next 3 hours; this is not seen after eating biscuits or chocolate.
2. Carbohydrate is desirable because it spares body proteins; hence it reduces the endogenous urea excretion and further reduces the necessary urine excretion.
3. Fat is desirable because of its protein-sparing effect and because, according to American investigators, it reduces the nausea produced by a high carbohydrate diet.
4. The diet should supply the maximum amount of water of oxidation; protein gives less than its own weight of water when oxidised, carbohydrate its own weight, and fat a little more.
5. The chloride content of the diet should be minimal.
6. It should have good keeping quality under a wide range of climatic conditions.

The ideal ration then contains no protein or salt and the maximum amount of fat. But as the protein-sparing effect of fat fails when more than half of the diet is fat, the physiological ideal is 50% fat and 50% carbohydrate. The diet should also be palatable and easy to eat; variety is an important factor in palatability, a point perhaps overlooked by BUTLER and by IVY and his co-workers. The Ministry of War Transport emergency ration contained pemmican, nearly half of which is nitrogenous matter; the old-style American raft ration was also rich in protein because it included pork luncheon meat. Both rations therefore were to be condemned on their diuretic effect. The ration now recommended by IVY is a tablet ration of butterscotch (i.e., sucrose-lipid-citric-acid tablets) with multivitamin tablets and chewing-gum. The vitamins are included mainly because the men have faith in their powers; the chewing-gum to promote salivation, clean the mouth and release nervous tension. The important food is the butterscotch; this contains 20% fat and is free from salt and protein, so it approximates to the physiological ideal. It falls down however in the matter of variety; even the sweet-toothed American might be expected to quail at the prospect of a diet consisting exclusively of butterscotch. The longest test of the diet reported is one in which 18 men took the diet for 4 days; it was tolerated well in this short test. The tablets soften when kept in the heat but do not deteriorate. The MRC ration, on the other hand, has managed to achieve variety; there are four items:

Biscuits of high fat content	20% fat
Butter fat	100% ,,
Chocolate	40% ,,
Full-cream sweetened condensed milk	20% ,,

An ounce of each of these foods is recommended daily. The total fat content is not far short of the ideal 50%. The condensed milk is included because it is popular (it was used as a lifeboat ration in the last war, and has been used by enemy castaways in this war); it contains only a little protein (5 g. per ounce). All the items keep well. The ration has stood up to more severe trials than those to which the American tablet ration has been subjected—in one instance 20 men lived on the ration, with a limited water intake, for 10 days; in another, 3 men lived on it for 6 days with no fresh water at all in the last 2 days. In both cases the subjects still found the diet appetising and acceptable at the end of the test. Thus the American and British workers have come to substantially the same conclusions concerning the food and water requirements of the man on the raft, but the MRC committee seems to have shown more enterprise than the Americans in prescribing a diet to meet those requirements.

A Year's Work on the Rh Factor

THE past year has brought us much new information about the cause, prevention and treatment of fœtal hæmolytic disease. In 92–94% of cases this is due to Rh-negative mothers becoming sensitive to the blood of their Rh-positive babies[1,2]; and the proportion due to Rh sensitisation is higher still if the rare immunisation of Rh-positive mothers is taken into account. The small remainder may be due to

1. Levine, P., Burnham, L., Katzin, E. M., Vogel, P. *Amer. J. Obstet. Gynec.* 1941, **42**, 925; Boorman, K. E., Dodd, B. E., Mollison, P. L. *Brit. med. J.* 1942, ii, 535 and 569.
2. Race, R. R., Taylor, G. L., Cappell, D. F., McFarlane, M. N. *Brit. med. J.* 1943, ii, 289.

sensitisation to the group factors AB and possibly M, N or P, but cases of the last three have yet to be described. The doctor can now give definite advice and practical help in what may be a very delicate sociological problem, and the expert serologist can with certainty decide whether a husband can father a normal child with a sensitised wife.

Ideally Rh testing should be done in all antenatal clinics, but the technical difficulties are so great that only comparatively few of the larger laboratories are likely to be able to cope with the work. In our present issue MURRAY records the opening stages of an investigation of unselected antenatal mothers. Of the first 200 women 12·5% were Rh-negative. At least 2 of these 25 Rh-negatives actually had an Rh antibody, and these women may expect a baby with hæmolytic disease. According to BOORMAN, DODD and MOLLISON,[3] "the main importance of making Rh grouping tests during pregnancy as a routine is the detection of Rh-negative women to ensure that if they require blood-transfusion they shall not receive Rh-positive blood." But recent work shows that a more complete investigation than the simple detection of the negatives is desirable. The same workers found an Rh antibody in the serum of 93 out of 97 cases of fœtal hæmolytic disease, a proportion which seems rather high in view of the findings of WIENER,[4] though it agrees with the findings of RACE and his colleagues. In every family where fœtal hæmolytic disease is suspected, samples of whole blood from the father, the mother and any existing children should promptly be examined. If an Rh incompatibility between husband and wife is found, then the mother's serum should be titrated repeatedly for antibody content. If an irregular antibody is present in the mother's serum fœtal hæmolytic disease is highly probable; if no antibody is found on a single occasion the disease may still appear, since the severity of the affection of the infant is not directly related to the titre of the mother's antibody. In an established case it is advisable for pregnancy to end as soon as a viable child may well be expected, since there is no possibility at the moment of neutralising the maternal antibody by injecting appropriate group-specific polysaccharide. Many obstetricians are now practising induction a month to six weeks before term, and perhaps cæsarean section may be considered. By a family study it is often possible to predict the genotype of the unborn infant, particularly if any previous children are available for test; thus it is unnecessary to attempt any dangerous method of obtaining fœtal blood.

At the birth, group-O blood of the mother's Rh subgroup should be on hand in case either mother or child need it. Mother's subgroup is necessary for the child so that the injected cells cannot be harmed by the maternal antibody in the child's circulation. The blood used must come from a man who has never been transfused or a woman who has had neither transfusion nor pregnancy. In practice group-O Rh-negative blood cross-matched against mother's serum is usually employed, being free from danger. When the ABO group of mother and infant agree it is theoretically possible to give the child the mother's cells washed free from the plasma which contains the dangerous antibody, but this is seldom practicable. A suitable donor is more likely to be found among the mother's than the father's relations. The father's blood should never be used. Failing Rh-negative blood, in extreme emergency group-O Rh-positive blood may be used for the baby of a Rh-negative mother, but its benefit is likely to be transient and lysis with jaundice may occur. When the infant is born, a smear of cord blood is examined, and some suggest leaving the cord long to permit transfusion of blood into the umbilical vein. Recently successful transfusions into tibial bone-marrow have been reported, but the more usual route is intravenous by cutting down. The quantity of blood transfused may be calculated according to the formula

$$\frac{\%\text{ rise in Hb required}}{100} \times \text{blood-volume of infant}$$

and this usually means 150–250 c.cm. (The blood-volume is assessed as 40 c.cm. per lb. body-weight.) GIMSON[5] showed no immediate mortality in 18 infants of Rh-negative mothers transfused with group-O Rh-negative blood, compared with 6 deaths out of 17 cases treated by transfusion without regard to Rh grouping. There is a risk of antibodies being present in the breast-milk, so the child should not be put to the breast, and breast-milk should be brought to the boil before use to destroy any antibodies it contains.[6] The newborn baby should be given vitamin K, since deficiency may also complicate the picture.

Fœtal hæmolytic disease often misses the firstborn and even the second and third child, so the present tendency to small families reduces the risk of the disease. Until recently it was accepted that once an affected child is born all subsequent children will be affected with increasing severity, but it is now known that a woman who has had an affected infant may still give birth to a normal child, and that each successive infant is not necessarily more severely affected than the last. The development of the disease in the child will depend on the genetic factors operating, particularly on whether the father is homozygous (RhRh) or heterozygous (Rhrh). Clearly, the Rh-negative mother is more likely to become sensitised if every succeeding pregnancy provides the necessary antigenic stimulus—that is, if the father is homozygous. Thus:

Mating	*Children*
RhRh × rhrh	All Rhrh
Rhrh × rhrh	Rhrh and rhrh in equal proportions.

Rhrh children are likely though not certain to be affected. According to TAYLOR and RACE,[7] the incidence of homozygous (RhRh) fathers in affected families is very high indeed. Serological investigation of the Rh subgroups in the particular family may establish whether the father is homozygous or heterozygous. If the family of an Rh-negative mother already contains an Rh-negative child, then the father has proved himself heterozygous and there are equal chances of an insusceptible child and a susceptible one. While 90% of mothers of erythroblastic babies are Rh-negative, affected babies may also be born to Rh-positive women, and occasional

3. Boorman, K. E., Dodd, B. E., Mollison, P. L. *J. Obstet. Gynæc.* 1944, 51, 1.
4. Wiener, A. S. *Arch. Path.* 1941, 32, 227.
5. Gimson, J. D. *Brit. med. J.* 1943, ii, 293.
6. Witebsky, I. E., Heide, A. *Proc. Soc. exp. Biol., N.Y.* 1943, 52, 280.
7. Taylor, G. L., Race, R. R. *Brit. med. J.* 1944, i, 288.

Rh-negative mothers "get away with" an apparently normal Rh-positive baby, even after several tragedies.

It may be asked why erythroblastosis is confined to 1 in 438 pregnancies,[8] and why in over 90% of cases Rh antigens can be inculpated instead of ABO groups, when incompatibility between mother and child is commoner in the latter. Thus 1 individual out of every 7 or 8 is Rh-negative; in 1 mating out of 8 the mother is negative and the father positive; in 1 pregnancy out of 10 the mother is Rh-negative and the fœtus Rh-positive; while in 1 pregnancy out of 5 the mother's serum contains isoagglutinins against the AB antigen present in the fœtal cells. The rarity of hæmolytic disease due to the ABO groups may be explained by the presence of group-specific substance A, B or O in the plasma of "secretor" babies, protecting their red cells. In any case anti-O is rare in humans and the 1 in 5 calculation only takes into account the A and B incompatibility with anti-A and anti-B. Moreover, 80% of persons are secretors of ABO substances. Thus the chances of ABO incompatibility affecting the fœtus are reduced to 1 in 25. Rh antigen, on the other hand, is present in the body fluids in only minute traces, according to BOORMAN and DODD,[9] and American workers have failed to demonstrate it at all, so it cannot block the Rh antibody from the red cells and tissues. There is no doubt, too, that mothers vary considerably in their reactivity to antigenic stimuli. Recently RACE[10] has described a coating factor in some sera which can combine with the Rh antigen without producing agglutination. Little is known about the coating factor except that it may be found in the serum of the mother of an affected infant whether an antibody is demonstrable or not.[11] Although transfusion, except in extremely acute cases, has reduced the immediate mortality of affected infants to almost nil, GIMSON does not believe that it has reduced the chance of the infant developing kernicterus, the serious cerebral involvement which develops in 10% of affected children, according to MCINTOSH[12]; but MOLLISON[13] suggests that on theoretical grounds early massive transfusion might be expected to lower the incidence of this complication.

Up to last summer it was generally recognised that different anti-Rh sera gave different results, 84% positive reactions being obtained by LANDSTEINER and WIENER[14] with their immune rabbit and guineapig sera, 70% positives with some human sera by WIENER,[4] and 86% and 87% positives with human sera by LEVINE and his colleagues.[15] Later in 1943 sera giving 30–35% positives were described by WIENER,[16] and by RACE and others.[17] The position was complicated by the serum anti-Hr of LEVINE,[18] JAVERT and KATZIN, which agglutinated all the negatives and some of the positives. In this country the first clear exposition of subgroups of the Rh factor was given in November, 1943, at the Royal Society of Medicine by RACE, who correlated the findings of the New York workers with his and TAYLOR'S results. The final plan which RACE, TAYLOR, CAPPELL and MCFARLANE[2] evolved was identical with that of WIENER[19] except that these workers[20] recognised one more gene than WIENER, by using a serum named St which WIENER had not yet found, but which may be identical with that called Hr by LEVINE.[18] With the addition of this serum it has been possible to detect directly the genotype in 80% of cases, whereas without it only 30% were detectable. The demonstration,[21] in a family study, of the eighth gene, Rhz, supports FISHER'S system of eight genes with three allelomorphic antigens described by RACE,[10] though the existence of the seventh gene Rhy has yet to be directly proved. Lately MURRAY[22] has tabulated a complete scheme of Rh antisera and their reactions and adopted a simple nomenclature of genotypes according to the sera with which the cells react. He also divides up the genotypes to show what antisera are likely to be produced by their antigenic stimulus and makes it clear that the babies of Rh-positive mothers are by no means free from the chances of fœtal hæmolytic disease. Obstetricians should be warned against the routine use of Rh-negative blood for transfusion without regard to the Rh genotype of the patient, because the average female patient is unlikely to be Rh-negative. Rh-negative donors are valuable and their blood should not be squandered; moreover, it *is* possible to immunise an Rh-positive mother with Rh-negative blood.

During the past year the greatest advances may have seemed academic, but they have made prognosis and therefore the choice of suitable donors much more accurate. Moreover, it seems that fœtal hæmolytic disease occurs in all mammals which carry their young in utero for a long period, although the disease is not so often recognised in animals as it is in humans, and "water-belly," the animal equivalent of hydrops fœtalis, is somewhat rare. In racing circles, however, isoimmunisation in pregnancy is becoming a grave anxiety to owners of blood-stock.

Nobel Laureates

THE 1944 prize for physiology and medicine has been awarded to Dr. Joseph Erlanger, emeritus professor of physiology in Washington University, St. Louis, and Prof. Herbert Gasser, head of the Rockefeller Institute of Medical Research, New York, for their studies of nerve reactions. The 1943 prize has been given to Prof. Henrik Dam, who left the Copenhagen Institute of Biochemistry in 1940 to work in America, and to Prof. Edward Doisy, professor of biochemistry at St. Louis University, for the discovery of, and research into, vitamin K.

THE annual meeting of fellows and members of the Royal College of Surgeons of England will be held on Thursday, Nov. 16, at 2.30 PM.

THE next session of the General Medical Council will begin on Tuesday, Nov. 28, at 10 AM, when Sir HERBERT EASON, the president will deliver an address.

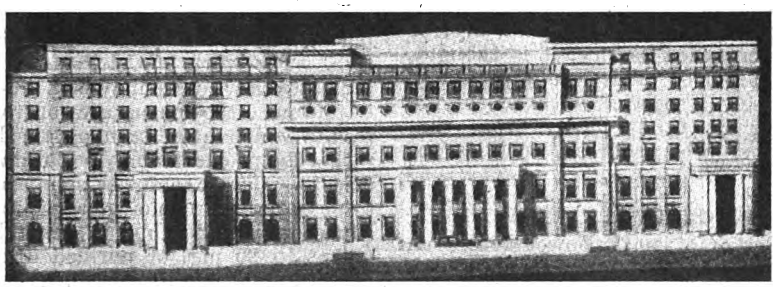
Sir Robert McVitie Grant has given £70,000 to found a chair of dermatology at the university of Edinburgh. This is the first chair of its kind to be established in this country.

8. Javert, C. *Amer. J. Obstet. Gynec.* 1937, **34**, 1042.
9. Boorman, K. E., Dodd, B. E. *J. Path. Bact.* 1943, **55**, 329.
10. Race, R. R. *Nature, Lond.* 1944, **153**, 772.
11. Wiener, A. S. *Proc. Soc. exp. Biol. NY*, 1944, **56**, 173.
12. McIntosh, R. *Canad. med. Ass. J.* 1941, **45**, 488.
13. Mollison, P. L. *Arch. Dis. Childh.* 1943, **18**, 161.
14. Landsteiner, K., Wiener, A. S. *Proc. Soc. exp. Biol. NY*, 1940, **43**, 223; *J. exp. Med.* 1941, **74**, 309.
15. Levine, P., Katzin, E. M., Burnham, L. *J. Amer. med. Ass.* 1941, **116**, 825.
16. Wiener, A. S. *Science*, 1943, **98**, 182.
17. Race, R. R., Taylor, G. L., Boorman, K. E., Dodd, B. E. *Nature, Lond.* 1943, **152**, 563.
18. Levine, P. *Arch. Path.* 1944, **37**, 83.
19. Wiener, A. S. *Proc. Soc. exp. Biol. NY*, 1943, **54**, 316.
20. Race, R. R., Taylor, G. L. *Nature, Lond.* 1943, **152**, 300.
21. Murray, J., Race, R. R. Taylor, G. L., in the press.
22. Murray, J. 1944, in the press.

Annotations

A TRINITY OF COLLEGES?

IN its report for 1944 the Royal College of Surgeons puts the case for establishing the three Royal Colleges in the same or adjacent buildings, and invites the Physicians and the Obstetricians and Gynæcologists to move to Lincoln's Inn Fields and share the Surgeons' site. The council of the RCS hope to see a medical centre worthy of professional traditions, and to achieve this they would be willing, if good cause were shown, to move elsewhere. But they point out that Lincoln's Inn is well placed, being easily reached from the London hospitals and the railway terminuses, and well served by bus and Underground. Lincoln's Inn Fields is the largest square in London; it is quiet, with little through traffic, and has ample parking-space for cars. Moreover, the presence of the Honourable Society of Lincoln's Inn gives it a suitably collegiate atmosphere, and the address is known throughout the world as the home of the RCS museum. The college owns the freehold of Nos. 35 to 45, Lincoln's Inn Fields, a site twice the size of that occupied by its buildings before the war; this would allow of the erection of a building as large as the present college to the east, and a rather smaller building to the west. A decision by the other colleges is considered urgent, because the RCS has to provide for the return of its research laboratories, find accommodation for the new professor of human and comparative pathology, and house the 27,000 museum specimens now stored in the country as well as the large number of new specimens already promised. The RCS declares itself willing "to assign to common use or to the specific use of any other college any existing part of the present college buildings in exchange for equivalent accommodation on some other part of the site," and it is also prepared to share the existing or restored museums, laboratories and libraries with the other colleges. This offer should reduce the natural fears of the other colleges that they might become junior rather than equal partners.



The tentative design for a façade here reproduced shows one way in which the site could be adapted.

INTESTINAL SYMBIONTS IN CHEMOTHERAPY

DRUG, parasite and host have normally interacted in bacterial chemotherapy in such a fashion that the more antibacterial the drug, and the less its influence on the host, the more effective was it as a chemotherapeutic agent. Development of sulphonamides active in intestinal infections has shown that this is not always the case, for it leaves out of consideration the majority of micro-organisms which are associated with higher organisms. This majority—a fourth party in the chemotherapeutic system—are those organisms normally called commensal. If they were simply commensal the host would be indifferent to their inhibition; but instances are accumulating in which inhibition of components of the intestinal flora leads to nutritional deficiencies in the host.[1] The relationship between a host and its familiar micro-organisms can therefore be symbiotic. This was first established in animal experiments but more recently has been observed with respect to aneurine in man.[2] Here it was found that not all individuals could be rendered deficient in the vitamin by stopping its intake. On an identical diet the fæces of subjects not susceptible to deficiency contained much more of the vitamin than did those of susceptible subjects. A person not ordinarily susceptible to aneurine deficiency could be made susceptible to it by giving succinylsulphathiazole by mouth, and this was concluded to act by suppressing intestinal bacteria which synthesise the vitamin. It has been loosely suggested that the gut is sterilised by such drugs, but in animal experiments the numbers of bacteria present remained approximately unchanged during treatment. The flora, however, was qualitatively changed, enterococci replacing coliform organisms.[1] A similar effect of succinylsulphathiazole on the nicotinamide balance of man has also been demonstrated.[3] The conclusion that the drug acted through its effects on the intestinal flora appears sound, although it was not supported by a microbiological investigation; some intestinal bacteria are known to synthesise nicotinamide derivatives. There is evidence from animal experiments that folic acid and biotin balances are also upset by sulphonamide action.

These results carry implications both in chemotherapy and nutritional investigations. Thus the vitamin level of a patient will influence not only his chances of recovery but also his susceptibility to the undesirable effects of drugs given to attack intestinal parasites, if treatment is protracted. And beyond this there is the possibility that if we give extra vitamins to protect the patient against deficiency we may at the same time interfere with the antibacterial action of the sulphonamides. Actually aneurine, nicotinamide, folic acid and biotin are not potent antagonists to sulphonamide action, but the last three are known to have a limited antagonistic effect in vitro. In acute infections the difficulty will not arise, but a watch for B-vitamin deficiencies is clearly required when sulphonamides are being given for long periods, and it remains to be seen whether large doses of these factors will reduce the efficacy of the treatment.

1. Keresztesy, J. C. *Ann. Rev. Biochem.* 1944, **13**, 388.
2. Najjar, V. A., Holt, L. E. jun. *J. Amer. med. Ass.* 1943, **123**, 683.
3. Ellinger, P., Coulson, R. A., Benesch, R. *Nature, Lond.* 1944, **154**, 270.

ADVISING THE HOUSEWIFE ABOUT FOOD

THE war has taught us some good food habits which the Children's Nutrition Council would like to see preserved. With the coming of peace and, perhaps, relative plenty it should also be possible to develop some new and even better habits about eating. The editor of the council's *Bulletin* would like to see a "pervasive and patient campaign" carried on, especially among housewives.[1] In this campaign the women's organisations would play a prominent part, but a central staff would also be needed as well as news-letters, bulletins, and a small body of salaried organisers. Costs could be low: but they would have to be guaranteed. The Ministry of Food already has a special department with a staff of about 25, and an experimental kitchen for the trial of new recipes. This sends out a regular service of news-letters. Some 40 food-advice centres are also scattered about the country, each staffed by two or three qualified women. These usually have a shop window for displays designed to interest and influence housewives. From such centres the

1. *War-Time Nutrition Bulletin* No. 32. October–November, 1944.

organisers can arrange lectures and demonstrations in village halls, clinics and factories. In addition the voluntary organisations have provided "food leaders" who act under an honorary organiser for borough or county. These spread useful information by word of mouth among their neighbours, arrange window displays, lectures and brains-trust programmes, and keep their organiser in touch with local problems. They are prepared by a short course of lectures, and given a badge, but they do not themselves lecture unless they are otherwise qualified to do so.

To carry on the food-advice service at the present level would probably cost, the article estimates, £70,000 a year. A drastically curtailed service, it is thought, might be provided for £15,000. This would provide a food-advice council loosely associated with one of the Ministries and drawing its funds partly from that Ministry and partly from other sources, such as the local authorities.

MASSIVE RESECTION OF SMALL INTESTINE

EVER since the resection of small bowel became a feasible procedure there have been differences of opinion on how much can be removed without ill effects and on the consequences of removing large portions, the reason being, no doubt, the wide individual variation in the amount of gut necessary to support life and health. People have survived, for several years at least, with only 3 feet of combined duodenum and jejunum and no ileum. Resections of this magnitude, however, usually result in progressive emaciation and loss of strength, and death within a few months. From a review of 257 cases in which more than 6½ feet of small intestine had been resected, Haymond [1] concluded that removal of up to a third of the total could be followed by a return to normal function, but that resection of anything over half, or 11 feet in average people, was likely to give poor results. The length of bowel removed gives no true indication of that which remains, because the small intestine varies considerably in length—Bryant's [2] figures ranged from 10 feet to 28 feet 4 inches in 160 adults. His measurements were made at autopsy, and when the mesentery and the intestinal musculature are alive and intact the gut is a great deal shorter—possibly half the autopsy length or less. But the autopsy measurements are comparable with those the surgeon makes on resected bowel after operation. Of the two cases reported in this issue, that described by Cosh is an example of the common unfortunate sequelæ of the operation, while Holman's case is remarkable for its freedom from subsequent trouble up to 18 months from operation. A continued follow-up of the latter case would be advisable because complications may develop later than this. The commonest sequel of extensive resection of small bowel is a fatty diarrhœa, similar to that of sprue, and due to the incomplete digestion and absorption of food. In one case [3] carbohydrate was well assimilated but 25% of the protein and 45% of the fat ingested was lost in the stools. The fat is lost chiefly in the form of fatty acids, which combine with any available calcium and so reduce its absorption to low levels. The result is a low blood-calcium, associated with which are attacks of tetany which respond to a diet high in calcium and vitamin D but low in fat. The diarrhœa is not controllable by drugs but can be combated by a diet with plenty of carbohydrate, an adequate amount of protein, and little fat. To allow for faulty absorption the calorie intake must be generous. Macrocytic anæmia does not seem to be a sequel to extensive small-bowel resections, as it sometimes is in cases with intestinal short-circuits or strictures.[4] Probably the absorption of products of bacterial activity determines its onset in these cases.

1. Haymond, H. E. *Surg. Gynec. Obstet.* 1935, 61, 693.
2. Bryant, J. *Amer. J. med. Sci.* 1924, 167, 499.
3. West, E. R., Montague, J. R., Judy, F. R. *Amer. J. digest. Dis.* 1939, 5, 690.
4. Barker, W. H., Hummel, L. E. *Bull. Johns Hopk. Hosp.* 1939, 64, 215.

CURARE IN ANÆSTHESIA

CURARE is an important pharmacological tool for laboratory investigations. Its action is confined to paralysing skeletal muscle by interrupting impulses at the myoneural junction; it thus enables animals to be immobilised without interfering with their central nervous system. The rapid excretion of the drug allows its paralysant action to be utilised in human beings in the treatment of various spastic [1] and convulsive states,[2] such as spastic paralysis, dystonic athetosis and advanced parkinsonism. In these diseases its action is but palliative. The work of Cole,[3] Mitchell,[4] West [5] and others indicates that curare may be a life-saver in the treatment of tetanus; the spasms are controlled and the successful results which have been obtained suggest that anoxia rather than toxæmia may be the dangerous feature of this disease. Curare is now being investigated as an adjuvant to anæsthesia. A biologically standardised preparation, 'Intocostrin' (Squibb), is available, 1 c.cm. being equivalent to 20 mg. of purified drug. With it muscular relaxation is readily obtained in subjects resistant to anæsthesia, enabling such procedures as abdominal section and laryngoscopy to be carried out with ease. Even in average subjects it is useful in obtaining relaxation without "pushing" the general anæsthetic. Griffith and Johnston [6] reported a small series of patients, and Cullen [7] a much larger one in whom intravenous curare was successfully used to produce muscular relaxation when the patients were but lightly anæsthetised. The drug is not without its dangers. Overdose produces intercostal and diaphragmatic paralysis with cessation of respiration. This may be and usually is of short duration, but artificial respiration should be started immediately, and a pharmacological antidote such as physostigmine or 'Prostigmin' be kept at hand. Should these remedies be withheld, death may result. In addition, Perlstein and Weinglass [8] observed that, in spite of the maintenance of artificial respiration, long-continued curarisation in dogs is lethal, an effect enhanced by atropine. The effect here may be due to involvement of the cardiac neuromuscular mechanism. In any case their observations suggest caution in the use of curare during tetanus or long operations, and the avoidance of atropine when curare is used. Reports so far suggest that curare may have a definite place in anæsthesia, but that the time is not yet ripe for its general adoption. One thing seems certain—curare must not be regarded as a substitute for the skilful use of anæsthetic agents. Much scientific clinical investigation remains to be done by those who are thoroughly conversant with the action of the drug and have the means and ability to counter inadvertent overdose.

1. Burman, M. S. *Arch. Neurol. Psychiat.* 1939, 41, 307.
2. Bennett, A. E. *Amer. J. med. Sci.* 1941, 202, 102.
3. Cole, L. B. *Lancet*, 1934, ii, 475.
4. Mitchell, J. S. *Ibid*, 1935, i, 262.
5. West, R. *Ibid*, 1936, i, 12.
6. Griffith, H. R., Johnson, G. E. *Anesthesiology*, 1942, 3, 418.
7. Cullen, S. C. *Surgery*, 1943, 14, 261.
8. Perlstein, M. A., Weinglass, A. *Amer. J. Dis. Child.* 1944, 67, 360.

EDITORSHIP OF THE LANCET

THE Proprietors of THE LANCET announce with much regret the retirement of Dr. Egbert Morland from the editorial chair. Dr. Morland joined the staff in 1915 and has been editor since 1937. He is succeeded by Dr. T. F. Fox, with Dr. E. Clayton-Jones as assistant editor.

The Aylesbury office of THE LANCET has been closed. Henceforward all communications should be addressed to the London office, 7, Adam Street, Adelphi, WC2. (Tel.: Temple Bar 7228.)

Mr. J. B. HUNTER has been selected dean of the faculty of medicine of the University of London for the period 1944–46.

Special Articles

DEMOBILISATION

STATEMENT FROM THE CENTRAL MEDICAL WAR COMMITTEE

SOME considerable time ago, at the request of the Ministry of Health, a special subcommittee of the Central Medical War Committee, known as the Demobilisation Committee, was appointed to advise on the problems connected with the postwar release of medical practitioners serving with HM Forces. The Government had announced that the main considerations which would determine priority of release would be age and length of service; and the task of the committee was to consider what detailed procedures, under this general plan, would best combine justice to the serving doctors and satisfaction of the more urgent needs of the depleted civilian medical services. Most of the recommendations made by the committee were accepted by the Ministry of Health, though in some instances with modifications. The Government's proposals have now been published in a white-paper.[1] A brief account of the plan follows, with special reference to medical practitioners, whom the white-paper does not specifically mention.

Summary of Government's Plan

1. General demobilisation must await the total defeat of the Axis Powers. All that is contemplated at present is the reallocation of man-power between the Forces and civilian employment when Germany has been defeated and while the war with Japan is still in progress.

2. As there can be no break in the war effort, military requirements will override all other considerations. The requisite control of civilian labour will be maintained and compulsory recruitment for the Forces will be continued. At the same time it will be possible to "bring relief to the men who have served for long periods" and, through continued recruitment, to "enable more of them to return to their homes." This reallocation of man-power will be "on a substantial scale," but "the rate of reallocation must differ as between the three Services."

3. The plan provides for two separate methods of selecting men for return from the Forces. The larger group, designated class A, will be selected for *release* according to age and length of service. In addition, there will be a limited provision for the *transfer* from the Forces of men who are qualified for "urgent reconstruction work." This smaller group, designated class B, will be required mainly to supplement the labour force available for building houses, but will include "a limited number of individual specialists, for whose transfer application may be made through Government Departments in accordance with existing arrangements." So far as doctors are concerned, the description "specialist" is not used here in its professional sense but is applicable to all medical officers.

4. Although the Services will make every effort to release men in their turn in accordance with the plan, in whatever theatre of war they may be serving, no man will be released or transferred if his retention is considered necessary on military grounds; nor will any man be released or transferred if he prefers to volunteer for a further period of service. In short, there will be no compulsory return to civilian employment but there may be compulsory retention in the Services of men due for such return, either in class A or in class B.

CLASS A

5. Within class A there will be special priority for men of 50 years of age and over, who will be released before other men if they so wish. Otherwise, men in class A will be released by release groups determined by a combination of age and length of war service on the basis that two months of service are equivalent to one additional year of age. For example, a man of 22 with four years' service will be in the same release group as a man of 40 with one year's service. "In general, war service means whole-time service in the Armed Forces since the 3rd September, 1939, which counts for Service pay."

6. The release of men in class A will begin as soon as practicable after the defeat of Germany, but there will necessarily be a pause to enable the Services to identify the men who are to be released first and to arrange for the return to this country of those who are overseas. The number of releases in class A will depend on the reduction that is found to be possible in the strength of the Forces and also on the number of new recruits called up.

7. To assist in resettlement, men in class A will receive, on release, eight weeks' leave with full pay and certain allowances, and additional leave and pay will be given in respect of foreign service. When the period of leave has expired these men will be placed to a special class of Reserve, from which they would be recalled only in an extreme emergency. They will be able, on release, to exercise their right of reinstatement in their former civilian employment and, while receiving regular Service payments, they will not be regarded by the Employment Exchanges as "subject to any powers of direction which are otherwise generally operative." The benefits received by men in class A will be available also to men discharged on medical grounds. The present arrangements for release on compassionate grounds will be continued.

CLASS B

8. Transfers in class B will be small in number in proportion to releases in class A and will not begin until a start has been made with the releases. The actual numbers for transfer will be determined from time to time by the immediate requirements of the "reconstruction employments" and the extent to which these requirements will be met by releases in class A and by transfer from other civilian work. So far as possible, the selection of the required number of men from a particular occupational class for transfer in class B will be based on the principle of age and length of war service.

9. Men transferred in class B, since they will leave the Forces out of their turn, will not be entitled to the same benefits as those released in class A. They will be given only three weeks' leave before being placed to the Reserve, and payments due in respect of foreign service will be held in suspense until after the end of the war. Men in class B will be under direction and will be liable to be recalled to the Forces if they discontinue the civilian work for which they were transferred. If this is not the work in which they were formerly engaged, their reinstatement rights will be preserved.

10. A man will not be transferred in class B against his wish if he prefers to await his turn for release in class A. "Once, however, a man has been transferred in class B he will not subsequently be eligible to apply for inclusion in class A."

11. Both class A men and class B men may, immediately on release or transfer, apply for a pension for disablement due to war service. A scheme of war gratuities by way of reward for service will be announced later.

12. The general arrangements described above will apply to women as well as to men, "with the addition that married women will have priority over all others if they so desire."

The Special Position of Medical Officers

As has been stated above, medical officers are not specifically mentioned in the white-paper. The general arrangements proposed will of course apply to them as to other members of the Forces. So far as class B is concerned, they are within the category of "specialists" who will be transferred, not in groups, but individually on application made through a Government department. In practice, the recommendations for transfer will be made by the Central Medical War Committee after consideration of applications submitted through the local medical war committees or, in appropriate cases

1. Reallocation of Man-Power between the Armed Forces and Civilian Employment during any Interim Period between the Defeat of Germany and the Defeat of Japan. (Cmd. 6548.)

in the London area, through the committee of reference. In short, the machinery set up for the recruitment of medical practitioners will "go into reverse" for the purpose of the reallocation procedure.

The total number of transfers in class B will be limited and it is not to be expected that any particular group of "specialists" will be allowed a disproportionate share of such transfers. It is probable, therefore, that the strengthening of the hard-pressed civilian medical services will depend mainly on releases in class A, and the question arises whether the numbers of medical officers whom the Services will be able to release will be such as to meet the urgent civilian needs and to ensure equality of treatment in respect of release between medical officers and other members of the Forces.

It is clear that the requirements of the Services in respect of medical officers will continue to be heavy after the defeat of Germany, both because of the high incidence of sickness in the Far East and because the resources of the Emergency Medical Service will not be available there. Moreover, some considerable time may elapse after the fighting has ceased in Europe before medical officers can be made available in sufficient numbers for service in the Far Eastern theatre. It may well be, therefore, that the requirements of the Services at the end of the European war will be such as to make it impossible to allow the medical profession its proportionate share of releases in class A under the general reallocation scheme.

It appears that the number of releases of medical officers will be determined largely by the number of civilian practitioners available for recruitment, and this in turn will depend on the Government's decision as to the limit of age for continued recruitment after hostilities in Europe have ceased. On this matter the white-paper gives no definite information but merely states that "in order to increase the releases in class A and to compensate for the transfers in class B, numbers of young men at present deferred, particularly in the munitions industries, will be called up for the Forces."

The Demobilisation Committee recommended the continued recruitment of young medical practitioners who are within five years of qualification or are below the age of 28, and this recommendation was accepted by the Ministry of Health. But, in view of later information as to the probable needs of the Services, it now appears that the continued recruitment of doctors will be desirable up to a somewhat higher age, perhaps in the region of 35, even if this age should be above that fixed by the Government for recruitment generally. The Central Medical War Committee has decided to recommend accordingly through the Ministry of Health.

A special consideration which has influenced the committee is the impossibility of recruiting, from practitioners within five years of qualification, the specialists—the word is used here in its professional sense—who will be required to replace those who are due for release in class A and those whose transfer in class B will be recommended. Apart from this, it is clearly important that the practitioners available for recruitment should be sufficient in number to enable serving officers generally to be released in their turn under the Government's scheme in order that their future prospects in civilian practice may not be unfairly prejudiced.

The committee has in mind the fact that the needs of the medical schools and associated hospitals, both in respect of the teaching of undergraduates and in respect of the postgraduate instruction of medical officers returning from the Forces, will be likely to give rise to applications for class B transfers. Every effort will be made to deal justly with such applications in the light of exact information to be obtained from the schools regarding their comparative needs, and with due regard to the fair distribution of the permitted number of class B transfers among the various spheres of professional work.

Reference has been made to the postgraduate instruction of practitioners returning from the Forces. It may not be generally known that, some years ago, the British Medical Association foresaw this need and urged the Government to prepare suitable arrangements. The matter is now in the hands of the Central Medical War Committee and discussions are proceeding with the Ministry of Health. The aim is to ensure, not only that refresher courses and clinical appointments are available but also that appropriate financial arrangements are made in order that no man who is in need of professional rehabilitation, and no suitable candidate who wishes to continue his interrupted education with a view to specialisation, will be unable to find the opportunity he seeks through lack of means.

LIVERPOOL CHAIR OF CHILD HEALTH

THE new department of child health of the University of Liverpool was opened by Miss Florence Horsbrugh, parliamentary secretary to the Ministry of Health, on Oct. 27. Dr. N. B. Capon, the first holder of the chair, will be director and have his headquarters at Alder Hey Hospital, where three wards have been set aside for a teaching and research unit, though the whole hospital complement of 950 beds will be available for the work of the department. Space for a lecture theatre, director's room, museum, and rooms for students, has been found by converting another ward, and it is hoped to add more teaching and research rooms at the end of the war when it is thought another ward can be spared for development. In addition, all the wards of the Royal Liverpool Children's Hospital will be available for teaching and research work, and rooms are provided there for the use of the director and his first assistant, and for research. This hospital has a city branch with 125 beds, and a branch at Heswall with 250 beds; there will thus be in all 1325 beds available for teaching in the department.

The department has been set up through the combined activity of the Liverpool Council, Liverpool University, and the Merseyside voluntary hospitals with the aim of teaching child health to medical undergraduate and postgraduate students, and of studying problems of child health. It therefore represents an important experiment in coöperation between voluntary and municipal agencies. There are advantages in putting the headquarters at Alder Hey—the municipal hospital—because those working in the department will have ready access to infant welfare clinics, child-guidance clinics, and clinics for tuberculous and rheumatic children. The teaching will thus be well rooted in preventive and social medicine.

Besides the director, whose appointment is part-time, the staff is to consist of the three present university lecturers in clinical pædiatrics, a first assistant (a clinician holding appointments in both hospitals), a second assistant selected from the staff of Alder Hey, and several registrars, three of them—medical, surgical and orthopædic—at the Royal Liverpool Children's Hospital, and one or more resident at Alder Hey. In addition there will be research-workers and several senior residents at both hospitals.

The expenses of the new department are being borne by the three responsible bodies: thus the capital outlay for furniture and equipment is being shared by the city council and the university, except that the Royal Liverpool Children's Hospital will provide its own equipment. The salaries of the director and his first assistant will be shared by the city council and the university, while the second assistant will receive an honorarium from the university in addition to his usual salary from the city council. The registrars at the Royal will continue to be paid by that hospital. The council will provide a laboratory technician and a secretary at Alder Hey, and the university will make an annual grant to the department's expenses. The medical correspondent to the *Times* (Oct. 27) notes that before the war the English provincial universities were spending only £400 a year on pædiatric training or research; London with its 12 schools only £1400.

We pointed out in 1942 that in 1939 seven provincial universities allotted only 5½*d.* in each £100 of their grant money to the special teaching of child health; yet £3 million a year is spent on child welfare and £4 million on the school medical services. The new chairs of child health established in England during recent years follow the pioneer lead of Edinburgh which has had a department of child life and health since 1931.

MEDICINE AND THE LAW

Overdose of Carbachol

THERE were two interesting features in the case in which Mr. Justice Hilbery gave judgment against Savory and Moore Ltd., on Oct. 26. The first was the nature of the negligence alleged. Flight-Sergeant Simpson died in the Cowley Road Hospital at Oxford after an injection of 'Moryl' (carbachol *BP*) which was said to have been 400 times greater than the correct dose. Dr. Arpad Lovas had prescribed an injection of one ampoule of moryl; he gave evidence that the medical profession, both in Britain and on the Continent, recognised an ampoule as synonymous with a dose; he had never heard of more than one dose being packed in a single ampoule. Savory and Moore, as the judge found, had been packing the drug in crystal form (which was 400 times too strong for internal use) in ampoules sold with printed instructions that ½–1 ampoule was the correct dose but with no warning that moryl in dry form in an ampoule was not for internal use. This, in the judge's view, was negligence justifying the award of damages. Judgment was entered for the widow and the co-administratrix of the dead man's estate in the sums of £1650 under the Fatal Accidents Act and £350 under the Law Reform Act, with costs. Dr. Lovas, during his cross-examination, said that, in ordering an ampoule of moryl to be given, he had never seen the drug in crystalline powder form in an ampoule.

The second point of interest was that the plaintiffs were charging negligence or breach of duty, and were suing for damages, not only against the chemists and druggists who supplied the moryl in this fashion but also against Dr. Lovas, the sister who administered the injection, and the corporation of Oxford as the hospital authority. The judge declared at an early stage that there was not a shred of evidence against the sister. He also dismissed the claim against Dr. Lovas, against whom he could find no negligence. He awarded costs to these two defendants and to the corporation against Savory and Moore Ltd. A stay of execution was granted, pending a possible appeal. Had the sister been found negligent, there would have been a question whether the hospital authority could be liable in damages as her employer. In Strangways-Lesmere *v.* Clayton in 1936 it was held that the administration of a dose by a nurse was not a "ministerial act" and that the hospital was not liable. In Dryden *v.* Surrey County Council and Stewart in the same year, where plugging had not been removed and the medical practitioner was held liable, the hospital was declared not to be liable for the negligence of nurses in matters of professional skill.

STREPTOCOCCAL ENDOCARDITIS PRODUCED EXPERIMENTALLY

LARGE verrucose lesions on the heart valves of pigs are commonly due to infection by *Erysipelothrix rhusiopathiæ* organisms, but Hont and Banks [1] have described large yellow cauliflower-like growths in the left atrioventricular valve of pigs caused by streptococci. Of two strains examined one did not belong to any of Lancefield's groups A, B, C, D or G, and was not pathogenic to mice, but the second was a group D strain and large doses killed mice. Two young pigs from a healthy herd were given 3 and 4 intravenous doses of mixed culture containing both streptococcal strains. The doses were given at intervals of about a week and the pigs were killed a week after the last dose. One showed severe endocarditis similar to that seen in the naturally affected pigs and large numbers of group D streptococci were demonstrated in the lesions. In the second pig only slight endocarditis was produced but there was a severe streptococcal epicarditis. An uninoculated pig from the same healthy herd showed no lesions.

1. Hont, S., Banks, A. W. *Aust. vet. J.* 1944, **20**, 206.

In England Now

A Running Commentary by Peripatetic Correspondents

WE are watching concentrated evolution at the Boys' Club. With their upbringing they are aggressive individualists and have no conception of working for a community. Even playing for a team is satisfactory only as long as it is winning, and now that they have at last believed that the helpers are not paid the boys are trying to fathom what ulterior motive there can be in helping. The first glimmerings of a social conscience come, oddly enough, from the gangsters. We make a point of putting them in charge of things; at first their underlings are bullied unmercifully, but the underlings are used to that. Then, as the gangsters find that the helpers ask their opinion on weighty matters, so they begin to use their power to administer a rough justice and within a surprisingly short time most of them have lost their spiteful characteristics. Occasionally we find a less tractable type, but the treatment is essentially the same. If these boys had fought their way to the top instead of being appointed by a higher power, their gangster outlook would have been accentuated by fear of revolution. It's all too simple.

We are now beginning an experiment in Town Planning. They are fond of model-making. We have found them half a ping-pong table and built it up with papier-maché to form an "undeveloped land" with mountains and a coast. Little groups of them—as pioneers—are engaged in building railways with matchsticks for sleepers and wire for rails. Their choice of building inevitably concentrates on seaplane bases and barracks, with an occasional chip-shop, but much of it imitates their own neighbourhood. No libraries or public lavatories have yet appeared but perhaps these are not usually found in a new country. They have not yet reached the cinema age, in that although they attend frequently this amusement has not become a drug to which they are addicted, so cinemas do not abound in the land. At the moment we have opportunities for unlimited expansion, although patrols from various communities have clashed, and frontiers have appeared in places. Much of the country is still undeveloped and there is no great incentive to occupy other people's territory. In the face of aggression alliances spring up, and wars would be frequent if we, as a deus ex machina, did not forbid them except where some really good reason can be found. It might be argued that this is an opportunity to teach that war is never justified, but this is primarily an experiment, and not education. We are waiting to see what will happen when expansion leads to overcrowding. Will they plan, or will they fight? Experience suggests the latter, but if they do, will the majority realise that this is unfair to many? Unfortunately jungle law is so ingrained in them that it is accepted as right for the strongest to enjoy the fruits of the weakest's labours. Group passions are seen in these boys without the trappings of adult ethics, and like the geneticists' fruit flies, they show years of evolution in a few months. Perhaps this is a way to solve the world's problems, by setting up prototypes in miniature.

* * *

If these cures for a cold, for rheumatism and for constipation were not reproduced here they might be lost for ever, for they are taken from a book called *Edgiana: Being a Collection of Some of the Sayings of Edward Edge*, so scarce that E. V. Lucas said of it, "Money cannot buy this book which is as rare as an Elzevir and much more humanly interesting." (I should like to know how E. V. L. came by his copy; mine is a family treasure.) Edward Edge was the Dane's (Dean's) man of St. Patrick's Cathedral in Dublin, and keeper of the gate and handy man about the Deanery. He was a character, a gossip, a maker of quaint remarks and a great teller of yarns. Everybody knew him; particularly the Quality in and about Dublin that "does be rowlin' by in their carriages wid tundherin big horses"; though even they did not believe that he was descended from the landed gentry, as thus: "did ye ever hear tell of Edgware Road in or about the city o' London? Well the Edges owned that and bedambut I'm thinkin' the weighty part o' the county o' Middlesex." Bedambut was one of his favourite expletives, one gathers

from the collection, which was made by the member of the Dean's family most favoured by Edge and the most frequently chosen recipient of obiter dicta, complaints and recollections. Edgiana was published, of all places in the world (as Edge would have said, "for why"?) in Alassio.

Here then is your cure for a cold. "If it was a thing ye had a heavy surfeit o' cowld, faith there's nothin' better ye could do only take an' ate a rale terrible ould salty book haird'n (buck herring) that 'id give ye the divil's drooth (thirst) an' then nothin' 'id satisfy ye but you should swally two or three bookets o' cowld spring wather, and agin yid be in bed be the tundherin Mack, the lather o' pesperation yid be in id sweep the cowld to blazes out o' your body"! No less effective was his cure for rheumatism: "heltake the docthor in Ireland that 'id cure the rheumatism agin me. Sure it's nothin' in the world only the best whisky mixed with a little brimstone: Ye take 3 croppers of it every day for 3 weeks, and the force of the alcordn (alcohol) drives the sulphur all through yer body and *tears* the rheumatism out." For constipation, said Edge, "I'll tell ye the greatest cure alive, if it was a thing ye were tibby (to be) bound *in* the body. Yid take and dhrink may be it id be the divil less than from three to four pints o' po-ertther wid a great big loomp of butther on top of each pint: well yid fire that down yer neck; and then yid get up on an ould kyar, and mindja the road should be rale joulty, an' yid give th' ould horse a couple o' leadthers o' the wattle and make him gallop as hard as ever he could, an (be the good man!) it 'id give ye the divil's fine rallyin' and next mornin' yid be as clane as a whistle. Bloog an' ounds but there's nothin' ayqual to it!!"

* * *

The travellers' tale that they are phosphorescent in the dark is both false and malicious. In fact, when you first join their Mess, psychiatrists look at first sight just like ordinary people. Therein lies your great danger. Many an unsuspecting lad has fallen into that trap and will carry invisible scars to his grave. Even their patients, they admit—nay, some of them boast—are never the same again after their successful treatment. Mind you, in the Mess they don't buzz round newcomers salivating like a covey of orthopædic surgeons at a nudist colony. No, far more subtly and disarmingly they wait for you to make the first move. And on your overtures may depend your whole future sanity. You see, they've got to fit you into one or other of their recognised categories, and they mustn't use force. That is one of the rules of their game. The obvious rejoinder (I see now) is to keep your mouth firmly shut. Don't be tempted to come out with something snappy about the weather, for one thing leads to another. Concentrate on ingratiating smiles, conciliatory gestures and being ready with the cigarette-lighter. Thus you may be able to slip quietly into the background and come to be regarded as an inoffensive piece of Mess furniture. I see now where I made my mistake. I was too pleomorphic. To one (in a fight for the fish-paste) I was a trifle aggressive, to another completely imbecile, a third threw me into a state of anxiety (with depressive features), from a fourth I could not conceal my hysteria, and I'm sure a fifth considered me obsessional from the way I mopped the beer off my trousers. I asked one of the bigger ones (for they are of all sizes) what their technical expression was for a chap—a purely hypothetical chap, of course—who reacted thus differently to different people. Without an instant's hesitation he replied, "Definitely immature, regressive and narcissistic." I hope he didn't notice my sudden pallor, but I bet he did. If so, that makes six. I suppose my idea roughly was not to put all my eggs into the same basket; but it was a rotten idea and I don't advise you to act on it should you ever get shipwrecked with a rubber (or is it a chunter?) of Trick Cyclists. You will find when you run unavoidably into the whole bunch—as one does in a Mess (or on a desert island)—that your reactions get like those of the chameleon on a plaid rug, and you badly Want to Leave the Room. (Infantile again, hey?) There only remains, and I hope it's not too late, to establish yourself as a Psychopathic Personality (with Anti-Social Tendencies). You lose caste terribly thereby (which is an awful pity, because their runcibility in the deepest and truest sense of the word simply couldn't be higher); but the chances are that it will work you your ticket.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

MEMBERS of Parliament are to visit the Italian theatre of war, and there is a rumour that holders of E petrol coupons may have preference in getting new tyres for their cars and possibly even some additional petrol. Signs of spring! As soon as any normal peace-time travel begins here or overseas the process will continue and extend. But in London, and what is officially described as South-east England, the immediate prospects for winter are not too good. The repair of war-damage in the London region—roughly the same as the Metropolitan Police District—will cost £30–£35 million, and cannot possibly be done by Christmas under present arrangements.

The debate last Friday adumbrated the complex problems which face Government and local authorities. There were warnings of the possible increase of tuberculosis and other diseases. One member asked whether the Minister of Health was keeping a watch for the beginning of any epidemic such as spread across the world after the first world war. The food situation in this country is better than it was then, but the housing situation is worse. There is overcrowding, sometimes gross overcrowding, in London and the blitzed towns. And there is overcrowding in other parts of the country for other reasons. To repair blitzed dwellings is only the first stage in providing adequate housing for our population. There are all the arrears of war-time neglect of routine repair and maintenance to make up. And there is all the new building which will be needed "when the men come home." Housing alone will provide work for all in the building trade for a long time ahead.

In the meantime London and the South-eastern counties have been given absolute priority for repairs over the rest of the country, and 140,000 workers are already employed, but there are difficulties not only of labour but also of supply and distribution.

The Moscow visit is to be followed, it is hoped, by a meeting of Marshal Stalin, the President of the United States, when elected, and Mr. Churchill "before Christmas," if possible. But although the time is full of hope yet the period of the war before us will be hard and grim. The Goebbels broadcast showed how grim it is for the Germans, and desperate men will fight hard. Even if dozens of MPs fly like doves to the reconquered lands of Europe from this Ark of Britain, the winter struggle has still got to be endured.

FROM THE PRESS GALLERY

Hearing-aids

IN the House of Lords on Oct. 24 the Duke of MONTROSE asked what progress had been made by the Government in their negotiations with the hearing-aid manufacturers to produce national standardised hearing-aids; and whether the aids would be sold at a price within the means of deafened ex-Servicemen, or whether a grant would be allowed towards the price. Lord TEMPLEMORE in reply said the Medical Research Council had appointed a committee to investigate the electro-acoustic problems connected with the manufacture of hearing-aids. It was hoped that this committee would be able to recommend specifications for standard models to be sold at a reasonable price. The committee had already held several meetings and a number of physicists had been appointed to collaborate with otologists and physiologists in experimental work on their behalf (see *Lancet*, 1944, i, 574). Discussions between Government departments and the hearing-aid manufacturers had been informal. He understood that the Association of Hearing-Aid Manufacturers had prepared a tentative specification for a standard aid and had submitted some information about it to the committee. It was too early yet to give any indication of the price at which any standard aid would be sold, but hearing-aids were supplied free of charge to ex-Servicemen suffering from deafness due to war service. The Duke of MONTROSE said he believed American manufacturers had a standard aid costing $40 of which they had manufactured about 100,000.

QUESTION TIME

Scientific Advisers

Mr. B. BRACKEN informed Sir E. GRAHAM-LITTLE that the BBC has no scientific advisory committee. It seeks advice on scientific subjects from the Royal Society, the British Association, the Medical Research Council and other authoritative sources, according to need. This procedure will be reviewed in due course in relation to the BBC's post-war arrangements for advisory committees generally.

Replying to a question, Mr. R. K. LAW stated that the British Council have established in Chungking a cultural and scientific office under the direction of Mr. Joseph Needham, FRS, to promote contacts with China. He added that though no scientific attachés have yet been appointed to HM missions in foreign countries a British scientific mission also existed in Washington for the purpose of exchanging scientific information with the United States Government. The possibility of making similar arrangements elsewhere was under consideration.

Research in a National Health Service

The encouragement and assistance of research will continue to be primarily the function of the Medical Research Council which was set up by Royal Charter for the purpose. It is the Government's intention that research and opportunities for research should be continually developed with the help of the council. (Mr. H. WILLINK replying to Mr. E. W. SALT.)

Old-Age Pensioners and Artificial Limbs

Mr. R. DUCKWORTH asked the Minister whether he was aware of the difficulty which faced civilian men and women who were old-age pensioners in obtaining needed replacements of artificial limbs; and what assistance his Ministry was prepared to give to these people.—Mr. WILLINK replied: I am aware that some difficulty may be experienced in obtaining artificial limbs owing to the shortage of labour and supplies. I understand that so far as possible preference is given to war casualties and to persons whose capacity for employment is adversely affected by the absence of an artificial limb. So far as the question is one of cost, the provision of an artificial limb for a pensioner in need is a matter for the decision of the public-assistance authority and any such person should make application to the appropriate officer of the authority.

Residential Nurseries

Sir HAROLD WEBBE asked the Minister, what was the total number of children in residential nurseries maintained or aided out of public funds.—Mr. WILLINK replied: There are about 3000 children in residential nurseries maintained or aided by public-assistance authorities and a small additional number in nurseries maintained by maternity and child welfare authorities. In addition there are 407 residential nurseries with approximately 13,000 places established under the Government evacuation scheme. Some 4000 staff are engaged in this latter service, and the average weekly cost per place varies from 25–40*s*.

ADDITIONAL HEALTH INSURANCE BENEFITS.—Mr. WILLINK confirmed that persons insured under the existing National Health Insurance Act, who were at present entitled to receive dental treatment and other additional benefits out of the valuation surpluses in their approved friendly societies, would continue to receive the same until the new scheme became operative.

CHILDREN'S HOMES AND INSTITUTIONS.—Mr. WILLINK said that 581 hostels of varying types for children of school-age had been established under the Government evacuation scheme. The number of places in the hostels was approximately 14,300.

TYPHUS MEDAL.—The medal of the USA Typhus Commission has been awarded to Colonel J. S. K. Boyd for his coöperation in the distribution of typhus vaccine through the Middle East, to Brigadier G. B. Parkinson and Brigadier R. W. Galloway for their help in preventing the spread of typhus in Southern Italy, and to Dr. Abdel Wahed El Wakil, Egyptian minister of health.

Letters to the Editor

CHRONIC NECROBIOTIC SUBCUTANEOUS NODULES OF THE RHEUMATOID ARTHRITIS TYPE

SIR,—Since Collins (1937) and others have conclusively shown that the characteristic subcutaneous nodules of rheumatoid arthritis consist of foci of fibrinoid degeneration and necrosis, surrounded by a border of tissue reaction, notably with a palisade-like radiate arrangement of fibroblasts, it has become evident that not all subcutaneous nodules in cases of rheumatoid arthritis are microscopically of exactly the same type (F. P. Weber, *Brit. J. Derm.* 1943, **55**, 1, and *Ann. Rheum. Dis.* 1944, **4**, 3). To facilitate further work on the subject (biopsy results especially) I would suggest that the nodules of the now well-known type, as described by Collins and others, should be termed "chronic necrobiotic subcutaneous nodules of the rheumatoid arthritis type," this term to include indurations of similar structure in the walls of bursæ, in tendon-sheaths, and attached to fasciæ, ligaments, or periosteum, or, in a very few cases, apparently arising from or involving the deep cutis. Some of the exceptional nodules which I have in mind may apparently differ altogether in histological structure, whilst certain others may differ only by deposition in the nodule of calcareous or lipoid (cholesterol) or other material. I cannot help thinking that further biopsy examinations will furnish us with data of clinical, and especially diagnostic, value.

Harley Street, W1. F. PARKES WEBER.

SPREAD OF SCABIES

SIR,—Dr. Fleetwood's letter of Oct. 14 raises a matter which needs more clinical attention. In factories I have occasionally seen little outbreaks of scabies among young girls working in one particular office or canteen, but never an outbreak among young boys in similar circumstances. These young girls, coming from different homes, probably contract their disease through their affectionate habit of walking about with their arms round one another's necks—a habit which boys would scorn. However, there is no doubt that sleeping with an affected person is still the commonest cause. From experience in a clinic for venereal diseases, and occasional observation on men and women whom I knew were associating together, I should say that sexually contracted scabies commences often round the genitals and buttocks, the rest of the body being free for a time. Some months ago I saw a man with scabies of the penis, abdomen and upper thighs (he had a typical lesion on the dorsum of the penis), while the woman with whom he had recently begun to carry on a clandestine affair during the night-shift in the factory had the ordinary distribution. This "midriff" distribution may be common in the type of person, often seen in VD clinics, who indulges in hole-and-corner sexuality. I myself have never seen scabies proved to be contracted through paper or any other material handled while at work in factories and should regard such infection as unlikely.

G. P. B. WHITWELL,
Oxford. Works Medical Officer.

CRUDE PENICILLIN

SIR,—With the assistance of clinicians at several hospitals we have been testing a penicillin filtrate on a fairly extensive scale during the last four months. The filtrate has been prepared under our guidance and direction by Messrs. Roche Products Ltd. Unfortunately "enemy action" has destroyed a large proportion of our records and we are unable to publish the detailed paper we intended to prepare. The recent greatly increased availability of pure penicillin, however, renders such a report somewhat less useful. We would therefore like to summarise briefly the results still available and then to indicate the lines along which crude penicillin products appear to us to be developing a definite place in clinical work.

First, both Mr. D. F. Freebody at Putney Hospital and Dr. Walsh at King George Hospital, Ilford, report excellent results in hand infections. The former treated a severe tendon-sheath infection by the instillation of filtrate by catheter. He obtained healing in a few days with full functional recovery. The latter had a similar

good result with a palmar infection with several sinuses. Most striking, however, are the results in fresh burns. As in cases already reported in THE LANCET by one of us, all burns of first and second degree treated with crude penicillin from the outset have healed without any sepsis in 7–10 days. Third-degree burns also heal rapidly and only occasionally do small areas become septic; Dr. Walsh reports 3 such cases. A third condition which yields rapidly to crude penicillin is acute staphylococcal or streptococcal skin infection. All these results have been obtained with filtrate of between 1·6 and 10 Oxford units per c.cm.

In future pure penicillin solutions will be available for injection into sinuses and for treating deep wound spaces, but there seems to be a large field left for more or less crude—and therefore cheap and plentiful—penicillin dressings for surface conditions, especially in general practice. We would suggest that the following types of cases remain:

1. Fresh burns of the first three degrees.
2. Abrasions and surface wounds.
3. Acute skin infections.
4. Dirty chronic ulcers preparatory to radical surgical treatment.

We are now experimenting with a dried dressing impregnated with crude penicillin of considerably higher strength. Messrs. Roche Products are preparing this for us, sterilely packed. Under suitable conditions these dressings seem to have a considerable stability. The Penicillin Production Committee has lately interested itself in our development and we hope that both the committee and ourselves will soon have encouraging reports to publish. If these hopes are realised penicillin treatment of a wide range of cases will become available at a very reasonable production cost.

A. J. HOBSON.
Harley Street, W1. L. D. GALLOWAY.

THREADWORM INFECTIONS

SIR,—In Colonel Clayton Lane's article of Oct. 14 I note that only two drugs are mentioned—gentian-violet and phenothiazine. Moreover the article concludes with the remark: "But no drug is yet known that is deadly to the worm yet less risky to man than is the infection. It needs finding."

Another substance which is also a dye and has a chemical similarity to phenothiazine is methylene-blue. Incidentally, this substance is described in the BPC as being destructive to parasitic worms in vitro, but I have found no other reference to its use in this respect. I recently gave gr. 3 t.d.s. for a week to a nursing mother because phenothiazine would have been too dangerous, and no toxic effects were produced either in the mother or in the baby. Although the infection was not severe, this patient had had repeated attacks over several years, in spite of treatment with phenothiazine. The treatment she received last April, together with subsequent prophylactic courses, appears to have rendered her free from her complaint. The patient herself had suggested the methylene-blue as the result of a letter from her father who "for years was tortured with the little brutes and tried everything." He eventually got rid of them after a doctor had treated him with methylene-blue for albuminuria. I have since treated another case which was riddled with them and there has been no recurrence, and I shall continue to use this safe and effective remedy.

Lancaster. R. PAKENHAM-WALSH.

TREATMENT OF CEREBROSPINAL FEVER

SIR,—Your leader of Oct. 21 suggests that the treatment of cerebrospinal fever by intrathecal injection of serum should now be abandoned. I can think of many severe cases which I treated, before the discovery of sulphonamides, by repeated lumbar puncture and intrathecal administration of serum, whose recovery I attributed to this method. The sulphonamides inhibit the growth of germs but do not act on their toxins, against which antitoxic serum still seems to be the best means of defence. I suggest that, pending further evidence, the use of serum in cerebrospinal fever should be continued.

Croydon Borough Hospital. J. TODESCO.

EVALUATION OF NUTRITIONAL STATE OF CHILDREN

SIR,—Dr. Kornfeld and Professor Nobel have rendered a service in directing attention once again to the use of anthropometric data in assessing the need for food relief after the war. If relief is to be given according to need, answers will be required, for each of the populations receiving it, to the questions "what is the nutritional status now," and, from time to time, "is it getting better or worse?" Kornfeld and Nobel point out that comparisons should, if possible, be made between both different regional and social groups and between individual children within those groups. They suggest that for regional and social groups the answer to the first question would be given by comparing the distributions of the heights and weights of the "relief" and of "normal" populations within the chart they publish. They do not say, however, what the normal distribution is. Presumably, the answer to the second question would be given by the changes from time to time in the distribution of the physical measurements within the chart of the various relief populations. It is not clear what advantage the chart has over average heights and weights according to age for a quick review of the anthropometric status of such regional or economic groups. Nor is it clear what advantage the chart has over similar averages, together with weight increments according to age and attained weight, for assessing changes in status from time to time. Such averages have the advantage that they can be used for simple and direct comparison with corresponding data, where they exist, for similar groups before the war.

The use of anthropometric data for differentiating between well and badly nourished individual children is full of snags. A child lighter or shorter than his fellows need not be undernourished, and a child undernourished need not be lighter or shorter than his fellows. While it is recognised that weight change is a sensitive index of changes in environmental conditions, no technique has yet been evolved for using attained heights and weights to select the undernourished. In fact, no technique based on anthropometric data of any kind has yet been found reliable after thorough testing. The difficulty in the use of individual heights and weights for that purpose can be illustrated by considering how two children of different physique would be classified on the proposed chart. A naturally light child would be selected as underweight and referred for clinical examination, whereas a naturally heavy child who was ill-nourished might still be overweight and thus escape detection. Franzen, McCloy and Dearborn and Rothney, as well as other workers in the USA, have recognised the anomalies which arise in selecting according to attained height and weight and have proposed "static" formulæ of a more complicated kind for detection of the undernourished. It is doubtful if the method proposed by Kornfeld and Nobel, which is based on the relationship of individual to average heights and weights, can satisfactorily be used for differentiating between well and badly nourished children.

London, SW1. E. R. BRANSBY.

CONGENITAL ABSENCE OF SWEAT GLANDS

SIR,—I was interested to read in your issue of Oct. 21 a description of two cases of hereditary ectodermal dysplasia. About a fortnight ago I was visited by a soldier whose discharge from the Army was under consideration on account of this disability. He came to see me because I had had him under my care at a school clinic in Glasgow from the age of about ten years until he left school. His appearance when I first saw him coincided with the description in an article in THE LANCET by a professor of medicine in Cape Town, I think. The diagnosis was made on sight because of the remarkable resemblance to some photographs of children published with the article. The general characteristics at that time were as follows.

Face and scalp.—The face had a curious old-man look, there being a discrepancy in size between the upper and lower part of the face. The cheeks were sunken, the chin pointed and the nose overhanging the mouth because of the lack of normal dentition. The bridge of the nose was sunken and the

hair on the scalp was very fair and definitely sparse on the vertex.

The *teeth* were characteristic. There were four canines, long and slender, resembling reptilian teeth. Three malformed molars were present—two on one lower jaw and one on the other. The alveolar margin was knife-edge in appearance. X rays showed some other unerupted teeth.

The *skin* was smooth and fine, but with thickening on palms and soles.

Symptoms.—He was most uncomfortable in hot weather, suffering from exhaustion and occasional fainting turns. He tried to overcome this discomfort by splashing cold water over his clothes. There was some anæmia.

He has now had artificial dentures for two years and apparently 14 teeth in all erupted. X rays now show no evidence of any unerupted teeth. The lips are prominent, probably because they have been used for grasping food. The hair on the scalp is sparse with practically none on the vertex. Pubic and axillary hair is present but very sparse, short and fine; there is no hair elsewhere on the body. He still complains of discomfort in warm weather, which is to some extent overcome by soaking his socks in cold water and splashing his hands frequently with water. He feels that as he has grown older this discomfort in warm weather has become less pronounced. On effort he rapidly becomes exhausted but seems to recover reasonably quickly with rest. There is no history of any fainting during training in the Army, though he found many of his duties very exhausting. He says that he never at any time has been aware of perspiration on his body. There is a soft systolic murmur at the apex, but this is apparently not significant. He has a chronic pharyngitis, but no nasal symptoms. The skin of palms and soles is parchment like and fissured. On the whole his symptoms now are less pronounced than they were in his school days.

Glasgow. J. MILLER YOUNG.

RESERVATION OF MEDICAL STUDENTS

SIR,—The letter of Sir E. Graham-Little in your issue of Oct. 21 is timely. There is little reason for a man being judged on the result of one examination, and none for labelling him an unsatisfactory student on that one result. There is another point. Are these young men who have been called from their studies to have any chance of resuming them at a reasonably early date after war ends? A ruling on that would be welcome. As I am the parent of one of these lads I shall merely sign myself,

AGRESTIS.

LANCECTOMY

SIR,—I cannot agree with your correspondent, Mr. E. G. Sita, on the technique of this important operation. I have essayed his method, but my cases suffered—too severely for my taste—from resultant trauma to the underlying non-expendable tissue. I commend to surgeons the following manipulative measure which obviates the use of any instrument:—

Grasp the cylinder in the manner of one elevating the offertory—i.e., in both hands, palms up, with the thumbs laid just clear of the suture line, in such a way that pressure by the flexor surface of the pollicular distal phalanges is exerted on that layer of the superficies which passes underneath at the gingival (or gummy) margin. Press boldly with the thumbs (uttering any suitable incantation), and the entire structure will be found to burst open along the suture line. For complete delivery it may be necessary to move the thumbs and repeat the pressure at one or two more levels, but the total operation is completed in an average of 2·75 secs.

Any distortion of shape due to pressure is purely transitory; the medulla emerges unscathed, while the cortex also is retained intact, for such valuable purposes as pipe-lighting, shopping lists, or re-issue as wrapper.

Aldbourne, Wilts. K. FORSAITH LANDER.

*** This correspondence is now closed.—ED. L.

TUBERCULOSIS ASSOCIATION.—At 3.45 PM on Nov. 17 at Manson House, 26, Portland Place, London, W1, Dr. F. R. G. Heaf, Dr. P. W. Edwards, Dr. W. L. Yell and Dr. J. H. Crawford will open a discussion on the place of work as a therapeutic measure in tuberculosis.

Obituary

ERNEST WILLIAM HEY GROVES

M D, M S LOND., HON. D SC BRIST., LL D BELF., F R C S, F R A C S

ALL over the world the name of Hey Groves is associated with orthopædic surgery. But he was a general surgeon before he was an orthopædist, and a general practitioner before he was a surgeon. Some would say that this was the ideal training for his specialty, and it certainly gave him the catholic outlook he showed as editor of the *British Journal of Surgery* for 28 years.

British Journal of Surgery, 1941

He was the son of a civil engineer, Edward Kennaway Groves, and was born in India. From school at Redland Hill House, Bristol, he went to Bart's, and having taken his B Sc Lond. he demonstrated biology to his fellow students for three years under T. W. Shore—a stimulating experience that left its mark on his career. Qualifying in 1895, he became obstetric house-physician under Sir Francis Champneys, and after a period at Tübingen he settled in practice in one of the outer Bristol suburbs. But general practice did not satisfy him; he was soon haunting the hospitals to see what he could learn of surgery. A colleague who met him first in 1903 recalls that "his mind was infinitely inquiring; he would take nothing for granted, and he would see everything for himself. He would not hesitate to express an opinion of his own or disagree with that of another, senior though he might be. At this time he was beginning to embark on a surgical career on his own account, and he made a start by taking into his own house, to be nursed by his wife who had been trained at Bart's, any case which his practice provided. He used to say that the first gastro-enterostomy he ever saw was one performed by himself." In 1905, having taken his FRCS and MS (with gold medal), he was elected to the staff of the Bristol General Hospital, and also became senior demonstrator in anatomy at Bristol University. At the hospital the few beds then allotted to him did not provide sufficient outlet for his energies—a situation which he met by interpreting the scope of outpatient operative surgery much more liberally than is usual.

At first Hey Groves wrote, as he worked, on all sorts of surgical subjects, but before long his mechanical turn of mind led him to concentrate on bone and joint cases, in which he could employ his talents as inventor and carpenter. His splints and devices were legion; indeed at one time examination candidates, asked the name of some appliance strange to them, felt fairly safe in attributing it to him. At the same time he was exploring new ground in bone surgery. In particular he worked at improving the operative treatment of fractures of the neck of the femur. Before the days of the Smith-Peterson and similar pins he spent much time and thought in fashioning pins from beef-bone and from the horn of stag and rhinoceros. More than once he attempted even the transplantation of a complete knee-joint from the dead to the living; though here success eluded him. Already in 1913 he was suggesting, as an alternative to plating of fractures, the use of steel pins passed through the fragments and held together by external splints.

In the war of 1914–18 Hey Groves extended his reputation. In 1915 he produced a primer on Gunshot Injuries of Bones which, inter alia, described the use of his transfixion pins in such cases. Often, however, he found himself up against the powers that were; for he displayed a lively contempt for anything that seemed to him red tape. As a junior officer he had no hesitation in visiting Command headquarters and expressing his opinions to those in charge; and some said that he was

sent to Egypt, not France, because it was farther away. (It is related that on setting out for Alexandria with other RAMC officers, he found that none could go aboard ship unless properly dressed in spurs; whereupon he managed to acquire a rusty pair at a marine store, and having himself embarked, tossed them ashore repeatedly for the use of each of his colleagues in turn.) After a year in Egypt he was home again, and soon had surgical charge of a military orthopædic centre in Bristol, later becoming surgical director of the Ministry of Pensions Hospital, Bath. In 1920 he contributed to our columns a valuable account of bone-grafting.

From a lectureship Hey Groves was promoted to the Bristol chair of surgery in 1922. Though honoured and liked in his own city, he was also now becoming a national and international figure in surgery. At the Royal College of Surgeons he remained a member of council for no less than 23 years, serving as vice-president (1928–29), examiner (1928–34), Bradshaw lecturer (1926), Hunterian orator (1930) and first Moynihan lecturer (1940). In 1928–29 he was president of the British Orthopædic Association, and in the following year president of the Association of Surgeons. His *Synopsis of Surgery* (first published in 1908), his *Modern Methods of Treating Fractures*, his *Surgical Operations*, and his textbooks for nurses brought him as teacher before a very large audience, and his indefatigable work as editor—or, strictly speaking, "editorial secretary"—of the admirable *British Journal of Surgery* from 1913 to 1941, placed the whole profession in his debt. Many lectures and shorter papers appeared in *The Lancet*, including a study of "Our Hospital System" in 1928 which recommended state aid without state control. In personal contacts, though strong-minded, he was also good-tempered, and associates speak of his "magnanimous spirit."

Professor Hey Groves became emeritus professor on his retirement from the chair of surgery, and received honorary degrees from Bristol and Belfast, as well as the fellowship of the Royal Australasian College of Surgeons. He died on Oct. 22, at Clifton, at the age of 72, after a long illness.

Appointments

BROOKES, C. J., MB ST. AND., FRCSE: examining factory surgeon for Paddington.
CUNNINGHAM, NORMAN, MB CAMB.: examining factory surgeon for Shelf, Yorks.

Births, Marriages and Deaths

BIRTHS

BARRY.—On Oct. 23, at Wellington, Somerset, wife of Captain C. T. Barry, RAMC—a son.
BENNETT.—On Oct. 25, at Wroxham, Norwich, the wife of Dr. Ronald Bennett—a daughter.
DUPRE.—On Oct. 24, at Hemel Hempstead, Herts, the wife of Dr. Peter Dupré—a son.
GREEVES.—On Oct. 25, at Wellington, Somerset, the wife of Major P. R. Greeves, RAMC—a daughter.
PAUL.—On Oct. 26, at Liverpool, the wife of Major Richard Paul, RAMC—a son.
SALEM.—On Oct. 21, the wife of Lieutenant J. S. Salem, RAMC, of Kenton, Middlesex—a son.

MARRIAGES

GUTHRIE—BOWMAN.—On Oct. 26, at Bussage, Gloucestershire, James Guthrie, lieut.-colonel IMS., to Rosalie Joan Bowman.
STEWART—TYLER.—On Oct. 23, at Swindon, Harold Constantine Stewart, lieutenant RAMC, to Phyllis Mary Tyler.
STONEHAM—WALKER.—On Oct. 14, in London, Frederick James Russell Stoneham, MRCS, squadron-leader RAFVR, to Pauline Elaine Walker, section officer WAAF.
THOMPSON—WHITE.—On Oct. 21, at Bromley, John Herbert Thompson, MRCS, to Eleanor Ada White, MRCS.
WRIGHT—COHN.—On May 30, at Chungking, China, Philip Rickard Turton Wright, BRC, to Adele B. Cohn, MD, of Rochester, NY.

DEATHS

AYLEN.—On Oct. 28, at Southwold, John Aylen, MRCS, aged 64.
JAMES.—On Oct. 27, at Reigate, Charles Henry James, CIE, FRCS, lieut.-colonel IMS retd., aged 81.
JOHNSON.—On Oct. 26, Raymond Johnson, OBE, MB LOND., FRCS.
KEMP.—On Oct. 24, at Worksop, Notts, George Lajus Kemp, MD LOND.
LAUCHLAN.—On Oct. 26, at Haslemere, Henry David Lauchlan, LRCPE, of Ewell, aged 88.
THOMAS.—On Sept. 4, George Trevor Harley Thomas, MRCS, FRCSE, major RAMC retd., aged 84.

On Active Service

CASUALTIES

MISSING

Captain C. E. C. WELLS, MB LOND., RAMC

WOUNDED

Captain P. N. SWIFT, MRCS, IMS

AWARDS

DSO

Captain V. J. DOWNIE, MC, MB BIRM., RAMC
Major G. McC. BASTEDO, RCAMC
Major C. E. CORRIGAN, RCAMC

MC

Major A. C. S. HOBSON, MRCS, RAMC
Captain LEONARD CROME, LRCPE, RAMC
Captain J. A. PETRIE, MB ST. AND., RAMC
Captain A. I. PIRIE, MB EDIN., RAMC
Captain M. K. RAY, IAMC
Lieutenant D. K. RAMADWAR, IAMC

MEMOIR

Captain NEIL WHITLEY was born at Barton Pines, Paignton, in 1918, the youngest son of Mr. and Mrs. William Whitley of Welstor, Ashburton. He was educated at Bromsgrove School, Worcestershire, and Clare College, Cambridge, where he took his BA in 1942, and in the same year he obtained the Conjoint qualification from the London Hospital. On first joining the RAMC he was attached to an anti-tank regiment and later trained with a parachute regiment. He landed in Normandy on D-day with an airborne division and was wounded by mortar fire while attending to a German prisoner. He was brought back to a hospital in this country, but died ten weeks later on Aug. 26 and was buried at Buckland-in-the-Moor. Captain Whitley married in 1941 Miss Eileen Zender Browne, third daughter of Prof. T. J. Browne of Bradenton, Florida, and he leaves her with a three-month-old son.

Cooper

"When I knew Whitley first as a clinical clerk," G. R. writes, "his cheerful, enthusiastic personality was arresting and his keen interest in his work made it easy to predict that he would become an excellent medical officer. And so he proved to be with the airborne division, and courageous as well. When I next saw him in a coastal hospital, seriously wounded, paralysed and gravely ill, he was still himself, his smile as vivid as ever and his interest in others alive. He was moved to a special centre for spinal injuries where with skilled treatment he rapidly improved for a time; but the sepsis from his wound had extended too deeply and caused fatal damage. It is a sad waste of a young life and of a promising family doctor of the best kind."

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED OCT. 21

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 2176; whooping-cough, 970; diphtheria, 580; paratyphoid, 6; typhoid, 9; measles (excluding rubella), 3779; pneumonia (primary or influenzal), 640; puerperal pyrexia, 157; cerebrospinal fever, 36; poliomyelitis, 14; polio-encephalitis, 0; encephalitis lethargica, 1; dysentery, 391; ophthalmia neonatorum, 76. 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 Oct. 18 was 717. During the previous week the following cases were admitted: scarlet fever, 41; diphtheria, 26; measles, 13; whooping-cough, 18.

Deaths.—In 126 great towns there were no deaths from enteric fever, 2 (0) from measles, 2 (0) from scarlet fever, 6 (0) from whooping-cough, 7 (0) from diphtheria, 50 (3) from diarrhœa and enteritis under two years, and 25 (4) from influenza. The figures in parentheses are those for London itself.

Manchester reported 5 deaths from diarrhœa.

The number of stillbirths notified during the week was 202 (corresponding to a rate of 30 per thousand total births), including 17 in London.

Notes and News

CINEMICROGRAPHY

Two papers on the recording of movement taking place under the microscope were read at the meeting of the Association for Scientific Photography at Caxton Hall on Oct. 14. H. Emmett, FRPS, described the set-up used in one of the ICI research laboratories, consisting of a petrological microscope, above which is supported the ciné camera without its lens, while the microscope is also used without the usual eyepiece, but it must have a viewing attachment to enable the image to be kept under observation while being filmed. Focus on the film is ensured by inserting a piece of ground glass in the gate and balancing this image with one seen in the viewing eyepiece; careful centring of the light is obviously of first importance. A 9·5 mm. camera was used connected through a belt drive to an electrically controlled gramophone motor which enables exposures to be taken at known intervals and projected at the normal speed of 16 frames per second, when slow changes can be clearly seen. This set-up was used in recording crystal growth. Of two films projected by Mr. Emmett the first showed various points of interest in the study of crystals, such as the changes in crystalline form induced by impurities, and the allotropic change in acicular crystals of ammonium nitrate which can take place on lowering the temperature. The second film dealt with the concentration gradient around a crystal during growth.

The second paper, by R. McV. Weston, FRMS, on cinemicrography in biological research, described a more elaborate apparatus for higher-power micrography, using a 16 mm. Ciné-Kodak Special camera to record the images. Owing to the employment of living specimens, a rotating sector shutter was used to prevent overheating and the whole of the microscope stage was enclosed in an incubator, the necessary controls being outside. The heating elements were two 30-watt carbon filament lamps shielded to prevent direct rays reaching the object and a chloroform-mercury thermostat next to it. As in the first apparatus the light was provided by a 100 c.p. 'Pointolite' lamp. Mr. Weston projected a film showing the movement of the leucocytes among the red corpuscles of the blood; higher magnifications showed the triple nuclei and the movement of the granules inside the cells.

RETURN OF THE CHILDREN

THE Government have decided that certain districts on the coast and elsewhere shall cease to be evacuation areas. The position of children belonging to these districts who are now accommodated in residential nurseries and small nursery units in reception areas is therefore to be considered with a view to sending them home. As the Ministry of Health points out (circular 149/44), the best place for a healthy child under 5 is with his mother; even if he spends part of the day in a nursery school or war-time nursery, he should be with his mother for the rest of it. In every residential nursery, however, there will very likely be some children whose parents cannot resume care of them immediately. A health visitor or other social worker is to visit the parents to find out whether the child can be received back, and to discuss difficulties and help in making any arrangements that will enable the parents to take the child—finding accommodation for homeless families, arranging for a local nursery to take the child during the mother's working hours, and procuring a cot and bedding if these are needed.

Children who cannot go home because their mothers are dead or ill, and whose fathers are in the Services or not living at home, will be transferred to existing residential nurseries until permanent plans can be made for them. Parents able and willing to take a child back at once will be given a free travel warrant to fetch him. Children whose parents cannot fetch them may be taken home, or brought in a group to their home neighbourhood, to be collected by parents from some central point. The Ministry recommends that follow-up visits should be made to the children in their homes, to see how they are settling down.

British Medical Students Association

The annual general meeting will be held at BMA House, Tavistock Square, London, WC1, on Nov. 10, 11 and 12. The Minister of Health will attend the session beginning at 4.30 PM on Friday the 10th, when a member will present him with the results of the questionnaire to students on a national health service.

Royal College of Physicians of London

At a comitia held on Oct. 26, with Lord Moran, the president in the chair, Air Vice-Marshal C. P. Symonds, Dr. T. L. Hardy and Dr. J. A. Charles were elected councillors. Sir Adolphe Abrahams was elected representative on the committee of management of the Conjoint Board, Sir Comyns Berkeley on the council of the Central Midwives Board, Sir Stanley Woodwark on the Central Council for District Nursing, and Dr. J. Hay on the court of governors of the University of Liverpool. Dr. H. E. Magee was appointed Milroy lecturer for 1946. The Jenks scholarship was awarded to P. H. Lovell, late of Epsom College.

The following were admitted to the membership:

*Yasin Abd el Ghaffar, MB CAIRO, J. N. Agate, MB CAMB., A. D. Barlow, MB CAMB., A. J. V. Cameron, MB GLASG., *T. A. W. Edwards, MB CAMB., squadron-leader RAF, *A. El Mofty, MD CAIRO, *M. N. Fahmy, MD CAIRO, E. A. Fairburn, MB LOND., *M. A. R. Fayez, MD CAIRO, J. L. Fluker, MB CAMB., J. H. Friend, MB LOND., flying-officer RAF, M. R. Geake, MB CAMB., J. G. Howlett, MD MCGILL, wing-commander RCAF, *J. A. Inglis, MB SYDNEY, captain RAMC, R. W. Lass, LRCP, squadron-leader RAF, F. K. Lau, MB CAMB., J. M. Lipscomb, MB CAMB., *F. L. A. Lydon, MB NUI, major RAMC, R. I. McCallum, MB LOND, *D. R. Macdonald, MB EDIN., Georges Marcel, MD PARIS, R. J. G. Morrison, MD LOND., major RAMC, *A. H. Mousa, MD CAIRO, P. B. Newcomb, MB LOND., *Ali Omar, MB CAIRO, James Overton, MB LEEDS, *Youssef Rizkalla, MD CAIRO, Dorothy H. Robertson, MB LOND., John Reginald Trounce, MB LOND., lieutenant RAMC, *Hermon Whittaker, LRCP, and J. V. Wilson, MD BELF., major RAMC.

* Admitted in absentia.

Licences to practise were conferred upon the following 174 candidates (147 men and 27 women) who have passed the final examination of the Conjoint Board and have complied with the by-laws of the College:

Doreen M. Aaröe, E. W. R. Alderman, Philip Allebone, P. M. Anderson, J. D. Andrew, John Andrew, Joseph Armstrong, Roy Astley, F. J. Aumonier, A. D. Bangham, R. H. O. Bannerman, J. C. Barclay, M. A. Barker, Frank Batley, Katharine M. O. Beadon, M. F. Bethell, D. T. A. Brown, Arnold Bruce, Alice E. Buck, Joan Bullough, R. D. Calcott, G. R. H. Calleja, M. D. Caplan, H. S. Capoore, Dan Cappon, J. A. Carr, H. E. Claremont, C. B. Clarke, I. F. Collie, Pamela J. Coope, A. R. Corbett, J. H. Coulson, R. A. Cranna, G. E. Cree, Richard Creese, R. H. Cutforth, J. K. Datta, P. L. H. Davey, Edith M. Davies, Jean M. B. Davies, Rosemary Davies, A. M. Dawson, I. M. P. Dawson, S. J. Dickson, J. W. T. Dixon, M. H. N. Dixon, Aileen P. M. Dring, S. L. Duggal, Michael Duggan, J. S. Ebsworth, V. B. J. Edwards, M. A. Epstein, Samuel Epstein, D. M. L. Evans, B. L. Finzel, L. G. Fison, T. W. Forster, Maud M. Frankland, P. H. Friedlander, A. E. Gibbs, Muriel M. Gloster, J. S. R. Golding, G. E. L. Graham, J. C. Graham, Joyce F. Grant, B. A. J. C. Gregory, A. J. M. Griffiths, G. J. Grossmark, D. W. Hall, H. A. N. Hammersley, L. G. W. J. Hannah, R. M. Hardisty, R. O. F. Hardwick, L. I. Hatherley, Katharine P. Haworth, †Alison B. Hay-Bolton, F. G. J. Hayhoe, P. R. Headley, Josephine M. R. Heber, E. W. Heining, E. P. W. Helps, Adrian Hill, F. A. Holden, C. J. S. Holdsworth, R. G. Howell, Margaret E. Hughes, C. F. Hutton, D. G. James, N. H. James, Arthur Jones, S. K. Kalgutkar, J. G. Kendall, Ethel E. A. D. Knowles, Barbara Law, David Lawrence, B. C. Lee, R. E. D. Leigh, D. W. L. Leslie, Moses Levene, W. B. Lingard, G. H. Lloyd, E. S. Lower, John Meyrick, C. M. Monro, Rhiannon Morgan, P. D. Mort, J. P. D. Mounsey, B. G. P. Oakenfull, T. D. S. Oswald, K. G. Paddle, K. W. E. Paine, H. E. Parry, P. F. Pearson, B. H. Pentney, J. C. E. Peshall, R. G. Pitman, B. R. Pollard, G. W. Poole, Diana Powell-Cotton, J. P. Pracy, Robert Pracy, P. D. G. Pugh, R. J. P. Pugh, N. E. Rankin, K. E. E. Read, Moira K. E. Reaney, A. Q. Ritchie, D. C. Roberts, W. G. Robinson, Elizabeth V. Rohr, Clement Rose, C. D. Routh, M. E. Samrah, G. H. Seale, R. A. Setchell, Sydney Sheare, R. H. Shephard, Joseph Shibko, R. F. Shove, R. L. Shrivastava, Patricia D. Shurly, K. E. D. Shuttleworth, R. L. Sikes, B. P. Skinner, D. M. Smart, Catharine E. Smith, G. B. Smith, I. B. Smith, J. S. Smith, Agnes A. V. Smyth, B. S. H. Storr, S. P. W. Street, J. E. H. Stretton, G. L. Stumbles, B. S. Sweetman, R. E. N. Tattersall, J. D. G. Turner, A. B. Vanscolina, T. R. Waddell, A. M. Walker, R. C. Walsh, H. D. Walters, B. C. WH. Ward, E. N. Watson, C. H. A. Wedeles, J. E. M. Whitehead, M. R. Williams, R. F. Williams, R. J. Williams, R. A. Womersley, T. M. Wood-Robinson, Sophie E. J. Wright, V. J. K. Wright, and Max Zoob.

The following diplomas were conferred jointly with the Royal College of Surgeons to the following:

DOMS.—J. A. Chivers, Philomena M. Guinan, Waldron Harris, H. G. W. Hoare, Miklos Klein, Leonard Lurie, S. J. H. Miller, M. C. Mundle, V. G. Patel, E. C. Richardson, R. H. Rushton, William Shortis, G. L. Simmons, Ronald Spink, Mabel E. Stewart and G. F. Wright.

DMR.—K. E. Barlow, R. J. Carr, F. H. Cross, Kathleen M. Packett and George Steiner.

National University of Ireland

Dr. C. J. McCarthy has been appointed lecturer in mental diseases at University College, Galway.

The following have been elected as representatives to the new senate which holds office for the next five years:

Prof. James O'Connor and Prof. Denis Coffey (University College, Dublin); Prof. James O'Donovan (University College); Prof. Henry Barniville and Prof. Patrick Kiely (Convocation).

Royal College of Surgeons of England

The annual meeting of the fellows and members of the college will be held at the Lincoln's Inn Fields, London, WC2, on Thursday, Nov. 16, at 2.30 PM. Copies of the report of the council may be obtained from the secretary of the college, and also, after Nov. 11, copies of the agenda of the meeting.

The annual report for 1944 states that the council intends to apply, after the war, for a supplemental charter enabling the college: (*a*) to grant fellowships to ophthalmologists (see *Lancet*, Aug. 12, p. 215); (*b*) to grant a fellowship in dental surgery (FDS); (*c*) to increase the number of permitted elections to the fellowship in each year and to render non-members eligible for such election; and (*d*) to coöpt not more than 6 additional members to the council to represent branches of practice not otherwise represented (see *Lancet*, July 1, p. 20). Proposals for further building in Lincoln's Inn Fields are described on p. 605

Society of Apothecaries of London

Today, Friday, Nov. 3, at 2.30 PM at the society's hall in Black Friars Lane, EC4, Surgeon Rear-Admiral C. P. G. Wakeley will speak on surgical warfare in 1944, in place of Colonel Elliott Cutler, who will be unable to attend owing to the exigencies of war service.

Scottish Conjoint Board

At recent examinations of the board of the Royal Colleges of Physicians and Surgeons of Edinburgh, the following were successful:

LRCP & SE, LRFP & S

J. E. Bossman, Enid W. Brett, J. Y. Brown, Aline L. Buchanan, J. S. Gibson Clark, W. H. Dempster, T. W. Duff, R. J. Frame, James Gemmell, Phillip Harris, J. D. Hope, B. D. Jacobson, Leo Jaffe, I. S. Lechler, Joseph Maizel, Gordon Paterson, Maurice R. Pitts, M. M. Salzmann, Ellis Shenken, Herman Shilling, K. S. Stewart, Richard Thomas, J. S. Tugendreich, R. S. Walker and A. L. Walcott.

Norbert Klein, MD PRAGUE, was also admitted to the licentiateship as a graduate of a recognised foreign university.

University of Liverpool

Lieut.-Colonel B. G. Maegraith, who is at present in charge of the Army malaria research unit, has been appointed to the Alfred Jones chair of tropical medicine which has been vacant since the death of Prof. Warrington Yorke last year.

Dr. Maegraith, who is 37 years of age, graduated MB at the University of Adelaide in 1930 before he came to Oxford as a Rhodes scholar. He obtained his B Sc there in 1933, his D Phil. in 1934, and his MA the following year. Meanwhile he had been awarded a Beit fellowship, and had been elected to a fellowship at Exeter College, where he acted as tutor in physiology. In 1937 he was appointed university demonstrator and lecturer in pathology. Dr. Maegraith has also served as dean of the Oxford medical school. In Australia he had made a hæmatological study of the aborigines, and his interests have since centred on the mechanism of hæmolysis, though he has also published papers on the tissue changes following occlusion of the blood-supply and on the effect of section of the renal nerves on hypertension. In the earlier years of the war, before joining the malaria research unit, he was consulting physician and assistant director of pathology in the West African Command. There, with G. M. Findlay and N. H. Martin, he studied the factors present in tissues and blood which may produce or inhibit lysis of blood-cells (*Lancet*, 1943, i, 573). His later observations on blackwater fever appeared in these columns on Sept. 9 and 23. The university council has granted Professor Maegraith leave of absence until he is free to take up his new duties.

Royal College of Obstetricians and Gynæcologists

At a meeting of the council held on Oct. 28, with Mr. Eardley Holland, the president, in the chair, Dr. Leonard Colebrook and Prof. L. G. Parsons were admitted to the fellowship. The following were admitted to the membership:

J. N. I. Emblin, J. P. Erskine, A. H. Maclennan, RCAMC (in absentia), Agnes M. Stewart, Elsie M. Terry, and Irene M. Titcomb.

The following were awarded the diploma of the college:

S. J. Barr, E. K. Blackburn, D. W. Briggs, Maud L. Buchanan, Allson Clarke, Josephine A. Davidson, A. S. Esslemont, P. K. Holding, J. K. Irving, R. J. M. Jamieson, D. L. H. Jones, Max Lipsitz, P. A. T. Lowden, J. M. Pallot, B. D. Patel, Jean A. Robertson, Margaret O. Thorpe, R. A. K. Wiener, and Ruth M. H. Winter.

Research on Sleeping Sickness

The Secretary of State for the Colonies has appointed a commission to advise on the coördination of action, including research, against human and animal trypanosomiasis, and in particular against the tsetse fly. The chairman is Mr. G. H. Creasy and the members include Prof. P. A. Buxton, Dr. H. Lyndhurst Duke, Prof. I. M. Heilbron, Dr. E. M. Lourie and Dr. A. G. H. Smart, with Mr. C. W. F. Footman (Colonial Office) as secretary.

Medical Society of London

On Monday, Nov. 13, at 5 PM, at 11, Chandos Street, W1, Mr. John Everidge will open a discussion on clinical aspects of renal ectopy and fusion.

Middlesex County Medical Society

A meeting will be held at Redhill County Hospital, Edgware, at 2.45 PM, on Saturday, Nov. 11, when Dr. Muriel Rose will speak on the treatment of sterile mating, Dr. S. W. Coffin on the choice of the anæsthetic, and Mr. Frank Forty on the treatment of varicose veins.

Association of Industrial Medical Officers

A joint meeting with the section of psychiatry of the Royal Society of Medicine will be held on Tuesday, Nov. 14, at 1, Wimpole Street, London, W1, at 4 PM, when Dr. Aubrey Lewis, Dr. Elizabeth Bunbury, Dr. Ernest Capel, and Dr. Russell Fraser will open a discussion on psychiatric advice in industry.

A Lister Lecture

The first Lister lecture of the Society of Chemical Industry will be delivered by Sir Alexander Fleming, FRS, in the anatomy lecture theatre of Edinburgh University, on Thursday, Nov. 9, at 5.30 PM. He is to speak on antiseptics. The Lister lecture is one of those lately founded by the society to perpetuate the memory of scientists and industrialists whose work has helped in building the chemical industry, and it has been endowed by Messrs. J. F. Macfarlan & Co., and Messrs. T. and H. Smith, of Edinburgh. The lecture will be delivered every four or five years in Edinburgh, Aberdeen or St. Andrews.

Royal Medical Benevolent Fund

A number of medical officers of health have been elected local secretaries of this fund. The suggestion arose from a speech made by Dr. R. H. Jolly as president of the Society of Medical Officers of Health. Looking at the returns of subscriptions to the RMBF and Epsom College he had been struck, he said, by the difference in different areas. Good results depended on the presence of an energetic local secretary, and he appealed to MOH's, as being in close contact with medical men in their areas, to undertake this work.

The state of the Fund is at present encouraging; subscriptions have increased and there has been a steady flow of bequests, including one from the late Sir StClair Thomson. Dr. C. L. Batteson, medical secretary of the Local Medical and Panel Committee for London, has been appointed treasurer in succession to Dr. Lewis Glover, who has resigned after many years of valued service.

Royal Society of Medicine

There will be a meeting of fellows on Tuesday, Nov. 7, at 4.30 PM. At 5 PM, on the same day, the section of orthopædics will hear papers by Mr. S. A. S. Malkin, Mr. T. T. Stamm, Mr. David Trevor, and Mr. M. E. Wilkinson. On Nov. 8, at 4.30 PM, at the section of physical medicine, Surgeon Commander G. Murray Levick will describe the physical preparation of commandos, and at 5 PM Mr. R. S. Corbett will give a presidential address to the section of proctology, on the surgical treatment of chronic ulcerative colitis. The section of ophthalmology is to meet on Nov. 9, at 5 PM, when Mr. E. W. Godding and Captain John Yudkin will speak on dark-adaptation. The day of the meeting of the clinical section has been changed to Nov. 10, at 2.30 PM.

Association of Approved Societies

At a conference last week this association, which represents 114 societies with a membership of rather less than a million, passed a resolution asking HM Government to review their social insurance plan to promote:

(*a*) For the patient, the avoidance of arbitrary labelling as sick or unemployed and the substitution of a unified test—e.g., "that the applicant has not, without just cause, failed to continue or take up work for which he is medically suitable."
(*b*) For the doctor, a greater emphasis on rehabilitation than on certification.
(*c*) For the community, a scheme which encourages productive effort by making it always a financial advantage to seek light work or part-time work when full duty cannot be performed.

An amendment asking for the retention of the approved society system was rejected by an overwhelming majority.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

SOCIAL MEDICINE

AN ACADEMIC DISCIPLINE AND AN INSTRUMENT OF SOCIAL POLICY *

F. A. E. CREW, M D, D SC EDIN., F R C P E, F R S
BRIGADIER, AMS; PROFESSOR OF PUBLIC HEALTH AND SOCIAL MEDICINE IN THE UNIVERSITY OF EDINBURGH

ABSOLUTE health is the state in which there is harmony within the individual and between the individual and his external world. But since life is labile and the environment continually changing everything is unstable and health and ill health are but different aspects of this instability. The distinction between them is one of degree, not qualitative but quantitative; it is a difference in the degree of imbalance or disharmony.

It follows that modern medicine concerns itself not merely with the alleviation of disease but includes within its province all that pertains to man's well-being, taking into account not only the makeup of man but also his external world and his interaction with it. Developments in sociology have led to the acceptance of the view that of all the constituents of the individual's external world nothing is of greater importance than the existence of other individuals of the same species, and that in the interrelationships of individuals within the group are to be found the major causes of harmony and disharmony. Moreover it is now fully recognised that in this external world man-made institutions are not less significant than are the components of his natural environment. It is for these reasons that social medicine is now proceeding on its active development.

There is a further reason for this. We of medicine have reason to know that very many of the ills that now disfigure individuals and communities derive directly from the fact that the development of the different fields of science and the application of the different sciences to human and social affairs have been very unequal. So great has been the encouragement, born of necessity, lavished upon the physical sciences that our knowledge concerning them is vast. Through their application man has been able to bring about profound and rapid modifications of his natural environment. All this has been accomplished in the entire absence of any real knowledge of human and social biology, sociology and of the psychology of communities.

It is not to be wondered at therefore that the environments that man has created for himself have proved to be out of harmony with human needs and sentiments. Disharmony between man and the social structures he has created has in fact been produced and so it is that the treatment of disease engendered by such disharmony has become a major preoccupation of medicine.

The community is now demanding, through medicine its mouthpiece, that the social sciences shall receive an encouragement at least equal to that given by industry to physics and chemistry, since the most urgent need of our time, if harmony between man and man and between mankind and its environments is to be restored and disease prevented is an expanding scientific knowledge of man and of society: the present combination of vast knowledge of inanimate things and an almost complete ignorance of ourselves constitutes a danger that may well destroy us.

It is in an attempt to remedy this imbalance that the medical faculties of universities are now finding a place within themselves for social medicine and it is through association with social medicine that the social sciences will encounter the opportunities they need for healthy and vigorous growth.

WHAT IS SOCIAL MEDICINE?

Social medicine is medical science in relation to groups of human beings. Such a definition gives to this branch of medicine the dignity of an academic discipline in its own right, distinguishes it from clinical medicine and makes it clear that it is not circumscribed by what has come to be known as preventive medicine.

Clinical medicine, in so far as it is a science, is the science of the sick individual. Preventive medicine is medical science applied to the elimination of sickness by appropriate social and collective procedures based upon the findings of clinical medicine and the ancillary sciences of the individual.

Social medicine rooted both in medicine and in sociology includes preventive medicine in this sense as well as industrial medicine, which is surely more than a variant of toxicology, but it differs from these in that it is not merely or mainly concerned with the prevention and elimination of sickness but is concerned also and especially with the study of all social agencies which promote or impair the fullest realisation of biologically and socially valuable human capacities. It includes the application to problems of health and disease of sociological concepts and methods.

Social medicine is nothing new as an interest or as a subject, its present claim to be recognised as a definite branch of medicine rests upon the facts that there is now a widespread full recognition of the number and importance of health-promoting and disease-provoking elements in the social milieu, and that recently and especially in the medical services of the armed forces its scope and content have been clearly defined and its methodology elaborated.

Problems of social medicine are of two kinds: one is concerned with the definition of the social environment in relation to the prevalence of morbidity and mortality; the other is concerned with the social agencies which are propitious to maximum health in the widest sense of the term.

THE SOCIOLOGY OF DISEASE

So stated, the first group of problems is concerned with disease in the body politic. This is the province of vital statistics, an instrument as valuable to medicine, though not so commonly used, as is the surgeon's knife. In saying this I do not forget that Lister when occupying the chair of clinical surgery in this university wrote:

> "I have often been reproached for not having published statistics ... the truth is that life is short and that when every day begins one has to consider which is the occupation that is most likely to be valuable ... I have felt that there was every day something more congenial and, I hoped, more profitable to do than to compile statistics."

The operative word here is, I submit, congenial. As an essay in profitable speculation it would be interesting to inquire which of the two, John Graunt's measurement of the rate of mortality in childhood or the Listerian system of antisepsis in surgery, has proved historically to be the greater contribution to medical science.

It is certainly true to say that the lack of carefully compiled records of disease has in the past often delayed the advancement of medicine and led to the acceptance of mistaken or misleading notions regarding disease causation and that it still is doing so. The prevalent abhorrence of figures on the part of medical men is to be regretted, and regarded as the product of a faulty education. It must be overcome if social medicine is to flourish; for this branch of medicine, by definition, must be concerned with the health of the group, whether in the positive or negative sense, and so it must always rely on those basic techniques which are essential to the study of groups in general. The research-worker in social medicine must perforce be a statistician; but it is important to realise what kind of a statistician he or she must be.

What social medicine needs for its immediate development is a personnel of research-workers who are not afraid of figures and who realise when and where they should and can get help from the expert statistician possessing highly sophisticated mathematical knowledge and facility, in order to avoid misunderstanding and misinterpretation. But it needs even more young men and women who have a keen interest in humanity and its affairs, for "where there is love of man there is also love of the art." Mathematical ability is no substitute for scientific interest in the social structure. No skilled mathematician who lacks an inclination for biological or social studies is likely to be able to make a contribution of any quality to social medicine save in an advisory capacity. Such as are not skilled in or quick at mathematics should not be discouraged from sharing in this high adventure, for they can quickly acquire the few

* Part of an inaugural lecture in the Bruce and John Usher chair of public health delivered at Edinburgh on Oct. 20.

and simple statistical techniques sufficient for ordinary purposes and the sense to know when they need to consult a real mathematician.

It is customary to look upon vital statistics as an audit of public health and as a yardstick of social welfare. But it has another function commonly unrecognised which impinges on the province of clinical medicine. It will be agreed that if we know the sort of environment in which the immediate causal agencies of a disease are likely to be found we are well on the way to discovering what these agencies are. It should be one of the main tasks of statistical medicine to supply relevant clues of this kind.

In this connexion it is of interest to refer to the history of nutritional science. Centuries before the essential techniques of biochemistry had been evolved clues pointing directly to the causal factors in certain deficiency diseases had been discovered by colonial administrators, navigators, ships' surgeons and the like. Nutritional science did not begin to advance immediately biochemistry had reached the necessary proficiency, for the reason that, since these clues had not been codified, their value was not appreciated. Research in the library can on occasion be as profitable and as important as research in the laboratory. The time has surely come when the systematic search for information about the climatic, regional, occupational and other more subtle circumstances associated with the occurrence of diseases of unknown origin should be planned and conducted. The urgent need is for data concerning morbidity as contrasted with mortality, and one of the first fruits of the modern renaissance of medicine has been this changed emphasis.

The appropriate methodology exists. Recent studies on human fertility, stimulated by interest in modern population trends, furnish a model for procedures equally appropriate to the study of agencies which make for disease and death. This differential method, employed with such great profit by the modern demographer, can easily be used in the exploration of group characteristics that are associated with differential morbidity and mortality.

It is particularly important at this time that the demographer shall be encouraged and aided to provide for those who are concerned with planning for the future as precise a knowledge as possible of the human resources that will be available for bringing their plans to fruition—knowledge of the numbers, sex, ages, geographical distribution, reproductive, morbidity and mortality trends of the people on whose behalf and by whom houses are to be built, food grown, work provided, and educational, health and social insurance and other services developed.

THE NEED FOR A SCIENCE OF HUMAN ECOLOGY

When I review the anxious years I have spent in the Army I am reminded of James Russell Lowell's lines:

> "Not but what abstract war is horrid,
> I sign to thet with all my heart.
> But civilyzation does get forrid,
> Sometimes upon a powdercart."

For it is true that the Army, with its all-in system of medical inspection and care has provided unique opportunities for the rapid development of social medicine. It has been my good fortune to have been permitted to exploit these opportunities and to create for this purpose new machinery. This, designed and exercised in the Army by my colleagues, can be the model for that which will be needed when peace returns. In these matters I refer not to the military system of regimentation that has attracted so much attention, but to the Army's techniques of fact-finding and its experimental methods.

Medicine in the Army differs from civil medicine in many ways, but especially for the reason that in the Army it is but one of many coördinated directorates that are responsible for health promotion and disease prevention. Medicine works along with and in the closest coöperation with the directorates of manpower—planning, organisation, personnel selection, welfare services, personal services, education and training, for example, in the study of disease as a function of the social environment and in the objective study of human institutions and social groups. Thus in the Army there has been proceeding an exploration of previously ill-charted territories in social science, and the doctor and the demographer have been working in close collaboration with the social anthropologist and the social psychologist.

Through the study of differential morbidity and mortality the social biologist had already created a reservoir of information concerning biological differentials within the social framework. But when attempts were made to assess the significance of such differentials it was found that our knowledge concerning social structures and human relationships within such lagged far behind our requirements. Social medicine in the Army demanded for its development a corpus of knowledge concerning occupation, locality, social amenities, personal habits, aspirations, risks and responsibilities, that could not be derived from questions the economist asks in peace concerning price and wage levels in a monetary society but could be derived from questions to which the social biologist, anthropologist and psychologist seek an answer. The Army needed a new kind of sociology and this has been created.

This new science of human ecology has been of the greatest value in its application in the Army; its further development after the war and for the purposes of peace must be encouraged: that university which contributes in the immediate future most to the advancement of learning and to human betterment will, I submit, be the one that develops the greatest institute of human ecology. Such a development is of special importance because the interrelationships of this science are so manifold that any discovery within it will animate speculation and inquiry in many other disciplines. Sociology, anthropology, psychology, criminology, pedagogy, history, law as well as medicine wait upon human ecology and its discoveries concerning human needs, sentiments and beliefs.

THE SOCIOLOGY OF POSITIVE HEALTH

The second group of problems which fall naturally into the province of social medicine are those which are concerned with the assessment of the agencies that make for positive health in a community. As would be expected, these loom exceedingly large in military medicine, and experience has shown how lamentable is our ignorance of the strains and stresses of modern life and how little physiological science has probed the range of the normal within the social group.

Through active collaboration with physiology, socia medicine must bring into being a new kind of physiology which for the lack of a better name may perhaps be called field physiology, using the statistical techniques perfected by psychologists and industrial efficiency experts to assess the significance of biochemical and physiological tests as a basis for a conspectus of the criteria of physical fitness.

In the Army the term positive health is no empty phrase; for a purely negative health standard is not good enough for a medical service which is called upon to assess training procedures and to promote and prescribe a regimen appropriate to the maintenance of the highest level of attainable efficiency for an exacting life and an increasing variety of specialised activities imposed by mechanisation.

Psychologists (non-medical), psychiatrists, primarily interested in the preventive aspects of their subject, and specialists in physical medicine especially have all been concerned within the Army in giving to the term positive health an exact meaning. It is a quality that is measured by performance tests and of it there are grades. Performance in tests of intelligence, agility, endurance, and strength, is at the same time a measure of the individual's will to perform, and of his enjoyment in the possession of the ability to do so, for "as he thinketh in his heart so is he." Every job, simplified as far as possible, that the soldier can be called upon to perform has been measured in respect of the mental and physical qualities and acquired skills that must be possessed by the individuals who are to undertake it. Every recruit is measured in respect of his inherent and acquired

qualities. As far as possible his posting and employment are such as ensure that his attributes are in tune with the complexities and responsibilities of the rôle which he is required to fill. This job-analysis and this selection of personnel are activities that are of the greatest interest to social medicine since their effect is the prevention of disharmony between the individual and the conditions of his employment. In the Army as in civil life much sickness is nothing more or less than disinclination born of dissatisfaction and transformed into disability.

It is of interest to note that in the Army, physical medicine has come to be no longer primarily concerned with the exhibition of physiotherapeutic procedures. It has become that branch of medicine which is especially concerned with what may be called somatology—with the somatological aspects of those psychosomatic problems that refer to the attainment, maintenance and restoration of maximum fitness in a social group.

This combination of psychiatrist interested in group problems and competent in their investigation and the specialist in physical medicine must be projected into postwar civil life and must be employed in a comprehensive attack on the criteria of a positive health regimen, interpreted in relation to maximum fitness of the individual for a particular job in a particular environment, and embracing individual variables such as sleep and exercise requirements as well as socially significant variables such as the demands on the human subject of mechanical transport and the best distribution of leisure. Such matters as these must have profound social repercussions on our views concerning prehabilitation, rehabilitation, revocation, vocational guidance, town-planning, location of industry, distribution of population, &c. The study of all of them entails access to groups of individuals and an interest in the psychological and physiological, rather than in the statistical aspects of social medicine.

There is no paucity of existing facilities for the conduct of such inquiries in civil life. It is sufficient to point to two examples, the factory and the nursery school. The time has surely come to take a broader view of industrial medicine linked with industrial psychology as one of the main diversions within the province of social medicine. The time is ripe also for using the machinery of the nursery school for the intensive study of child life and health. Moreover, projects already being devised for youth services such as the Army Cadet Force and the prospect of compulsory military service will provide full opportunities for carrying forward such inquiries into and through adolescence into maturity.

The general social conditions within the Army receive no less attention, and as far as possible they are so manipulated by the welfare, education, medical and other directorates that they are attuned to the needs of the soldier. In these activities the psychiatrist, who in the Army is a social psychologist rather than an alienist, is involved in a consultative capacity.

It is recognised that the military quality of troops is determined very largely by factors that pertain to the social environment of the Army—that for example the record of performance in battle, the incidence of crime in a military sense, the rate of deterioration of morale that is a function of the duration of service especially overseas, no less than the incidence of preventable sickness, are profoundly influenced by such factors as the quality of the educational, entertainment and recreational agencies provided and the frequency and regularity of the mail.

We of the Army have cause to know the prophylactic properties of the postage stamp and to appreciate the value of medal ribbon as a wound dressing. We know that sickness is rare in such as enjoy a sense of participating in a goodly enterprise, the purpose of which is understood by the troops and applauded by the community of which they are part. We know that the feelings of being forgotten and of being frustrated are the prodromata of much serious sickness, which for its cure demands treatment that is outwith the scope of medicine itself.

The Army organisation is such that insofar as this is possible under the conditions of actual war it is an environment—natural, occupational and social—which is harmonised with the needs of those who serve in it. Since intraspecific warfare can by us be regarded only as a disgraceful anachronism, a denial of man's morality and intelligence and a ghastly betrayal of science, it follows that it remains impossible within the Army, an instrument of war, to create an environment that is propitious to the cultivation and expression only of those human attributes that are socially valuable and to the satisfaction of those needs that are beneficent. Nevertheless since battles are rare events in war and remain the experience only of the minority of those in uniform there is much in Army life that approximates closely the conditions of peace. For this reason there is much in military sociology that could with advantage be carried over into peace-time society.

ORGANISATION OF A UNIVERSITY DEPARTMENT OF SOCIAL MEDICINE

From the foregoing it will be apparent that in my view to the specialists in public health and industrial medicine who heretofore have constituted the staff of a typical department of public health there should now be added specialists in social biology, demography, social anthropology, social psychology and physical medicine to form an integrated group, behind which there should be a strong statistical laboratory. Such a group has been fashioned by the needs of and by the opportunities afforded by the Army. Nothing would be more reasonable than that with the restoration of peace this group should be transplanted to form the staff of a university institute of social medicine. The group should so organise and exercise itself in teaching and research that it would come to be regarded by clinicians, medical officers of health and their staffs and others, as the centre to which they naturally turned for help in the design of investigations in the field of social medicine, in the conduct of investigations, and in the interpretation and presentation of the results that emerged therefrom. Nothing is more certain than that the lack of a centre of this kind has prevented scores of isolated medical men up and down the land launching upon the investigation of problems that beset them in the course of their daily work and that the existence of such a centre to which these men could turn for technical assistance would multiply the volume and value of research in the field of social medicine a hundredfold.

SOCIAL MEDICINE AS A NEW WAY OF LIFE

What has gone before has been an attempt to state in coldly academic terms the scope of the problems with which teaching and research in social medicine are concerned, the techniques on which it must rely, and the personnel required for the task. There is no need to display its social worth for this is surely self-evident. Its elevation to rank as a discipline in its own right, however, signifies much more than the provision of a new instrument to be used in the interests of social policy in matters affecting community health. It signalises also the birth of a new outlook on human affairs, a new interpretation of human relations in a free society and a new scale of social values.

During the past two centuries advancing medical knowledge has generated new communal aspirations by exposing common perils. The process of democratic government has become increasingly involved in responsibility for administering the results of new scientific knowledge concerning human needs in respect of such things as food, homes and work. The public health is now one of the major preoccupations of government in a democratic society, and our profession is therefore robed somewhat uneasily in the mantle of the elder statesman: its own special responsibilities, already great, will certainly increase in the postwar world.

The discoveries of medical science are quickly made known to the general public and an appreciation of their implications is quickly and widely diffused. Out of this awareness there is emerging a new social phenomenon, the rational recognition of common needs. So it is that politics, which used to deal with human rights and desires, is now concerned more and more with human needs. It is the aim of social medicine to define these needs and ceaselessly to urge that they shall be satisfied.

MICRO-METHODS OF ESTIMATING PENICILLIN IN BLOOD SERUM

AND OTHER BODY FLUIDS

SIR ALEXANDER FLEMING
M B LOND., F R C S, F R C P, F R S
PROFESSOR OF BACTERIOLOGY IN THE UNIVERSITY OF LONDON

Inoculation Department, St. Mary's Hospital

THERE is no chemical test for penicillin in blood, but the concentration of this substance in blood-serum can readily be estimated by titrating its bacteriostatic power on a suitable test organism.

This titration can be done in test-tubes using 0·5 c.cm. or 1 c.cm. volumes; but this requires a large sample of blood, and as blood specimens sometimes have to be taken at frequent intervals we have not considered it justifiable to withdraw large samples of blood from sick patients, more especially as the test can be better carried out using minute quantities of blood such as can readily be taken from the finger or ear.

I have described (1943) methods of performing this microtitration, but since then much further work has been done and the methods have been slightly modified. At first we used staphylococcus as the test organism. When grown in human serum in confined spaces this organism develops into separate colonies which, unless the inoculum is excessive, are easily recognised. When using staphylococci it is always necessary to adjust the inoculum so that the staphyloccocus colonies are well separated, and we found that in some titrations there was a point where it was difficult to say whether the cocci had grown or not; so we have now given up staphylococcus as the test organism and have substituted a hæmolytic streptococcus, using blood as the indicator of growth. This gives a more definite end-point, and also allows a considerable latitude in the amount of the test organism which may be inoculated. For incubation of the test mixtures we use either slide cells or capillary tubes.

SLIDE CELL METHOD

The slide cells now used differ only slightly from those described by Wright (1923). His were divided into 4 compartments; we now divide them into 6 to allow a complete titration to be made with one set of cells.

Preparation of the slide cell.—This has been described by Wright (1923) and his description need not be repeated, except in regard to certain details.

The paper strips, treated with soft paraffin, which are used to separate the slides into compartments, are cut about 2·5 mm. wide from the prewar *Journal of Pathology and Bacteriology*. This paper is 0·2 mm. thick, and was chosen because it is available in most bacteriological laboratories. (There is sufficient paper in the advertisement pages to make large numbers of slide cells.) A diagram of the completed slide cell is made on a piece of paper showing the exact position of the strips, and every time that slide cells are prepared they are constructed over this diagram. The prepared slides can be stored in an ordinary slide box, for the ordinary air contaminatives do not grow readily in blood or serum and do not interfere with the test.

For use the upper slide covering the cells is slid back about 1 mm. to permit easy filling of the cells, and after the cells are filled it is replaced so that the slides are in alignment before sealing. Each compartment of the slide cell holds almost 50 c.mm.

A good laboratory technician can soon acquire facility in making these slide cells, which may be used for many other purposes in connexion with immunology and chemotherapy.

Test organism.—We selected a hæmolytic streptococcus which grew profusely in ordinary broth, which produced a powerful hæmolysin and which survived well in culture. Our custom is to plant it each week on an agar slope and from this to make broth cultures each day for use in the test. This streptococcus is not especially sensitive to penicillin, but we have chosen it because it is sensitive enough for practical purposes, and the ease with which it can be grown and manipulated has outweighed any slight advantage possessed by any of the more sensitive streptococci we have tested. If, however, we find a more sensitive streptococcus with equal cultural advantages we shall immediately use it, since it might enable us to detect smaller quantities of penicillin in the serum.

Before commencing to work with a new test organism it is necessary to standardise its sensitivity. This is done by making up a solution of penicillin containing 0·5 unit per c.cm. in blood-serum and titrating it in exactly the same way as would be done in the actual test. With our materials we repeatedly find that a 1 in 16 dilution of such a solution shows partial hæmolysis.

Indicator.—We have used human blood which has had the leucocytes removed or inactivated, and it is preferable to use group O blood so that the corpuscles will not be agglutinated by any serum. This absence of agglutination of the corpuscles makes for better readings. Fortunately my own blood is group O, and as it is generally my own blood which I use I have had no difficulty with isoagglutination.

The leucocytes in human blood have considerable power of killing streptococci and it is therefore desirable to remove or inactivate them so that the only bacteriostatic agent present will be the penicillin in the test serum. This can be done in various ways: (1) removal by filtering through cotton-wool (Fleming 1926); (2) heating to 50° C. for 30 minutes; (3) keeping the blood for more than 3 days; or (4) adding 'Liquoid' up to a concentration of 1/1000 or 1/2000. This last method is convenient; the liquoid not only destroys the leucocytes but also prevents clotting, so defibrinating the blood is unnecessary.

The blood is inoculated with hæmolytic streptococci by adding 5 c.mm. (or a large loopful) of a 24-hour broth culture to 1 c.cm. of blood.

Technique of the test.—Serial dilutions of the patient's serum are made as follows:

A series of volumes of 25 c.mm. of normal salt are placed on a paraffined slide.* A volume of 25 c.mm. of the patient's serum is placed on the slide to the left of the first drop of saline. Another 25 c.mm. volume is mixed with the first volume of saline, and of this mixture 25 c.mm. is mixed with the next volume. This is repeated until the penultimate volume is reached, when (after mixing) the extra volume of 25 c.mm. is discarded. This gives a series of dilutions of the serum of 1/1, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, and so on, while the last volume remains normal saline and serves as a control. Then 25 c.mm. volumes of the infected blood are mixed with these serial dilutions and run into the slide cells.

It may be that the cell will not contain the whole volume; but this is immaterial, for one is not counting colonies but observing whether or not growth has taken place, and the inoculum used is such that there is no danger of missing growth if a small quantity of the mixture is not incubated.

Sealing the slide cells.—This is a very important procedure, for if a small pinhole is left the contents will dry during incubation.

The filled slide cells are arranged side by side on a glass plate of suitable size with only 1 or 2 mm. between their opposing edges. A mixture of equal parts of paraffin wax and soft paraffin is well heated and then with a pipette and teat is run along the top and bottom of the series of slides. When this cools it fixes the slides in position and the same mixture is run along the edges and in the narrow spaces between the slides. This usually suffices, but for extra safety a small quantity of melted paraffin wax may be run on top of the mixture of paraffin wax and soft paraffin. The whole thing can be smoothed off and made tidy with a heated metal spatula (the metal handle of an old surgical scalpel is admirable).

Incubation of slide cells.—They are incubated overnight at 37° C. and are best examined horizontal by transmitted light. An examining box is readily made from a wooden box with one side open and a piece of mirror glass fitted in at the right-angle, and having a glass lid on which the glass plate with the slide cells is placed.

Result.—Where there is enough penicillin in the serum to inhibit the streptococci the blood is unchanged. In the cells in which the streptococci grow freely the blood is completely hæmolysed. Frequently there is a cell between these extremes where the streptococcal growth

* A paraffined slide is made by spreading paraffin wax which has been heated to about 130° or 140° C. in a thin layer over a microscope slide and allowing it to cool. A stock of these can be prepared, laid face to face, and kept in place by wiping the paraffined brush along the edges of the heap. A slide can then be detached from the heap for use when required.

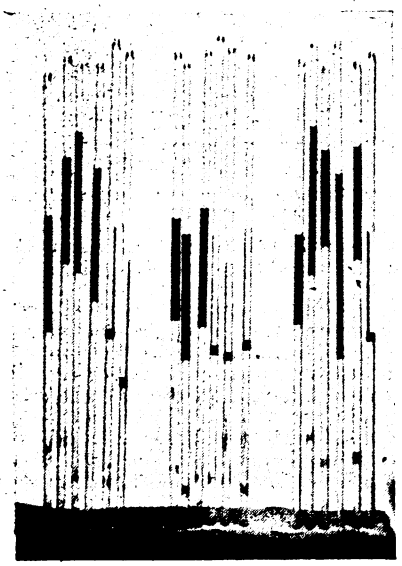
has been partially inhibited and hæmolysis is only partial. The end-point is sharp and definite.

CAPILLARY TUBE METHOD

This avoids the preparation of slide cells which some workers find troublesome. It also avoids the possibility of a result being spoilt by the slide cells drying up from unskilful sealing. For many purposes in connexion with chemotherapy it is definitely inferior to the slide-cell method, but for the estimation of penicillin in blood-serum it seems to have no disadvantage.

Preparation of capillary tubes.—A piece of wide glass tubing is drawn out in a suitable flame in such a way that the calibre of the long capillary tube is about 0·8 mm. and is relatively constant. This is now cut into 3-inch lengths and these can be stored in a sterile test-tube.

Test organism and indicator.—The same hæmolytic streptococcus and blood are used as were employed in the slide-cell method. To obtain a good end-point the final mixture in the test must not contain more than 10% blood; therefore, if equal volumes of serum dilution and blood are to be used, the blood must first be diluted 5 times with normal saline. We have found it better, however, to dilute the blood with an equal volume of saline and to use a smaller volume.



Three titrations in capillary tubes. The capillaries after incubation have been set upright in plasticine on a slide and the undissolved corpuscles have settled to the bottom. In each set the concentrations of serum from right to left are 1 in 2, 4, 8, 16 and 32, and the left-hand tube is a control.

The blood diluted with saline is infected with 5 c.mm. per c.cm. of a 24-hour broth culture of the test hæmolytic streptococcus.

Technique of the test.—Serial dilutions (25 c.mm. volume) of the patient's serum are made on a paraffined slide exactly as for the slide-cell test. Then each dilution is mixed with 5 c.mm. of the infected blood (diluted with an equal volume of saline). The drops are one by one touched with the end of one of the capillary tubes held at a low angle. The fluid runs up the tube. By tilting the tube the fluid is run to about the middle of the tube and the ends are now sealed in the flame. The tubes are now stuck in plasticine on a slide and are incubated *horizontally* overnight.

When making the series of dilutions of serum it is convenient to know the time relation between the taking of the blood and an injection of penicillin. In this way a guess can be made at the penicillin concentration, and so the number of dilutions can be cut down to a reasonable number with the certainty of obtaining an end-point.

Reading the result.—If the tubes are examined against a black background it is usually easy to see whether hæmolysis has occurred, but if the tubes are now set upright in the plasticine and left for an hour or so the undissolved corpuscles settle to the bottom, giving a beautiful end-point (see figure). Sometimes one tube is completely hæmolysed and the next one shows no hæmolysis; or frequently there is a tube in between which shows a sediment of undissolved corpuscles but in which the supernatant fluid contains more or less hæmoglobin.

APPLICATION

Very consistent results are obtained by these methods, and when a series of observations is made at intervals following an injection of penicillin a regular curve is obtained. The results obtained after the administration of penicillin in various doses by different routes appear in an accompanying paper.

The methods described can be used to estimate penicillin in other body fluids, and are especially valuable in those cases in which only minute quantities of fluid can be obtained from the patient. One can readily make adjustment in the size of the capillary tube to allow the test to be done so that the total volume of fluid in each tube is only 10 c.mm. Pus can also be tested by centrifuging the pus and titrating the supernatant fluid, or, if the pus is so thick that there is no supernatant fluid on centrifuging, a sufficiency of normal saline is added to the pus, allowed to stand for a short time, and then centrifuged. The presence of staphylococcus or other organism (other than a hæmolytic organism or a penicillinase producer) does not interfere with the test.

SUMMARY

Methods are described for performing microtitrations of penicillin in the body fluids of patients who are being treated by the drug. In these slide cells or capillary tubes are used as the cultural vessels, hæmolytic streptococcus as the test organism, and blood as the indicator.

In conclusion I must thank the Penicillin Therapeutic Trials Committee of the Medical Research Council for the penicillin which enabled these tests to be done.

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PENICILLIN CONTENT OF BLOOD SERUM AFTER VARIOUS DOSES OF PENICILLIN BY VARIOUS ROUTES

SIR A. FLEMING FRCP, FRS
M. Y. YOUNG CIE, M B GLASG.
J. SUCHET, M R C S
A. J. E. ROWE, M R C S
Inoculation Department, St. Mary's Hospital

WE have estimated the concentration of penicillin in the blood-serum of patients who have been receiving the drug in various doses intravenously, intramuscularly, or subcutaneously, either as single injections or as a continuous drip. In this way we have acquired information as to the maximum height to which the penicillin content rose, and as to how long an appreciable penicillin content was maintained after a dose. The methods used for estimation are described in the preceding paper.

SINGLE INJECTIONS

15,000 *units.*—Fig. 1 shows the penicillin content of the blood after single injections by three different routes:

Intravenous.—As the penicillin is introduced directly into the circulation it is found almost immediately at its maximum concentration (about 4 units per c.cm.). The concentration falls very rapidly so that after ten minutes it may be only 0·5 unit. Thereafter the fall is slower, but after one hour there is only about 0·03 unit. At the end of three hours it may not be possible to detect penicillin in the serum by the methods used.

Intramuscular (figs. 1 and 2).—After one minute no penicillin could be detected, but after two minutes there was an appreciable quantity (0·12 unit per c.cm.). The maximum concentration was reached in six minutes, and this maximum (0·5 unit) was maintained for approximately ten minutes, after which the content dropped rapidly but not as quickly as with the intravenous injection, so that after three hours little or no penicillin was detectable.

Subcutaneous (fig. 1).—This gave almost the same curve as the intramuscular injection except that perhaps the first appearance in the blood was delayed by a minute or two. In fifteen minutes it had reached the same maximum level as with intramuscular injection, and the fall followed the same curve.

20,000 *units intramuscularly* (fig. 2).—After fifteen minutes the serum contained a little less than 1 unit per c.cm. and after three hours the serum was still bacteriostatic.

35,000 *units intramuscularly* (fig. 2).—This was investigated only on one patient. After 15 minutes the

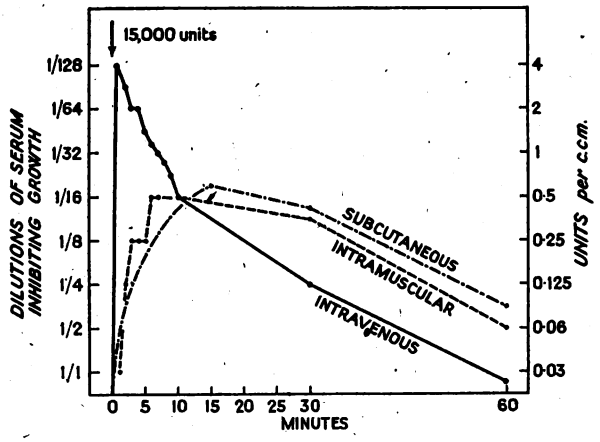


Fig. 1—Bacteriostatic power of serum following injection of 15,000 units penicillin intravenously, intramuscularly, and subcutaneously.

serum contained 2 units of penicillin per c.cm. and it was still detectable after four hours.

50,000 *units intramuscularly* (fig. 3).—In fifteen minutes the blood had reached its maximum of almost 2 units per c.cm. This was maintained for fifteen minutes, and the rate of disappearance of the penicillin was slower than with the smaller doses so that at the end of four hours it was still detectable. A second injection given four hours after the first raised the blood level to slightly over 2 units, but after another four hours the serum had no inhibitory power.

100,000 *units intramuscularly* (fig. 3).—This, the largest dose we have administered, was followed through in a number of patients. Some of these had the sodium salt and some the calcium salt. There was no difference in the clinical result whichever salt was used, nor was there any difference in the curve of the penicillin content of the blood. The maximum height of the curve, from 2 to 3 units per c.cm., was reached in fifteen minutes, and penicillin could still be detected in the blood after five or even six hours.

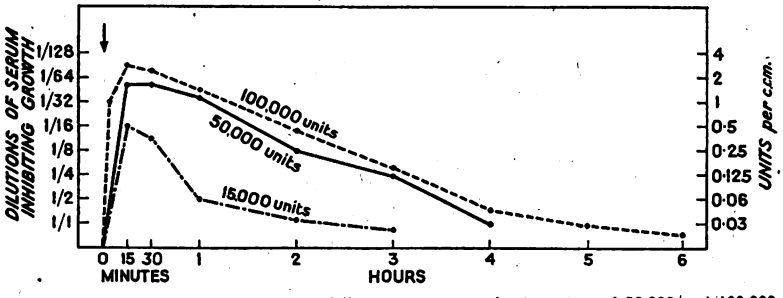


Fig. 3—Bacteriostatic power of serum following intramuscular injection of 50,000 and 100,000 units of penicillin. Result with 15,000 units included for comparison.

20,000 *units intravenously*.—In one patient six injections of 20,000 units were given at two-hourly intervals. Blood was tested two minutes after the injection and again immediately before the next one. Fig. 4 shows the results, and it is to be noted that in this patient no penicillin was detectable in the blood two hours after any of the injections.

REPEATED INJECTIONS AT SHORT INTERVALS

Intravenous (fig. 5).—In one case injection of 15,000 units was repeated four times at ten-minute intervals. No clinical symptoms followed.

After the first injection the blood content rose immediately as in fig. 1, and fell in the same manner. At the time of the second injection it contained 1 unit per c.cm. It again rose to a higher level and fell rapidly. After the third injection it rose to such a level that the blood-serum could be diluted over 1000 times before its bacterio-inhibitory power was lost. This is a phenomenal dilution, and anything like this degree of bacteriostatic power cannot be produced with any drug other than penicillin. After this, even when a fourth injection was given after another ten minutes, the penicillin content fell rapidly, so that in two hours the serum contained only 0·06 unit per c.cm.

Intramuscular (fig. 6).—Injection of 15,000 units was repeated every fifteen minutes (at which time the blood content should be at its maximum) for seven injections. The blood content rose to over 0·5 unit per c.cm. in the first fifteen minutes. After the second it showed a further rise, and then it remained practically stationary until thirty minutes after the last injection. Then it dropped and was at a very low level at three hours. After the third injection it seemed that absorption and excretion just balanced so that the blood content remained constant.

In another patient three intramuscular doses of 15,000 units were given at fifteen minute intervals, and the blood was tested at five-minute intervals. There was a steady rise till fifteen minutes after the third injection, when the blood contained 4 units of penicillin per c.cm.

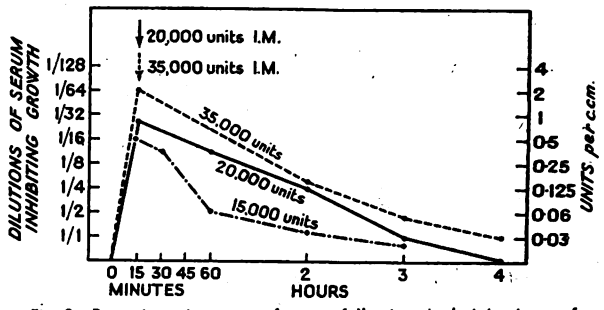


Fig. 2—Bacteriostatic power of serum following single injections of penicillin in doses of 15,000, 20,000, and 35,000 units.

DRIPS

Intravenous.—Fig 7 shows the effect in the same patient of intravenous and intramuscular injections of 15,000 units and of an intravenous drip at various rates of flow. With the single injections there was a rapid rise, but at the end of three hours no penicillin was detectable by the test. With the intravenous drip a constant level was obtained, and the height of that level simply depended on the rate of flow of the penicillin into the vein. This is just what would be expected.

Intramuscular.—We have obtained figures relating to the administration of penicillin by intramuscular drip at the rate of 60,000 units in twenty-four hours. There is a lapse of one hour or more in which no penicillin can be detected; then it gradually increases, and after two hours it maintains a more or less constant level. This level is not high—if the serum is diluted more than twice the inhibitory power disappears—but apparently this is enough as the patients recover.

Table I shows the findings at the beginning of treatment:—

TABLE I—GROWTH OF STREPTOCOCCUS IN VARIOUS CONCENTRATIONS OF SERUM

	5/6	1/2	1/4	1/8	Control
Before treatment	+	+	+	+	+
10 minutes after and every 10 minutes up to 1 hour	+	+	+	+	+
1 hour 10 minutes after ..	±	+	+	+	+
1 ,, 20 ,, ,, ..	0	+	+	+	+
1 ,, 30 ,, ,, ..	0	+	+	+	+
2 hours after	0	trace	+	+	+
2 ,, 20 minutes after ..	0	0	+	+	+

The final level shown was maintained with slight variations which could easily be accounted for by irregularities in the rate of drip.

Another patient received penicillin at the rate of 240,000 units in twenty-four hours by intramuscular drip. Half an hour after the commencement of the drip an eight-fold dilution of the serum completely inhibited the growth of streptococci, and during the three days that the drip was continued the serum was tested at intervals and contained 0·5 unit of penicillin per c.cm.

Subcutaneous.—As with the intramuscular drip there is a lapse of over an hour before penicillin is detectable in the blood-serum with a dose of 60,000 units in twenty-four hours. The time varies in different patients as can be seen from table II.

COMBINATION OF PENICILLIN AND PROCAINE

All the penicillin in use is impure, and most of it contains at least 60% of impurities, varying according to the culture medium and the mode of extraction. Some batches have, on intramuscular injection, given rise

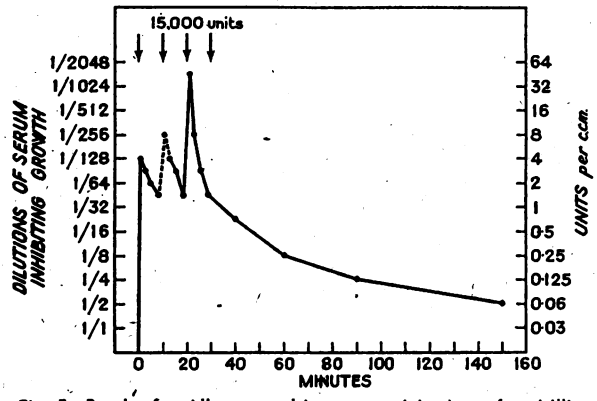


Fig. 5—Result of rapidly repeated intravenous injections of penicillin.

to a very considerable amount of pain—no doubt due to some undesirable impurity. This pain could be done away with by mixing the penicillin with procaine before injection. It was necessary before recommending this to see whether procaine interfered with penicillin. To do this 10% procaine was mixed with an equal amount of penicillin solution, and as a control some of the same penicillin was mixed with an equal volume of normal

TABLE II—GROWTH OF STREPTOCOCCUS IN VARIOUS DILUTIONS OF SERUM

	CASE I					CASE II					CASE III				
	5/6	1/2	1/4	1/8	C	5/6	1/2	1/4	1/8	C	5/6	1/2	1/4	1/8	C
Before	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
After— ½ hour	+	+	+	+	+	..	..	..	..	..	..	..	..	..	..
1 ,,	+	+	+	+	+	..	..	..	..	..	..	..	..	..	..
1½ hours	..	AC	+	+	+	+	+	+	+	+	..	..	..	..	..
2 ,,	..	0	0	AC	+	−	..	..	..	..	..	..	..	..	..
2½ ,,	..	..	..	..	..	+	+	+	+	+	..	..	..	..	..
3 ,,	..	0	0	+	+	0	0	+	+	+	..	..	..	..	..
4 ,,	..	0	0	AC	+	..	..	..	..	..	..	..	..	..	..
6 ,,	..	..	..	..	..	0	±	+	+	+	..	..	..	..	..
8 ,,	..	0	0	AC	+	..	..	..	..	..	..	..	..	..	..
1 day	..	..	..	..	..	..	..	..	..	..	0	±	+	+	+
4 days	..	..	..	..	..	0	0	+	+	+	0	±	+	+	+
5 ,,	..	..	..	..	..	0	0	+	+	+	..	..	..	..	..
7 ,,	..	..	..	..	..	0	±	+	+	+	0	+	+	+	+
8 ,,	..	..	..	..	..	0	0	+	+	+	0	+	+	+	+
10 ,,	..	..	..	..	..	..	..	..	..	..	0	0	+	+	+
11 ,,	..	..	..	..	..	0	0	+	+	+	..	..	..	..	..
14 ,,	..	..	..	..	..	..	..	..	..	..	0	0	+	+	+

+ = complete hæmolysis. AC = almost complete hæmolysis.
± = partial hæmolysis. − = no hæmolysis.

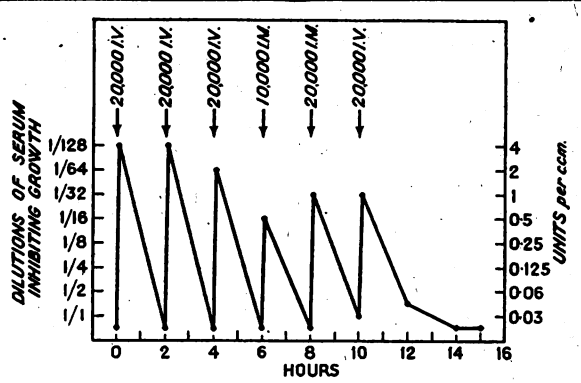


Fig. 4—Bacteriostatic power of serum five minutes and two hours after a series of injections of 20,000 units of penicillin.
IV = intravenous. IM = intramuscular.

saline. These mixtures were titrated after 24 hours, 48 hours, and 72 hours, and it was found that the procaine did not interfere with penicillin activity.

To confirm that what happened in vitro also happened in the body we estimated the amount of penicillin in the blood of some patients who received penicillin made up in 1% procaine—enough to do away with the pain following injection. We obtained the same curves as had been obtained on injecting penicillin dissolved in normal saline.

EFFECT OF A KIDNEY LESION

It has been reported that in cases of nephritis penicillin is less rapidly excreted. We had two patients with

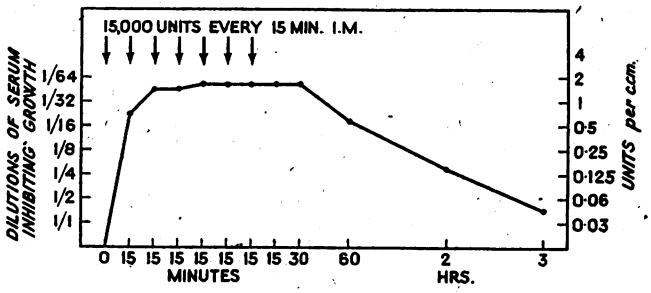


Fig. 6—Result of rapidly repeated intramuscular injections of penicillin.

kidney disease in whom we made observations of the penicillin content of the blood.

The first had an old-standing suppurating actinomycosis with urinary findings indicating some amyloid disease.

Fig. 8 shows the findings after a single injection of 15,000 units intramuscularly, and a comparison of this with fig. 2 shows that, whereas normally penicillin disappears from the blood in about three hours, in this case it was easily detectable five hours after injection. The same patient was given a subcutaneous drip (60,000 units every twenty-four hours), and the blood tested at intervals over a period of eight days showed that even when the serum was diluted eight times it had some inhibitory power. This was at least twice as high as in the other patients tested with undamaged kidneys.

Even when the amount administered by continuous drip was as low as 20,000 units in twenty-four hours there was so much penicillin in the blood that the serum diluted twice would show inhibitory power on the test streptococcus.

The other patient, suffering from "crush injury," received 50,000 units intramuscularly, and was found to have a very high concentration (4 units per c.cm.) in his blood-serum six hours afterwards. In the normal person the penicillin would have disappeared much earlier than this.

DISCUSSION

Our results confirm the observations that penicillin is very rapidly absorbed when injected intramuscularly or subcutaneously, and that it disappears rapidly from the blood. In common with many observers we have found that it is rapidly excreted in the urine. If a patient is receiving three-hourly doses of 15,000 units, the amount of penicillin in the urine is such that it can be

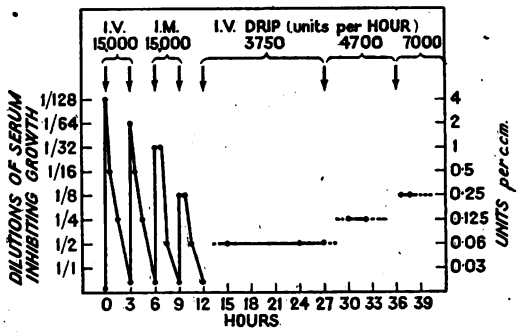


Fig. 7—Result of intravenous and intramuscular injections and an intravenous drip at various rates on the bacteriostatic power of serum.

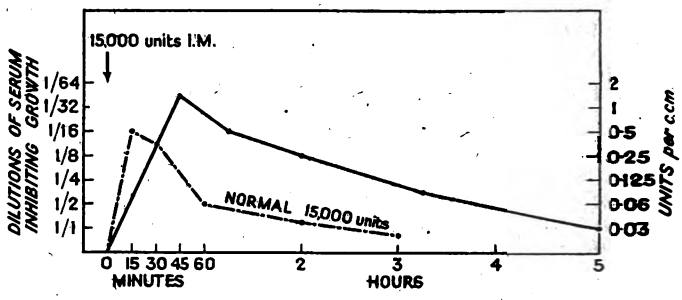


Fig. 8—Effect of a dose of 15,000 units of penicillin in a patient with a damaged kidney. Result in healthy person inserted for comparison.

diluted 1000 times or more and still inhibit the standard test staphylococcus. The urine of the patient referred to in fig. 5 who had received four injections of 15,000 units at ten-minute intervals contained at one time just after the last injection so much penicillin that it could be diluted 20,000 times before its bacteriostatic power disappeared. This represents about 400 units per c.cm.

These results also show that penicillin appears in the blood within a few minutes of an intramuscular or subcutaneous injection; so from the point of view of getting the drug into the circulation quickly there is little to be gained by intravenous administration. At the same time there is little to be lost, for the rate of disappearance from the blood is not markedly different whether the injection is given intravenously or intramuscularly.

It appears from the curves we have obtained that the time at which measurable penicillin disappears from the blood is somewhat as follows:—

Intramuscular dose	*Time of disappearance*
15,000 units	2–3 hours.
20,000 ,,	3 ,,
35,000 ,,	4 ,,
50,000 ,,	4–5 ,,
100,000 ,,	5–6 ,,

Of course the maximum titre obtained in the blood after 15,000 units is much less than after 100,000 units, and it is clear that if the interval between the injections is kept the same then the larger the dose the higher will be the average penicillin content of the blood. The figures we have given show definitely that when single injections are used a continuous bacteriostatic power can be obtained in the blood much more economically by the use of smaller doses like 15,000 units than with larger doses like 100,000 units. Six doses of 15,000 units given every two hours will certainly maintain a bacteriostatic power in the blood for twelve hours, and this only makes 90,000 units; whereas 100,000 units in a single dose will only last for five or six hours. However, there are times, especially in war, when injections cannot be given frequently; and then, even at the cost of using more penicillin, the larger doses and the less frequent injections are advantageous. There are times, also, when it seems desirable to have a high concentration in the blood for only a few hours. If, for instance, it is necessary to operate through septic tissues, a dose of 50,000 or 100,000 units given fifteen minutes before the operation commences provides a high penicillin content throughout the operation and for an hour or two after it, which seems to prevent any generalisation or spread of infection.

In hospital, however, the most economical method of administering penicillin seems to be by a continuous drip, and for practical reasons the intramuscular drip seems the best. Even with a dosage of 60,000 units in twenty-four hours the blood-serum is rendered bacteriostatic, and with increased dosage it simply becomes more highly bacteriostatic.

We do not yet know whether it is better to maintain a constant low level of penicillin in the blood, or to have a very high level for a short time after an injection, followed by a period of very low level before the next injection. Clinically both systems have worked excellently. It will take a long series of observations to decide which is the better. Circumstances must in some cases govern the system of dosage, but if we know how long penicillin persists in the blood after any single dose we have a solid foundation on which to base our system of dosage, and it is for this reason that we put forward our results.

SUMMARY

Figures and charts are given showing the amount of penicillin in the blood-serum following administration of the drug intravenously, intramuscularly, and subcutaneously, by single injections and by continuous drip. The curves are regular, which suggests that the method of test is reasonably accurate.

These curves show that penicillin is very rapidly absorbed after intramuscular or a subcutaneous injection, and that following the larger doses it can be detected in the blood for a considerably longer time than after the smaller doses.

The findings indicate the frequency with which doses should be given to maintain a bacteriostatic concentration in the blood over the whole period of treatment.

Our work was carried out in the Penicillin Trials Unit at St. Mary's Hospital, and we have to thank the Medical Research Council for a whole-time grant to Dr. A. J. E. Rowe, and for the penicillin with which these observations were carried out.

CASE OF AFRICAN SLEEPING SICKNESS

JAMES GRANT, MD GLASG., DPH
MEDICAL OFFICER OF HEALTH, GATESHEAD

MANUEL ANDERSON
MD DURH.
RMO, SHERIFF HILL ISOLATION HOSP., GATESHEAD

R. B. THOMPSON
MD DURH., MRCP
FIRST ASST, DEPT OF MEDICINE, UNIVERSITY OF DURHAM

THE following condensed case-record exemplifies the diagnostic difficulties which arise from war conditions.

A man of 25 years was discharged from the army in March, 1942, as a result of right cervical and axillary tuberculous adenitis contracted in Nigeria in 1941. In the summer of 1942 the axillary adenitis recurred and in September a gland was removed for biopsy. A year later recurrent glandular swelling developed on the left side of the neck and the patient showed a progressive mental torpor, which led to his admission to hospital on Feb. 26, 1944, as a case of encephalitis.

On admission, the patient was markedly apathetic and drowsy but coöperated in the examination. Muscular movement was at a minimum, the head inclined forwards and rotated to the right. His face presented a sad mask-like expression with dribbling of saliva. The eyes alone were used to follow movements. Pupillary reflexes were normal. Breathing was noisy. There was obvious nasopharyngeal obstruction and he had occasional bouts of hyperpnœa. Speech was monosyllabic, slurred and hoarse. When undisturbed the patient showed "pill-rolling" and picked at his nostrils. The organic reflexes were unimpaired. The left supraclavicular fossa was obscured by painless massive œdema of the soft tissues, which merged under the sternomastoid muscle with a large slightly tender diffuse swelling of the cervical glands. There was puffiness of the skin of the left cheek and jaw with several patches of erythema. The axillary and inguinal glands were enlarged and there were three scars, one above the right clavicle and two in the right axilla, all ascribed to surgical removal of glands. The pulse

was rapid (112 per min.), temperature 98·6° F. and blood-pressure 125/100 mm. The heart and lungs were normal. There was albuminuria. The cerebrospinal fluid (CSF) was clear, under increased pressure, and showed excess of lymphocytes. No organisms were seen on staining by methylene-blue and Gram's method. Blood examination showed leucocytosis (17,000 per c.mm.), chiefly of polymorphs. No parasites were found in blood-films.

Progress.—Next day an attack of streptococcal follicular tonsillitis began. The œdematous cellular tissues were aspirated but only sterile serous fluid was obtained. The Paul-Bunnell test, Wassermann reaction and blood-culture were negative. By Feb. 29 the tonsillitis had resolved as well as the adenitis and œdema of the neck, but a sharp attack of facial erysipelas began, which was treated by streptococcal antitoxin and sulphadiazine. The postnasal obstruction and hoarseness disappeared entirely by March 2, when the temperature became normal, the urine clear and the rash had faded. The pulse still remained rapid (124) and the mental

1 2 3 4

Fig. 1—July, 1941. Before infection.
Fig. 2—March 11, 1944. Facies of trypanosomiasis.
Fig. 3—March 21, 1944. Second attack of erysipelas.
Fig. 4—May 11, 1944. Conclusion of tryparsamide course.

condition as on admission, with some lucid intermissions during which the patient read papers. On March 7, in consultation with Dr. C. N. Armstrong, it was decided that the patient's history demanded the exclusion of tropical disease. On the 8th one of us (R. B. T.) performed a hæmatological investigation, which showed Hb. 50% (Sahli), red cells 3 million per c.mm., white cells 6000 per c.mm. (polymorphs 25%, lymphocytes 40%, monocytes 13%, eosinophils 1%, degenerates 21%). The sternal marrow count was essentially normal, but two trypanosomes were found in the marrow film. Thereupon centrifugalised CSF and citrated blood sediments were stained with Leishman and Giemsa stains. Numerous trypanosomes were found in the CSF but none in the blood. The formol-gel test was positive. On March 11 a photograph was taken (fig. 2; compare with fig. 1) and treatment commenced by injection of 1 g. of tryparsamide.

Further investigation of history.—Subsequent inquiries showed that soon after arrival in Nigeria the patient was admitted to hospital, on Sept. 16, 1941, with enteritis. A week later he had a "blind boil" of the right ear, presumably the trypanosomal chancre. A week later still there began progressive enlargement of the right glands of the neck accompanied by pyrexia. He was treated with injections of emetine and acetarsol, and sulphapyridine by mouth, without improvement. On Nov. 17, 1941, a gland was removed and subsequently reported to be tuberculous. In another Nigerian hospital a further biopsy of a gland was made on Dec. 11, 1941. The patient embarked on Jan. 6, 1942, for this country and was boarded out in March. The patient resumed his work as a clerk until Dec. 15, 1943. There were three absences from duty totalling 26 days. Two of these were due to transient pyrexia, wrongly thought to be relapses of malaria, but one was caused by the axillary adenitis, which led to the biopsy in September, 1942, when the gland showed "inflammatory changes of an unusual character." He was stated to have been very listless at work in 1943, being slow to grasp what was said and to recognise people. He never initiated a conversation but would respond. He could nevertheless summon up energy when called on and was very willing. His gait was peculiar and he had difficulty in ascending stairs. Speech became slurred and latterly a mumble.

Response to treatment.—In three days the patient began to smile and speak spontaneously; 2 g. of tryparsamide was given on March 15, 1944, and thereafter 3 g. every week to a total of 30 g. At night the patient was inclined to be unruly and complained of nightmares. He was introspective and depressed. On March 18 the facial erysipelas relapsed, with pyrexia, polymorph-leucocytosis and well-marked deterioration of the mental condition, combined with urinary incontinence. (Fig. 3.) A repetition of chemotherapy limited the attack of erysipelas so that by March 22 the patient was convalescent. Thereafter the lethargy gradually diminished, so that on March 27 he was speaking freely, though with some slurring. The CSF then showed no trypanosomes and a cell-count of 98 per c.mm. Subsequently there was a phase of extreme depression. The patient made hypochondriac complaints, murmuring frequently "God have mercy" and initiated functionally the bouts of hyperpnœa already noted. He refused to read and slept badly. This was combated by vigorous encouragement and allowing the patient up on March 30. He was soon able to walk about. His weight was 8 st. 4 lb., against a normal 9 st. 10 lb. On April 12 speech was definitely improved and it was obvious that memory was unimpaired. On April 29 he was allowed home to continue treatment as an outpatient.

Examination of CSF on May 5 showed a slight increase of protein but was otherwise normal. A photograph was taken on May 11 (fig. 4). The course of therapy ended on May 17. On May 26 his weight was 9 st. 9 lb., his facial expression was rather immobile and he showed a slight paresis of the left side of the face. There was some lack of initiative in conduct and speech and his personality was still introverted. Arrangements were made for the patient to go to Childwall Hospital, Liverpool, under the care of Dr. A. R. D. Adams, who later informed us that the CSF cell-count was 10–12 per c.mm., protein 40 mg. per 100 c.cm., glucose normal and globulin slightly increased. As a result, careful observation with a quarterly re-examination was recommended. In July the patient went back to work, and inquiry in September showed that he has given satisfaction. His sense of humour has returned and his gait has improved.

SUMMARY

We report a case of sleeping sickness in an Englishman of 25 years, infected in Africa over two years before he became incapacitated. The patient managed to follow his occupation in spite of recurrent adenitis and pyrexia, wrongly ascribed to other causes. Accurate diagnosis was made only when nervous involvement had occurred. The response to tryparsamide was gratifying. Intercurrent streptococcal infection which arose was treated successfully with antitoxin and sulphadiazine.

Emphasis is laid on the importance of trypanosomiasis as a possible cause of glandular enlargement in patients who have returned from tropical Africa.

We acknowledge with thanks the assistance of Dr. C. N. Armstrong and Dr. A. R. D. Adams. The photographs are the work of Mr. John McHugh of Gateshead Police.

OPERATION FOR HYDROCELE

H. J. CROOT, MB LOND., FRCS
LIEUT.-COLONEL RAMC

No claim for originality is made for any of the suggestions put forward here. Nearly every point has been picked up in watching and in conversation with colleagues at different times. The result is the technique which I have now employed for three years in about 50 cases. During this time there has been no trouble whatsoever from postoperative swelling of the scrotum. Late follow-up has not been possible, but the results have been uniformly good at 10–14 days and it is reasonably certain that they will have remained so.

No doubt many surgeons are practising an equivalent technique, but even more, I believe, are employing unnecessarily difficult and time-consuming methods. I refer especially to the use of an inguinal incision, excising the sac and using diathermy or numerous ligatures to control the bleeding. I do not suggest that there is anything wrong with any of these procedures: in expert hands they can and do give perfect results. But they call for considerable skill, care and time, and a swollen scrotum, perhaps with an organised hæmatoma, is all too commonly the sequel when everything has not gone exactly as it should. I think that nearly everyone who tries a simple operation on the lines of that described below will thenceforth discard other methods except for

very thick-walled or unusually large hydroceles; for these excision is desirable on account of the mass of the empty sac.

Operation.—The incision, 1½ in. long, is made vertically on the front of the scrotum, right down to the sac. Fluid is removed by trocar and cannula. As the cannula is withdrawn the edges of the opening in the sac are picked up and it is enlarged enough to allow the testis to come through. The sac is turned inside out and the cut edges approximated behind the epididymis with one fine cotton suture to prevent it from resuming its normal relation to the testis. No attention is paid to the usual slight oozing; occasionally a fine ligature or an extra stitch is needed for a troublesome vessel. Testis and sac are replaced and dartos and skin closed in one layer with two or three silkworm-gut sutures, the ends of one of them being left long. A little care in everting the wound edges will ensure their lying nicely. Between the upper stitch and the upper end of the wound a gap is left to take comfortably a small drain of loosely rolled globe rubber. One of the long suture ends is passed through skin and fat of the abdominal wall, the needle taking a good half-inch bite. The two ends are then tied so as to hitch the scrotum well up on to the abdomen. Gauze is loosely packed between the wound and the abdomen and a thick pad of wool and a T-bandage exert an even pressure on the scrotum. The drain is removed in 2 days and the anchor stitch is cut 3 or 4 days later. The patient gets up for essential purposes the day after operation if he wishes, but except for this he remains in bed for 7–10 days.

Scrotal swelling from œdema, hæmatoma or serous exudate is notoriously common after hydrocele operations. With the technique described above the tendency to all three conditions is diminished by the small amount of handling of the tissues and by the position of the scrotum afterwards. The anchor stitch is foolproof, and however loose his bandage becomes the most careless patient is not found lying with scrotum hanging between his thighs. Time is not spent dealing with every minute bleeding point; the position is so favourable for drainage that any blood readily escapes and no harm results.

An objection sometimes raised against not excising the sac is that an exudate will result. In practice of course the endothelial lining soon ceases to produce fluid when it is no longer part of a closed sac. Furthermore those who practise excision of the sac do not always realise that their operation is really only partial excision. That part of the tunica vaginalis which covers the testis is left behind and presumably has a power of secretion in proportion to its area. In the operation I am recommending drainage takes care of any exudate there may be.

On general principles such drainage of a clean wound may be considered undesirable, since a channel is left for the scrotum to become infected, but I have never seen this happen. In fact infection may be less likely than it is after complete closure, because there is no collection of blood or serum to favour bacterial growth. The scrotal incision heals perfectly and the scar is hardly visible after a month.

SUMMARY

A simple operation for hydrocele is described.

The essential features are: scrotal incision; minimal handling of the tissues; evagination without excision of the sac; no attempt at complete hæmostasis; anchoring of the scrotum to the abdomen; drainage from what is then the most dependent point.

Postoperative swelling of the scrotum has been eliminated.

Reviews of Books

Essentials of Syphilology

R. H. KAMPMEIER, MD, associate professor of medicine, Vanderbilt University. (Blackwell. Pp. 507. 25*s*.)

THIS new textbook of syphilology is well written, well illustrated and well produced. In addition to the usual sections on the biology, symptomatology, therapy and prognosis of all stages of acquired and congenital syphilis, it has useful chapters on serological tests, marriage and syphilis, epidemiology and the administrative and educational requirements for the control and prevention of the disease. Many statistical data are presented succinctly, case-histories are well chosen, each chapter has its list of references, and the whole book bristles with the wisdom and commonsense culled from a large clinical and postgraduate teaching experience. Pleasing historical notes preface each chapter. The recommended dose of sulpharsphenamine (0·2–0·3 g. for adults of average size) is low and many syphilologists now consider that 'Mapharsen' should be given more often than once weekly. Dr. Kampmeier dedicates his book to two general practitioners of medicine and seeks to assist undergraduate students, health officers and general practitioners to reach a higher standard of practice in, and fuller knowledge of, this "systemic disease whose manifestations may be manifold, at times presenting problems for every type of specialist and thus perforce a disease of peculiar interest to the general practitioner." The book is a notable contribution towards the achievement of this objective and should be read widely on both sides of the Atlantic.

Welfare in the British Colonies

L. P. MAIR. (Royal Institute of International Affairs. Pp. 115. 5*s*.)

THIS small book gives a comprehensive account of welfare work in the British colonies. It is no mean task to survey the activities, past, present and future, of some fifty dependencies and make the results readable, but Miss Mair has done it. The subject is dealt with under the headings of education, labour, health, and social welfare. A chapter on the background to social policy sketches the sort of life into which the social services have to be fitted in such different regions as Africa, Malaya, the West Indies and the Pacific Islands. The interdependence of health with education on the one hand, and with labour problems and agriculture on the other, is rightly stressed. In the past the tendency has been for each department to work independently and the results have often been disastrous. The prevention of disease, which is coming into its own in tropical countries, cannot be carried out adequately unless the people can be made to understand the reasons for the preventive measures undertaken. This calls for widespread education: higher education for those in training for health services, and general education for the people at large. Nutrition, too, can only be tackled through the close coöperation of all departments concerned in social welfare. The whole standard of living has to be raised. The main object of the book is to give facts about present conditions, but past history is surveyed and plans for the future outlined. The methods by which sleeping sickness and yellow fever have been controlled, and the large degree of malarial control achieved in Malaya are striking object lessons.

The Riddle of Cancer

CHARLES OBERLING, MD; translator, WILLIAM H. WOGLOM, MD. (Oxford University Press. Pp. 196. 20*s*.)

THE author has set himself two tasks: to discuss the problem of the nature and cause of cancer; and to convey the essence of that problem to both the lay public and the professional but non-specialist student. The cancer problem was first attacked with modern experimental methods at the turn of the century. Even those who have taken part in the attack are baffled by many aspects of it: to one who has stood outside this particular arena the details of the contest must appear even more confused. If simplicity, vividness and enthusiastic presentation can bridge the gap of unfamiliarity, Dr. Oberling succeeds. No better volume could be found for the young investigator in need of a critical guide to steer him through the thicket of published data, to show him the wood instead of the trees. Dr. Oberling's way of applying logic to the examination of every hypothesis so far advanced is a salutary lesson for all amateur theorisers. The original French edition, *Le problème du cancer*, is worthy of inclusion in the "France Forever" collection, if for this reason alone. The most masterly section contains a critical examination of the virus hypothesis. The author holds that while other theories are based on verbal explanation and argument, the virus theory alone is based on facts, and though these are admittedly incomplete, such as are known are inescapable.

THE LANCET
LONDON: SATURDAY, NOVEMBER 11, 1944

The Panel Conference

OF the two national conferences at which representative doctors were to express their views on the National Health Service, the first has come and gone. This year, contrary to custom, the Conference of Local Medical and Panel Committees has been held first, and it will be followed next month by the postponed annual representative meeting of the British Medical Association. The Panel Conference, which is reported on another page, naturally looked at the Government's proposals from the standpoint of the insurance practitioner; there was not the diversity of approach sometimes found at the annual representative meeting, whose members are drawn from all branches of the profession; nor was there time to give the many controversial questions the detailed consideration they will doubtless receive in December. On the other hand, the Panel Conference enjoys the advantage that its members are all drawn from local medical and panel committees, and are therefore men and women with experience and understanding of the problems arising in National Health Insurance practice. So, compared with some of their colleagues engaged solely in clinical work, they are more willing to undertake detailed examination of administrative changes. This gives added value to some of the opinions they have recorded.

On the whole, there were no surprises. The debate was carried on in a welcome spirit of reasonableness and good sense. Strong preferences were expressed, but no ultimatums were delivered. The delegates obviously had confidence in the well-tried machinery of the NHI system, and were uneasy about replacing this by the arrangements outlined in the white-paper. Many alterations were suggested, most of them directed towards ensuring that the advice of the profession does not remain unsought, or go unheeded, either in planning or carrying on the new service. These several suggestions, none of them unreasonable, were regarded by the conference as of paramount importance, and a strong plea was made that the administrative mechanism should be the first subject of negotiation with the Government, and that all other problems—such as remuneration, compensation, practice in health centres, provision of hospitals, the extension of consultant services—should wait on the achievement of an acceptable administration. This is a wise approach; it is the one we should have expected the conference to favour.

The representatives did not, however, find it possible to reach a final decision on the long-debated question of the scope of the new service. The Preston committee proposed that, now it is known that the Government's social security plans embrace the whole community, the conference should agree to the provision of a medical service equally available to everyone. This proposal was discussed at length, but when the vote was taken, the conference rejected Preston's view and decided instead, "pending fuller information," to adhere to the opinion of the ARM of 1943 "that a comprehensive medical service should be available to all who need it, but it is unnecessary for the state to provide it for those who are willing and able to provide it for themselves." Unless this decision is reversed next month by the ARM (and the voting of 125 against 39 on the Preston resolution does not suggest that this is likely) it seems that negotiations will have to begin with this old cause of contention no nearer settlement. For it is hardly probable that on this issue the Government will wish to make greater concessions than have been made already—namely, that no patient will be compelled to use the new service, and that practitioners in the service will ordinarily be able to undertake private practice. It would have augured better for the unhampered progress of negotiations if they could have been conducted with this subject no longer a source of vexatious dispute.

Most of the remaining decisions of the conference followed expected lines. Generally they were in accord with the majority views expressed in the replies to the questionary to the profession. There was, however, one other subject upon which the conference did not endorse the questionary preference. The representatives were strongly opposed to conceding the right to any body, central or local, to require practitioners to seek permission if they wished to set up in new practice in any particular area. They held that this would be conceding powers that could be used to restrict a doctor's freedom in a way unjustifiable when Britain is again at peace. While realising that the distribution both of general practitioners and of consultants needs to be so arranged as to make their services easily and evenly accessible to the community, the conference nevertheless felt that this could best and most safely be done by means of variation in terms of service, amenities, and emoluments, so planned as to make areas at present under-doctored more desirable places in which to live and to work. The present maldistribution should be corrected by attraction and not by compulsion. How best, and how completely, this dictum can be implemented in practice, time alone will show; but we may be better able to judge the likelihood of its success when negotiation has produced some more definite proposals.

The conference showed again its vigilant concern for justice and for safeguarding the rights of the doctor when it debated a motion by the West Riding committee "that any regulations or contract for service contemplated by the white-paper should provide that in all cases of dispute between any members of the profession and the Minister, there should be an ultimate right of appeal to a court of law." This motion evoked an interesting and well-informed discussion, showing a clear division of opinion. On the one side were those doctors who, from their experience of the work of the medical services subcommittees, were satisfied that NHI machinery gives an ample and preferable safeguard to the doctor; on the other side were those who, giving full credit to these subcommittees, still urged that the Minister should not be the final arbiter, and that, no matter how seldom it might have to be invoked, the right to appeal to court is an elementary civil right that should not be denied any medical man or woman. In the end this latter opinion prevailed and the West Riding resolution was accepted.

The conference was conducted with an obvious desire to find the wisest solutions for many difficult

problems, and with a realisation that there are many matters on which the last word cannot yet be spoken and which will need constructive discussion and negotiation for their settlement. In their readiness to submit these matters to calm negotiation, and their choice of subjects to be discussed first, the representatives set an example of medical statesmanship. We hope that this example will be followed next month by the annual representative meeting of the BMA in its more arduous and detailed deliberations.

Diphtheria in Germany

THE latest official figures on the incidence of diphtheria in Germany show a remarkable rise. Thus for the first 23 weeks of this year 126,913 cases were notified, an increase of 7637 over the total for the first six months of 1943, and 51,894 more than in the corresponding period of 1939. In Germany, unlike most western European countries, diphtheria had been steadily increasing in the years before the war until in 1934 it exceeded 100,000 cases annually. Case-mortality was also high in certain German towns, and the greater incidence and severity were apparently associated with an epidemic spread of gravis infection. Since the war began the rise in incidence has been shared by other countries in western Europe; thus in France the rates per 100,000 jumped from 35·9 in 1939 to 118·7 in 1943; in Germany from 180·9 to 287·1; in the Netherlands from 16·6 to 638·9; and in Norway from 1·8 to 752·8. By contrast the rates for Britain have fallen from 114 to 84. The age-distribution of diphtheria in Germany is not known here, but it may be assumed that a variety of causes have contributed to the higher incidence—industrial concentration of mixed populations from town and country and from different countries, overcrowding in the factories, in the home and in air-raid shelters, and a general lowering of hygienic standards and of host resistance from malnutrition. That malnutrition is not yet a factor of prime importance is suggested by the absence of any significant rise in the case-mortality, although figures from Germany for the first 15 weeks of 1944 show a fatality-rate of 6·0% compared with 4·4% for 1939. A state of chronic malnutrition may lead to an increase in both morbidity and mortality, for there is experimental evidence that malnutrition adversely affects the immunity response so that latent or subclinical infection may not prove as important as it ordinarily is in raising the specific resistance of the community

The spread of diphtheria among the peoples of western Europe must be considered in relation to its possible effects on the occupying armies of British, Canadian and American troops. Diphtheria has not been a serious menace to our troops in the Middle East, yet an annual incidence of 4–5 per 1000 British (it was very rare among the Indians) and a case-mortality over 2% indicates that it has not been a negligible infection. Cutaneous diphtheria received a good deal of publicity, but careful checking of the virulence of strains isolated from "desert sore" and the like showed that much of it was spurious. In Italy, on the other hand, recent figures show a much higher incidence of faucial diphtheria than was seen in Africa, and this may be a warning of what to expect in western Europe where conditions during the coming winter may favour its spread. If results of Schick tests among nursing staff are any guide, we may estimate that 40–50% of young adults are susceptible to diphtheria. It is true that adults seem to have a greater non-specific resistance to diphtheria than children, and this large proportion of susceptibles need not in itself cause alarm. But if diphtheria begins to spread in any group of Service men, active or combined active-passive immunisation would have to be considered. The prophylactic available for the British Army is TAF, which could be given without preliminary Schick test in three 1 c.cm. doses at three-weekly intervals to *all* men at risk without much danger of local or systemic reaction. The Canadian Army prefers APT in two doses at one month's interval to Schick-positive soldiers, while the American Army would first use a detector dose of 0·1 c.cm. of formol toxoid and proceed to immunise the non-reactors with three doses of toxoid at three-weekly intervals.

Besides these precautionary measures, arrangements have been made for the issue of new scales of dosage of antitoxin which in future will be available to field medical units of all kinds. The important point about the use of antitoxin therapeutically is to give it *at once* whenever there is any clinical suspicion of diphtheria. The disease is unfortunately insidious and in the adult is often atypical; a small dose of 8000–16,000 units in an early doubtful case will cause no upset and is worth much more to the patient than 50,000 units some days later. If infection is already advanced, especially if it is of the naso-pharyngeal type with "bull neck" and nasal discharge, the best hope of recovery lies in a single massive dose (50,000 units) intravenously together with expert nursing during at least the first fortnight to minimise the risk of cardiac failure.

The Menace of Rabies

RABIES affects primarily the canine, feline and vulpine species, but man and all the domestic animals are susceptible if bitten by a rabid animal. ARISTOTLE described the disease in animals, and CELSUS (100 BC) realised that the bite of a rabid dog was dangerous to man and advocated local measures similar to those still employed to reduce the probability of infection. ZINKE in 1804 showed experimentally that the saliva was infective, but despite this early recognition of the method of spread the disease has seldom been eradicated or even effectively controlled when once it has gained a foothold. The United States Bureau of Animal Industry has been particularly successful in stamping out a large number of animal diseases, but during the past ten years human cases in that country have averaged 57 annually and individual states have reported a yearly average of over 1000 proved cases in animals.[1] According to FLEMING[2] rabies was first described in Great Britain about AD 1000, but probably existed much earlier. In the middle of the eighteenth century "madness raged amongst dogs in London" as well as the rest of England and a reward of 2*s*. (quite a large sum in those days) was offered for the destruction of stray dogs; this led to much brutality but was ineffective in controlling the disease. In the nineteenth century

1. Webster, L. T. Rabies, New York, 1942.
2. Fleming, G. Rabies and Hydrophobia, London, 1872.

several packs of hounds, including the Quorn, were affected and some had to be destroyed; up to 36 persons died annually from the disease. The stringent control measures which were eventually imposed led to the eradication of rabies from the United Kingdom in 1902. For 16 years strict quarantine measures enabled the Board of Agriculture to guard against its introduction from abroad. STOCKMAN,[3] who was Chief Veterinary Officer at the time, has described how rabies was reintroduced into Great Britain. The blame must be attached partly to the abnormal conditions then prevailing and partly to the fact that after long unfamiliarity with the disease "a section of the British public failed, or refused, to realise the gravity to man and dog of introducing rabies into a clean country." During the 1914–18 war the incidence of rabies had greatly increased on the Continent and mysterious deaths began to occur among dogs in the Plymouth district in 1918. After field and laboratory investigations the Board of Agriculture declared the disease present on Sept. 7, 1918. It was established that the outbreak was due to the smuggling of dogs by air. Energetic control measures were taken, and a definite diagnosis could be given by the board's veterinary laboratory within 5 hours of receiving material. Regulations concerning the muzzling and movement of dogs were at once applied; but they would have been less effective than they were if it had not been for several fortuitous circumstances. First, most of the dogs were affected with the dumb or paralytic form, which greatly curtailed their wanderings and their ability to bite. Secondly, Cornwall is relatively isolated from the rest of the country and most of those dogs which did run long distances took a westerly direction and came up against the sea. Yet despite these favourable circumstances 17 counties were eventually involved, 327 dogs died of rabies and 358 bitten persons were given anti-rabies treatment. The *Times* contended that the offence of smuggling dogs should be made punishable by imprisonment, because fines were ineffective. The outbreak was not finally controlled until December, 1921.[4]

Since 1941 the Germans have taken precautions against the introduction of rabid dogs from occupied countries and there can be little doubt that the spread of rabies in Europe has been even greater than it was in the last war. Unless all precautions are strictly observed there is a very real danger of introducing the disease into Great Britain again. If this is to be prevented the general public must know something of the nature of the disease.

The incubation period is usually 2–4 weeks but may be six months or even longer; hence the necessity for the lengthy quarantine period. In the earliest stages of the disease the dog is moody and restless, seeking out corners in which to hide, but on occasion it may be unusually affectionate. The dog becomes more and more restless and displays fits of rage, and owing to changes in the throat there is often a characteristic bark; a rather high pitched bark is followed by 5–8 decreasing howls, the jaws not being closed between each. The dog becomes aggressive whenever it sees another of its own species. After 2–3 days of these preliminary symptoms the animal passes into the "furious stage" and may wander long distances attacking any man or animal in its path; it attacks silently and when beaten shows no sign of feeling pain. Between paroxyms of fury the animal may be exhausted; then all at once it rouses itself again. The furious stage seldom lasts more than 3–4 days and gradually merges into the last period when the symptoms of paralysis appear, to be followed by death. In dumb rabies the furious stage does not develop and the dog is less dangerous; it does not bark, and the lower jaw hangs down partially paralysed. At no time during the disease does the animal display any fear of water, and it may bury its muzzle in water in a futile attempt to drink.

If rabies reappeared in Britain it would of course be necessary to make available one or other of the rabies vaccines, though their value has been questioned. WEBSTER[1] has reviewed the results, both clinical and experimental, of inoculating against rabies and can find no scientific evidence that vaccination after the bite of a rabid dog reduces the likelihood of the victim contracting rabies. He points out that in man one vaccine is as effective as another and a 14-day or more delay before beginning treatment does not increase rabies mortality. He admits, however, that if a person is bitten by a rabid dog and takes treatment his chances of contracting rabies are no more than 1 in 77 and probably as low as 1 in 510, and despite his scepticism these figures compare very favourably with earlier ones quoted by FLEMING in 1872: of 132 persons bitten by rabid dogs who had their wounds cauterised 41 (31%) died, and of 66 persons bitten, whose wounds were not cauterised, 55 (84%) died. Even if one allows for lack of precision in diagnosis these figures are far worse than those obtained today and it seems either that rabies is less virulent for man than it used to be or that modern methods of treatment are effective. The importance of removing infected saliva by immediately washing an open wound or sucking a punctured wound should not be overlooked, and it is generally agreed that cauterising a wound by heat or nitric acid reduces the chances of infection.

If rabies does come again it will cause much suffering to man and animals. It need not be introduced if the general public as well as the military and civil authorities realise the dangers and insist that no false sentiment permits the regulations against smuggling dogs to be infringed. If all dogs brought into Great Britain are kept in quarantine for six months, as the law lays down, the country will remain free from rabies.

3. Stockman, S. *Vet. Rec.* 1929, **32**, 135.
4. See *Lancet*, 1926, ii, 719.

"... In these years of war, mutual aid has enabled the United Nations to defeat their common enemy. The principle of mutual aid, widely and wisely applied in the years of transition from war to peace, should enable the free nations to lay the foundation of a new world order. The supreme task of UNRRA, it seems to me, is to make the benefits of mutual aid so apparent to all nations as to render enduring the new world order which we so fervently pray may succeed the old."—Mr. MACKENZIE KING, prime minister of Canada.

RECRUITMENT of civilian physicians for the United States Army has been discontinued, but the US Navy urgently needs 3000 additional medical officers, to cover the personnel expansion and intensification of operations in the Pacific. There are now roughly 60,000 doctors in the US armed forces and the Veterans' Administration. The number in the forces represents 40% of the active medical profession in the country.

Annotations

STAYING AWAY FOR GOOD

LARGE-SCALE experiment is seldom possible in social science. The best the sociologist can do is to make use of such social changes as are available and argue by analogy. The dispersal of a part of England's urban population in the course of the war was a social change of great importance, but the conditions were hardly those of a planned experiment. The dispersed people saw their new environments with all the added inconveniences of war-time; the country town loses much of its charm when seen through the windows of an obligatory landlady, when fuel is short, unrationed extras hard to get, and public transport dislocated. It was not surprising therefore that a committee of investigation,[1] set up by the National Council of Social Service at the request of the Bank of England, found that most black-coated workers wanted to get back to London as soon as possible. The committee was satisfied that there was a strong case in the national interest for the dispersal of a substantial part of London's office work. London in peace-time is too full, particularly in the centre; traffic is jammed; and most workers spend many uncomfortable hours every week travelling to and from their places of work. That many have successfully adjusted themselves to these conditions, counting them a loss worth while in the face of the gains which London gives, is not disputed. But home lives could be fuller, and leisure no less pleasant, if the journey to work was drastically cut.

Though war-time dispersal was no fair test of the opinions of the dispersed on extrametropolitan life, it has nevertheless enabled a measure to be made of the material difficulties involved. Not only must the dispersed people be housed; their old houses must be disposed of and the move made without loss. For the classes concerned—men earning £200–£600 a year, and women £100–£300—houses often represent their only invested capital and the sum total of their savings. The biggest difficulties are, however, in the matter of children's education. To say that all will be well when the new Education Act bears its fruit is no satisfaction to the committee. Primary education with the social segregation which black-coated workers expect is harder to come by in dispersal towns than in London. And with secondary and technical education the problems are greater still. For example, if the secondary schools in the dispersal towns have 100% of special places, the clerk whose child is not intellectually capable of winning a special place is deprived of giving it the secondary education which he can afford to do, and indeed is usually determined to do. The committee would like to see some at least of the evacuated offices make their enforced dispersal a permanency, but the business house which decides to put part of its staff out of London would be well advised to examine carefully the local education authority's activities before choosing its provincial home. With the health services there are both gains and losses. The general practitioner services are often better outside London than in it; but the hospital and specialist services are not so good outside, and often not to be had without much travel. With the provisions for leisure, too, there are two sides to the questions, though evacuated office staffs are often heard bemoaning "the one-eyed holes" in which they have found themselves. If London has more indoor entertainment to offer, it is always much more expensive. In outdoor activities the country town wins every time. To get the most out of extrametropolitan town life, the committee points out that it is necessary to be a participant rather than a spectator. Once this is achieved, the rewards are usually greater than those offered by life in the suburbs. It is the first generation of dispersed office workers who will have the greatest strains to bear. The children who grow up in new surroundings may well prefer them to London's lights, particularly since their health services and the schools for their children should be no less satisfactory than those in London.

The committee's report ends with a note on communications. The use of the telephone, teleprinter, microgram, railex letter service, and courier can do much to overcome difficulties. The need for conferences, discussions, and personal contacts with other firms or organisations still places a limit on the amount of dispersal possible; but most business men admit that some of their work could be done outside London without loss of efficiency. No mention is made in the report of the fear which sometimes assails those away from headquarters that they may be overlooked when the question of promotions arise; it is perhaps a pity that the investigators did not use their opportunities to find out how widespread is this attitude. It looks as though most of the dispersed offices are starting to drift back to London, though without any Government lead. We may hope that the Bank of England will see to it that this report, conceived at its behest, finds its way into the hands of the business community before they all finally make up their minds to fill up London once more to its prewar bursting point.

1. Dispersal. An inquiry made by a committee set up by the National Council of Social Service at the request of the Bank of England, Oxford University Press. 1944. 3s. 6d.

FATTY STOOLS AFTER DYSENTERY

THE signs, symptoms and treatment of tropical sprue are so distinctive as to stamp themselves indelibly on the physician's mind. The association of glossitis, steatorrhœa, meteorism and mild anæmia was noted 60 years ago by Van der Burg and Manson, and little has since been added to their conception of the disease. Though the clinical picture can often be recognised at sight, without the aid of elaborate biochemical methods, the ætiology remains obscure. There is clearly a connexion, too, between this tropical disease, those cases of idiopathic steatorrhœa which puzzle the general physician, and the pædiatrician's cœliac disease. In all three, according to Bennett and Hardwick,[1] there is a failure in jejunal-ileal function.

With the increasing knowledge of nutrition it has become clear that some of the main stigmata of sprue can be attributed to vitamin deficiencies, especially to deficiency of the B_2 complex, and this view has been supported by the studies of pellagra by Spies, Sydenstricker and others, and of ariboflavinosis by Sebrell and Butler. But though tropical sprue does respond to treatment with riboflavin and nicotinic acid the response is usually not so striking as that of pellagra. On these grounds tropical sprue is generally accepted as arising not so much from lack of dietary vitamins as from their non-absorption or destruction in the alimentary tract. This would fit in with the fact that tropical sprue may begin many years after the patient has returned to a temperate climate from an endemic zone, and that it usually affects Europeans, who constitute the best-nourished section of tropical populations. In his early descriptions Manson recognised a form of sprue secondary to dysentery, and Manson-Bahr [2] has noted that a history of previous intestinal infection can be obtained in some 40% of sprue patients, though dysentery is so common in the countries where sprue is endemic that this may be no higher than the incidence in the general population. Transient sprue-like symptoms are certainly a fairly common sequel to bacillary dysentery, and may even supervene on any persistent intestinal disturbance accompanied by chronic diarrhœa.

1. Bennett, T. I., Hardwick, C. *Lancet*, 1940, ii, 381.
2. Manson-Bahr, P. *Trans. R. Soc. trop. Med. Hyg.* 1941, **34**, 347. *Lancet*, 1940, ii, 317, 356.

The explanation of the steatorrhœa seems to lie not so much in damage to the intestinal mucosa as in the rapid passage of the intestinal contents and consequent failure to absorb the vitamins and other substances necessary for the complete metabolism of fats.

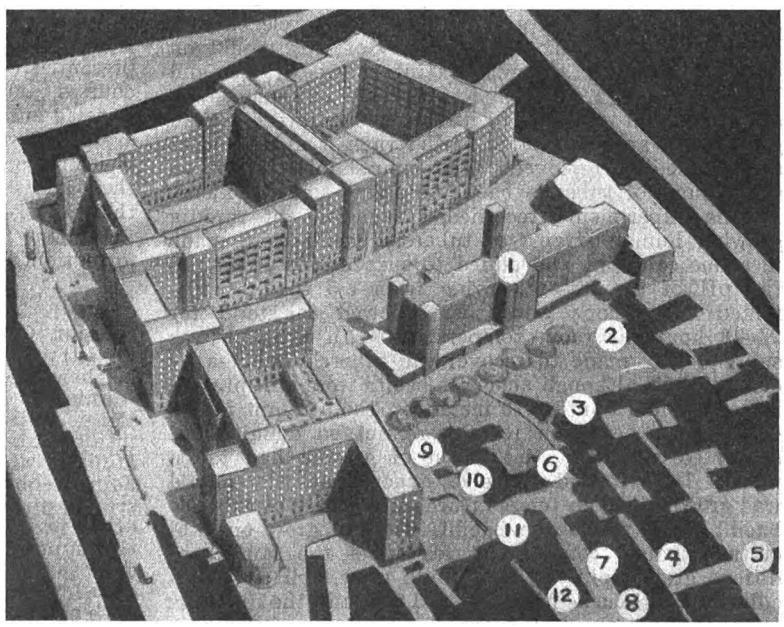
It seems reasonable to draw a parallel between the two syndromes of sprue and pellagra, in both of which we can recognise a primary and a secondary form, the primary form arising from lack of vitamins in the diet, the other being secondary to intestinal infection. This view is supported by the experience reported in our issue of Oct. 28 (p. 560) by Howat—stomatitis and steatorrhœa were an increasingly common sequel to dysentery not only among prisoners-of-war but among British troops on a "balanced and well-controlled diet." The half-starved British prisoners whom Bloom (p. 558) treated against heavy odds in Italy presented the symptoms and signs of multiple vitamin deficiencies and famine œdema, and all were reported as having *Entamœba histolytica* in their stools, with a multitude of other organisms. Their large pultaceous stools were of the frothy type, as in tropical sprue. Axis prisoners captured at Alamein included men whom the enemy had been compelled to keep in the battle zone though they were suffering from untreated, or partially treated, dysenteries as well as privation; it is said that many of these showed signs of vitamin-B_2 deficiency, and some had steatorrhœa. This observation recalls that of Enright[3] among German and Austrian prisoners captured in the Palestine campaign of 1918. These men had "lived on the fat of the land" before capture, and had received what was thought to be a fully generous diet in the camps afterwards; yet Enright could report 65 cases of pellagra in one hospital, with offensive, copious and sometimes porridgy stools. It was notable that only 3 of the 65 men had no previous history of diarrhœa or dysentery, and *E. histolytica* or dysentery bacilli were the usual finding in their stools. Thus it is not easy to apportion the blame for sprue-like sequelæ between infection and dietary deficiency. A further complication is the suggestion, made by Howat, that sulphaguanidine may favour the production of vitamin-B complex deficiencies by inhibiting the symbiotic organisms in the bowel which synthesise these growth factors for themselves and incidentally for their host. This is a suggestion worth pursuing, though there is as yet no convincing evidence that postdysenteric "sprue syndrome" is more common with sulphonamide treatment than in patients treated by the older methods. It may be wise to heed the advice of Najjar and Holt[4] and of Ellinger and his colleagues[5] to attend to the vitamin-B status of the patient when employing "chemotherapy within the bowel."

The behaviour of a man's intestine is largely a reflexion of his mental attitude, so excitable types are likely to be seriously affected by low-grade bowel infections, and to develop that intestinal hurry which may predispose to pellagra, sprue, cœliac disease and even idiopathic steatorrhœa in adult life. Whatever may be the changes in intestinal physiology in these diseases they may be partially reversed by giving a high protein diet and vitamin B_2; but relapse remains a distinctive feature of the whole group. Recrudescence of protozoal disease, or mild intercurrent infection of a much buffeted bowel, may be enough to upset the precarious balance of intake and absorption. While we await the explanation of these disorders we must bear them in mind when treating the dysenteries, acute or chronic, remembering that sulphaguanidine may cut off the patient's supplies of home-grown vitamin-B_2 complex and that it is sometimes as important to quieten a man's mind as his bowel.

3. Enright, J. I. *Lancet*, 1920, i, 998.
4. Najjar, V. A., Holt, L. E., jun. *J. Amer. med. Ass.* 1943, **123**, 683.
5. Ellinger, P., Coulson, R. A., Benesch, R. *Nature, Lond.* 1944, **154**, 270.

GUY'S PLANS

WHEN we think of the hospital beds destroyed in this war, of their shortage before it, and of their additional use after it, we must conclude that the next half-century will be one of great hospital construction. Guy's seems to be the first of the London teaching hospitals to publish a postwar plan, though the governors have wisely decided that it is provisional only. To make provisional plans stimulates thought without fixing ideas. The first datum that must be established before planning any such institution is the number of beds based on the needs of the population in relation to all other hospitals in the vicinity. The great voluntary hospitals have always attracted patients from outside the county area. These patients are likely to become relatively fewer as provincial centres become self-supporting, considering the standard of work now being done in hospitals that have arisen since the passing of the Local Government Act of 1929. But the main supply of clients to any hospital must be drawn from families who live near by. It may be easier to see how these two classes of potential clients can best be served in London when the survey by Dr. A. M. H. Gray and Dr. Andrew Topping is published; it is said to be in the printer's hands. Next there are their exits and their entrances. We think of a hospital as a place where patients are. We seldom think of how they get in and out, or of all that serve them directly and indirectly, and come to inquire of or to visit them, not to mention supplies perishable and imperishable, consumable and permanent, medical, nutritional, mechanical and constructional. The ideal would be for these after entry to have different routes to and from their loading and unloading sites, but some vehicles have to remain stationary, sometimes for long periods, between loading, unloading and reloading; hence the need for adequate parking-places away from avenues of



Tentative plan for rebuilding Guy's Hospital, including a central administration block; a surgical block for 600 beds; a student's college for 150 persons; and a dental block for 400 students. Existing buildings, with the exception of Hunt's House, are shaded: (1) Hunt's House for medical patients, &c. (2) Nuffield House for paying patients. (3) Medical school. (4) and (6) Nurses' home. (5) York psychiatric clinic. (7) Laundry. (8) and (9) Staff hostels. (10) Massage and electrical departments. (11) Mortuary. (12) Works department.

movement. Then this internal circulation needs to be harmonised with movement outside. In all great cities there will be planning of movement, and the hospital gates must not be placed so that to enter them every vehicle must cut across the traffic of a two-way street, or must leave them contrary to the current of a one-way street. Then there is arrival by air. If a fighting plane can land on an aircraft-carrier, an ambulance plane can land on the roof of a modern hospital, and must do so. Next is the problem of recreation. Not that of the convalescent but that which leads to convalescence, or occupies the mind of those awaiting operation, undergoing investigation, or recovering from either. This should include floor space for dancing and a cinema-show, side-rooms or recesses therefrom where cronies can gossip, as well as a canteen where a modest glass of beer should be obtainable, if the consciences of the committee approve. Such a hall of recreation should be common to patients and all workers in the hospital, including nurses and doctors, and, where a medical school is attached, students of both sexes. When this is done we need to consider the buildings not in terms of wards but of ward-suites, and these must be constructed not for the idiosyncrasies of the day but for all the time that the hospital will stand. This is not likely to be less than 50 years and may be 200. When at the end of these years the ward-suites are still functioning without undue conflict the stones of that hospital may be said to have been well and truly laid.

A MOULD INHIBITING TUBERCLE BACILLI

THE symbiosis of the tubercle bacillus has always been rather a dark corner of the bacteriological field. One wants to know why the tubercle bacillus often disappears from discharging sinuses when other organisms gain access; how and why the chronic suppurative lung lesion will sometimes light up an old tuberculous focus; why the secondary infection of a cavity inhibits the tubercle bacillus; and why the tubercle bacillus will occasionally appear at the site of a suppurating wound—questions which seem to have apparently contradictory answers. Penicillin has brought the issue to the front again. Miller and Rekate[1] have studied the inhibition of the growth of a strain of *Mycobacterium tuberculosis* by a green mould of the penicillium group accidentally grown on a subculture of tubercle bacillus stored in the ice-box. Subcultures of this mould on other cultures of tubercle bacilli showed rapid and luxuriant growth at room temperature but no growth at 37° C. On cultures of tubercle bacilli the mould grew faster and sporulated earlier than it did on other sterile media employed. The mould also grew on suspensions of tubercle bacilli in saline solution alone. In the experiments recorded suspensions of rapidly growing human strains of tubercle bacilli were made in saline solutions and added to suspensions of mould, the pH of the latter varying from 6·5 to 7·8. The mixed suspensions were then allowed to stand for 24–48 hours at room temperature. An attempt was subsequently made to recover the tubercle bacillus by culture, but, although acid-fast bacilli were still present in smears in 12 out of 13 instances, the attempt failed. Guineapig inoculation tests were not so definite but suggested that some inhibition of growth had taken place. In a second series of experiments the mould was grown at room temperature on cultures of tubercle bacilli, after which the bacilli failed to grow on subculture though control cultures under the same conditions grew rapidly. The mould grew well on tuberculin in dilutions as high as 1 : 10,000, and the dilutions of tuberculin thereafter failed to give positive skin reactions in tuberculous guineapigs. Suspensions of the mould inactivated 1 : 100 tuberculin in 2 hours, and the supernatant fluid obtained after centrifugation of a mould suspension also inactivated 1 : 100 tuberculin, but this did not occur when the suspension was passed through a Seitz filter. Fluid media, however, on which mould had been grown for 8–15 days, had no effect on tubercle bacilli or on tuberculin, while *Staphylococcus aureus* grew on solid media on which the mould had been grown and removed. It is therefore assumed that the substance produced in this mould is not similar to penicillin.

1. Miller, D. K., Rekate, A. C. *Science*, 1944, **100**, 172.

NURSING DEMONSTRATION TEAMS

THE hospitals that train nurses are scattered up and down the country. Many of them are almost isolated, and most of them are almost autonomous. When we add that they are all overworked it will be evident why innovations in nursing technique sometimes take a long time to pass into the practice of the wards.

Difficulty of transport and shortage of staff prevent ward sisters from attending the refresher courses that might bring their methods up to date; and at first sight it may seem that nothing can be done about this till times change. But when a mountain cannot come to Mahomet, there is an obvious alternative. Could not demonstration teams hold practical refresher courses in the hospitals themselves? A crack team of sisters might staff an entire ward for, say, a fortnight, and demonstrate the latest nursing techniques in one or more of the kinds of case treated in the hospital—e.g., fractures chest, cases, spinal or head injuries, maxillo-facial injuries, or tropical diseases. In this way information would spread from the centres that have specialised in particular work, and spread far faster than it does today. The visit of the nursing team might be made the occasion of a kind of nursing conference, with social gatherings in the evening where nursing problems could be discussed over coffee and cakes, medical films might be shown, debates and lectures held, and a dance or two fitted in. The refresher course would be offered primarily to ward sisters who might take it in turns to work in the demonstration ward with the team; but a few demonstrations of the simpler techniques might also be arranged for student nurses, with a view to encouraging them and arousing keenness. The student nurses as well as the sisters would join in at the social gatherings.

Senior nurses fear that there might be some prejudice in the hospitals against such an influx of strangers; but this should not develop if the course is properly presented to them. Nurses as a whole enjoy refresher courses, and though a course at home would lack the novelty and the change from the familiar round which are part of the charm of a course in another centre, the visit of the team would give them the chance to modify their accustomed routine, and incidentally to exercise their well-known gift for hospitality.

Perhaps the Ministry of Health would consider the formation, training and employment of such teams.

WE regret to record the death on Nov. 4 of Sir GEORGE CHRYSTAL, late Permanent Secretary to the Ministry of Health. Eldest son of the famous Edinburgh mathematician, he entered the Civil Service at the Admiralty in 1904. As secretary to the Ministry of Pensions in 1919, he took a special interest in the medical work of the department, and he moved to the Ministry of Health in 1935. There, with the late Sir John Hebb, he carried the greater part of the burden of setting up the Emergency Medical Service, and of many other preparations for war such as the heavy work of the supply committees. He was a man of friendly disposition, always approachable and helpful, and when poor health led him to retire in 1940 he left the Ministry with the sincere regrets of his colleagues.

THE death is announced in Paris of Dr. ALEXIS CARREL at the age of 71. Dr. Carrel was a Nobel laureate and an emeritus member of the Rockefeller Institute for Medical Research.

Special Articles

THE EDITOR RETIRES

A VALEDICTORY LETTER

HAVING served as assistant editor from 1915 to 1937, and editor from 1937 until last week, Dr. E. C. Morland sends the following message on his retirement :—

To the Editor of THE LANCET

SIR,—For the first time in thirty years I am free to address you. I do so to acknowledge the help given me during these many years by associates both inside and outside the office. In 1923, when THE LANCET was celebrating its centenary, my predecessor, Squire Sprigge, described it as a friend-made journal. That was confirmed by the warmth of the many counsellors and contributors who were present, and I felt that the last word had been said. But I was wrong. The past five years of shared difficulty have brought a new experience of intimacy for which I express my gratitude. And in my thanks I must, without permission, include the chairman of the directors, whose pride in the journal has been a constant incentive to me.

EGBERT MORLAND.

SOME PRESS TRIBUTES

From THE BRITISH MEDICAL JOURNAL

As brother medical journalists we can appreciate better perhaps than others the skill and devotion with which Dr. Morland has served our profession through the columns of *The Lancet* during the past 29 years. His unremitting work for the advancement of medical science and practice, and for the maintenance of the traditions of medicine, has been done for the most part in the background, but both the Royal College of Physicians and the Royal College of Surgeons have recognised it publicly by admitting him to their Fellowship.

From NATURE

Though 30 of his 70 years have been given to medical journalism, this was the third of his careers. Of a Quaker family, he took his BSc Lond. from Owens College with first-class honours, and distinguished himself at St. Bartholomew's Hospital Medical College, winning the MB gold medal in physiology. But the series of junior hospital posts that should have led to consultant practice ended when, like many another house-physician of those days, he developed tuberculosis. In Switzerland he embarked on a second career: he took the Swiss federal diploma and the MD Berne, settled in Arosa, and became an expert in the disease he had overcome, writing a prize essay on sanatorium construction and many papers on tuberculin. The contentment of his trilingual practice, however, was destroyed in 1914. After relief work on the Marne, he came to London and called at *The Lancet*. The editor, Squire Sprigge, asked him to remain as his assistant, and in 1937 he succeeded to the chair.

Dr. Morland's experience and talents alike fitted him to conduct a medical journal of international scope. He combines a taste for detail with a flair for essentials, and innumerable contributors have been grateful for his drastic subediting of their papers. By concentrating on the needs of the reader he has played no small part in bringing about the improvement evident of late years in the presentation of medical data. His editorial columns have been enlivened by an eager mind, always ready to reconsider even the most venerable hypothesis. Likewise his intense interest in social and medical reforms have arisen from the needs of people, never from theories. Having found *The Lancet* humane, he leaves it human.

From THE MEDICAL OFFICER

During his tenure of the editorial chair, Dr. Morland has preserved many of the distinguished features of the journal, has added new features, and in many ways has impressed on the publication the hall-mark of his own personality and interests. Readers of *The Medical Officer* will be especially grateful to him for the amount of space which he has given to public health matters. His early practice in the field of tuberculosis was reflected by the publication of many important articles dealing with this subject. A glance through the last fourteen volumes of *The Lancet* will reveal a surprisingly large number of leading articles on such subjects as the provision of pure supplies of milk and of water, and on the prevention of epidemic diseases. Much space has been given to the proceedings of the Society of Medical Officers of Health, the Royal Sanitary Institute and other associations. Dr. Morland has always been interested in the expectant mother and young children, and during its entire life (1917–34) he edited *Maternity and Child Welfare*, a journal which was widely read by workers in this field. There have been important articles in *The Lancet* on the medical aspects of youthful delinquency, on the public health aspects of heart disease in children, on the preventive possibilities of general practice, on epidemics in schools, and on immunisation against infectious diseases—to mention only a few. The symposia on the Control of the Common Fevers, on Prognosis, and other subjects are well known. A very popular feature introduced during his editorship is the series of light sketches by peripatetic correspondents. The Aylesbury Broadside on Family Allowances, for which Dr. Morland was responsible, is well known. It is unfortunate that during most of his tenure of the editorial chair his work and his policy have been made more difficult by evacuation, and other rigours of war.

It was not given to everyone to know the man, but Dr. Morland's personal touch is apparent in his creations. His sway has been marked by catholic taste; an all-embracing knowledge of the currents of medicine—not to speak of its shoals; an insatiable curiosity; and a penetrating wit which was most effective when pitted against over-organisation of the profession and the eclipse of the human touch in the healing art.

From THE TIMES

He became editor in 1937, and has done sterling work in maintaining the world-wide high reputation of the oldest medical journal in this country.

From THE MANCHESTER GUARDIAN

A professional newspaper is written mostly by experts and the personality of its editor remains in the background. But no regular reader of his paper could fail to observe the character and keenness of its editorship. To evoke thought has indeed been his principal aim; he has not sought to impose opinion. An editor's duty, as he sees it, is chiefly to present the facts, and let them do the rest. But his own choice of facts for presentation has revealed his constant concern for the needs of the people—a concern that relegates the needs of his profession to second place. Under his control *The Lancet* has shown clearly the bias towards reform with which it started 121 years ago.

From THE SCOTSMAN

The leaders of Dr. Morland and his editorial team give week by week critical commentaries on all kinds of medical problems, scientific, clinical, political; and these leaders, blending literary style, critical penetration and fairness, and a delightful playful humour, have been a powerful influence in instructing and moulding medical thought and practice.

Pope is said to have written his Translations of the Iliad on the covers of letters, and he was touched off by Swift as "paper-sparing Pope." Everybody knows about the postcards of Bernard Shaw. In the circle of Dr. Morland's contributors and correspondents his postcards are well known, and they are in the same tradition. He uses cards a little larger than stock size, covering the space with his beautiful writing, and unfolding his problem in a miracle of luminous condensation.

From THE FRIEND

Egbert Morland ... inherited from his predecessor, Squire Sprigge, a high standard in medical journalism. He has maintained *The Lancet's* reputation for original contributions to medicine and for literary grace, but his own distinctive service has been to make his journal a forum for the discussion of the social aspects of medicine and the future evolution of the profession in a society of rapidly-changing structure.

Under his guidance ... encouragement was given to a group of young medical planners before the war and many valuable articles on the Beveridge report and the Medical White Paper have been published. In this sphere *The Lancet* has stood for open-mindedness, constructive criticism, vision and faith; and its independence has given it much influence. A certain light-heartedness and even whimsicality, occasionally encountered in the title of a leader, or some tell-tale phrase, have seemed to those who knew him the sign-manual of the editor. Egbert Morland has served his profession well in difficult times.

From THE SPECTATOR

Dr. Egbert Morland is leaving *The Lancet*. He joined its staff towards the close of the last war and succeeded to the editorial chair on Sprigge's retirement in 1937. It would be hard to think of a greater contrast. Sprigge was debonair, almost dapper, as much at home in literary circles as in medical ones. ... Morland's appearance of otherworldliness was, and happily still is, utterly deceptive—as many have found to their surprise. In the past eight years he has not only steered *The Lancet* on a course of vigorous medical reform close to that which it followed in the days of its rebellious founder, Thomas Wakley; he has also helped forward the medical profession in the dark days of peace and war towards the shaping of a better future. When *The Lancet* evacuated to Aylesbury some feared that it might rusticate. Instead, both paper and editor took on a new lease of life. Now that its country sojourn is over Morland has chosen to remain behind. But there are many doctors, young and old, who will seek out his wise counsel in a quiet Aylesbury garden.

FUTURE OF MEDICAL SERVICES

VIEWS OF THE PANEL CONFERENCE

THE annual conference of representatives of the local medical and panel committees was held at BMA House on Nov. 2 and 3, with Dr. J. A. BROWN in the chair.

Fear of subjugation to local authorities soon became evident in the discussion on Dr. F. M. SINCLAIR's motion, on behalf of Fife,

> That the profession is willing to discuss the white-paper on the National Health Service provided it has an adequate share in the organisation and control of the medical services.

The proposals in the white-paper, Dr. Sinclair said, violated the British Medical Association's principle D, which rejects all control by local authorities as at present constituted. The controlling body should be independent, be elected by the profession, and have the right to publish a report. Dr. F. GRAY thought little of Fife's long-range diplomacy. Whatever the medical profession wanted they would have to fight for it, he considered, and this was the moment to state clearly what they were going to fight for. The meeting passed the motion amended (from Hull) by the substitution of the words "a predominant" for "an adequate."

EVOLUTION FROM NHI

The meeting showed no unwillingness to travel towards a National Medical Service, but many representatives clearly felt that the track beaten out already by National Health Insurance was too good to by-pass: we should develop our new service by widening and otherwise improving the old road. Dr. J. KERR introduced a long motion from Cheshire, which affirmed that while the conference would welcome extension of the panel service to dependants, and desired that cottage-hospital, X-ray and other diagnostic facilities should be available to all practitioners, together with access to consultants for their patients, it opposed:

(i) A state-salaried service.
(ii) Civil direction of practitioners; government of the profession by local health authorities; in short, most of the machinery of the white-paper;
(iii) Any and every measure which tends, in any respect, to limit the freedom of judgment, and of action, of the practitioner or to weaken his full responsibility for his patients.

Under a state service, he said, free choice of doctor would be impossible. In the past 25 years diagnosis and treatment had become highly technical, and appropriate equipment was concentrated in hospitals. The general practitioner therefore must be intimately associated with a hospital if he was to give adequate service. Extension of NHI to dependants within the present income limits would bring in about 90% of the population, and that, with proper hospital facilities, should go far to meet the Government's wish for a National Health Service. He carried the meeting with him, and the motion was accepted.

It was quickly followed by motions from Cheshire and Dorset, developing the same theme. These were cleverly combined to read:

> That the development of the National Health Service should be by stages—the first of which should be an extension of medical benefit to include the uninsured wives and dependants of insured persons, and other persons of like economic status together with their dependants, and to include consultant and specialist services, also hospital and laboratory facilities.

A voice asked whether this motion, if passed, would tie the negotiators to the support of this type of development alone. "No," replied the chairman, and thus assured the meeting carried the motion, following it with a rider to the effect that the hospital services of the country should be developed and reorganised to this end, and that administration of these services should be entrusted to ad-hoc bodies.

Dr. C. M. STEVENSON (Cambridge), indeed, swithered a little at the thought of an ad-hoc body, but the bogy was kindly laid for him by Dr. E. A. GREGG, who said it would probably be nothing worse than an improved insurance committee: and with insurance committees, he pointed out, most of those present had learned to live.

A motion by Cheshire to extend the National Health Insurance Acts "to include all insurable persons and any other persons who desire to contribute voluntarily" was turned down as confusing the issue; and the meeting was then confronted with a many-barrelled blunderbuss from Cambridge designed to hit several targets at once. It provided for extensions of national health insurance, reorganisation of the local authorities, and establishment of a comprehensive health service based on the reorganised local authorities. Having prodded it cautiously here and there the meeting decided the weapon was lethal and proceeded to the next business.

Dr. D. SAKLATVALA (West Bromwich) wished to persuade the meeting to give its approval to negotiations with the Government only if these aimed at development of national health insurance; but reminded by Dr. GUY DAIN that the white-paper was the first word rather than the last, and that a negotiator is none the better for having his hands tied, the meeting rejected the motion.

Dr. R. W. MCCONNEL (Buckinghamshire) moved that in view of the increasing age of the population the conference regretted that no special mention was made in the white-paper of domiciliary or institutional treatment of the aged. Thus made aware of its regrets the meeting was happy to endorse them.

ONE HUNDRED PER CENT?

The 100% issue was raised on a motion proposed by Dr. GREGG for the Insurance Acts Committee:

> That, pending fuller information on (1) the application of other social security provisions, (2) the general professional and administrative arrangements, both central and local, and (3) the machinery whereby private practice is to be continued, including safeguards to secure its preservation for those members of the community who are able and willing to provide the medical service for themselves, there be affirmed the view of the Annual Representative Meeting 1943 "that a comprehensive medical service should be available to all who need it, but it is unnecessary for the state to provide it for those who are willing and able to provide it for themselves."

Dr. F. M. ROSE moved an amendment by Preston:

> That since the national security plan as a whole is available to the whole community, the new Health Service should also be available to the whole community.

The health service, he said, would be part of an interlocking system of social security: what right had the profession to try to debar one group from the scheme? We should be doing an injustice to the upper-income

group if we tried to withhold service from them. Besides, he added, doctors would have to pay for it by a lower settlement all round. The effect of this would be unevenly distributed, for in some areas the well-to-do abound, in others the poor, and the man who could continue private practice in a rich area would do better than the man in a poor one. Thus Gorbals would be subsidising Guildford. The profession was buying a new pig in a poke, but some wished to retain a ham of the old pig, forgetting that it would only mean a couple of chops for others. "Let us," he pleaded, "go the whole hog."

Dr. GORDON WARD (Kent) remarked that if the profession tried to exclude 10% of the population the public would say it was in order to keep their fees—and they would not be far wrong. Dr. J. A. IRELAND (Shrewsbury), however, felt that it was not a question of £ *s. d.* Doctors today were trustees for the whole profession now and in the future. Those in the Services he was sure, were not as much in favour of a National Health Service as they were sometimes represented to be. Dr. DAIN begged the meeting not to attempt to decide the 100% issue until the three things set out in the original motion had been decided. Dr. JOHN HALLAM (Stoke-on-Trent), on the other hand, urged them to vote, for once, on what they wanted instead of what they thought they might get. His branch thought it inherently wrong for people of means to get the best service for a few pence; and for doctors to be paid only a few pence for it. Dr. WALTER LIVINGSTONE (also Stoke-on-Trent) pointed out that both white-papers—on the National Health Service and on social security—were mere drafts, and we still could not tell how they would be modified. Social security was not to be uniform for the whole nation—contributions and benefits varied to some extent. Why should the medical service be uniform? To Dr. F. E. GOULD the issue had been settled already: in resolving that the best method of development was by extension of the panel system to dependants the meeting had in effect decided in favour of service for 90%, and exclusion of 10%.

Dr. K. WATSON (Surrey), while agreeing that extension of the panel system to dependants was required as a temporary step forward, insisted that we must work for a comprehensive service. Were we prepared, he asked, to let it be supposed that conditions were inferior in some way for 90% of people and good for 10%? Dr. N. J. COCHRAN (Burton-on-Trent) thought it unlikely that the Government would be able to implement a scheme for 100%. Dr. J. A. PRIDHAM (Dorset), though unwilling to go to the Minister in the harness of war, felt that the 100% issue was deeply tangled with the question of medical independence. Nevertheless he was in favour of leaving it open for the moment until the points brought forward by the Insurance Acts Committee had been settled. Dr. H. W. POOLER thought administration for 90% would be impossible. Medical benefit should be open to all who had contributed—if they desired it. Dr. R. W. COCKSHUT (Middlesex) prophesied that the consequences would be unpleasant, whichever way the meeting decided, but did not feel they had heard even one sound argument for the Preston view. Dr. S. WAND thought Preston might be asking the profession to surrender a bastion against a state medical service: he was for delay until more information came to hand. He was supported by Dr. A. M. MCMASTER (Rochdale) and Dr. J. G. F. HOSKEN (Gloucester) but Dr. P. C. MCKINLAY (E. Yorks.) believed that the hands of the negotiators would be strengthened if they could say the profession was prepared to offer a first-class service for 100% provided remuneration and terms of service were satisfactory. Dr. A. TALBOT ROGERS (Kent) held that it was for the country to say what it wanted, and not for the doctors to obstruct. Dr. C. F. TURNER, who was in favour of 100%, felt this was not the moment to decide the issue. Dr. ROSE took the view that 100% should be the ultimate aim, and that it did not entail a salaried state medical service. If the profession stood out for 90% they would be regarded as retaining the cream.

The Preston amendment was lost by 39 votes in favour and 125 against.

Various other amendments on the original motion fell to the ground or were withdrawn.

Discussing the original motion, Dr. F. GRAY held that the profession could accept 100% or fight for 90%. He did not agree with those who favoured 90%, though he sympathised with them. The profession must not shirk the issue by a face-saving compromise. In fact, we were accepting 100%, but without grace. "Either fight for 90% or accept 100%, but have nothing to do with this wishy-washy motion." Dr. E. A. GREGG repudiated "wishy-washy," and the meeting supported him, passing the motion by a large majority.

The debate however continued. For Wolverhampton Dr. A. V. RUSSELL proposed:

> That this conference deplores the tendency in so many quarters to assume that 100% state medical service is inevitable and not to be opposed; that it considers such an attitude to be defeatist, and that it thinks the profession can adequately plan and administer a satisfactory medical service for the nation, without becoming full-time Government servants.

Dr. GORDON WARD pointed out that there was not a person on the platform who did not know 100% was inevitable, and that the Minister was negotiating on that assumption. Dr. ARTHUR BEAUCHAMP asked whether it was not true that so far there had been no negotiations—only discussions? The CHAIRMAN replied that it was true. "Call it what you like," tranquilly responded Dr. WARD, as he marched down the hall to his seat; "it's the same thing." Dr. GREGG said that the Minister had dropped some views to which he knew the profession was opposed, and might drop others.

A voice asked whether there was any reason to suppose the Minister would reconsider the 100% question. "At the moment there is not," replied the CHAIRMAN. "Have there been discussions about it?" the questioner persisted. There had been no discussions specifically on the 100% issue, Dr. GREGG said. "There is no doubt that what Dr. Gordon Ward says is true"; "but," he added, "we have not got as far as discussions." The conference then passed the Wolverhampton motion.

A motion by Staffordshire, providing that practitioners participating in the proposed National Health Service should not be debarred from private practice, was also carried.

ADMINISTRATION IN THE NEW SERVICE

Dr. GREGG, for the IAC, moved that the central administrative body (of the National Health Service) should be concerned exclusively with all civilian health services. This was amended by Surrey, and amended again by Dr. GREGG, until it read:

> That all civilian health services should be the concern of a single central administrative body, and that that administrative body should be concerned exclusively with those services.

The idea, Dr. Gregg explained, was to prevent the new body from being loaded down with those burdens transferred from the old poor-law—such as local loans and housing—which had hampered the Ministry of Health. The meeting supported this kindly intention.

Croydon, through Dr. J. NEWTON HUDSON, disapproved of the administration of the National Health Service as laid down in the white-paper. In it, Dr. Hudson said, the Minister is given the right to appoint his medical advisors; they may not publish a report, and he need not take their advice. The conference shared Croydon's disapproval of these provisions.

Dr. BEAUCHAMP, on behalf of Birmingham, went further and moved:

> That the administrative structure of the National Health Service must be satisfactorily amended before any negotiations on the remainder of the proposals can be undertaken.

Dr. DAIN assured the conference that the BMA council would not proceed until it could come back from the Government with proposals which the profession could accept. The motion was carried without an opposing vote.

A long motion by the IAC was twice amended, little discussed, and carried *nem. con.* As a resolution it read:

> (*a*) That, whether the central body be a department or a corporate body, it should be advised by a statutory body, the Central Health Services Council, predominantly medical in composition. (*b*) That the members of this body who

represent the medical profession should be elected by the profession itself. (c) That members should hold office for three years and be eligible for re-election. (d) That the main functions of the council should be to consider and advise on any general medical questions affecting the service, the Minister to seek the council's advice on medical questions before him and to be under an obligation to refer to the council any draft regulations or conditions of grant. (e) That the council should have the right to tender advice on its own initiative and, if it thinks desirable, to publish its advice, without modification, after it has been transmitted to the Minister. (f) That the council should have power to coöpt on to any committees or subcommittees set up to consider particular questions. (g) That the council should be entitled to call upon the Ministry to supply any reasonable and proper information and to publish an annual report of the council's work. (h) That the council should meet at least quarterly, and as often otherwise as might be required, and should be free to appoint its own chairman and secretary.

Dr. TALBOT ROGERS moved that the conference was in favour of a single Central Health Services Council representing all branches of medical practice. It had been suggested, he said, that the hospitals should have a separate council set up in parallel. The conference agreed such separation should be discouraged.

APPEAL TO THE COURTS

Dr. J. E. OUTHWAITE (West Riding) roused a spirited discussion by moving that any contract for service "should provide that in all cases of dispute between any members of the profession and the Minister, there should be an ultimate right of appeal to a court of law." So much, he said, was the right of every subject of the Crown. Various speakers noted the success with which the medical services subcommittees usually function, and the leniency of the Minister in his decisions, but nothing could stand before Dr. Outhwaite. "We are asking for justice, not privilege," he asserted—and carried the meeting with him.

A QUESTION OF JOINTURE

The conference passed a motion, by the IAC, providing that the Central Health Services Council should not be concerned with terms and conditions of service, but that these should be negotiated directly between the Minister and the profession by a permanent agreed machinery set up for the purpose.

Introducing a motion asking that no proposals should be considered unless they contained figures for range of remuneration and compensation Dr. PRIDHAM (Dorset) remarked that it was customary to make the marriage settlement before the wedding, not after. Reminded by Dr. DAIN that they had arranged for a proper negotiating body in the previous motion, and that no bill would go through without reference to the profession, Dorset was satisfied and withdrew.

FUNCTIONS OF THE CENTRAL MEDICAL BOARD

Two important motions by the IAC were accepted:

That no body, central or local, should have the power to require practitioners to take up any particular form of practice or to enter a particular area for the purpose of practice; and

That no body, central or local, should have the power to require practitioners desiring to set up in practice in an area to seek its permission.

Then followed several motions, carried almost without discussion, which urged that the profession should be adequately represented on the proposed Central Medical Board, that all doctors in the National Health Service should enter into contract with the same body, and that maldistribution of practitioners should be corrected by attraction not compulsion. A long motion introduced by Dr. CRAN, for Surrey, asked the IAC to consider the organisation of National Health Service practitioners into the following classes: (A) those who wish to receive the full capitation fee for every patient they accept (any doctor could be free to do this when and where he chose); (B) those who prefer a basic salary plus a capitation fee (no-one could enter this class if in the view of the administrative authority the medical needs of the area were fully met); and (C) a flying squad, prepared to act as locums, who would receive a basic salary. The meeting seemed a little bewildered, but since the motion was in effect only a reference to the IAC they passed it by 70 votes to 56.

LOCAL ORGANISATION

The conference considered the relations of doctor and local authority in three motions from the IAC and several supplementary ones. The first IAC motion proposed:

That the suggested Joint Health Authorities should be replaced by bodies covering natural hospital and medical areas, and representative of local authorities, voluntary hospitals, the medical profession and other vocational groups working in the service.

It provoked the question "What is a natural hospital area?" "It has been described," said the CHAIRMAN, "as a catchment area for hospitals." The conference passed this motion, and with slight amendments, two others which finally read:

That the regional bodies suggested should plan all the medical services in the area, preventive and curative, institutional and non-institutional; and

That the contract of the general practitioner should be only with a body on which the profession is predominantly represented, and not with a body composed wholly or mainly of local authority representatives.

Glasgow crossed the "t" of this part of the discussion with a readily approved motion that the medical profession should not accept any new medical service controlled by local authorities.

SOME FINANCIAL POINTS

A motion by the IAC, slightly amended by the meeting, proposed:

That organised methods of practice in alternative types of health centre should be initiated experimentally only after agreement with the local medical profession; that there should be no difference between the terms of service and method of remuneration of general practitioners, whether in separate or grouped practice, apart from differences related to expenses involved; and that the method of remuneration should not be by full-time salary.

Dr. GORDON WARD said that his division did not favour salaries, but he did not doubt if those offered were good they would accept them. The motion was an insult to those who were now paid by salary, implying that they did worse work than those who were paid by other methods. But he did not believe the profession worked merely from the love of money, and salaries were not going to corrupt them. Dr. L. J. PICTON emphasised the advantages to the general practitioner of cottage hospitals, which, he considered, provided similar facilities to a health centre, only better. He suggested that cottage hospitals should be maintained and possibly multiplied. The motion was carried.

Dr. J. A. MOODY, for Essex, proposed that the control of health centres in clinical matters should be in the hands of a medical committee analogous to the medical committees of first-class voluntary hospitals, and this too was accepted.

By way of safeguarding rural practitioners the IAC proposed that the National Health Service should include: (1) an extension of the system of cottage hospitals, suitably equipped; (2) substantial increase in maternity beds, where patients can be attended by their own medical attendants; (3) the provision, in any area plan, of X-ray and pathological facilities for rural districts, possibly by means of mobile units; (4) a substantial increase in the basic mileage grant covering normal travelling costs and time occupied in travelling; (5) in rural areas where health centres cannot be established, financial provision to enable doctors to provide the facilities available in health centres.

This provoked a brisk discussion on the expenses of the country doctor, who, besides shaking his car to pieces in rocky lanes and running his tyres to the canvas in no time, has to send his children away to boarding school. Moreover, it takes him perhaps an hour or more to see three patients where his town colleague might see eight or ten. The case was put well by Dr. C. M. STEVENSON, Dr. C. F. R. KILLICK, and Dr. PICTON, who pointed out that though like services should be rewarded at the same rate, the services given in town and country practice were very different. He cited the case of the fractured femur, which the town doctor sends to hospital but the country doctor must treat in the home.

Dr. TALBOT ROGERS drew attention to dangers in clause (5) of the motion, which might, he said, lead to things like the privately-owned nursing-home. Dr. PRIDHAM explained, however, that the intention was only to arrange that a secretary-dispenser should be provided for the doctors affected, and on this assurance the conference accepted the IAC motion as it stood.

Some discussion followed a motion by the IAC that the adoption of the limited compensation proposals in the white-paper would affect the capital value of all general practice. It was clear from what speakers said that the capital value of practices has been affected already; no-one is willing to buy while the subject is still under discussion; and a substantive motion to that effect was carried. So was a motion from Hull, recommending that compensation formulæ should be calculated and agreed *now*.

Two motions, one from Surrey, the other from Lancashire, aimed at securing beds in general hospitals where general practitioners could treat their patients; and at bringing general practitioners into closer relationship with the hospitals by appointing them as clinical assistants and as members of hospital boards. These proposals were accepted.

THE QUESTIONARY

The meeting took the view that the recent questionary "was so constructed that it did not reflect the opinion of the profession." The representatives decided that no valid conclusions could be based on it.

In England Now

A Running Commentary by Peripatetic Correspondents

How many people have any real love for children? Not the fierce, possessive love of an animal for its own young, but human tenderness for all children, an emotion which may be felt by those who have never had children of their own. It is rare, I think, though few people express their feelings as frankly as a young Jewess, a patient of mine, who said, "I don't like children—except of course my own child." Perhaps it is this dislike, or indifference, or perhaps just lack of imagination, that allows a child to be unnecessarily hungry. The first and most primitive way of showing affection is to give food, and there can be few greater satisfactions than to see a child—anyone's child—thriving under one's care, active and happy. I know *one* schoolboy who has nothing but good to say of the food at his school. This modern and flourishing school employed a dietetic expert with a London B Sc, who fed the boys well, even in war-time. On the other hand, another boy, no grumbler, and the least greedy child I know, wrote on being launched into another school this term, "... One needs plenty of money here, because one likes to get some respite from all the rules and regulations of College by going to the tuck-shop now and then. On a Saturday one can get what is called sausage and mash. It is quite nice but rather expensive. The food here is not as good as at home by any means and is always cold, but one soon gets used to it. This place is very cold indeed, but one gets used to that too ..." The first boy had said that the tuck-shop was unnecessary, and sold mainly sweets. Indeed, a tuck-shop should not be needed for more than sweets and extra fruit, with, in better times, ices and soft drinks. Parents do not expect their children to supplement home meals by going to restaurants and those who stand in loco parentis should feed their charges well enough to make tuck-shop meals unnecessary; and the food should be well cooked, nourishing, hot and appetising. It can be done, and is done, but not everywhere, yet.

* * *

In our house no speck of dust is allowed to settle for more than five minutes; and so, the little servant having gone away, my old missis spends her time cleaning, in addition to the cooking, shopping, washing, attending to the stove, and hundred other things that looking after a husband means. Strangers bring dust. It is but seldom that one comes in without leaving some behind on the carpet, or a fingerprint on some highly polished piece of oak or mahogany, and each has forthwith to be eliminated. This means more work, so strangers are not encouraged. If it were not for the milk man, the rag-and-bottle man—and bottles are rare these days—and the old man that sweeps the pavements she would have no-one to talk to from the time I leave till I get home again. To all this the two pair of twins and John are the exception. John is the elder brother of the younger pair of twins and he has adopted my old missis. Reputed to be shy, retiring and frightened of strangers he is just the opposite with her. He walks into the house and does what he likes with it to an extent that would have horrified her children and to which even her grandchildren have hardly attained. Their father is an analytical chemist to a big firm and they live on the first floor of an old house that has been subdivided as have so many been down our road. Since the twins came off the breast, he likes to take his young wife to the pictures when he gets an afternoon off. They can push the twins upon the lady upstairs, who having two children of her own can manage a bit extra for an hour or so; but John is too much for her and so John comes to spend the time with my old missis. The other pair of twins are older and they live down the side street opposite. In fact they live *in* the side street, for their mother turns them out to play, scrupulously clean, soon after breakfast, in their neat clothes that she makes herself out of bits; for she was a dressmaker before she married. And from this standpoint they are advancing further with the months. They remind me of a bevy or scuttle—or whatever is the proper term—of little pigs a neighbouring farmer had near our cottage in the country. Each day they came the same way round the field and each day a few yards further, till one day they reached our garden hedge at which they used to sniff, and another day they found a hole through that and the next day they were through it to the detriment of our root crops. So has it been with this pair of twins. A year ago they were still toddling and their range was limited to their next door neighbour's doorstep, whence they have extended first along the pavement to the corner, then round the corner into our street, then into the road, and then across it. It was thus that they reached our doorstep. They had long got to know us, hailing me as "doctor man," as I went off, and the wife as "doctor lady" when she came to the door. They have a lot of toys, too many we believe, because they do not get much out of them; but from the rare occurrences in a side street to a side street off the high road they get great profit. That of most frequent routine is the old man who sweeps the pavement; he is just a pal of theirs. Then there are the dustmen, but they do not wait and gossip and are usually by before the twins are up. The great excitement is the huge tank with a pipe that comes and sucks up the muck from the water-drains and then flushes them out. But twice in the last two months they have had a real event. It was when we had coke delivered. It is hard for an adult to realise that this can be a rare adventure. But last year their range did not bring them to our pavement, and other people around our streets in small subdivided houses have theirs in in hundred-weights, and so the first time we had coke delivered in the spring was the first time they had ever seen such a thing. It was then that they reached our front door. A little later they got through it. For a while they used both to go into the drawing-room and ask for the toys they knew were there. But these boys though alike are not identical twins, in which they differ from the piglets; and so now they are beginning to be independent of one another; and when the missis opens the front door they dodge each side of her under her arms and one makes for the drawing-room and the toys, and the other darts up to my room where there is something that has taken their fancy. I wish someone round our way had identical quintuplets. I feel sure they would be just like those piglets.

* * *

Miss M. Margareta Scott (I don't mean Margaretta of *Fanny by Gaslight*) would have approved of my home. We had two pianos—a grand and a little one, first cousin to a spinet—a 'cello, several violins, a banjo, an oboe, two flutes and several assorted piccolos, fifes, ocherinas (which she ignores), not to mention loud voices and whistles, which Miss Scott rightly classes as wind instruments; and we thumped, twanged or blew them all. Her book, *What Can I Play?* (Quality Press, pp. 109, 3*s*. 6*d*.), will encourage anyone, "musical" or not, to learn an orchestral instrument or two; and she

tells them how and at what age to set about it, how long it will take, and what it will cost, at prewar values. Her book will be a welcome present for an invalid and a good investment for those whose job it is to keep an invalid's spirits up. For music is one of the finest stimulants for the convalescent, and there is the whole orchestra from which to choose a suitable instrument. Even the loss of fingers—or sight—need not be a bar, for an adapted instrument will often meet the case. Alas; the bar just now is the scarcity of instruments, but second-hand ones still appear in the *Exchange and Mart*. Miss Scott agrees that the amateur musician, like the amateur golfer or tennis-player, should play for his own enjoyment, and not face an audience until he reaches professional skill. Bassoonists please note.

* * *

"Do you know these?" asked my friend the chemist. From the back of a shelf he lifted a medium-sized bottle containing several hundred white-coated tablets and I studied the label with interest. It bore the superscription of a well-known firm of wholesale chemists and in large letters the words "Livingstone's Rousers." The name was not belied by the formula, which stated that each tablet contained a far from negligible amount of calomel, jalap, rhubarb and (one wonders why?) quinine. Undoubtedly the Rousers would have strength to remove mountains but it was doubtful whether they would have the charity which is the sine qua non of the ideal purgative. Whence did these tablets obtain their name? Was the original Livingstone some small practitioner or chemist plying his trade in a more than usually constipated neighbourhood, or was he a knocker-up in some Lancashire mill town whose tapping required reinforcement? Or was he the great David himself? There is a wistful attraction in the thought of his walking through some remote African village in the early morning, noting with satisfaction that the Rousers were taking effect and that even the village sluggard was not lying abed: possibly he was whistling quietly as he took his morning stroll, and the tune...? Well, granted the combination of circumstance and Scots ancestry probably it was "Hey, Johnny Cope, are ye wakin' yet?"

* * *

Doctors are highly differentiated people; neurologists are highly differentiated doctors; and my friend J is a highly differentiated neurologist. His clinical investigations are a thing of academic beauty. At least they were before he came to France. But now, in busy wards, he finds he can't examine a case at all unless he starts by giving the man (*a*) a "bottle" and (*b*) a drink. The malignant change of war has de-differentiated poor J. And, when peace returns, his primitive ministrations may look a little odd on his teaching rounds at St. Synapse's.

Public Health

Future of School Medical Service

A MEETING of the school medical officers' group of the Society of Medical Officers of Health was held on Nov. 3 to hear an address by Mr. R. A. Butler, Minister of Education. Unfortunately, the same day had been chosen for the parliamentary debate on social security; so the Minister could not attend, but his place was ably filled by Mr. CHUTER EDE, parliamentary secretary to the Ministry. The foundation of school medical work, said Mr. Ede, was routine inspection. It had been alleged against this that it was not performed often enough, that too much time was wasted in examining normals, and that not enough supervision was given to the child who really needed it. But no satisfactory alternative had been propounded, and in the regulations which were to be issued for its conduct there would be latitude to allow for experimentation. Probably not enough doctors would be available for all the increased work of the service and this would mean that the school nurse would have to do more. He would like to see the school nurse visit every school every day and, as contact with the home must be maintained, he hoped that the school nurse and health visitor would be the same person. Until the details of the future health service were fixed it would be impossible to indicate how much additional treatment would have to be provided; but he would like to see the school medical officer engaged in a wider scope than at present, and no doubt he would be doing other public health work. The dental problem was particularly important, and if all the treatment required was to be given it would mean that the dental staff would have to be bigger than that for all other forms of treatment combined.

The new act provided for the inclusion for medical purposes of the young recruit to industry who would thus be offered the same facilities as the young person of similar age still in a secondary school. No doubt mass radiography and dental treatment would have to be considered for this important group. As regards handicapped children there would have to be a great development of special schools and where numbers were too small in one area combined efforts would be needed. Voluntary bodies would no doubt still be welcome in making such provision. Many such children would have to be provided for in ordinary elementary schools with special adaptation of the curriculum. Consultation with an educational psychologist would be required in very many such cases. Mr. Ede hoped to see the school medical officer playing a more important part in bringing about improvements in the standards of school buildings, taking an interest in the school meals service and particularly in the physical training programme.

Sir WILSON JAMESON, chief medical officer of the Ministry of Education, said that the sort of changes forecast in the white-paper would probably come into operation slowly so far as school medical work was concerned. The family doctor had a definite part to play in the service, but there would always be a need for a corps of full-time school medical officers for the performance of certain highly technical duties. For such officers the DPH was not such a satisfactory portal of entry as would be a reformed DCH. They should, in fact, be trained pædiatricians, preferably holding a higher qualification, as did their colleagues on the full staff of children's hospitals, and having themselves some association with hospital practice. Such men should be remunerated on a basis more comparable with that of administrative medical officers than is at present the case. Continuity of care throughout child life was essential, and there was much to be said in favour of separating maternal care from child care, so far as whole-time appointments were concerned. The child-care service must be recognised as a service in its own right and not merely as a stepping-stone to administrative work. The medical officers of Part III authorities were worried about their future, but he thought that the proposal to associate them with the work of the county councils—not as assistant county MOH's but under some new and more suitable title—would greatly expand their opportunities of service and promotion. The proposal was one rather of coöperation than of subservience of the municipal borough or urban district MOH to the county MOH.

Infectious Disease in England and Wales

WEEK ENDED OCT. 28

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 2288; whooping-cough, 1061; diphtheria, 554; paratyphoid, 14; typhoid, 9; measles (excluding rubella), 4442; pneumonia (primary or influenzal), 538; puerperal pyrexia, 162; cerebrospinal fever, 47; poliomyelitis, 14; polio-encephalitis, 1; encephalitis lethargica, 3; dysentery, 362; ophthalmia neonatorum, 64. 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 Oct. 25 was 722. During the previous week the following cases were admitted: scarlet fever, 42; diphtheria, 12; measles, 19; whooping-cough, 20.

Deaths.—In 126 great towns there were no deaths from enteric fever, 3 (0) from measles, 2 (2) from scarlet fever, 7 (1) from whooping-cough, 8 (1) from diphtheria, 37 (2) from diarrhœa and enteritis under two years, and 17 (1) from influenza. The figures in parentheses are those for London itself.

Birmingham reported 6 deaths from diarrhœa.

The number of stillbirths notified during the week was 197 (corresponding to a rate of 28 per thousand total births), including 13 in London.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

WITH the Prime Minister's speech on the bill for the prolongation of Parliament, the stage is set for a change from the present Coalition Government to some future government in 1945. The mass resistance movement, which we in Great Britain have called a coalition, will be over and a new chapter of normal parliamentary business will open. But before then there is much to be done.

The bill for the appointment of a minister of social security has already been presented to the House, and we have had a two-day debate on social insurance introduced by the minister designate, Sir William Jowitt, and wound up by Sir John Anderson. Sir William Beveridge in an unusual maiden speech said he had laid his baby on the doorstep of a Government office in Whitehall, and on returning nearly two years later to acknowledge paternity, found the baby somewhat changed. To admit paternity, Sir William said, was always a slightly delicate operation, particularly in a maiden speech. Continuing, he urged that the scheme should insure every child against want, and recalled that before the war nearly half of all working-class children were exposed to its sinister concentration. Sir William also argued that the pensions of the aged should be fixed at a subsistence level without the need for extra public assistance. He agreed that the approved societies (but not the friendly societies as such) must go, and suggested that the Government should take over industrial assurance.

The Minister of Education in dealing with school meals and milk admitted that the extension of school feeding would need some three years to become general, but said that building priority, for school canteens, was to be first on the list after the repair of the most extensive war damage to houses.

During the debate a Conservative MP prophesied red ruin and the breaking down of laws, but got very little support even from his own colleagues. The Government and the House are determined to carry the bill through, and the demand of Mr. Arthur Greenwood, speaking for the Labour Party, that the bill should go on the Statute Book before a general election was endorsed by Sir William Beveridge, and by the general support of the House.

SOCIAL SECURITY DEBATE

AFTER a two-days' debate, in which there were a large number of criticisms of the details of the scheme, the House of Commons agreed on Nov. 3:

> That this House welcomes the intention of His Majesty's Government, declared in the white-paper presented to Parliament, to establish an enlarged and unified scheme of social insurance and a system of family allowances.

In his opening speech Sir WILLIAM JOWITT, Minister of Social Insurance designate, urged the House not to lose the good in the scheme by stumbling forward towards what we think is a best but may prove unattainable. This, he pointed out, was an insurance scheme based on the contributory principle, in which contributors got benefits as a right and not only if they could establish need. The taxpayer would pay the entire cost of family allowances, nearly all the cost of training allowances, a third of the cost of unemployment benefit, nothing towards funeral benefit, and a sixth of the other benefits. The scheme was based on universality, and contributors were divided into three groups: I, employees; II, those working on their own; and III, those not working at all. The Government had refused to adopt the subsistence level as a basis for benefits, because subsistence varies from person to person, from place to place and from time to time. Individuals could still supplement the benefits from other sources; the Government did not want to discourage either voluntary insurance or other forms of thrift. Anyone who could not manage on the benefits could apply to the National Assistance Board for help. In embarking on family allowances the Government wished not to remove the responsibility of parents but to help them discharge it. They attached the greatest importance to payment in kind, and proposed that all children attending primary and secondary schools should receive free school meals and milk, up to the age of 16. No cash payment would be made for the first child unless the breadwinner was on benefit. School meals for all school-children would cost £60 million a year; he could not specify the date when all children would get them, but the Minister of Education was certainly not going to delay the scheme. In 1796 William Pitt had introduced a bill for family allowances, but it had been crowded out by pressure of public business—a proposal to alter the date of grouse-shooting. This time they would show a better sense of values, and this would be one of the first bills introduced by the new ministry. Retirement pensions would be paid not on reaching a particular age but on retirement from work, and they had been designed to encourage those who reached pensionable age to continue at work. The machinery of the scheme must run not only economically and efficiently but humanely and sympathetically—the customer's convenience must always be considered. Unemployment benefits would be paid at the employment exchanges; sickness benefits sometimes by postal draft, sometimes at the local social insurance office, and sometimes at the contributor's home. It had been decided that the present system, by which insured persons could segregate themselves into separate societies, receiving varying benefits, must stop, but he did not believe that the exclusion of the friendly societies from the scheme would sound their death-knell. People might well become more insurance-minded and welcome the additional types of insurance that friendly societies could offer. National assistance would be extended to everyone in need; the powers of the Assistance Board would be enlarged, and local authorities would no longer pay cash allowances, though they would be responsible for institutional services. Parliament would control the whole system of cash assistance, and the Minister of Social Insurance would be answerable to them for it. The cost of the scheme would be some £650 million now, rising to £831 million in 1975, the taxpayers' or ratepayers' burden being half of this rising to two-thirds. These heavy commitments were at once a challenge and an act of faith in the country's future.

Mr. ARTHUR GREENWOOD, who opened the debate on the Beveridge report in February, 1943 (see *Lancet*, 1943, i, 282), urged that all the necessary bills should be on the Statute Book before the next General Election; he was not prepared to wait until the whole plan was ready in legislative form. We could afford the scheme if our people were enabled to work for their living.

Mr. SUMMERS pleaded for improvement in the lot of the self-employed, especially in the benefits payable during the first month of illness, for which they did not at present qualify.

Mr. MESSER hoped the measure would spell the death of the Poor-law; it would spread over the nation what should be a national responsibility, but local consideration would have to be given to special claims—for instance, those of cripples and the blind. He asked whether nurses in the various forms of private practice would be in class I or II.

Sir CHARLES MACANDREW thought the average figure for unemployment over the 10 years after the war would be nearer 17% than the Government's estimate of 8½%. Everything we did in the way of spending enormous sums must increase unemployment.

Mr. A. EDWARDS disagreed; in his view what needed to be done when unemployment increased was to swell not skimp the wage-packet. People should not talk about the cost of the measure; they should consider what it is going to save the country.

Mr. JOHN GRIMSON, in a maiden speech which brought praise from all sides of the House, regretted that the scheme was compulsory; many people conscientiously objected to using a doctor and would object to insuring in a fund which supplied one. Why, he asked, should we all have to contribute to a funeral fund? The sole effect of paying a £20 bonus at death would be to put up the cost of funerals by £20. The Government should set up a committee to inquire into the cost of dying, which now bore too great a relation to the deceased person's means and too little to the cost of the services rendered. Friendly societies were the home and essence of democracy; they had encouraged in ways no other society had

the habit of thrift among working people. They taught people to realise that the benefits came from the money they had paid in and not from a bottomless pit. The Government Actuary had said that a high standard of certification would be essential, "supported by adequate arrangements for medical referees and sick visiting"; such arrangements already existed in the friendly societies and nowhere else. Paraphrasing the opening speaker, he would say, do not let us lose the good in the existing societies by stumbling forward towards what we think is a best but may prove unobtainable.

Mrs. ADAMSON said that many women's organisations felt the children's allowances ought to be paid for the eldest child also, and they were unanimous that they should be paid to the mother. She appealed for the equalisation of pensions between civilian and war widows.

Major WOOLEY pointed out that children under school age would receive no benefit in kind, and asked what would be the position of school-children at week-ends and during the holidays. The Government should, he thought, increase the allowance for all children when the parent was on benefit. The rates of benefit should, in his view, be tied to the cost of living. The atmosphere of the Employment Exchange was not what he wanted in the social insurance scheme—there was too much of the "What is your identity number?" spirit. The friendly societies had established a real friendship between themselves and the people they served. (Mr. MESSER here reminded him that approved societies could accept or reject applicants, so that they accepted only the good lives, leaving the bad to become deposit contributors.)

Mr. GRAHAM WHITE wondered whether income-tax rates were to be reviewed in the light of family allowances.

Mr. COLLINDRIDGE compared the scheme with that in New Zealand, which was based on subsistence standards, so that an increase in the cost of living entitled the recipients to increased payments.

Mrs. CAZALET KEIR hoped the children's allowances would be paid direct to the mother, and would have preferred a higher allowance. She asked what additional benefits would be paid to the parents of children who did not get the school meals. She urged the Government to set up a statutory committee to watch over the whole scheme.

Mr. W. J. BROWN pleaded for more generous provision for the chronic sick; after three years' sickness a man should receive an increased rather than a reduced benefit. When the breadwinner was receiving sickness or unemployment benefit he should get at least 10*s*. a week for his first child, instead of the suggested 5*s*. He urged the Government to get the measure on the Statute Book before the General Election.

Sir WALDRON SMITHERS, who defined a reactionary as one who snatches another back from the edge of a precipice, thought the scheme unworkable and contrary to the natural law. No-one knew what the future value of the pound would be, and one could not run even a fish-and-chip shop on a notional figure.

Mr. HYND asked the Government to give the aged worker not less than his colleague who was temporarily off work because of sickness or unemployment. The attempt to drive old-age pensioners back to work when they were no longer fit for it was a serious blot on the scheme.

Sir IAN FRASER asked whether we had the labour, materials, and other resources to carry the proposals out. He asked for assurances that no blind person should get less as a result of the measure, and agreed with the original proposal of Sir William Beveridge that there should be a special disability pension for civilian blind people.

Mr. RHYS DAVIES did not believe that a monetary consideration ever influenced the birth-rate.

Sir STANLEY REED thought the family allowances would go a long way towards remedying the unequal economic position of the bachelor and the married man. Cash allowances might be made in the form of a deposit in the Post Office Savings Bank.

Mr. LESLIE had been inundated with pamphlets, circulars and letters from approved societies, insurance companies and friendly societies. If the staffs of the approved societies were taken over by the Government they would ensure the success of the scheme.

THE DEBATE RESUMED

Mr. BUTLER, Minister of Education, in resuming the debate, described the scheme as a logical development of a peculiarly British social experiment. In answering critics of the clause under which self-employed contributors get no sickness benefit for the first four weeks of illness, he explained that such people could often let their job tick over for a short period, whereas an employee would be stood off. It had been difficult to single out the blind for special hardship pensions; the provisions were based on the view that normalcy was the kindest treatment for them. Raising the birth-rate was not the sole aim of the family allowances; but what made the birth-rate rise was confidence, and the scheme as a whole would give families that confidence. A child's allowance would continue to be paid to the family if he was in hospital or in any other institution which did not take over parental responsibility. The father would apply for the order-book for his children's allowances, but either he or the mother could draw the money; the family itself would decide. Out of the 28,000 schools, 19,000 were serving meals, and all but 1000 provided milk. There was a long way to go before all school-children got meals in school, but school canteens had now been granted priority only second to the urgent house-repairs in London. The standard of school meals had been raised to a degree unbelievable, even in peace-time. (Dr. HADEN GUEST asked what pressure the minister was to exert on the education authorities which were backward in supplying school meals, and Mr. Butler drew his attention to his new powers under the Education Act.)

Sir WILLIAM BEVERIDGE, making his first speech in the House, was pretty certain that this plan of the Government's was the same baby which he had left on their doorstep two years before. The first principle of the Government's policy about children should be to ensure every child against want—against going hungry, cold, ill-clad and ill-housed. This should be done in such a way as to preserve the parental responsibility as completely as possible. Whatever form the provision for children took, the amount for every child after the first (and for the first also when the father was not earning) should be enough by itself to maintain that child in health. Though he welcomed the developments in school feeding he doubted whether this was the best way to set about abolishing want among children. It was a greater interference with parental responsibility; it did not cover the holidays or children under five; and it went to the first child also, which according to the white-paper was unnecessary. Similarly in providing for the aged the aim should be to ensure an old age without want, without dependence on the young, and without the need for charity or assistance; the Government plan definitely rejected that aim. The variety of human needs was no reason for deliberately aiming at something well below the average. He did not want pensions and benefits on a sliding-scale, changing with the cost of living, but we must estimate where it will be possible to stabilise the cost of living after the war and relate the benefits to that estimate, making it our policy to keep the cost of living there. In the administration of sickness benefits we should retain the friendly societies as responsible agents, but he could see no reason for retaining the approved societies connected with industrial life offices in their present form. He begged the Government to consider his proposal for taking over industrial assurance and making it a public monopoly. The Government's scheme could easily be turned into a plan to abolish want; the structure was there; all that was needed was a change in the figures. Could we not in the next 12 months pass the legislation to make the Britain of the future a land in which, in Mr. Lloyd George's words, "indolence alone shall suffer want"?

Mr. MACK, as a representative of the 60,000 insurance agents, asked for consideration for the loss of earnings they might suffer under the scheme. The establishment of an Industrial Assurance Board should be the keystone of the scheme.

Lady APSLEY thought it highly incongruous that there should be funeral benefit of £20 and only £4 for maternity.

Mr. LEACH asked why the Government had a softer spot in its heart for widows than spinsters; a 20*s*. a

week pension for all insured spinsters over 55 would cost only £5,600,000 a year.

Sir ARNOLD GRIDLEY could see no provision in the scheme for illegitimate children.

Mr. KENNETH LINDSAY was doubtful whether 5s. a week, plus meals for 70% of the school-children for five days a week for 45 weeks in the year, would answer the fundamental problem of poverty.

Sir ADAM MAITLAND could put up a good case for the exemption of the contributions from income-tax, on the grounds that they were compulsory payments. It could be argued that the benefits represented partially capital savings and partially income. He had put down a motion, to which 91 other members had put their names, expressing apprehension at the decision to abolish the approved societies. In this the Government had blundered; they were discarding an agency which could be of the greatest service to them, certainly in the initial stages. He asked for a Select Committee to study the question.

Miss RATHBONE, discussing whether the family allowances should be paid to the mother, said that women looked on this as a test question—Does the community really want the mother to continue to be regarded as a mere dependant? The Government's proposal was a deliberate throwing of an apple of discord between husband and wife. The Government should have assumed from the first that the allowance should be paid to the mother. She begged the Government to think again whether they could not adopt the 8s. allowance proposed in the Beveridge report; school dinners and school milk were going to be slow in coming into operation, very costly, since a school dinner cost at least twice as much as an equally good one at home, and would meet less than half the food needs of the child. For the sake of those parents in the higher income classes who were now reducing their birth-rate rapidly the Chancellor should introduce a revised system of income-tax allowances. Her final request was "Be quick."

Mr. HUBBARD asked what it would cost to make provision for those old people who had not contributed to an insurance scheme, and who would receive nothing under the scheme but the right to ask for national assistance.

Lieut.-Colonel W. ELLIOT challenged the proposal to make retirement from employment a condition for a pension. It should be open for the man of 65 to take the 10s. a week, which represented his life's savings, whether he was working or not. The Minister of Education should not think he would get arrangements made for school meals merely by being granted priority by the Minister of Works. But milk could be provided quickly and easily; that part of the nutrition policy should be pressed forward with all possible speed; Dr. May Mellanby had attributed the reduction in dental caries between 1929 and 1934 largely to the milk scheme. In implementing its proposals Colonel Elliot urged the Government to strike now, while the iron was hot.

Mr. JAMES GRIFFITHS asked why, if the Government intended to stabilise the cost of living, the benefits under this scheme should not be placed at a level adequate to maintain a national minimum standard of life. With the retiring pensions of 35s. for a couple and 20s. for a single person, three-quarters of pensioners would have to apply for help from the Assistance Board. The people of this country disliked going to the Assistance Board at all. In reducing the benefits after the third year of illness the Government had taken the view that continuance of the full rate would induce a neurosis, so that the man would settle down to chronic invalidity. Was it seriously suggested that the way to help people recover from sickness was to reduce their income? He cordially approved of what Sir William Beveridge had said about the essential need for the children to be raised above want.

Sir JOHN ANDERSON, Chancellor of the Exchequer, did not think the estimate of 8½% for the average of continuous unemployment in the ten years after the war unduly optimistic. He thought the contributions to the scheme would probably be deducted from income in calculating income-tax, but that the benefits would be counted as income. It would probably be desirable to continue the system of income-tax relief for children in spite of the family allowances. Full adoption of a subsistence basis for the benefits would be very difficult; the Government approach was: "Make up your minds what you think is right. Fix the benefit and fix the contribution, and if circumstances change by all means look at it again." He hoped that the habit of saving was not going to end with the war, and that it would be only in exceptional cases that recourse would be made to the Assistance Board. The scheme was intended to deal with interruptions in earning capacity. Taking a person who was at work from 16 to 65, with a normal expectation of life when he retired at 65, the proportion of his working life spent in sickness or unemployment would be 12% and the proportion during which he would be drawing pension would be 11%. If the present scheme was not introduced it would be impossible to carry on with the existing schemes—there would be demands for bringing health insurance up to the level of unemployment insurance, a demand for an improved health service and for family allowances. Considering what was included in the scheme, the additional expenditure was well justified. After looking closely at our prospective sources of income and our liabilities he was not alarmed at the prospective cost to the Exchequer.

FROM THE PRESS GALLERY

Penicillin Supplies

IN the House of Commons on Nov. 2 Mr. KENDALL raised the question of penicillin supplies for civilians suffering from bacterial endocarditis. The disease had been universally fatal until this great discovery came along. Some 80–90% of sufferers might still die, but at least with penicillin treatment they had a possibility of living. While the control of penicillin continued he asked the Minister to take regionally a few cases under his own experts, in consultation with the doctors whose patients these young people might be. This would stop him (Mr. Kendall) having to try to get penicillin for such cases.

Mr. WILLINK, Minister of Health, in reply said he was anxious to relieve the anxiety of any who believed there had been some undue rigidity, or even inhumanity, about the administration of our supplies of penicillin. It was in August, 1942, that the Ministry of Supply set up a general Penicillin Committee to consider the production of penicillin. They had difficulty, but in the early part of 1944 it became clear that during this vital summer our total supplies—home production and imports—of the drug would be more than sufficient for the needs of the Armed Forces. The first allocation for clinical trials, which were under the control of the Clinical Trials Committee of the Medical Research Council, was made in January, 1944. The business of that committee was to arrange for the use of the substance in cases where it was likely to be beneficial, and to record the quantities needed for a particular type of case, and the results. By August, 1944, supplies had increased and they were able to provide a general supply, though on a very restricted basis, for civilians. In the three months from August to now they had been able to maintain the amount they hoped for in August. The allocation was really, as it should be, on a regional basis, and the decision as to how the allocation should be used was made by the university medical schools; there could not be a better quarter in which to place that responsibility.

Mr. Kendall asked if it was not a fact that definite orders had been given to these regional authorities that no penicillin could be used for bacterial endocarditis?

Mr. Willink explained that each of the medical schools had set up its own expert committee. Treatment was given in teaching hospitals, but not only in those hospitals; there were other hospitals which had been approved as proper hospitals for that purpose. Penicillin could not be used with advantage in every type of disease. There were some diseases in which it might be the only means of saving life, in others it might be an alternative to the sulphonamides, and in others it might be quite ineffective. It was worrying to find that even some doctors were asking for penicillin for cases including cancer, mycosis fungoides and chronic leukæmia, in all of which, he was advised, it was quite ineffective. The memorandum issued by the Ministry of Health, based on the advice of a committee of high experts from many fields, set out the conditions for which penicillin should be used (see *Lancet*, Aug. 19, 1944, p. 255). It recommended that penicillin should not be used for rheumatic

fever, ulcerative colitis and other intestinal infections, bacterial endocarditis, or syphilis. Reports from hospitals indicated that the supplies had proved sufficient for all suitable cases. There was as yet no satisfactory evidence as to the effect of penicillin in the treatment of bacterial endocarditis. Some believed that if a patient who was seriously ill with this disease was given large doses he would almost certainly show an immediate improvement, but that as the condition would probably relapse, more and more penicillin must be given. There had not yet been sufficient experience to show whether the patient could be definitely cured if one went on and on with large quantities, or whether without being cured he could be kept alive, or whether he would die anyhow in a slightly longer period. But even on the most favourable interpretation of results, with the supplies they had it would be wrong to make penicillin available in every case. The ministry proposed to investigate the effects of penicillin on the disease. The quantities of the drug allotted to the ministry were being progressively increased and by January next there would be twice as much penicillin available for civilians as was available today. No-one would doubt that priority should be given to the Service cases. With all the generous help we had had from the United States, it would be wrong for us to use penicillin for our civilians on a more lavish basis than the United States were using it for theirs. But the Ministry of Health were doing their best. Before the end of 1945 he hoped the amount of penicillin available would meet all, or nearly all, reasonable demands.

QUESTION TIME

National Health Service

Sir LEONARD LYLE asked the Minister of Health what progress was being made in his discussions with the medical profession about the establishment of a National Health Service; and by what date he anticipated that he would be in a position to evolve definite legislative proposals for submission to Parliament.—Mr. H. WILLINK replied: The representative meeting of the British Medical Association has been arranged for early next month. Meanwhile, the council of the association have agreed to my suggestion that they should send representatives to elucidate points in their own draft statement of policy, and useful discussions for this purpose have taken, and are taking, place. I am not yet in a position to say when legislation will be introduced.—Sir L. LYLE: Can the Minister give an assurance to the House and to the country that the medical profession will not be cajoled or compelled to join the Civil Service?—Mr. WILLINK: I do not propose to cajole or compel the medical profession in that or in any other direction.

Design of Artificial Limbs

Replying to a question Sir WALTER WOMERSLEY, the Minister of Pensions, announced that he had appointed the following committee to consider the design, development, and use of artificial limbs and appliances connected therewith: Sir Brunel Cohen (chairman), Dr. A. A. Atkinson, Captain F. W. Bain, MC, Mr. T. H. Hall, Prof. T. P. McMurray, FRCSE, Mr. H. Parker, MC, Mr. G. Perkins, MC, FRCS, and Prof. H. J. Seddon, FRCS.

Doctors for Unrra

Mr. H. W. BUTCHER asked the Secretary of State for Foreign Affairs to what extent UNRRA had needed doctors; and whether he would, in consultation with the Minister of Labour and National Service, place the services of those doctors who entered this country as refugees at the disposal of that organisation.—Mr. R. K. LAW replied: UNRRA have appointed a medical liaison officer for each of the countries in which they expect to function. It will be the duty of these liaison officers to assess the need for further medical personnel. It is expected that the chief need for doctors will be for work with the displaced persons section of the administration. Apart from work with this section, it is thought that doctors who entered this country as refugees will be best able to assist by serving in the health organisations of their own countries rather than in UNRRA itself.

INTERDEPARTMENTAL COMMITTEE ON DENTISTRY.—Miss HORSBRUGH announced that this committee had presented an interim report in which recommendations were made on the place which dentistry should take in the National Health Service proposals. The report would be published as soon as possible.

Letters to the Editor

VENOUS SPASM PREVENTING BLOOD TRANSFUSION

SIR,—The interesting article by Humble and Belyavin in your issue of Oct. 21 suggests that this condition is relatively uncommon. As those who have to perform many emergency transfusions are aware, this is not correct. In 1939 I drew attention to venous spasm or collapse causing such difficulty in transfusion that on occasions it was necessary to supply the blood under pressure (*Brit. med. J.* 1939, i, 153). Since that date, with the establishment of an emergency obstetrical flying-squad service for the Oxford region, a much greater experience of this condition has been gained. At least 10% of the transfusions performed on this service require pressure to establish an adequate flow of blood. The following practical observations have been made:

1. Spasm is most often seen in the immediate postpartum state.
2. It appears to be commoner and greater when blood is given without a preliminary saline infusion.
3. The degree of spasm appears usually to be related to the degree of clinical shock or to the severity of the previous hæmorrhage.
4. Spasm occasionally occurs during transfusion, when the cessation of flow may be wrongly attributed to clotting in the cannula.
5. Usually the spasm is slowly relieved as the condition of the patient improves; but not infrequently there is a sudden change, and if the pressure is maintained the rate of administration of blood may reach dangerous or fatal levels.
6. Spasm seems to be greatest in the extreme periphery—for example, greater in the long saphenous vein at the ankle than in a vein of corresponding size in the antecubital fossa.
7. A pressure of 200–300 mg. Hg has been required in most of the cases, and this has been obtained by an inflated sphygmomanometer bag connected to the air inlet tube of the bottle of blood. Incidentally, the corks must be firmly secured, and in several cases the pressure has been sufficient to burst the bag from its container.
8. It must be emphasised that if this technique is adopted the patient must not be left for a second until the pressure is completely released, or the danger of a massive air embolus becomes real.

Transfusion has been possible in every case of spasm yet seen by me, although on several occasions, when the condition of the patient was very critical and the rate of flow alarmingly slow, two separate sets have been used simultaneously in different limbs until such time as the spasm was relieved.

Oxford. JOHN STALLWORTHY.

NEUROLOGICAL COMPLICATIONS OF ANÆSTHESIA

SIR,—In his interesting paper on neurological complications of serum and vaccine therapy (Oct. 7, p. 464) Major Hughes refers to our report of 13 patients who developed cranial nerve palsies after general anæsthetics (*Brit. med. J.* March 4, 1944). Only 2 of these anæsthetics contained 'Trilene.' His statement, "neuritis following the use of 'Trilene' as an anæsthetic," requires comment, lest it be believed that the drug, as such, may be responsible for neurological complications. It was found that in our anæsthetic machine chemical reactions were taking place between trilene and soda-lime, with the production of dichloroacetylene. This may decompose further, and dichloroacetylene, or possibly some other reactive product lingering in the machine, is believed to have produced the cranial nerve palsies. Postanæsthetic neurological complications similar to those we have described are reported by McAuley and Carden, and also by Hewer who considered the cause to be impurities in the trilene used. Fifth-nerve palsies occurring in industrial workers with trichlorethylene are almost certainly due to impurities in the drug. (References are given in our original paper.) On no occasion have we seen cranial nerve palsies follow any of the many administrations of trilene as the only anæsthetic agent. Since he

specifically mentions ether, Major Hughes may be interested in a report of three members of one family who, over a period of four years, and each in a different hospital, developed polyneuritis within two weeks of laparotomy performed under ether anæsthesia (Hammes, E. M., Frary, L. G. *Arch. Neurol. Psychiat.* 1936, 35, 617).

Central Middlesex County Hospital. MARGARET MCCLELLAND.

PROBLEMS OF AGEING AND THE CARE OF OLD PEOPLE

SIR,—In March of this year the Nuffield Foundation announced the formation of a survey committee to consider problems of ageing and the care and comfort of the aged, and of a medical subcommittee to deal with medical problems, especially medical research problems, of the causes and results of ageing. The medical subcommittee is now considering its programme of work and, in order to avoid overlapping and to promote general integration of relevant research, is anxious to make contact with investigators already working on this subject. The questions immediately before the subcommittee relate to the morphological, physiological, pathological and psychological changes which characterise the syndrome of ageing, and to the factors which expedite and retard the process.

The secretary of the medical subcommittee, the Nuffield Foundation (Survey Committee), 12, Mecklenburgh Square, WC1, will be glad to hear from investigators, medical men or biologists, who have research along these lines in hand, or projected, and who are not yet in touch with the committee.

A. S. PARKES,
Chairman of the Medical Subcommittee.

RECORDING OF CANCER CASES

SIR,—In an annotation on Oct. 28 you discussed the National Radium Commission's Record Cards, which have recently been issued to the National Radium Commission centres and the King's Fund hospitals. This scheme marks a real advance in the recording of cancer cases and contains so much of value that any criticisms suggested here are merely put forward in the hope that they may be constructive and helpful.

The value of any such scheme depends upon the use that can be made of the information supplied; no particulars have yet been given as to how the mass of data obtained from the Radium Commission cards will be sorted and analysed. It would seem that the abstract cards, while they have the great advantage of simplicity and provide a single card for all organs, are not designed for mechanical sorting, and that so great a labour will be involved in statistical analysis that full use will not be made of all the information recorded. These cards appear to have one other major disadvantage. Your annotation states that "the success of present methods of treatment will be assessed and new methods will be evolved and tested." I am doubtful whether this will really be possible with a card in its present form. It will be possible to produce "survival rates," but to assess a method of treatment a "disease-free rate" is required, for a distinction must be made between patients who have required no further treatment and remained free of disease for a period following the treatment under review, and between those treated initially by the same method but who, although alive and well at the end of the same period, have had some other treatment for recurrence in the interval. A patient who survives five years and is well may be a credit to the centre concerned with his treatment, but may have to be regarded as a failure when considering the efficiency of the first method of treatment employed.

The National Radium Commission's circular says: "it is hoped that certain hospitals will be able to undertake more detailed studies of problems of cancer, and to carry out special research into the development and evaluation of new methods of treatment." The inclusion in the Radium Commission abstract card of data from which "disease-free rates" can be calculated for each initial treatment employed, and the coding of the information supplied in such a way that it would be suitable for mechanical sorting, would, I believe, enhance the value of these record cards.

London, W1. D. W. SMITHERS.

CALCULATION OF LUNG EXPANSION

SIR,—In his paper of Sept. 23 (p. 415), Colonel Goadby, regarding for the purpose of mathematical calculation the upper chest as a cone with its apex at the suprasternal notch and base at the level of the nipples, and the lower chest from the nipple line to xiphisternum as a truncated cone, states that each of these geometrical shapes increases in length on inspiration. Seeing that the lengths referred to add up to that of the sternum, this cannot be what he means, and the same applies to the length xiphisternum to umbilicus, unless the umbilicus moves up and down in respiration as well as backwards and forwards. This rather arresting conception of respiration does not detract in any way from what is likely to be the most accurate attempt so far to "box" the chest geometrically for mensuration, and the abdominal circumference also taken is probably the best relative measurement of the diaphragmatic excursion, the factor which alters the length of the thoracic cavity. In fact the only reasons which could interfere with the perfect correlation of such a near "overall" measurement of the outside of the chest and the internal measurement of its volume by the spirometer may well be pathological and not physiological. Presumably any increase in the non-respiratory at the expense of the respiratory tissue in the chest would do just this.

Colonel Goadby gives interesting exceptions to the other relationship—that of vital capacity standardised to size, with performance in the field. While in the case of good physique and poor performance one would have to eliminate the malingerer, with the reverse—a good effort with a poor physical equipment—the explanation is not so simple unless one of a psychophysiological nature is forthcoming. The picturesque expressions "guts," "greatheartedness" and "wind" (the latter in the abdomen and not in the chest) can be literally interpreted in terms of sympathetic-parasympathetic balance in the other vital organs, and this again is capable of instrumental measurement in blood-pressure and of some degree of instrumental correlation in the respiratory manometer of the RAF endurance test. If, as is to be hoped, Colonel Goadby will publish fuller details of his tables, it will be possible to compare his results on the one hand with those from asthmatics, and on the other with those from civilians both at school and at work, as in Dreyer and Hanson's classification which he quotes.

Evidently the relationship of *age* to vital capacity is only one of *size* and *shape* to vital capacity, qualified by the capacity of youth to improve by growth and training to higher standards. Without such conceptions any work on vital capacity is likely to be discredited.

Petts Wood, Kent. J. E. CHEESMAN.

CRUDE PENICILLIN.—The letter on this subject (Nov. 4, p. 611) should have been signed by Mr. Hobson only.

On Active Service

CASUALTIES

KILLED

Major HAMPTON ATKINSON DOUGAN, MC, M B DUBL., RAMC

WOUNDED

Lieutenant J. T. S. BUCHAN, MB GLASG., RAMC
Captain L. G. HARPER, MC, MB GLASG., RAMC
Major R. H. C. MANIFOLD, MRCS, RAMC
Lieut.-Colonel J. J. MULES, MB NUI, RAMC

MENTIONED IN DESPATCHES

Surgeon-Lieutenant D. G. THOMPSON, MRCS, RNVR

MEMOIR

Major JOHN MOORE OFFICER, who was taken prisoner at the fall of Hong-Kong, is now presumed to have been killed in action at the beginning of October, 1942, while a prisoner of war in Japanese hands. Major Officer was born in 1907 and graduated MB at the University of Edinburgh in 1930. He joined the RAMC the same year.

Lord Nuffield has given £3000 to the Club for Research on Ageing to enable Dr. V. Korenchevsky to continue his gerontological investigations.

Obituary

ROBERT JAMES ROWLETTE

MD DUBL., FRCPI

Dr. R. J. Rowlette, King's professor of materia medica and pharmacy in the school of physic, Trinity College, Dublin, died on Oct. 13, at the age of 71.

He was born at Carn Cash, Co. Sligo, on Oct. 16, 1873. From school in Sligo he entered Trinity College and graduated in arts in 1895, with a first senior moderatorship and gold medal in ethics and logic. In the Historical Society he won the gold and silver medals for oratory, and he was president of the Philosophical Society, where his inaugural address on the Limitations of Government revealed his early interest in statesmanship and politics. He also took a keen interest in athletics; he was in the first class of long-distance runners, and a prominent member of the harriers. He kept up this interest after he graduated in medicine in 1898; he was elected a member of the governing body of the Irish Amateur Athletic Association, and was its president from 1906 to 1920. In 1920 he acted as honorary physician to the British Olympic team at Antwerp, and later he discharged similar duties for the Irish Olympic teams at Paris and Amsterdam. At the college sports he was a prominent figure for fifty years.

Lafayette

Soon after qualification Rowlette served for two years as resident medical officer at the Royal Hospital for Incurables. His flair for pathology received early recognition, and in 1904 he was appointed pathologist to Dr. Steeven's Hospital, and lecturer on that subject at Queen's College, Galway. In 1905 he became pathologist to the Rotunda Hospital. But although for five years Rowlette concentrated on pathology he never lost touch with clinical medicine, and in 1910 he was appointed visiting physician to Jervis Street Hospital. Nine years later he gave up his position both at the Rotunda and at Jervis Street, and joined the staff of Mercer's Hospital, where he remained till his death. At the Royal Academy of Medicine in Ireland he was president of the section of pathology and later of the section of state medicine. In 1942 he was elected president of the Academy, and a few weeks before his death he was re-elected for a third year. At the Royal College of Physicians of Ireland he was president from 1940 to 1943. His other appointments included the presidency of the Irish Medical Association and of the Irish Graduates Association. In 1917 Rowlette served in France at the 83rd General Hospital with the rank of lieut.-colonel, and was mentioned in dispatches. In 1921 he was appointed professor of materia medica and pharmacy in the schools of the Royal College of Surgeons in Ireland. From this he resigned on his appointment in 1926 as King's professor of materia medica and pharmacy.

Outside his professional work there were in recent years two other activities which occupied much of his time—politics and literature. For many years he took an active part in the various efforts which were made to improve the status and service of the medical profession in Ireland, and more especially that of the poor-law medical service. In 1933 he was returned unopposed as a Member of the Dáil, and three years later, when university representation in the Dáil was discontinued, he was elected a representative on the Senate. Both in the Dáil and in the Senate he made notable contributions in matters relating to medicine and the public health.

Rowlette was always interested in literature. In 1895 he was one of the founders of *TCD*. In 1903 he became assistant to Henry Jellett, then editor of the *Medical Press and Circular*. When Jellett resigned that office in 1909 Rowlette succeeded him, and he continued as Irish editor till 1936, when he became the first editor of the *Journal of the Medical Association of Eire*. In 1939 he produced a history of the *Medical Press and Circular*. For many years he was Dublin correspondent of *The Lancet*.

An associate says of him that "he went where there was need not where there was reward. Approachable at all hours, he welcomed students, colleagues, country doctors and those who sought to serve their country in any capacity. 'Better ask Rowlette' was the advice given to anyone in personal or professional difficulty, to anyone who had a suggestion or scheme for medical organisation or hospital development, to anyone puzzled by literature or embarrassed by life. Rowlette could have echoed with all sincerity the words of Sydenham 'I have weighed in a nice and scrupulous balance whether it be better to serve men, or to be praised by them, and I prefer the former.'"

Mrs. Rowlette, daughter of R. Camper Day, survives him with a son now in the Rhodesian Medical Service.

Mr. E. H. Alton, LITT D, provost of Trinity College, Dublin, writes:

Rowlette took an honours degree in philosophy, and he never lost his taste for it, especially for the philosophy of conduct. As a student I was a little junior to him and just beginning to turn the pages of Kant and finding darkness in many of them, when he helped me with the lecture notes he had gathered the previous year. I remember the enthusiasm with which he dwelt on the sublimity of the moral law within over against the starry heavens above. The categorical imperative and the autonomy of the will were magic terms for us in those days, and I think that in Rowlette's case the spell was a lasting one. Few persons observed so conscientiously the Kantian rule of conduct and tested so rigorously the maxims of their actions. His earnest look and his voice with the lilt he brought from the west of Ireland left a lasting impression on my memory.

The paths of our lives diverged; but in the Dáil, and later in the Senate, I saw a good deal of him. He made a mark in both Houses. His knowledge of matters affecting public health and medical education gave exceptional value to his utterances on these subjects. But he was something more than a specialist. He joined in debates where important principles of public administration were involved; his courage, width of outlook and transparent honesty of purpose ensured him an attentive hearing. He reasoned clearly and came quickly to the point, and he possessed a very effective dry humour. He had friends in every quarter, and respect from all parties.

RAYMOND JOHNSON

OBE, MS LOND., FRCS

Mr. Johnson, consulting surgeon to University College Hospital, died on Oct. 26 in his 83rd year. Of late years he had not been seen much in London, but among the surgeons who knew him in the active period of his age the mention of his name never fails to evoke affection and respect.

A. J. G. writes:—"That so quiet and unassuming a person should have left such clear-cut memories is in some ways remarkable, and it must be attributed in part at least to the complete consistency of his philosophy and actions. The question of how Raymond Johnson would have acted in any particular set of circumstances can always be answered with certainty, for his reactions were never devious and never complex. The good of his patient, the fair name of his hospital, loyalty to his colleagues and kindness to his inferiors were his guiding principles, and everyone who knew him well must at some time have witnessed his bitter distress when he found it impossible to be faithful to all these at once. Perhaps his house-surgeons loved him best. He could never bring himself to refer to the worst of them in any terms stronger than 'my unfortunate HS,' and I recall with gratitude more than one occasion on which his quick understanding saved an awkward situation. On one such occasion Johnson was performing a radical mastectomy, an operation in which he excelled, before a congress of distinguished colleagues from home and abroad. I remember very clearly applying a Spencer Wells with neat precision to the trunk of the nerve to latissimus dorsi. The arm gave a jump which must have been visible to the farthest corner of the theatre. 'Oh,' said Johnson, glancing up through his glasses and

removing the offending instrument with one of his quick bird-like movements, 'I *never* expected to see it there, did you?' The act was characteristic. The impression which he himself was making never entered into his calculations, but those dependent on him must at all costs be protected.

"As a student, between the years of 1881 and 1884 Raymond Johnson had to his credit no fewer than 14 scholarships, exhibitions and medals, and it is small wonder that he found himself on the staff of his own hospital only four years after becoming FRCS. On the staff he remained for 31 years, retiring in 1923 before his time because he thought that his successors under a new regulation would have to leave the staff at 60 and that he should not stand in their way by serving his full time to the age of 65. During that period he served both in the South African war and in the war of 1914–18, when he again demonstrated his complete consistency by resigning his appointment as Surgeon Rear-Admiral in favour of a captaincy in the RAMC because he felt that in the former appointment he was not giving enough service to warrant his rank. As an examiner he was well known for his fairness, and besides being a member of the court of examiners of the Royal College for nine years he examined for the Universities of Birmingham, Cambridge, London and Leeds. In literature he contributed, together with J. W. P. Laurence, an outstanding article on tumours to Choyce's *System of Surgery*.

"He was a much respected member of the council of the Royal College of Surgeons from 1916 to 1924. His last activities in London were concerned with the College and after leaving the court of examiners in 1926 he took little part in professional affairs.' At his country house with his wife and two daughters, who survive him, he was ideally happy and must have looked back over his long and useful life with singularly few regrets."

THE LATE DR. W. A. BREND.—Our notice of Dr. Brend on Oct. 21 stated that he was at one time in practice in Brill in Buckinghamshire. We are informed that this is not so. Almost his whole working life was passed in London.

Births, Marriages and Deaths

BIRTHS

COPE.—On Oct. 24, at Oxford, the wife of Lieut.-Colonel C. L. Cope, RAMC—a son.

CRICK.—On Oct. 30, at Oxford, the wife of Surgeon Lieutenant R. P. Crick, RNVR—a daughter.

FENTON.—On Oct. 28, at Reading, the wife of Captain John Fenton, RAMC—a daughter.

HUDSON.—On Oct. 30, at Cambridge, Dr. Jessie Hudson (née McKenzie), wife of Wing-Commander E. H. Hudson, FRCP, RAFVR—a son.

INGRAM.—On Nov. 3, at Gerrards Cross, the wife of Captain M. J. Ingram, RAMC—a daughter.

MACEWEN.—On Nov. 1, the wife of Dr. A. Campbell MacEwen, of Dunfermline—a daughter.

ROBERTSON.—On Nov. 1, at Guildford, the wife of Major D. Patrick Robertson, RCAMC—a daughter.

SHAW.—On Oct. 31, at Amersham, the wife of Surgeon Lieutenant C. Carter Shaw, RNVR, of Beaconsfield and Berkhamstead—a daughter.

SIMMONS.—On Nov. 1, at Manchester, the wife of Lieut.-Colonel H. T. Simmons, RAMC—a daughter.

STRANGE.—On Oct. 29, at Dunston-on-Tyne, the wife of Mr. F. G. St. Clair Strange, FRCS—a daughter.

MARRIAGES

CROSBIE—MCCORKELL.—On Oct. 26, at Culmore, Douglas Edward Crosbie, MC, LRCPI, to Doris Mary McCorkell.

GILBERT—SYKES.—On Oct. 21, at Lagos, Nigeria, William Thomas Moran Gilbert, LRCPI, to Mary Sykes.

HARLAND—MELLOWS.—On Nov. 1, at Redhill, the Rev. Robert Peirson Harland, MA, to Grace Edith Mellows, MRCS.

ORME—FOSTER.—On Oct. 28, in London, John Dennis Orme, MRCP, to Edith Diana Foster.

WESTALL—DOBBYN.—On Nov. 4, at Thaxted, Peter Rapkin Westall, MB, to Mary Margaret Dobbyn.

DEATHS

HALLS DALLY.—On Nov. 4, in London, John Frederick Halls Dally, MA, MD CAMB., MRCP

HEPWORTH.—On Nov. 5, at Saffron Walden, F. Arthur Hepworth, OBE, MB CAMB., FRCS.

HINE.—On Oct. 30, at Newark, Hugh Fitz-Neville Hine, MB LOND., FRCS, aged 69.

MACDONALD.—On Nov. 3, at Haslemere, Greville Matheson MacDonald, MD. LOND.

MACFIE.—On Oct. 31, Ronald Bute Macfie, OBE, MB EDIN., FRCSE, of Baron's Keep, London, W14.

MOORE.—On Nov. 3, Edmund Hugh Moore, DSO, MB ABERD., of Harley Street, W1, and Hampstead.

Notes and News

HEALTH OF THE NATION

IN the course of a broadcast on Oct. 31 Sir Wilson Jameson, chief medical officer of the Ministry of Health, said:

"It's probably true ... that there are more of the lesser ailments about than there were before the war. We just don't know precisely because there's no method of assessing the day-to-day health of over 40 million people. ... We ought to know more about the prevalence of these minor ailments—after all they're not so minor to the people who suffer from them. So the Ministry of Health is trying, by means of various inquiries, to fill in some of the blank spaces in our picture of the nation's health. We've learned, for instance, that in the spring some 69% of people felt something or other the matter with them and that 32% (one out of every three people) consulted a doctor. But when we say that the general health of the country has been maintained and in some ways improved, we're comparing our latest figures of serious illness and deaths with the same sort of figures for the last years of peace. Far be it from me to suggest that the nation's health is as good as it ought to be—or *could* be. It's certainly not. But I can assure you that we *have* been most fortunate in our health record all through the war."

Mothers and children.—"The most sensitive index of a nation's general health is probably the proportion of infants dying in their first year of life. In the last war it rose steadily. During the past three years it's declined steadily and last year was the lowest ever recorded. ... The death-rates for children up to ten years of age were last year the lowest on record, as was also the proportion of mothers dying as a result of their confinements. Finally, since 1942 the birth-rate has been rising and now stands at its highest for fifteen years. As the war has gone on, the vital statistics for mothers and children have continued to improve, and in the fifth year they're the best we've ever had. This can't be just an accident. All that's been done to safeguard mothers and children must have had *some* effect. ... Surely the fact that further progress has been made even in war-time, when we might have expected to lose some ground, shows how much more we ought to be able to do when peace returns."

Diphtheria.—"What a glorious victory it would be if we could drive epidemic diphtheria from this country! We've made a start, of course, and the number of cases, and of deaths, from this foul disease has fallen steadily and is now much the lowest on record. Yet last year there were 1370 deaths from diphtheria in England and Wales. Let me say bluntly—this is just about 1370 too many. Out of every 30 children who died, only 1 had had protective treatment; 29 had not. I wonder if it's realised that almost as many children died last year from diphtheria as were killed by bombs—yes, and by flying bombs too—during the whole of 1943 and the first nine months of 1944. And yet diphtheria's a disease we can do so much, so easily, to prevent. If the great majority of the children under fifteen were immunised—instead of just over half at present—and if every baby was protected at about the age of one year, diphtheria would cease to be a national public health problem."

Tuberculosis.—"Last year the total number of deaths from all forms of tuberculosis was almost exactly the same as in 1938, the last year of peace and the best year for tuberculosis we've ever had. And this is important, too—the death-rate among women and girls, where an increase often shows itself first, was the lowest on record. The number of deaths, however, isn't the whole story. Unfortunately, there's been an increase in the number of new cases notified and it's no good pretending this doesn't cause us some anxiety. Tuberculosis can be prevented mainly by improving conditions of living and of working and by providing the right foods in the right amounts—especially safe milk. It's not easy to make real progress on these lines during war-time, but we must do all we can. We've made a good start with our scheme for speeding up the detection of tuberculosis of the lungs by means of the new type of X-ray apparatus. ... At the moment, our most serious problem is the shortage of nursing and domestic staff in our sanatoria."

VD.—"There's still an increase in venereal diseases. Syphilis, which we can measure most readily, showed an increase last year of 139% over 1939—though the increase over 1942 was only 7%. A great change, however, has come over the situation in the last two years. No longer are we shutting

our eyes to this social plague, no longer do we refuse to discuss it, no longer are we withholding from young people information about its dangers. The old attitude of secrecy and hush-hush has not been entirely overcome, but it's suffered a resounding defeat. It's been possible to launch a programme of public education through the BBC, the press, films, posters and leaflets. We've evidence that this educational programme has been welcomed by the vast majority of the public and we intend to continue it."

HOSPITAL MAPS

King Edward's Hospital Fund for London have made new maps showing the location of hospitals, one covering the Metropolitan Police District (7*s.* 6*d.*) and a pair covering the home counties (10*s.*). The hospitals are marked in colour (voluntary red, municipal blue) on an Ordnance Survey background, which shows all roads, railways and stations. The scale is 1 in. to the mile for the map of the metropolitan area and ½ in. to the mile for the home counties map. Booklets supplied with the maps give the addresses and bed complements of every hospital marked.

The Fund are offering a limited number of copies to doctors, and applications may be sent to the secretary of the fund, 10, Old Jewry, EC2.

A TRICKSTER

IN the past three years many doctors and dentists have been victimised by a man who poses as a patient and offers to place money for them on a greyhound or racehorse, of which he has inside information. He is 40–45, with brown hair brushed back; his height is about 5 ft. 7 in., and he wears dark clothes. Names he has given include Greenwood, Turner, Hill, Phillips, Green, Mills, Day and Maxwell. Sometimes he wears a truss and asks advice about an operation for hernia; sometimes he wishes the doctor to call on his rheumatic wife; and sometimes he wants his teeth scaled before undergoing tonsillectomy. During the interview he says that he is a publican or a member of a bookmaking or racing syndicate, and mentions that he has lately won a lot of money. Finally he offers to let the doctor share in his next bet and departs with any money given for this purpose. He does not return.

It is suggested that any practitioner identifying this man should immediately telephone to the local police, who will arrange for an arrest just after the "patient" leaves the house.

Royal College of Surgeons of England

In the recent primary fellowship examination the following were successful:

W. P. Cleland, T. H. Cullen, J. S. Davidson, E. W. Grahame, J. D. Green, J. W. P. Gummer, J. D. Hallissy, H. O. Jones, P. F. Milling, M. R. Milne, M. R. Rifaat, J. M. Sanderson, D. W. Thomas, Jean K. M. C. Wilson, and W. K. Yeates.

Royal Society of Tropical Medicine and Hygiene

On Thursday, Nov. 16, at 3 PM, at 26, Portland Place, London, W1, Dr. A. R. D. Adams will open a discussion on amœbiasis. Lieut.-Colonel W. H. Hargreaves will also speak.

British Institute of Radiology

On Thursday, Nov. 16, at 8 PM, at 32, Welbeck Street, London, W1, Mr. J. R. Clarkson, PH D, Mr. J. W. Boag, Mrs. Barbara Holmes, PH D, and Dr. Frank Ellis will speak on physical, biochemical and therapeutic aspects of volume dose. There will be a meeting of medical members the following day at 5 PM.

Association of Industrial Medical Officers

A meeting of the Scottish group of the association will be held on Wednesday, Nov. 22, at 3 PM, in the institute of hygiene of the University of Glasgow, when Prof. T. Ferguson will speak on the re-settlement of disabled persons in industry.

Royal Society of Medicine

On Tuesday, Nov. 14, at 5 PM, at the section of experimental medicine and therapeutics, Dr. E. N. Allott will deliver a presidential address on blood electrolytes. There will be a clinical meeting of the section of dermatology on Nov. 16 at 5 PM. On Nov. 17, at 5 PM, at the section of obstetrics Dr. Bernard Sandler will speak on radiotherapy for carcinoma of the cervix. On the same day, at 7.30 PM, at the section of radiology Sir Ernest Carling, Mr. G. F. Stebbing and Dr. J. R. Nuthall will open a discussion on postwar organisation for cancer treatment.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

London Association for Hospital Services

The maintenance refund-rate of this association is to be increased from £6 a week to £6 6*s.* for subscribers admitted to hospitals after the end of October.

Research Board for the Correlation of Medical Science and Physical Education

The second annual general meeting of the board will be held at 21, Albemarle Street, London, W1, on Wednesday, Nov. 15, at 3 PM. Brigadier F. D. Howitt, FRCP, will be in the chair and the speakers will include Sir Alfred Webb-Johnson, PRCS, Mr. H. U. Willink, MP, and Brigadier F. A. E. Crew, FRS.

US Nurses' Tribute to Florence Nightingale

Ninety years ago, in October, 1854, Florence Nightingale sailed for Scutari, and on Nov. 4 American Army nursing and medical officers, accompanied by British colleagues, made a pilgrimage to her grave, at East Wellow, Romsey, and later visited Embley Park, her old home.

London Hospital

The subject chosen for the Hutchinson prize essay for 1947 is the value of local chemotherapy in the treatment of wounds. The value of the prize is £60 and all students within ten years of their registration as students at the hospital are eligible to compete. Further particulars may be had from the secretary of the medical college.

US Blood Flown to Paris

It was announced in Washington on Oct. 24 that 1¾ tons (3500 lb.) of whole blood is flown daily from the United States to France. After the C54 cargo transports are unloaded in Paris, the blood packages are sent to the front by air or by lorry.

Royal Society of Arts

At a meeting to be held at the house of the society, John Adam Street, London, WC2, on Wednesday, Nov. 29, Brigadier L. E. H. Whitby will speak on the Army Blood Transfusion Service. Three Cantor lectures are to be given on milk: on Monday, Nov. 20, Prof. E. Capstick speaks on dairy education and technological training; on Nov. 27, Mr. S. J. Folley, D SC, on the hormonal control of lactation; and on Dec. 4, Mr. S. K. Kon, D SC, on milk in relation to human nutrition. All these meetings will be at 1.45 PM.

Dietary at LCC Hospitals

The hospitals committee of the London County Council reports that under existing rationing arrangements it has been difficult to provide, from the prescribed dietary scales, adequate and sufficiently varied and interesting diets for patients and staff at the Council's hospitals. Accordingly the committee has suspended these scales and has given medical superintendents and officers concerned a free hand in preparing "as full, varied and comprehensive dietaries as possible from the available supplies of food commodities."

Sir ERNEST GRAHAM-LITTLE, MP, has been elected chairman of the council for external students of London University for 1944–45.

A MOTION was tabled in the House of Commons on Nov. 3 requesting the Government "to appoint a committee to inquire publicly into the provision made by Government departments, local authorities and charities for children deprived of a normal home life and to make recommendations." The motion is backed by 158 MPs of all parties.

MEDICAL EXAMINATION ON DEMOBILISATION.—The First Lord of the Admiralty, the Secretary of State for War and the Secretary of State for Air state that arrangements will be made for the medical and dental examination of Service men and women on demobilisation.

TUBERCULOSIS IN ULSTER.—The Northern Ireland ministry of health is taking over the military hospital at the Industrial School, Balmoral, and in Musgrave Park, Belfast, as an emergency hospital for 1000 tuberculous and general cases. It is hoped that when this hospital is in action there will be a bed for every tuberculous patient suitable and anxious for sanatorium treatment.

Appointments

MOORE, R. G. W., MB: RSO at King Edward Memorial Hospital, Ealing.

SPENCE, A. G., MRCS: asst. pathologist at the West Middlesex County Hospital, Isleworth.

LUNG ABSCESS *

PATHOLOGY AND DIAGNOSIS OF CERTAIN TYPES

N. R. BARRETT, M CHIR CAMB., F R C S
SURGEON TO OUTPATIENTS AT ST. THOMAS'S HOSPITAL, LONDON; SURGEON TO THE THORACIC SURGICAL UNIT AT A WAR HOSPITAL

LUNG abscess is a term whose meaning has changed as knowledge has advanced. At one time it was used to denote a specific lesion; but now it is used to describe any collection of pus in the lung, and so refers to a variety of conditions whose ætiology, pathology and response to treatment is different. This fact is not always understood, and in consequence many conflicting statements have been made.

There are other causes for confusion. Our vocabulary of pulmonary inflammations is not adequate and experiment has not clarified the position as much as might have been expected; I need only mention the work done by Cutler (1926) and Allen (1928), to settle the question as to whether lung abscess arises as a result of vascular or bronchial embolism, to remind you that both theories were shown to be correct—in the case of animals. These experiments did little to settle the cause of any particular type of lung abscess in man, and we are still uncertain on this point.

I propose here to describe certain varieties of acute lung abscess which are sufficiently true to type to warrant separate consideration. No classification yet suggested is entirely satisfactory, and I shall limit myself to an account of a few pieces of this jigsaw puzzle.

Solitary Putrid Lung Abscess

This type provides a basis for comparison. It is the abscess with which, as surgeons, we are most familiar, and our knowledge dates from the time of Hippocrates who attributed it to the aspiration of foreign substances into the bronchial tree.

In more recent times the ætiology and the pathology have been discussed by Neuhof and Wessler (1932) and Neuhof and Touroff (1936, 1940, 1942), and the opinions they express are those most generally accepted today (Joannides 1928, Barrett 1938). Putrid abscess is caused by the inhalation of infected matter into the terminal bronchioles of a bronchopulmonary segment, and the abscess is caused by certain definite anaerobic organisms in the bronchial embolus.

Foreign bodies such as blood-clot, viscid mucus, and small fragments of infected tartar from the teeth, can get into the bronchial tree and produce bronchial embolism only if the natural defences of the lungs have been overcome. Negus (1932–1937) states that these defences are four in number.

1. *Protective closure of the larynx* is effective against relatively large foreign bodies, but it is made ineffective by anæsthesia, and by the use of intratracheal tubes and such appliances as a Davis gag.
2. *Cough.*—It has been shown repeatedly that when the cough reflex is abolished—e.g., in sleep, general anæsthesia, or local anæsthesia of the larynx—foreign bodies can enter the bronchial tree (Myerson 1924, Hara 1930). Even if the cough reflex is present, it does not afford perfect safety against bronchial embolism, and for this there are two reasons. Cough is evoked as a result of reflexes from the mucosa, and the sensitivity of this membrane to the presence of a foreign body is short-lived; so unless it is immediately extruded "a solid body or a clot may lie in a bronchus for an indefinite period without inciting cough after the first paroxysm has passed." Secondly the bronchi contract actively with each cough and firmly grasp any object which has descended as far as its size will allow.
3. *Mucus* is bacteriostatic, and plays an important rôle in preventing infection of the air-passages by the organisms which are constantly being inhaled.
4. The *cilia*, working in conjunction with the mucus, provide a mechanism for protecting the smaller bronchioles, and it is these which are primarily concerned in the development of putrid lung abscess. Negus has compared the combined action of cilia and mucus to a moving stair-case; the cilia are represented by the rollers and the layer of mucus by the stairs on the rollers. Anything which interferes with the one renders the other inefficient.

   Normal ciliary action is also disturbed by many other factors such as the presence of weak acid in the bronchial tree, alterations in the pH of the tissue fluids, the vapour of many anæsthetic agents, and a break in the continuity of the ciliated membrane. Such a break interferes with the expulsion of a foreign body because the carpet of mucus, in which it is being carried, piles up at this point. Interruptions in the continuity of the ciliated epithelium may be due to established pathological processes involving metaplasia or ulceration, or, as Hill (1928) has shown, to the destructive action of liquid chloroform or ether upon the epithelium.

It is apparent that conditions favourable to bronchial embolism exist whenever a patient is given a general anæsthetic, but Lemon (1926) has emphasised that failure to expel aspirated material is more significant than the fact of its aspiration. Considerable quantities of blood can be harboured in the bronchial tree after hæmoptysis without causing permanent damage, and thick pus can accumulate in cases of bronchiectasis without abscess formation; so it is suggested that, for a putrid abscess to develop, anaerobic organisms must be present as well as bronchial obstruction.

The anaerobes concerned are probably Vincent's fusiform bacillus, spirochætes, *B. melaninogenicum*, vibriones and streptococci. These at least have been found necessary in experimental studies, and we should note their remarkable similarity to those found in diseased teeth.

Although the evidence in favour of bronchial aspiration as the cause of putrid lung abscess is convincing, we must remember that the lesion can also be produced experimentally by vascular embolism.

COURSE OF ILLNESS

Once infected material has become impacted in the terminal radicles of the bronchial tree, there is a latent period before the disease is manifest. This time of incubation varies from 1 to 6 weeks or more, but is commonly 10–14 days. It is difficult to explain and its existence has often been quoted as evidence in favour of vascular embolism as the cause of putrid abscess because about this time blood-clots are often dislodged from vessels in the vicinity of operation fields.

The lesion which eventuates in the lung is one of acute infective gangrene. At first it involves a part of one bronchopulmonary segment; in this limited area the bronchioles and their accompanying blood-vessels are destroyed and the intervening tissues are liquefied. The inflammation fans out towards the surface of the lobe and the pleura is soon involved, thus producing adhesions over the abscess which prevent its rupture into the pleural space. By about the 10th day a solitary cavity has formed, with an average diameter of 2 inches. *This cavity is peculiar in that it contains impacted sloughs of lung*, as well as foul pus, debris and organisms; its walls are granulation tissue forming a line of demarcation exactly like that seen in gangrene of the extremities. Beyond the cavity the whole of the bronchopulmonary segment concerned is in a state of acute vascular engorgement and œdema. Considering the peripheral site of the early inflammation, and the speed with which this advances to cavitation, it is surprising that a thin shelf of viable lung tissue is generally found at operation between the cavity and the pleural surface. Without this slender barrier most of these abscesses would probably perforate into the pleura at an early stage, and its presence is presumably to be explained by the existence of a subpleural plexus of blood-vessels (Miller 1937), which is not connected solely with the peribronchial vessels and suffices to maintain the circulation in this piece of tissue.

Death is unusual in the first fortnight of the illness, but it occurs if the gangrenous process is not localised within a line of demarcation. As a rule subsequent events are governed by the establishment, or not, of bronchial channels adequate to drain away the sloughs and other cavity contents. In a third of all cases such

* Abridged from a paper read before the Society of Thoracic Surgeons of Great Britain and Ireland on Feb. 10, 1944.

drainage takes place spontaneously; the necrotic material is coughed up and the patient is rapidly restored to complete health. Indeed bronchograms, made later on, show surprisingly little permanent deformity of the area.

Unfortunately the majority of putrid lung abscesses establish bronchial connexions which are insufficient for the evacuation of the more solid contents of the cavity; and although the fulminating anaerobic infection dies down the stage is set for progressive pulmonary suppuration caused by other pyogenic organisms. Its symptoms may at first be mild in comparison with those of the acute gangrenous phase, and the clinician may be tempted to assume that good progress towards resolution is being made. This assumption, however, is not only wrong but dangerous, because pulmonary suppuration arising from an imperfectly drained putrid abscess progresses slowly but surely to a fatal termination if left to its own devices. Reliable statistics have shown three facts which are relevant: (1) It is impossible to predict which acute abscesses will resolve spontaneously, except by observing the lesion for a short period; (2) the majority of spontaneous cures occur within 3 months of the onset of symptoms; and (3) the mortality of treatment of any kind increases as time passes.

Neuhof and Touroff define three stages of pathological progress in this unsatisfactory group of cases: the acute or gangrenous stage, they believe, lasts up to 6 weeks; the subacute, during which partial drainage into the bronchi is established, occupies about 3 months; and the chronic persists indefinitely. Their object in presenting this time sequence is to stress the rapidity of the forward march of events and to emphasise the necessity for obtaining complete early resolution. The disadvantage of regarding putrid abscess in this light is that it denies the possibility of resolution after the first 3 or 4 months of illness. Realising that a cure can still take place under these circumstances of delay, Shaw (1942) and others have argued that these time-limits have little clinical value; they prefer to regard putrid abscess as "localised" or "complicated," the former capable of resolution and the latter not. The difficulty of making such a clinical distinction is obvious, and in truth we are left only with one guiding thought—namely, that time is not on the side of the patient.

I would add certain observations to this brief description of putrid abscess.

Maxwell (1934) states that all who have examined large series of cases have come to the conclusion that pulmonary abscess is commonest in the lower lobes of the lung. This is true if all types of acute abscess are considered together, but the facts are different in reference to putrid abscess. Brock (1936) points out that, in the majority of cases of putrid abscess, the sites of election are the axillary and the posterior subapical segments of the upper lobes, and in the minority of cases the apical segment of the lower lobe. Brock, Hodgkiss and Jones (1942) have explained this distribution by showing that minute amounts of iodised oil introduced into the trachea of a patient lying flat in bed gravitate naturally into these very segments, and they submit that this is strong evidence that putrid abscess is caused by inhalation of foreign matter. It also accounts for the right lung being more often involved than the left.

Many surgeons have postulated that it is profitable to consider certain varieties of putrid abscess individually. I shall mention three of these.

Neuhof and his colleagues describe a *hyperacute type*, characterised by a short history, profound toxæmia and the tendency to spread locally and remotely with alarming speed. These, he says, must be segregated because conservative measures lead to death, whilst surgical drainage offers a good prospect of cure.

A second type *follows operations upon the tonsils*, and for reasons which have never been explained, is much more common in the United States than in this country. The majority are situated in the upper lobes of the lung; a high proportion resolve spontaneously, and the others can usually be cured by surgical drainage.

Abscesses which occur as complications of abdominal operations (Brock 1936, Battle 1936) are of very bad prognosis, and generally terminal.

In this last type the mortality is at least 60% and in my opinion surgical drainage generally aggravates the condition. Although they are commonly of the putrid type and arise in the manner already described, it is clear that some are the result of suppurating post-operative atelectasis, whilst others are due to vascular emboli carried to the lungs, by way of the portal circulation, from septic foci at the operation site. The latter group tend to be multiple, scattered throughout the lungs, and to contain the same organisms as the original lesion. It used to be said that such abscesses arose in pulmonary infarcts which had become infected; but infarcts occur peripherally in the lungs, produce characteristic signs and symptoms such as pleural pain and staining of the sputum, and seldom if ever suppurate.

Whatever may be the cause of the abscesses that follow abdominal operations they are generally seen in the lower lobes, and, although they are often multiple at first, there is a tendency for adjacent cavities to coalesce. The sputum is foul, generally bloodstained, and there is gross toxæmia and wasting. The pulmonary cavities tend to enlarge rapidly towards the pleural aspect of the lung, and one or more is apt to perforate producing a foul empyema. Limiting adhesions are but poorly formed, and the abscess, which has perforated into the pleura, usually communicates with this space by a widely open fistula. This fact explains the well-known risk of draining such an empyema under general anæsthesia, for under these conditions it is highly probable that the patient will drown in his own pus as soon as the pleural cavity is opened.

DIAGNOSIS

The diagnosis of putrid abscess (Ranson 1939) in general depends chiefly on an accurate history.

The onset is sudden; it has the features of an attack of influenza with pleural pain. The pain is due to the inflammation starting at the periphery of the lung, and its exact site is important surgically because it indicates where adhesions may ultimately be expected.

Within a few days the picture is more like that of lobar pneumonia; indeed this diagnosis is commonly entertained, and it explains the erroneous statement that putrid abscess follows pneumonia. During the first 7–10 days there is little cough or sputum, because the lesion has not yet excavated; but about this time the patient may notice a bad taste in the mouth and perhaps a little bloodstained expectoration. Then, suddenly, the sputum becomes purulent, abundant, and grossly offensive, and the patient often describes the change by saying that "it feels as though something has given way in the lung."

The question of whether the sputum is foul or not needs amplification because this is an important point in diagnosis. If the patient is simply asked "was the sputum foul?" the answer will probably be "yes" in many cases in which in fact it was not, because to a normal person the sudden development of purulent expectoration may seem a foul event. The information we require is more specific and the question must be posed in such a way that "foul," "offensive" and "odourless or tasteless" sputum are differentiated.

The first X-ray photographs are generally taken at about the end of the second week of the illness and may show a cavity, containing a fluid level, in an area of consolidation. Such a cavity can only be seen in half of the cases, and its absence does not negative the diagnosis.

Besides solitary putrid abscess I know of only two other varieties of lung abscess in which sloughs of tissue are impacted in the cavity during the acute phases of the disease, and in neither of these are anaerobic organisms concerned. Both are rare in this country. The first is "*aputrid pulmonary necrosis*" described by Kaufmann (1904) and again by Kessel (1930). The second is an *infected and impacted pulmonary hydatid cyst* (Dew 1928, Barrett and Thomas 1944).

Aerobic Lung Abscess

This term was devised by the Americans to describe a group of cases in which the clinical course was substantially different from that of acute putrid abscess (Neuhoff and Touroff 1941). It includes most of those cases formerly styled primary, cryptic, or atypical.

The essential difference was at first said to be that anaerobic organisms were not in evidence at any stage of the inflammation; but this is by no means the whole story.

The first pathological change in the lungs is *a diffuse bronchopneumonia of unusual type.* Small foci of consolidation appear over a wide area, in contrast with the early segmental distribution of putrid abscess. As time passes some of the consolidated areas resolve, some become organised and may be replaced by fibrous tissue, and some suppurate and progress to abscess formation. It is known that lungs damaged by previous disease are more prone to this type of inflammation than are normal tissues, but otherwise there is no special site of election. The foci of pneumonia may be bilateral and may spread slowly from one part of the lung to another, so that healing and progress are present together, but there is a general tendency for the lesions to remain in a state of non-resolution.

The abscesses produced in this way are at first small and scattered; the majority discharge their quota of pus into the bronchial tree and heal spontaneously, but in some cases the lesion is more circumscribed, the peribronchial collections of pus coalesce, and large abscess cavities can be formed. These are generally loculated and of more irregular shape than are putrid abscesses; but clinically it may not be possible to differentiate the two. After a cavity large enough to be diagnosable clinically has formed, the changes which can occur in the lung and the pleural cavity are similar to those which complicate anaerobic abscess, but the position is modified by one important difference. With an aerobic abscess bronchial drainage is not hindered by sloughs and debris retained in the cavity, and spontaneous resolution is therefore more likely.

The cause of aerobic abscess is not known, but the organisms found in the sputum and in the lung cavities are not anaerobes. It is assumed that neither previous surgical operations nor bronchial embolism play a significant part in the ætiology.

The onset of symptoms is often rather insidious, with lassitude, dyspnœa on exertion, an unproductive cough and pyrexia as the first abnormalities. The physical signs and the early X-ray findings are typical of bronchopneumonia, but the unusual course of events may suggest a diagnosis of pulmonary tuberculosis or of neoplasm.

Once an abscess has been diagnosed, the fact that the sputum is not foul is regarded by many as the most significant difference between this and putrid abscess. The presence of foul sputum strongly favours the latter, but its absence is of less diagnostic importance, because a putrid abscess may be so well shut off from the bronchial tree that the patient may not even discern the characteristic odour in the breath. In doubtful cases Neuhof advises bronchoscopy, for under these conditions the diagnosis is generally obvious when the patient coughs. The course of the disease is rather protracted and several weeks may elapse before a definite abscess has formed. During this time the patient may be very ill and may perhaps die, but the outlook is better than it is with putrid abscess and time does not seem to militate against recovery in the same way.

Diagnosis rests upon details of the early history of the illness, and if possible upon serial X ray films. The other significant points are the bronchopneumonic onset, the protracted course, and the absence of offensive sputum.

It will be apparent that the formation of an abscess is merely an incident in the course of a peculiar type of bronchopneumonia, and, as such, its presence is relatively unimportant. It follows that surgical measures, such as drainage of an abscess, are not likely to produce the same dramatic amelioration of symptoms as may be expected with putrid abscess.

I submit that "aerobic lung abscess" is the same condition as that described in this country by Scadding (1933, 1939) as *chronic suppurative pneumonia with abscess formation.* His account and that of Neuhof agree in all important particulars; they differ only in that Neuhof describes a lesion which is more acute in onset and progress. Scadding believes that most "atypical" abscesses come within this definition, and that in the past they have been confuse abscess because, by the time the pati autopsy, the cavity in the lung dominat and the surrounding areas of bronchop regarded as secondary.

Staphylococcal Abscess

It is only recently that surgeons have turned their attention to this important group of cases. The reasons for considering them separately from aerobic lung abscess are that the lesions are often blood-borne, or at least associated with a septicæmia, that the perfection of substances such as penicillin may affect the treatment, and that surgical drainage is seldom if ever necessary.

Hughes (1938) states that, next to skin, the parenchyma of the lung is more vulnerable to the *Staphylococcus aureus* than any other tissue in the body. In contrast with this Lemon (1926) believes that the bronchial tree is strongly protected against this organism, and that it only becomes susceptible if previously damaged by other factors. These observations are supported by experimental and clinical studies.

TWO VARIETIES

A staphylococcal abscess may develop in the lung either as a complication of staphylococcal pneumonia, or as part of pyæmia or septicæmia.

1. *Staphylococcal pneumonia* is now recognised as a clinical entity, and is clearly described by Heffron (1939). It occurs after surgical operations, during debilitating illnesses, and most often as a complication of influenza. Most of the large series of cases, such as those quoted by Chickering and Park (1919), Finland et al. (1942), Macgregor (1936), have been seen during influenza epidemics and it is generally assumed that preliminary invaders prepare the way for the staphylococcus to enter the bronchial tree.

The onset of symptoms is insidious, without chills but with high fever and sweats. The signs are of bronchopneumonia and the clinical state resembles septicæmia. There is cyanosis and the fever is of the remittent type so characteristic of staphylococcal infections in general. The sputum is odourless, but thick, purulent and often pinkish or like anchovy sauce; upon culture it yields a growth of coagulase-positive *Staph. aureus*, or at least a preponderance of this organism. If the patient survives the acute phase—and the mortality is said to be above 60%—abscesses form in relation to the bronchi and tend to become confluent. The development of a definite cavity is generally delayed, but Reimann (1933) reports one case in which a large abscess was present by the fifth day of illness. The more usual course is for multiple small cavities to develop throughout the affected area and for these to resolve as the pneumonia recedes.

Post-mortem specimens (Wollenman and Finland 1943) show diffuse bronchitis, zones of hæmorrhage, œdema, massive alveolar exudate and usually multiple cavities. It appears that the cavities are secondary to the bronchial inflammation. Suppuration in the mediastinal lymph-glands is as rare a complication of this condition as it is in all other forms of lung sepsis.

2. *Pyæmic and septicæmic staphylococcal lung abscess* offers a somewhat different problem, because the abscess is only part of a general infection. Cases may present in one of three ways. Lung complications may arise during the active phase of lesions such as acute osteomyelitis, or after the primary focus has resolved, or during the course of a staphylococcal pyæmia or septicæmia of unknown cause.

At first sight it might seem that the prognosis is well-nigh hopeless, but there is always a tendency for staphylococcal infections to become localised, and to heal rapidly if the pus can be discharged.

The pulmonary abscesses may be single or multiple, and I believe that the work of Cutler and Schlueter (1926), done to prove that lung abscesses of all types could be produced by vascular embolism, throws some light on this subject. They found that organisms introduced into the femoral vein caused multiple abscesses, whereas if the same organisms were first inserted into a small capsule, made from a piece of a vein, and if this capsule, so charged, was then put into

n, a solitary abscess appeared in the lungs. n is that if organisms reach the lungs as a mbolus, as opposed to a septicæmia, the lmonary inflammation will be localised tissues have had a better chance to organise

A number of papers have lately been published about this type of lung abscess, and these show that staphylococcal septicæmia is commoner than has perhaps been realised. Butler and Perry (1940) investigated the 53 cases dead of septicæmia in the London Hospital between 1935 and 1940 and found that no less than 41 were due to this organism. Butler also analysed 92 fatal cases of acute osteomyelitis, 72 of which had abscesses in the lungs. I have myself seen 6 cases during the last twelve months.

PLEURAL COMPLICATIONS

In both varieties of staphylococcal lung abscess there are pleural complications of great interest and importance. Small cavities situated upon the surface of the lung are apt to perforate into the pleural space and produce spontaneous pneumothorax, tension pneumothorax and empyema. Butler and Perry (1940), Macgregor (1936), Collis and Foster-Carter (1940), and Gairdner (1944) have all recorded instances of these complications. They note the following points:

1. As the abscess which perforates is often small, the pleural cavity is not suddenly flooded with a mass of purulent material. Hence the development of an exudate and empyema is delayed, and the reaction of the pleura is formative rather than exudative. In some cases the empyema can be controlled and cured by repeated aspiration.
2. Spontaneous pneumothorax and tension pneumothorax are more common immediate complications than empyema, and cases have been recorded in which operation has been performed to remove a supposed infected pulmonary cyst whereas in reality the lesion was a localised staphylococcal pneumothorax.
3. The commonest cause of spontaneous pneumothorax in infants is staphylococcal pneumonia with abscess formation in the periphery of the lung.

DIAGNOSIS

The diagnosis of staphylococcal pulmonary abscess depends chiefly upon demonstrating the organism in pure culture in the blood, or in practically pure culture in the sputum, the abscess cavity, or the pleural fluid. In the sputum the organism is generally contaminated, but even in this fluid a pure culture may sometimes be found.

The X-ray appearances of the lesions in the chest are so characteristic that many consider them pathognomonic. The opacities are widespread and dense, with rather indefinite outlines; they are often disposed throughout the lungs and their size and extent immediately suggest a hopeless prospect. But experience has shown that rapid resolution can take place, however threatening the X-ray findings may appear, and proof that the lesion is due to the staphylococcus is a point in the patient's favour. Large cavities are often seen and these have characteristic features. They are generally empty, or at best partly filled with fluid, and this should arouse suspicion because a putrid abscess, which has drained into the bronchus so well as to be empty, is not likely to cause such extensive suppuration. The cavities are undoubtedly due in some degree to inflation, for bronchograms made after recovery show little if any permanent lung damage. During the period of resolution the cavities may persist for a long time as "ring shadows" and can be mistaken for cysts.

There is little doubt that in all forms of staphylococcal inflammation in the lungs conservative measures are indicated, and once the diagnosis has been established abscesses of this type should seldom if ever be drained.

Bronchial Abscess

This term, suggested by Negus (1933, 1935), is useful provided the exact condition to which he refers be clearly understood. Negus uses it to describe the lesion which arises acutely as a result of bronchial occlusion by a relatively large foreign body such as a tooth. Such a body, having passed the larynx, may during inspiration be sucked into a bronchus and held there in spite of cough. In these circumstances atelectasis occurs in the affected segment and the bronchi peripheral to the block are at first reduced in calibre. Within a short time mucus and inflammatory fluid collect within these bronchi and infection produces a purulent exudate. It is this intrabronchial collection of pus which is called a "bronchial abscess." If the foreign body be removed by bronchoscopy the whole process settles down and the tissues return to normal. The points which require stress are:

1. The term defines a collection of pus in an acutely obstructed bronchus.
2. The ciliated epithelium of that bronchus is not irrevocably destroyed, so restitution to normal can take place.
3. There is no abscess cavity involving the parenchyma of the lung and no collection of pus outside the bronchial tree.
4. The X-ray appearances are of atelectasis and the foreign body may or may not be apparent.
5. If the foreign body is not removed early the condition progresses to bronchiectasis and pulmonary suppuration, and the result of this may be a "bronchiectatic abscess."
6. An important difference between a bronchial abscess and a bronchiectatic abscess is that the latter is lined either by granulation tissue or by squamous or columnar epithelium, and this favours stagnation of pus even if the obstruction is no longer present.
7. The term "bronchial abscess" does *not* refer to the lesion produced by the inhalation of vegetable material into the bronchial tree. In the older textbooks this accident was described as resulting in "arachidic bronchitis" because the fulminating bronchitis which develops was attributed to arachidic acid liberated by disintegration of a peanut. It is now known that many vegetable substances such as ginger, fruit seeds, and pieces of carrot, produce the same result by liberation of certain proteins, and the bronchitis is variously regarded as of chemical or allergic origin. The reason for separating this group of cases from bronchial abscess is that, unless the foreign body is immediately removed, the patient dies of generalised bronchitis (which may extend as far as the larynx) and not of bronchial obstruction.

Suppurating Hæmatoma of the Lung

This is the most ill-defined of the conditions here described, for there is no agreement as to what constitutes a pulmonary hæmatoma. This must be obvious to all who have studied the published accounts of war casualties, for some writers state that the lesion is common whilst others do not even mention it. In an experience of over 400 chest injuries of all types the diagnosis has been made on less than 10 occasions at a war hospital, and only 2 of these hæmatomas suppurated. The fact is that whenever the lung is injured, either directly or indirectly, there must be some extravasation of blood, but in the great majority of the cases this can be disregarded. For practical purposes a hæmatoma means an extravasation of such an extent that the lesion can be diagnosed radiologically, and the difficulty of such diagnosis is that similar shadows can be cast by so many other post-traumatic conditions. The presence of bloodstained sputum affords but little help in coming to a conclusion, and even the development of an abscess can often be explained in other ways. Post-mortem experience however has proved that a suppurating hæmatoma is an entity, and its pathology is as follows.

The lesion may result from crush injuries, blast injuries and penetrating wounds and the blood disrupts the interstitial tissue and lies in the alveoli and bronchi. If the patient survives the injury organisation occurs without cavity formation in most cases, and the affected area passes through a phase in which the macroscopical appearances are identical with grey hepatisation of lobar pneumonia. This superficial resemblance is fallacious; microscopy shows that the predominating cells are monocytes and not polymorphs, and for this reason terms such as "phrenico-costal pneumonia" are misnomers. If infection takes place at this stage a lung abscess forms and the diagnosis is confirmed by the presence of bloodstained purulent sputum and by radiography showing a cavity with a fluid level in it.

The available evidence suggests that the great majority of suppurating hæmatomas resolve spontaneously and that healing is complete.

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DIRECT LARYNGOSCOPY AND TRACHEAL INTUBATION

FREDA B. BANNISTER
M A OXFD, M D LPOOL, D A
MAJOR RAMC; FIRST ASST, NUFFIELD DEPT OF ANÆSTHETICS, UNIVERSITY OF OXFORD

RONALD G. MACBETH
B M OXFD, F R C S E
SURGEON TO DEPT OF OTOLARYNGOLOGY, RADCLIFFE INFIRMARY

DIRECT inspection of the larynx by means of a tubular endoscope carrying its own lighting system is a procedure which both laryngologists and anæsthetists must be able to carry out successfully; but it appears to be regarded by the inexperienced in both special fields as a difficult and mysterious technique. Because it is all too often done badly by experienced and otherwise competent anæsthetists and even laryngologists, the idea seems to have developed that luck is the chief factor in the achievement of a good view of the vocal cords. Anæsthetists who succeed in passing a tube between the vocal cords under direct vision in spite of the use of wrong mechanical principles do indeed owe something to luck, but even more to determined persistence and brute force. Difficulties are often followed by the unedifying spectacle of a trial of strength between patient and anæsthetist, with the sad result that the day after his operation the patient says that the site of the operation is reasonably comfortable but that he has a sore throat, or is husky, or that one or more teeth are chipped.

Poor teaching, both in writing and in practice, has led to much muddled thought about direct laryngoscopy; and this has actually been emphasised by some, who give a sound description of its performance but practise an indifferent technique.

This being so, we consider it worth while to emphasise that exposure of the vocal cords is essentially easy provided that sound anatomical principles are observed; and we propose to indicate simple rules. The kernel of the matter lies in the position of the patient's head and neck, relative to each other and to the trunk.

Direct examination of the larynx was shown to be a practicable routine by the Viennese school of laryngologists, but Chevalier Jackson has emphasised its basic principles. These people worked largely on conscious patients under surface anæsthesia; and while it is true that the conscious patient may rebel against instrumentation, even if his head and neck are in the correct anatomical position, he certainly is quite intolerant of attempts to view the larynx in any incorrect position. It is sometimes argued that under general anæsthesia the tongue becomes flaccid and enlarged and obstructs the laryngoscopist; but under local anæsthesia it often contracts into a firm inelastic bundle which can be equally difficult to deal with.

We believe that laryngoscopy on the conscious patient is impossible unless the anatomical position is correct, and that the same position is highly desirable for laryngoscopy under general anæsthesia.

A review of textbooks on anæsthesia reveals great variations in instructions, depending on whether the authors think extension of the neck is, or is not, desirable.

Hewitt (1922) recommends that a small sand-bag be placed beneath the shoulders and slight extension used; "this" he says "is not an absolute necessity, however, as there is no great difficulty in passing the catheter with the head flexed." Gwathmey (1925) would have the patient's head hanging down over the end of the operating table, "But if there is any difficulty in exposing the cords, *the head and neck are pulled forwards as a whole.*" (Our italics.)

Rood and Webber (1930) suggest that the patient's head be lowered, or a sand-bag inserted below the shoulders, but they continue "it is often a help if an assistant will slowly raise the head, after the tube has been inserted, when the glottis will slowly come down into view. ... *Introduction of the tube with the neck a little flexed frequently enables one to look straight into the larynx.*" (Our italics.)

Hadfield (1931) says "any pillow is now removed, or better still placed under the shoulders, so that the head is somewhat extended, but not too much so." Flagg (1939) describes extension of the head, but illustrates elevation of it—i.e., flexion of the neck—and extension about the atlanto-occipital joint. Minnitt (1940) would have the patient's neck slightly extended. Nosworthy (1935) indicates that extension of the neck is a handicap, and although he does not actually recommend flexion of the neck, he implies that he favours it, together with extension about the atlanto-occipital joint.

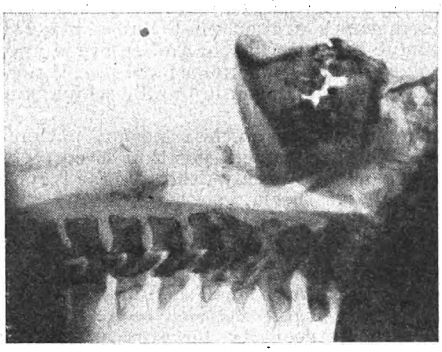
Gillespie (1941) carefully discusses and describes "position" in laryngoscopy and shows in a useful series of diagrams the amended Jackson position of the head and neck—i.e., flexion of the neck, and extension about the atlanto-occipital joint. This book is worthy of study by all would-be laryngoscopists. Macintosh and Bannister (1943) base their description on the Jackson position.

In not one book have we found an instruction to put an additional pillow under the head, or fold double that already present, though this is the simplest method of achieving the correct degree of flexion in the anæsthetising room.

THE MECHANICAL PROBLEM

We realise that diagrams may be "cooked" to illustrate and support any controversial point, but we believe that those shown here are sound in anatomical essentials. They were drawn on a basis of facts observed in the performance of laryngoscopy. The X-ray records alongside each diagram were taken *after* the diagrams had been prepared, and confirm their main essentials. For technical reasons a conscious patient was the subject of these records. It will be noted that the tonicity of the tongue was maintained, and therefore that the epiglottis, when the neck was extended, did not hang down as freely as it does in the unconscious patient.

The axis of the cavity of the mouth forms approximately a right-angle with that of the cavity of the pharynx; but in addition the general axis of the cavity of the pharynx crosses that of the larynx and trachea, as in fig. 1. The main mechanical problem is to bring these three axes into one. Fig. 2 illustrates the anatomical effect obtained by inserting a pillow beneath the occiput, thus flexing the neck. The pharyngeal and laryngeal axes are thus made to coincide. As Gillespie has pointed out, in order now to straighten out the right-angle formed by the axis of the mouth and the pharyngo-laryngeal axis, the head must be extended about the atlanto-occipital joint. (In practice, some extension is bound to occur at the joint between the 2nd and 3rd vertebræ, but this matters very little provided that the lower vertebræ do not move.) When this extension occurs, the tongue and epiglottis encroach upon the new axis and must be lifted upwards en masse to expose the vocal cords.



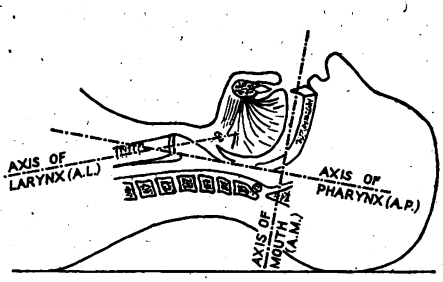


Fig. 1—Relative positions of the axes of mouth, pharynx and larynx with patient lying flat.

The laryngoscope as a whole lifts the patient's tongue and epiglottis (fig. 3); it need not take leverage off the upper teeth, though it almost inevitably touches them. As Jackson has suggested, the patient's head is suspended on the base of his tongue and epiglottis. Further, when the head and neck are in this position the epiglottis is viewed through the laryngoscope almost end-on, and is very easily passed by the blade of the instrument; indeed, the laryngoscope is often passed to the larynx without the epiglottis being seen at all, much less getting in the way.

It may be argued that fig. 3 represents the position essential for the passage of a bronchoscope, but that the anæsthetist does not need to see so much of the larynx as is now brought into view. This is so, but the requirements of bronchoscopist and anæsthetist differ only in that the former passes a rigid tube and so must have complete accuracy of exposure; while the latter probably uses a soft or semi-rigid tube, the mobility of which enables him to overcome inaccuracies of technique. The anæsthetist who adopts the bronchoscopist's position for his patient will be agreeably surprised to find how much easier his task becomes.

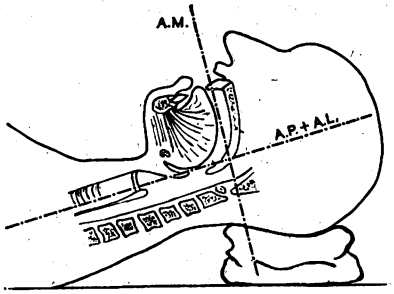


Fig. 2—Showing how axes of pharynx and larynx may be made to coincide when the head is raised. The cervical spine is also straightened out.

Fig. 4 shows the relative positions of the axes to which we have referred when the neck is extended over a sand-bag or pillow placed under the shoulders. With this position it is impossible, without first undoing the extension, to lift the tongue and epiglottis forward and make the pharyngeal and laryngeal axes coincide. Fig. 5 shows the result of introducing a laryngoscope when the neck is extended. Then, especially in an unconscious patient, the epiglottis instead of being viewed almost end-on and readily passed as in fig. 3 tends to hang down almost at a right-angle to the axis of the instrument. Not only is the larynx obscured thereby but the passage of the blade of the instrument beyond the epiglottis is quite difficult.

Care of the upper teeth.—Fig. 6 shows that when the blade of the laryngoscope has been successfully manœuvred past the epiglottis, in a patient with the neck extended, the view obtained is of the mouth of the œsophagus and the back of the larynx. To see even the posterior parts of the vocal cords the laryngoscope must be pivoted heavily on the upper teeth. We have already condemned leverage about the upper teeth, but must admit that with a patient possessing a full complement of teeth it is not easy altogether to avoid *pressure* with the blade of the laryngoscope on the upper row. This is true both for the conscious and the unconscious patient; but it is unnecessary to use these teeth as a fulcrum and the laryngoscope as a lever to elevate the tongue and epiglottis. The temptation to exert this leverage is greatest when one of the laryngoscopes having an anteverted handle is used; indeed, it is extremely difficult to use such an instrument without committing this error. We suspect that this form of handle was introduced owing to a basic misconception of the principles involved in direct laryngoscopy.

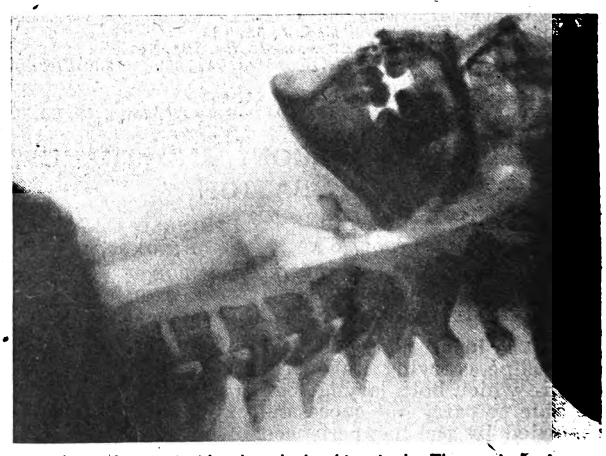
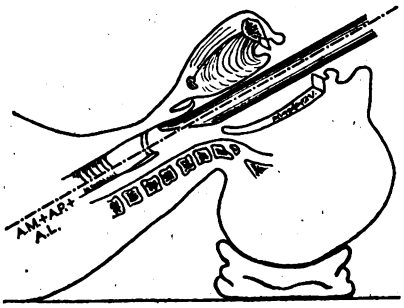


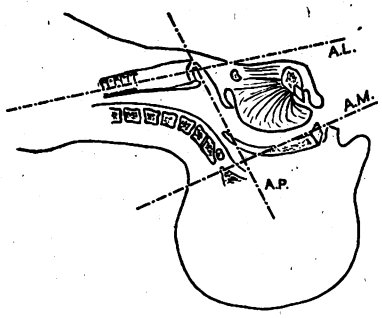
Fig. 3—Axis of the mouth is now made to coincide with the other axes by extension of the head around the atlanto-occipital and upper cervical joints.

Depth of anæsthesia.—Direct vision intubation should not be undertaken until anæsthesia is deep enough for the jaw to be relaxed and the laryngeal reflex abolished. Attempts to introduce the laryngoscope at a lighter level of anæsthesia always result in a struggle, which leads to serious risk of trauma to teeth, pharynx, larynx, or all three. Once the tube is in position this depth of anæsthesia need not be maintained and because of its brevity can scarcely be considered harmful.

Blind intubation is usually carried out via the nose, a semi-rigid curved tube being used which follows the natural curve of the nasopharynx into the buccopharynx, and so into the larynx. To accomplish this passage successfully the anæsthetist usually flexes the neck as in fig. 2, and the tube passes the epiglottis easily because the latter is lying almost parallel with the tube's course.



Laryngoscopes.—The many patterns of laryngoscope on the market testify to the difficulties encountered by anæsthetists in exposing the vocal cords. Points of advantage are naturally claimed for all varieties, and with all of them the cords can be exposed. The chief differences between the various models lie in the shape of the blade and the type of the handle. In many the beak at the end of the blade is too flat and narrow, and is thus apt to injure the soft tissues over which it should pass. In our view, the beak should be so curved and fluted that it picks up the epiglottis easily and rides harmlessly along the posterior pharyngeal wall. Further, we wish to emphasise once more that laryngoscopes with an anteverted handle are undesirable, especially in the hands of the less experienced.



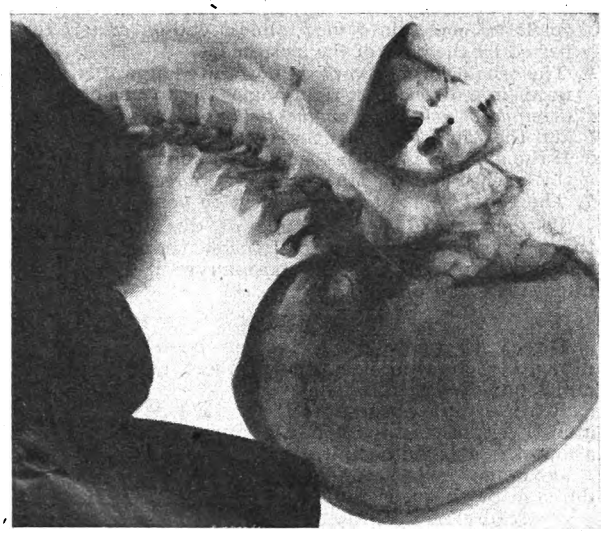


Fig. 4—Effect on the three axes of extension of the neck.

The Macintosh laryngoscope has a blade curved in length to fit the curvature of the tongue and is designed not to pass the epiglottis but to tilt it out of the way. The posterior part of the larynx can be seen with this instrument, even with the neck partially extended (as may be often noted during a tonsillectomy where the Boyle-Davis gag is used), but the best results with it are obtained when the patient's head is placed in the correct position.

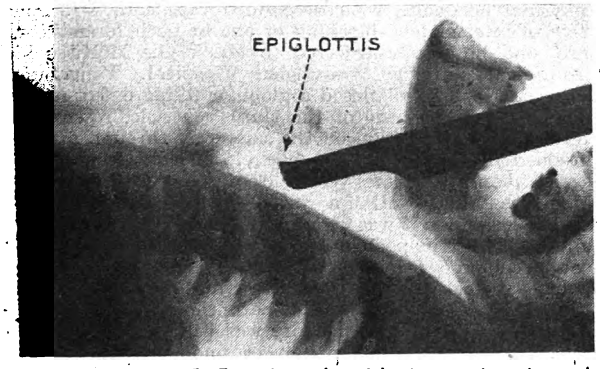
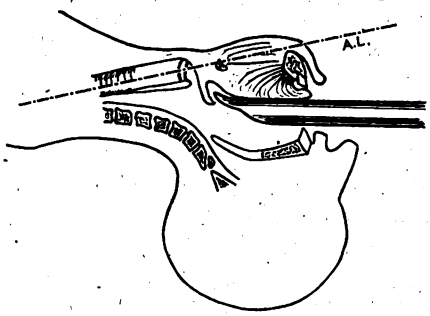


Fig. 5—Extension: the epiglottis comes into view and gets in the way of the laryngoscope.

To overcome some of the difficulties of laryngoscopy, and to eliminate what we consider to be faults in existing laryngoscopes, we have designed the instrument described on p. 660. While making no extravagant claims for it, we think that the retroverted handle minimises the temptation to exert leverage about the teeth, and the fact that the handle is not in the same plane as the blade facilitates inspection of the cords and passage of the endotracheal tube.

SUGGESTED TECHNIQUE UNDER GENERAL ANÆSTHESIA

1. The patient is deeply anæsthetised (the mobility of the jaw being used as a criterion of adequate relaxation) before any attempt is made to introduce the laryngoscope. Should it be difficult to deepen anæsthesia owing to poor air-entry, a nasopharyngeal tube may be introduced, after which the intake of vapour will be greatly improved. (Such a tube is more readily tolerated in light anæsthesia than is an oral airway, which requires almost as much relaxation of the jaw for its introduction as does the laryngoscope itself.)
2. A second pillow is now slipped under the head, or the patient's head-pillow is folded double.
3. The anæsthetic mask is lifted from the face; and the nasopharyngeal tube (if used) is removed. At the same time the chin is tilted sharply upwards, so as to extend the head about the atlanto-occipital joint.



4. The handle of the laryngoscope is held in the anæsthetist's *left* hand and the blade is inserted well to the right side of the mouth and advanced towards the midline dorsally, so that it passes the base of the tongue and along the posterior pharyngeal wall. The avoidance of the midline at the teeth shortens the distance from teeth to larynx and displaces the flaccid tongue to the left; this latter does not then obscure the lateral cleft of the laryngoscope. The upper teeth may be protected conveniently with folded strapping; and the anæsthetist may rest the first two fingers of the right hand upon the upper teeth and use his right thumb to support the blade of the instrument.

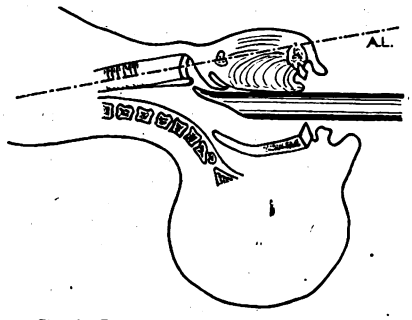


Fig. 6—Extension: the laryngoscope, after passing the epiglottis, shows the posterior part of the larynx and œsophagus.

5. As the blade of the laryngoscope is passed still further, the epiglottis comes into view almost end-on and is readily passed by the beak of the instrument.
6. The whole laryngoscope is now lifted upwards and forwards in a direction at right-angles to the axis of the blade (*leverage is not taken on the teeth, or anæsthetist's thumb*) and the whole length of the vocal cords comes into view. If the axis of approach is correct, it coincides with that of the trachea and the tracheal rings are readily seen.
7. The endotracheal tube may now be passed with ease.

The successful performance of direct laryngoscopy takes very much longer to describe than to carry out, and is essentially an easy manœuvre if simple anatomical rules are obeyed.

SUMMARY

Direct laryngoscopy has often been regarded as a difficult technique because incorrect anatomical principles have been assumed.

It is a simple manœuvre if the patient be adequately anæsthetised, the neck flexed and the head extended about the atlanto-occipital joint.

Leverage on the upper teeth, and consequent risk of damage to these, is unnecessary and is condemned.

Diagrams and X-ray photographs illustrate correct and incorrect methods.

We are indebted to Dr. F. H. Kemp for the X-ray records, to Messrs. Ilford Ltd. for making the prints from them, and to the patient who volunteered to be the subject.

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PAROXYSMAL AND POSTURAL HEADACHES FROM INTRAVENTRICULAR CYSTS AND TUMOURS

WILFRED HARRIS, MD CAMB., FRCP
PHYSICIAN, MAIDA VALE HOSPITAL FOR NERVOUS DISEASES AND ST. MARY'S HOSPITAL, LONDON

ACCOUNTS of only 49 tumours or cysts in the third ventricle had been published up to 1936; yet it is probable that these represent only a small proportion of actual cases, for I have personally met with 4. In many of the recorded instances of third and lateral ventricle cysts and tumours no physical signs have been found beyond the so-called classical triad of headache, vomiting and papilloedema, and sudden death has been common. It is therefore probable that many tumours and cysts of the third ventricle and lateral ventricle have never come to autopsy, and that their incidence is much greater than the published records indicate. As Dandy stated in 1933, "Not the least of the reasons for suspecting a tumour of the third ventricle is ... their silence."

Paroxysmal headaches, with sudden onset and perhaps equally sudden disappearance, have been recorded in most such cases, but even more characteristic is sudden relief of the pain by sudden change of posture. This has been observed by Fulton and by Stookey, and was striking in 3 of the 4 cases that I have met with. Indeed it was this sudden variation of the headaches with change of posture that enabled me to diagnose a pedunculated tumour blocking one foramen of Monro in 3 cases which showed no other physical signs than the classical triad.

Pedunculated tumours growing from the wall of a lateral ventricle may be ependymal in origin, whereas the tumours growing in the third ventricle are often colloid cysts. These cysts are paraphyseal in origin, according to McLean (1936), and grow downwards from the anterior end of the roof of the third ventricle from the paraphysis, a vestigial sense-organ. Sjövall (1909) first suggested the paraphyseal origin of these third ventricle cysts, and Bailey (1916) further elaborated this view.

These cysts are liable to block one or both of the foramina of Monro, and changes of posture are likely to shift their position slightly, so that sudden relief of the headache due to escape of fluid from the distended lateral ventricle is a characteristic sign, even in the absence of other physical signs. Tumours further back in the third ventricle are liable to cause signs of pressure on the anterior colliculi and the hypothalamus, so that ocular pareses and pupil changes and evidences of diencephalic disturbance, such as hypersomnia, obesity, polyuria and glycosuria, transient blindness and visual-field contraction from pressure on the chiasma will help in locating the tumour.

In the last 18 months I have met with two cases of colloid cysts of the third ventricle blocking one foramen of Monro, both of which were characterised by paroxysmal severe headache with sudden onset and sudden disappearance. In the first case the patient denied that change of posture influenced the headache, while in the second the relief of the pain was dramatic when the head was lowered.

CASE 1.—A man of 48, seen at the Maida Vale Hospital on Sept. 3, 1942, with a 12 months' history of attacks of vertigo, recurring weekly, associated with sagging of the legs. He also complained of paroxysmal severe headaches for a few minutes at a time, with sudden onset and sudden disappearance, and just before I first saw him he had a much longer attack of headache for several hours. His memory was much affected, but there were no pyramidal signs or ataxy. There were early choked discs, and lumbar puncture showed a pressure of 220 mm. of water in the cerebrospinal fluid. The paroxysmal headache, with its sudden variations, was suggestive of intermittent blocking of one or both foramina of Monro, and he was transferred to Mr. Wylie McKissock's neurosurgical unit at Leavesden Hospital. Ventriculography, on Nov. 18, disclosed a globular filling defect in the upper and anterior part of the third ventricle, resembling a colloid cyst. Operation on the same day through a small right-sided hypophyseal flap; a circle of right frontal lobe was excised and the lateral ventricle entered. At the foramen of Monro the bluish wall of a cyst was seen immediately, and by gentle dissection it was eventually delivered into the right lateral ventricle, the pedicle clipped and the tumour removed intact—a colloid cyst measuring 2·5 by 1·5 cm. Recovery was slow but satisfactory, and when I saw him on Jan. 13, 1944, he was quite strong and well. The optic discs would have passed for normal, but his memory was still very treacherous which made it difficult for him to undertake any work. Probably his denial that his headaches were relieved by change of posture was due to his unreliable memory.

CASE 2.—I saw a more striking case on May 4, 1943. A girl of 22, an aircraft worker, was sent to me, at St. Mary's Hospital, for severe intermittent headaches, getting worse for the past two years, and continuous for the past 3 weeks. There was papilloedema with 4D swelling. She stated that her headaches were liable to start suddenly and to disappear suddenly, and that she could sometimes stop them by throwing her head back. She was almost delirious with pain on the night of her admission, throwing her head about in the effort to get relief. On the following morning when laid on her side for lumbar puncture she at once exclaimed "My headache has gone." Her CSF pressure was 220 mm. of water, which I considered too high to be followed safely with an air encephalogram; but the evidence of postural headache made it clear that there was a valvular block of one foramen of Monro. Next day Mr. Dickson Wright did ventriculography, which demonstrated an enormously dilated left lateral ventricle, bulging slightly across the middle line. No air could be transferred into the right ventricle, and no air was visible in the third ventricle; the diagnosis of 3rd ventricle tumour or cyst seemed established. Mr. Wright operated on May 10 under local anæsthesia by the transfrontal route on the left side, exposing the cortex in front of the fissure of Rolando. A small circle of left frontal lobe was excised in the premotor area, the ventricle entered, and a colloid cyst as large as a small cherry was seen protruding through the left foramen of Monro. This was ruptured in the effort to deliver it into the lateral ventricle, a thick creamy fluid like condensed milk escaping into the ventricle. The fluid was evacuated and the cyst walls completely removed. The patient made a quick and uneventful recovery except for slight pyrexia from May 11 to 17, reaching 102° F. on three days, but falling

to normal after sulphathiazole was given. By May 19 she was very well, and left hospital on May 27. On June 28 I showed her at a clinical meeting of the Medical Society of London held at the hospital; she was perfectly well, and the papilloedema had almost entirely disappeared. In answer to a follow-up letter she wrote on Jan. 11, 1944, that she was very well, and back at work at the aircraft factory.

I wish to lay emphasis on the character of the headache in these cases, the suddenness of onset, and the equally sudden disappearance. If also an alteration of posture brings about a sudden change, either in starting or arresting the headache, the diagnosis of a valvular intraventricular lesion is almost certain, such as a pedunculated ependymal tumour in the lateral ventricle, or a colloid cyst or tumour in the third ventricle.

I have seen two other cases of this type of pedunculated ependymal tumour, in which the clear history of sudden onset and sudden disappearance of headache enabled me to make the diagnosis.

The first I saw in consultation in the north of London 32 years ago, where the local doctor, now dead, had made a diagnosis of hysteria in a woman school-teacher of about 40, who had been suffering for some months with headaches of this type. She was semicomatose when I saw her, with choked discs, and she died on the following day. It did not occur to me at that time that surgery was possible, but with modern methods her life might have been saved, since autopsy showed us an intraventricular ependymal tumour plugged in the right foramen of Monro.

The other case I saw several years ago at Maida Vale Hospital, the characteristic feature of sudden onset and sudden disappearance of violent headache being present. Even then surgery was considered impossible.

With modern methods of ventriculography and surgical approach most of these cases could undoubtedly be saved, since the cysts and most of such tumours are benign, and there is little or no danger of recurrence.

Although paroxysmal headaches with sudden onset and sudden disappearance have been recorded by most authors as characteristic of a ball-valve blocking of the foramen of Monro by a third ventricle tumour or pedunculated growth in the lateral ventricle, I have found only three references to change of posture causing the sudden changes in intensity of the pain (Stookey 1934, Dandy 1933, Fulton and Bailey 1929). Weisenburg (1910) first described intermittent sudden loss of vision dependent on changes of posture in cases of third ventricle colloid cysts.

The headaches in these cases occasionally last for ten years or more before vomiting, dizziness, faintings, sudden falls from collapse of the legs, and papilloedema develop. Sudden falls from the legs giving way might suggest the cataplectic attacks in narcolepsy, but the characteristic somnolence is absent, while the pr sence of headache, vomiting or papilloedema will decide the diagnosis of intercranial tumour. An instructive case is recorded by Dandy of a lady aged 37, who never suffered from headache except when she had attacks of dizziness accompanied by shooting pain from the occiput over the top of the head to the forehead. These were apt to occur with sudden change of posture, as on standing up or stooping to the ground. Otherwise she was perfectly well, and could play tennis most of the day, but not golf, owing to stooping to pick up the ball starting an attack. There were no other neurological signs, and Dandy mistook the case at first for "functional." Ultimately operation disclosed a benign tumour in the third ventricle which he successfully removed.

SUMMARY

Intermittent headaches, sometimes persisting even for ten years, may be due to intraventricular cysts and tumours. Their onset and disappearance are often sudden, and, especially if changes of posture produce or relieve the headache suddenly, this is a pathognomonic sign of the ball-valve action of such cysts or tumours blocking one or both foramina of Monro.

Third ventricle colloid cysts appear to be the commoner variety, and grow from the anterior part of the roof of the third ventricle.

They are non-malignant, and when approached through a hypophyseal flap, opening the lateral ventricle, are not difficult to remove completely.

References at foot of next column

DEFICIENCY DISEASES IN HONG-KONG

P. B. WILKINSON, M B LOND., M R C P
MEDICAL OFFICER IN THE COLONIAL SERVICE

POVERTY and polished rice are responsible for much of the disease seen in south China, and before making a diagnosis it is essential to find out in every case what the patient earns, how much he spends on food, what sort of food he buys, and how he cooks it. Today poverty is probably more widespread and more devastating in its effects in China than anywhere else in the world. The war has laid waste great tracts of the country and has created many millions of refugees who are often dependent for their existence on what they can carry with them. Most of these refugees are farmers or farm workers whose diet at the best of times is probably a defective one judged by western standards, and since the outbreak of the war quantitative deficiencies have been added to the normally occurring qualitative ones.

The staple foods differ markedly in north and south China, a point which has always to be borne in mind in taking case-histories. In the north the staple food is millet, a grain which is usually eaten in the form of coarse ground flour. Very often soya-bean flour is added to the millet flour, and this mixture contains an adequate amount of vitamin B_1 and valuable proteins. Vegetables are freely eaten and vary with the season. Fats are obtained almost entirely from the vegetable oils in which the vegetables are cooked. In the south, on the other hand, polished rice of an inferior grade is the staple food. Soya-bean flour is scarcely known and is not liked by the southern Chinese. Vegetables are eaten throughout the year, often cooked in vegetable oils such as groundnut oil and sesame oil. Meat, chicken, duck and fish are eaten, mixed with rice and vegetables if the family income permits, but dairy products such as milk, butter and cheese are unknown. Eggs are eaten infrequently by the masses because they are too expensive. Fresh fruit of any sort is not popular.

Both the northern and the southern diets are defective; the northern in calcium, vitamins A, B_1, C and probably D; the southern in first-class protein, vitamins A, B_1, B_2 and possibly D. As a result of these deficiencies, night-blindness, hyperkeratosis, infantile and adult rickets (osteomalacia), scurvy and pellagra are all found in northern China, though beriberi is rare except in the ports, and in southern China beriberi abounds and coexists with pellagra and certain other syndromes probably caused by lack of part of the B complex. But scurvy and rickets are distinctly uncommon in south China, and the skin and eye changes found in vitamin-A deficiency are not common. The cost of living rose steadily in Hong-Kong during the 3 years before the Jap invasion, and many of the poor Chinese undoubtedly had to exist on a diet defective not only in quality but also in quantity. These defects in diet are responsible for an immense amount of disease in China, and the well-marked differences between European and Chinese diets may account for some of the peculiarities in the incidence of disease.

Another most important point is the method of preparation of the food. The Chinese methods of cooking polished rice make an already defective food more so, and there is no doubt that much vitamin C is lost in the cooking of vegetables in oil. Poverty and polished rice, then, are the two outstanding factors in the production of deficiency disease in south China.

BERIBERI

Beriberi we have always with us in south China. The number of cases in Hong-Kong rose enormously during the three years before the Japanese occupation as the population increased and the standard of living

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went down. The following figures for the four years 1937–40 show how great this increase was, and these figures show only the hospital cases.

	1937	1938	1939	1940
Cases	2869	5373	8518	15,129
Deaths	928	1885	2061	4300

Total deaths in 1939 were 3189, and in 1940 were 5751.

Since the synthesis of thiamine by Williams in 1936 a great deal of work has been done on the subject of B_1 deficiency and our ideas have been reoriented. Today the existence of the biochemical lesion in beriberi is universally accepted, though there are still observers who maintain (rightly, I think) that there is as yet no clear-cut proof that thiamine is the antineuritic vitamin and is capable of curing the polyneuritis of beriberi. One difficulty, which had not been overcome during my time in Hong-Kong, was to obtain criteria which would place the diagnosis of B_1 deficiency beyond doubt; direct estimations of B_1 in blood were not possible and we were forced to fall back on the blood pyruvic-acid level; 0·7 mg. of pyruvic acid per 100 c.cm. of blood was regarded as the normal limit and figures between 1 and 2·0 mg. per 100 c.cm. were regarded as suspicious. A figure of over 2·0 mg. per 100 c.cm. was almost certainly due to severe beriberi, but it was often impossible to make intelligent use of the lower figures, and contradictions between clinical and laboratory findings were so common that the method was beginning to lose ground.

In dealing with Chinese of the outpatient class one is struck by the very high percentage of patients who have some loss of reflexes but no other signs or symptoms pointing to involvement of the nervous system. In a recent outpatient survey made on 500 unselected patients we found that, excluding those patients who were diagnosed as beriberi, just over 10% of the remainder had some reflex abnormality which was not accounted for by the illness which had made them come to hospital. This finding suggests that there must be a great deal of latent beriberi in south China, and clinical experience amply confirms this view.

So common is the disease that the Chinese often take no notice of it in its milder manifestations or at any rate do not seek advice from European doctors about it. It was, therefore, generally speaking, only those patients who showed an advanced degree of neuritis who were admitted to hospital. The fulminant cardiac form of beriberi, curious to relate, is rare in Hong-Kong and south China generally, though it is said to be common in the Shanghai district and Japan. An important cause of infant mortality is infantile beriberi, which is exceedingly common. So, too, is the disease as it occurs in the later months of pregnancy and in the puerperium. And we now realise why beriberi is a common sequela to any acute febrile disease; the raised BMR resulting from the fever increases the requirement for thiamine, and unless an increased amount is speedily made available beriberi may follow. This accounts for the many cases of the disease seen in patients recovering from smallpox, cholera and the various meningitides.

The importance of the biochemical lesion in the ætiology of beriberi was impressed on me in this way in 1939. My surgical colleagues asked why it was that when they admitted a man with a fractured femur he invariably developed beriberi after he had been in hospital about two months. The answer was that the man was given so much more carbohydrate, mostly in the form of unpolished rice, in hospital than at home that his daily intake of thiamine was insufficient to deal with it. Cutting down the daily ration of rice a little and making one-third of it unpolished put an end to this type of beriberi.

Treatment of the fulminant cardiac cases with pure thiamine by the intravenous route is dramatic and effective, but it must be admitted that the treatment of the advanced cases of neuritis which come in with wrist and foot-drop is neither. Recovery in these cases takes months, and, whereas pain and the subjective dysæsthesiæ are rapidly relieved by the exhibition of thiamine, the nervous signs take much longer to disappear. That they do disappear, if treatment be persisted in, is certain, but a return of absent knee- and ankle-jerks is not to be looked for in less than six months, and I have known cases which took over a year to regain lost reflexes.

All observers seem now to agree that thiamine, if it is to produce rapid therapeutic effects in B_1 deficiency, must be given in much larger doses than were advocated at first. For the cardiac crises of beriberi 50 mg. intravenously should be given at once and this dose may be repeated two or even three times in the first 24 hours. This should be followed by a daily dose of 50 mg. intravenously until serial radiograms show that the heart has reached normal limits. It is impracticable to employ such doses in the advanced neuritis cases because the expense would be prohibitive, and as a general rule these patients were treated by dietetic measures and a daily intramuscular injection of 5 mg. of thiamine for the first month. Occasionally this treatment brought about strikingly rapid improvement, and I have seen three patients who had to be carried into hospital able to walk in three months, but these cases are exceptional. The pregnant and puerperal cases lay outside my province, but they have been fully and ably described by Gordon King, who has also done much work on the relation of vitamin B_1 to the toxæmia of pregnancy.

However effective treatment is in hospital its results are usually speedily annulled by a return to home conditions. Life in a slum on eightpence a day leads to deficiency diseases, and beriberic patients, even if they recover completely while in hospital, inevitably relapse when they go home. Propaganda to encourage the lower class Chinese to eat more nuts or tomatoes or eggs is not of value when addressed to people who can only spend eightpence or ninepence a day on food. Attempts to change the food habits of a people are notoriously unsuccessful and the Chinese do not take kindly to the look of unpolished rice. Its use had been made compulsory in certain institutions in Hong-Kong during the last three years before the occupation, a sensible measure which might have produced results in time. Efforts had also been made to induce the Chinese to wash their rice less before cooking it. It is not uncommon for them to wash the low-grade polished rice which is their staple food four or five times before cooking it, and analyses made in Hong-Kong have shown that this measure alone is enough to halve the thiamine content of unpolished rice. They viewed these efforts to change their cooking habits with suspicion and regarded them as another manifestation of our invincible stupidity.

Much valuable work on thiamine assays of the common foodstuffs has been carried out by Mr. K. T. Liu, biochemist at Hong-Kong University, but unfortunately his figures have not been published and it is doubtful now if they ever will be. They clearly showed the difference in thiamine content of red rice, unpolished rice and polished rice.

PELLAGRA

Pellagra was first reported in China by Jouveau-Donbreuil in 1920, and early in the Sino-Japanese war 40 cases were described by Morris and others among war refugees in the Shanghai district. The disease did not appear in its classical form in Hong-Kong until the beginning of 1940. In February of that year a Chinese woman, aged 36, was admitted to hospital suffering from classical pellagra. She came from Kowloon and it was in Kowloon that the disease broke out suddenly at the end of April, 1940. During the next four months 420 cases of the disease were seen in Kowloon and the total figures for the colony for the year were 953 cases with 442 deaths.

Most of these patients belonged to the poorer classes and lived in slum districts, but it is interesting to note that only a small proportion were actually unemployed. Their diet consisted mainly of rice, salted fish and vegetables. Meat they could only afford occasionally, and as their average expenditure a day on food was only 12 cents they must obviously have been living at a starvation level ($1 Hong-Kong = 100 cents Hong-Kong = 1s. 3d. sterling).

The disease reached its first peak in June and showed a tendency to increase again with the onset of winter

in October and November. The commonest types of the disease were those showing dermatitis only, those showing dermatitis and diarrhœa, those with dermatitis, diarrhœa and severe prostration, and those with severe mental symptoms. Only two cases of "pellagra sine pellagra" were noted in the series of 420 cases recorded by Hua (1941), and the sites of the dermatitis noted were as follows:

Feet	78·1%	Forearms ..	17·0%
Hands	73·6%	Legs	16·0%
Perineum ..	63·1%	Neck	7·0%

The dermatitis followed the usual sequence of erythema, pigmentation, hyperkeratosis and desquamation.

Glossitis, which occurred in 43·3% of this series, varied much in severity. In the acutest cases the tongue was fiery red and swollen and showed numerous hyperæmic fungiform papillæ. After recovery permanent fissuring seems to persist and frequently gives the tongue a leaflike appearance. Stomatitis was noted in 16·4% of the series and varied from a mild angular to a generalised ulcerative stomatitis. Blepharitis and folliculitis were distinctly less common symptoms. Vulvitis and amenorrhœa were not uncommon in women who suffered from the disease. Diarrhœa occurred in about half of these patients. No signs of organic involvement of the nervous system were seen, but nervous symptoms were prominent, insomnia and headache being the commonest; 21 of the cases showed delirium and 4 became acutely maniacal. It is interesting that 253 patients out of these 420 showed signs of beriberi when admitted to hospital, a fact which emphasises the contention, if indeed it needs emphasis, that deficiency diseases tend to arise together rather than singly.

Nicotinic acid by mouth or nicotinamide by injection proved very effective in combating the mucocutaneous lesions and mental disturbances. Few things in medicine are more dramatic than the effect of nicotinamide given intravenously in acute pellagra; a patient who on admission is feverish, disoriented, rambling in speech, unable to coöperate or swallow, will in 72 hours be rational, hungry and able to swallow.

Few biochemical investigations could be carried out on these patients, which is the more unfortunate as so little is yet known of normal nicotinic-acid levels in body tissues or foodstuffs. The figures which were obtained showed that in acute cases of pellagra the average blood nicotinic-acid level was 0·31 mg. per 100 c.cm., rising in convalescents to 0·55 mg. A small group of healthy young adults had an average blood nicotinic-acid content of 0·75 mg. per 100 c.cm.

It is a striking fact that in all those cases where a fractional test-meal was given achlorhydria was found. It was felt that in some way this might have predisposed to the onset of the disease, because otherwise it is a little difficult to understand why there were not many more cases, since there were at least a million people living in Hong-Kong on a grossly deficient diet when the outbreak occurred. Sydenstricker (personal communication) working in America has also noted this achlorhydria, but he considers that in his cases it was secondary to the pellagra, and he has found that normal human gastric juice has a beneficial effect in these cases despite its negligible nicotinic-acid content. These findings lend some colour to the view put forward by Stannus (1936) that in pellagra we may be dealing with a deficiency disease conditioned by failure of either an endogenous or an exogenous factor, the endogenous factor residing in gastric juice, the exogenous in certain foods.

Two other syndromes deserve mention here because they are probably pellagrous, if indeed they are not just unusual types of pellagra itself. The first was noted in the men's prison at Stanley and I was asked to see these patients by Dr. Shaw, the prison medical officer, in 1939. All these men without exception stated that the disease came on within 3–6 weeks from the beginning of their sentence, and they were emphatic in saying that their health was good while they were in the outer world. Some of them, who spent their lives alternating between prison and Hong-Kong, had had several attacks during their lengthy existence in prison. Another interesting ætiological point was the sharp rise in the incidence of the condition in August and September. Prisoners sentenced at that time of year were four times as liable to get the disease as at other seasons. The outstanding signs and symptoms were angular stomatitis, glossitis, scrotal eczema, giddiness and weakness of the legs. Occasionally one of these patients would complain of dimness of vision, but this was rare. Knee-jerks and ankle-jerks were usually exaggerated in the cases which complained of leg weakness, and coupled with this was some degree of spasticity and extensor plantar responses. The tongues never presented the fiery red swollen appearance of classical pellagra, but the fissuring was much more pronounced and the general colour was a dusky bluish red. The signs of cord involvement were present in a considerable percentage of the men seen, another point distinguishing the condition from pellagra as we saw it in 1940. The condition was said to respond moderately well to treatment with 'Marmite,' but I was never able to ascertain what response, if any, it made to nicotinic acid or riboflavin. It is undoubtedly identical with the syndrome described in Malayan institutions by Landor and Pallister in 1935, and it is tempting to speculate on the possibility of its being a pure ariboflavinosis.

The other pellagra-like syndrome was first noted in June, 1940, when classical pellagra was rampant (Wilkinson and King 1944). The disease seemed to attack people of either sex and at all age-periods indifferently, and its outstanding feature was a rapidly oncoming, painless reduction of visual acuity associated with a well-marked concentric constriction of the fields of vision. Visual acuity was reduced in some of these cases to finger counting only at 3 feet within a few weeks of onset. No central or paracentral scotomata could be demonstrated in these cases. Common associated symptoms were giddiness, acroparæsthesiæ, palpitation, and weakness and puffiness of the limbs. Glossitis, stomatitis and dermatitis were not noted in the first cases seen, but later on it became clear that sore tongue and perlèche sometimes occurred in clear-cut cases of the syndrome. The response to both nicotinic acid and riboflavin was spectacular. Both drugs seemed equally effective in restoring visual acuity, but riboflavin seemed more effective in bringing about a rapid expansion of the visual fields; 100 mg. of nicotinic acid or 3 mg. of riboflavin a day would bring vision from $\frac{6}{60}$ to $\frac{6}{6}$ or $\frac{6}{4}$ in a week or ten days. It was also noted that simply keeping these patients on a full and well-balanced diet, without additional measures, helped to restore visual acuity. Dermatitis was not seen in any of these patients, all of whom had a most unsatisfactory dietetic history. Here, again, we are confronted with a syndrome which has certain affinities to pellagra, and it was difficult at first to know whether these patients were suffering from pellagra with incipient optic atrophy (which may occur in classical pellagra), from some unknown deficiency amblyopia, or from some form of ariboflavinosis. It is worthy of comment that none of the patients suffering from this syndrome showed any of the corneal and conjunctival changes described by Hou (1941) as characteristic of ariboflavinosis.

As is the case with beriberi, the aftercare of these deficient patients is extremely difficult. They are more or less restored to health in hospital only to be sent back to their slum homes and their eight penn'orth of food a day. The result of this deplorable state of affairs is that only too many of them relapse and come back to hospital worse than they were before. But the problem of aftercare in most of the maladies incident to outpatients is a sociological rather than a medical one.

SCURVY

Scurvy, the only known condition resulting from lack of vitamin C, is rare in Hong-Kong. No adult case of the disease was noted during the period 1937–41, but the disease was just beginning to appear in the colony towards the end of this time, as 3 scorbutic children were admitted to hospital in 1941. No doubt the steady increase in the number of destitute people in the colony was responsible for the appearance of scurvy.

Some work had been undertaken earlier by Wilkinson and Wu (1939) on the question of vitamin-C deficiency,

and in 1939 Rotter's test was used in investigating a group of 152 people, 132 of them being Chinese outpatients and 20 medical students. Sixty per cent. of these Chinese outpatients were within normal limits judged by their decolorisation times, a finding which tallied well with our clinical experience. One point which emerged from this investigation was that 13 out of 15 cases of pulmonary tuberculosis had greatly increased reduction times, 9 of them showing traces of the dye more than an hour after injection.

This absence of scurvy is probably to be attributed to the fact that the Chinese of all classes are fond of green vegetables and even the poorest people eat some green vegetables daily.

RICKETS

Florid rickets is apparently unknown in Hong-Kong. It must occur occasionally, but I have seen only 3 children in the second decade of life who showed obvious rickety bony changes. A radiological investigation of all the Chinese infants between 12 and 18 months old who came into hospital had been planned to ascertain if radiological signs of the disease occurred in significant numbers, but this investigation, like many others which had been started, will probably never be finished.

BITOT'S SPOTS, XEROPHTHALMIA AND FOLLICULAR HYPERKERATOSIS

Frank xerophthalmia occurred during 1939 and 1940 but the disease was not common. Bitot's spots, on the other hand, were quite common both in outpatients and in the children's ward. Not infrequently a skin condition which was indistinguishable from the lichen pilare of the older clinicians coexisted with Bitot's spots, but only once was phrynoderma noted in a child with Bitot's spots. This lichen pilare was most commonly found on the arms, forearms, thighs and in the popliteal fossæ; it consisted of a multitude of horny spinous outgrowths apparently arising from the hair follicles, and in several cases was so marked that it could readily be photographed. This follicular hyperkeratosis was conjoined with generalised dryness of the skin, but there was no pigmentation or pustulation. The youngest patient in whom the condition was seen was aged 14 years, and it appears to be commonest between the ages of 15 and 25.

Lichen pilare was also seen once coexisting with progressive muscular atrophy of the bulbar type in a patient aged 17. The Bitot's spots and lichen pilare were attributed tentatively to a vitamin-A deficiency, but, as is the way with deficiency diseases, many curious combinations of signs and symptoms were found. One little boy of 14 who was admitted to hospital because of difficulty in walking showed Bitot's spots on both sides, lichen pilare on the extensor aspects of both forearms, a reduction of visual acuity to $\frac{6}{36}$ in each eye, absent knee- and ankle-jerks and tender calves. He was suffering presumably from conjoined deficiencies of A, B_1 and B_2, and it is noteworthy that he came from an industrial school in the small town called Aberdeen. Investigations were made into the dietary of this school and certain improvements were suggested.

A photometer was made in 1941 but too late for any large-scale investigation to be undertaken. We had hoped to be able to make a photometric survey among the poorer class Chinese to see if any definite evidence of A-deficiency existed. This work might also have thrown some light on calculus formation in south China, for as far as I know no photometric studies have yet been made of Chinese suffering from calculus.

* * *

This brief outline will show how large a part the deficiency diseases play in medicine in Hong-Kong, and the numbers given for beriberi and pellagra leave no doubt about the magnitude of the deficiency problem. One point must be reiterated: in those countries where deficiency diseases are widespread it is much commoner to find two or more of these diseases coexisting than to find them occurring separately. Numerous reports on this subject from all parts of the world make this point abundantly clear. There is evidence that some of these deficiency diseases are "conditioned," and it is therefore essential in treatment not to rely exclusively on one or other therapeutic agent. For example, it is by no means uncommon for a classical case of pellagra to be admitted and treated with nicotinic acid; the immediate results are gratifying to everyone, but they are not permanent and later on gastro-intestinal symptoms only too often compel the patient to return to hospital.

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ALLOXAN DIABETES IN MONKEYS

SACHCHIDANANDA BANERJEE, MSC, MB
DR. A. MITRA RESEARCH SCHOLAR IN DIABETES, SCHOOL OF TROPICAL MEDICINE, CALCUTTA

IN 1943 Dunn et al. reported that parenteral injection of alloxan produces in rabbits and rats an acute necrosis of the islets of Langerhans resulting in hyperglycæmia and glycosuria. This was confirmed by Bailey and Bailey (1943), Hughes et al. (1944) and Brunschwig et al. (1944). It had been earlier observed by Jacobs (1937), and was confirmed by Dunn and other workers, that intravenous injection of alloxan produces in rabbits an initial rise followed by a profound fall in blood-sugar, leading to hypoglycæmic convulsions. If the animal is allowed to survive, the blood-sugar rises and the animal develops symptoms of diabetes mellitus. Alloxan diabetes has also been produced in dogs by Brunschwig et al. (1944) but they found that in a case of islet-cell carcinoma repeated intravenous injection of alloxan did not produce necrosis of the malignant islet cells.

I have studied the action of alloxan on rhesus monkeys. Six normal monkeys weighing from 2 to 4 kg. were starved overnight and next morning were given a single intravenous injection of alloxan (300 mg. per kg.) dissolved in sterile distilled water. They were then given nothing except water. Both before and at intervals after the injection of alloxan blood samples were taken, and the blood-sugar was determined by the method of Hagedorn and Jensen (1923).

No. 1 died of hypoglycæmia 3 hours after the injection of alloxan; the blood-sugar at the time of death was 39 mg.

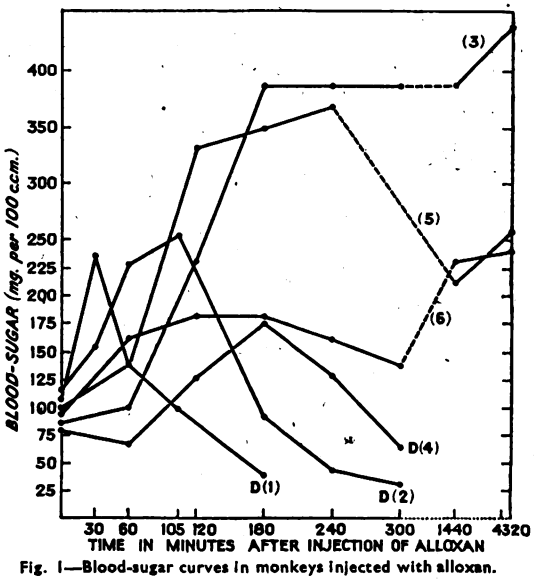

Fig. 1.—Blood-sugar curves in monkeys injected with alloxan.

per 100 c.cm. No. 2 died 5 hours after the injection, when the blood-sugar was 31 mg. No. 4 developed hypoglycæmia 5 hours after the injection and died an hour later, the blood-sugar not being determined.

Nos. 3, 5 and 6 did not develop hypoglycæmia; on the contrary, their blood-sugar was persistently high. They all survived and excreted sugar from the next morning when their blood-sugar value was still high (fig. 1).

No. 3 was killed 72 hours after the injection of alloxan. Its pancreas was fixed in Zenker-formol solution and paraffin

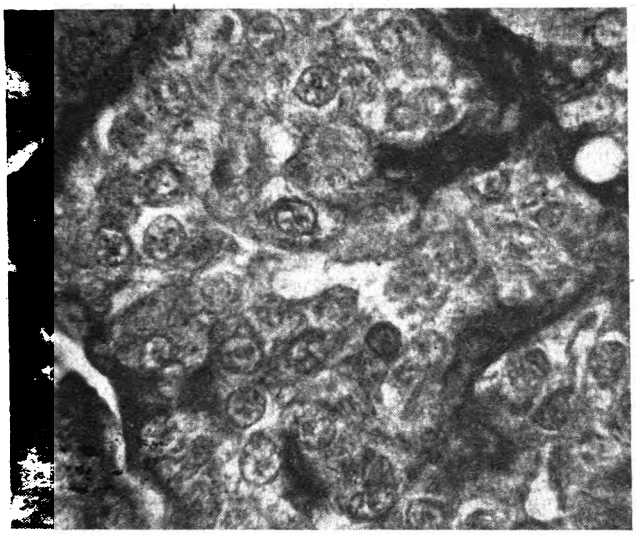

Fig. 2—Pancreas of monkey No. 3 (X 800)

sections 7μ thick were stained with Heidenhain's iron-hæmatoxylin or with Heidenhain's "azan" stain. In some of the cells in the islet of Langerhans the cytoplasm was homogeneous while in others it contained vacuoles. The nuclei were pyknotic. Granules were absent from most of the cells (fig. 2).

It will thus be seen that after a single intravenous injection of alloxan (300 mg. per kg. body-weight) 3 of the 6 monkeys died in hypoglycæmia, while the other 3 did not develop hypoglycæmia but nevertheless became diabetic. On examination of one of the diabetic monkeys cellular changes were found in the islet of Langerhans. An insufficient dose of alloxan may explain the absence of degeneration of the malignant islet cells in a case of islet-cell carcinoma observed by Brunschwig et al.

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FATAL CORONARY SCLEROSIS IN A BOY OF TEN YEARS

E. JOKL, MD J. GREENSTEIN, MB

SOUTH AFRICAN POLICE MEDICOLEGAL LABORATORIES, JOHANNESBURG

FATAL coronary arteriosclerosis in children is rare. In a study of coronary disease in youths, based on the records of 100 cases in persons under 40 years, Glendy, Levine and White (1937) did not encounter a single example under 20 years and only 8 between 20 and 29 years of age. Master, Dack and Jaffe (1939) analysed 500 case-histories of coronary occlusion; their youngest subject was 27 years old. French and Dock (1944), who reported on 100 fatal cases of coronary arteriosclerosis in soldiers, did not find the disease in subjects under 20, though a large number of younger men are serving with the forces.

A white boy, aged 10 years, collapsed and died five minutes after a boxing match lasting three rounds. He had received a number of blows against chest and abdomen but was not knocked down, nor did he seem to be unduly distressed at any time during the fight.

At autopsy the left descending branch of the coronary artery was blocked for a distance of about an inch, beginning ½ inch from the orifice. Above and below the occlusion were slight atheromatous changes in the intima. Histological examination of the diseased portion of the coronary artery revealed an almost complete occlusion. The intima was considerably thickened and hyalinised and a well-organised thrombus occupied almost the whole lumen of the vessel. There was well-marked cellular activity inside the thrombus. Several plaques of calcium were deposited between intima and media and the surrounding tissues were infiltrated with erythrocytes. The internal elastic layer was disrupted and completely absent in parts. No other abnormalities were found in the arterial system. A special effort was made to study the boy's family and previous history, but no light could be thrown on the origin of the condition.

We cannot give an opinion as to the cause of the coronary disease in this case. Nor is it possible to say whether the fist blows which the boy received a few minutes before he died contributed to his fatal collapse. This latter possibility is suggested by previous observations of injury to the heart in boxing (Jokl 1941). Nelson (1941) as well as French and Dock (1944) have pointed out that physical activity increases the risk of bleeding into the hypertrophied intima or into atheromatous or calcified plaques in diseased coronary arteries and that such hæmorrhages may expedite fatal collapses in persons thus affected. We therefore feel that the presence of recently extravasated blood in the intima of our young patient's coronary artery is significant. In spite of the fact that the boy's left coronary artery was almost completely occluded, he had been capable of strenuous physical effort immediately before he died.

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Reviews of Books

Infectious Anemias

Due to Bartonella and Related Red Cell Parasites. DAVID WEINMAN, parasitologist to the 1937 Harvard Expedition to Peru. (*Transactions American Philosophical Society*, vol. 23, part III. Pp. 243–339. $1.25.)

THE first part of this comprehensive review deals with human bartonellosis. There are two apparently unrelated syndromes: a severe, often fatal, infectious anæmia known as Oroya fever, and a benign skin eruption called verruga peruana. Oroya fever, which is neither contracted nor endemic in the city of Oroya, got its name because in 1870 there was an epidemic with a high fatality-rate among the workmen building the Lima-Oroya railway; the first thorough description was given by Odriozola in 1898 and the causative organism was described by Barton in 1905. The parasites invade the erythrocytes of the host and reproduce by binary fission; they can be transferred by cell-free media. So far, the disease is only found in some parts of western South America, a narrow strip of country comprising the western and central Cordilleras in Peru, Ecuador, and Colombia from 13° S to 2° N latitude. Weinman gives a full description of the clinical and pathological findings in the two forms of human disease and reviews all that is known of the protistology of the parasite. It has been shown that man is the only important mammalian reservoir, and the vectors are arthropods—one or more species of phlebotomus (sandfly). Apparently healthy persons carry the bartonella parasites and so increase the reservoir. There is unfortunately no known effective treatment for Oroya fever; NAB is effective against the allied infections in mice, but does not control the human disease. Part II deals with the related organisms that infest the erythrocytes of other animals: 21 species of hæmobartonella have been named so far. Part III gives present knowledge of the eperythrozoön, a related blood parasite affecting animals; human infection with this organism has not been established. Often the parasite appears in the blood only after splenectomy. The organisms described in parts II and III are widespread in animals and their possible presence in laboratory animals must always be considered. A final short section deals with epidemiological aspects. Bartonellosis can be very dangerous, and there is some evidence that it is extending; during a recent outbreak in an area of Colombia, in which the disease was previously absent, there were 4000 deaths in a total population of 100,000. Its control does not seem to be easy.

Year Book of Eye, Ear, Nose and Throat, 1943

LOUIS BOTHMAN, MD; SAMUEL J. CROWE, MD. (Year Book Publishers; Lewis. Pp. 580. 19s.)

THE past year has been one of consolidation rather than outstanding discovery in both specialties covered by this volume. A special article summarises the ocular changes in acute and chronic stages of malaria. This disease has been a major scourge during the present war, and in many localities it has been a good rule to suspect malaria in any case of PUO. Anything from lacrimation to optic atrophy may be found, and these complications have been noted in 10–20% of all cases of malaria and constitute the second commonest complication in the disease after splenomegaly. Many of the manifestations are transitory, some are periodic and synchronise with the somatic involvement, some respond to quinine therapy, others result in permanent changes. There is apparently a tendency in America to operate on congenital cataract with fair vision, and the optimum age is given as 3–4 years. There are a number of references to operations on the ocular muscles, but the objection to all such operations is the virtual impossibility of exactly gauging how much change the immediate correction will undergo when the final stage of healing is reached. A few more temporal bones of Menière's disease have been examined histologically, and dilatation of most of the endolymphatic system, with the constant exception of the semicircular canals, was a routine finding. These variations in dilatation of the different portions is possibly due to the variations in thickness of the walls. The cause is ascribed to raised pressure in the system, perhaps produced within it, since the perilymphatic space is always normal in appearance. No inflammatory changes were found. Portmann's operation of opening the endolymphatic sac is perhaps more physiological than, but apparently not yet as effective as, Dandy's division of the vestibular nerve. Treatment of laryngeal disease by irradiation receives some notice and progress has been made, but the same cannot yet be said for carcinoma of the œsophagus. There are a number of reviews of the results of penicillin treatment, but the precise fields of this and of the sulphonamide drugs have not yet been mapped out. More knowledge of sulphonamide sensitivity is accumulating. The book is as clearly printed as ever, and the editorial comment as sapient.

Reaction to Injury

WILEY D. FORBUS, MD, professor of pathology, Duke University. (Baillière. Pp. 797. 50s.)

Forbus has planned a "pathology for students of disease" which reflects the trend of modern teaching. The subject is built up from basic principles, and the reaction of tissues is studied as the natural response to injury—physical, chemical, bacterial, fungoid, virus—or to what Forbus calls "obligate cellular parasitism." In his preface he says: "The central idea of the chosen theme is that disease is a matter of the abnormal outcome of a constantly changing relation between the ultimate biological unit, the cell, and its environment." He admits in his preface that he did not realise the magnitude of his theme until he set about the arrangement of 800 pages of text and some 530 pictures; and this is but the first half of his study, for a second volume will deal with the "submissive type of reaction" and the "reaction of adaptation." In this first volume paragraphs on the immediate results of plain physical trauma are brief; and blast and crush syndrome, trauma and neoplasia, allergy, blood-transfusion "injuries," vitamin defects, and toxicology are not mentioned. No doubt the second volume will make good such omissions.

Professor Forbus has had vision in conceiving this work. In many ways it justifies itself, but it is too big for the student, though it is just the kind of teaching he requires. Firm editing could have reduced its bulk.

New Inventions

A NEW LARYNGOSCOPE

THE laryngoscope illustrated differs in a number of ways from those hitherto in use. The handle which carries the electric battery is sloped backwards at an obtuse angle to the blade, so that the wrist of the user is abducted and he is discouraged from exerting leverage about the upper teeth of the patient, as described in our article on p. 651. Also the handle is placed well to the left side of the blade. This facilitates manipulations through the tubular part, since the user's hands are not in a line with each other.

There are three sizes of blade, which can be sterilised and fitted to the handle at will, and which are kept in position by means of a set screw (fig. 1). The blades have been designed with curves whose object is to pick up the epiglottis easily and without injury to the pharynx. The illumination is by one of the twin lighting bulbs of the Negus instrument. This is carried in a small tunnel on the left side of the blade, and fits into a socket on the handle alongside that of the blade (fig. 2). The bulbs can be boiled so that the blade and bulb forms a sterilisable unit. They do not become hot when the lamp is in use.

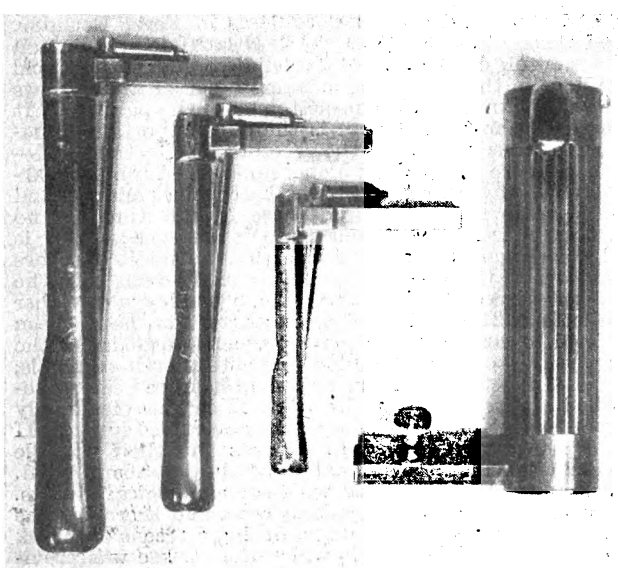

Fig. 1—Handle and three blades. Each blade carries its own lighting bulb.

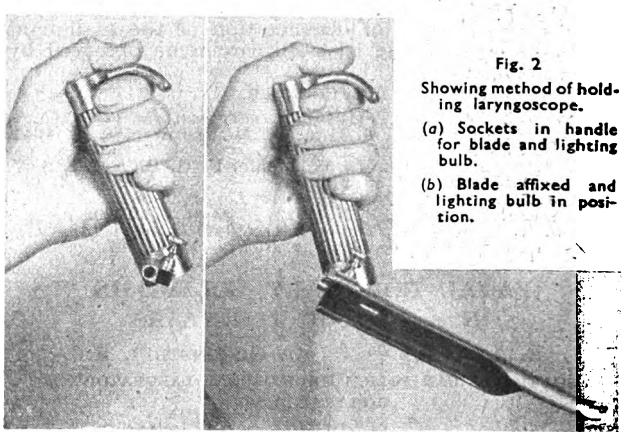

Fig. 2
Showing method of holding laryngoscope.
(a) Sockets in handle for blade and lighting bulb.
(b) Blade affixed and lighting bulb in position.

(a) (b)

We have designed this laryngoscope primarily for anæsthetists, and have found it convenient and easy to use. It is just as applicable, however, to laryngological purposes, and a Negus type of bronchoscope can be passed through it. It has been made for us by the Genito-Urinary Manufacturing Co. Ltd.

We have to thank Prof. R. R. Macintosh for permitting his technical staff to make our experimental models; Mr. R. Salt for most of this work; Mr. V. E. Negus for permitting us to incorporate his lighting system; and Mr. R. Schranz of the Genito-Urinary Mfg. Co. for suggestions for the final design.

R. G. MACBETH, BM OXFD, FRCSE
FREDA B. BANNISTER, MD LPOOL

THE LANCET
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The Injured Worker

THE House of Commons has been discussing the Government's plans for replacing workmen's compensation by "industrial injury insurance." Many of those who read the report in our parliamentary columns will wholeheartedly agree with Mr. WATSON-JONES, who on p. 666 pleads for full support of the new scheme. Others may feel that the reformers paint too black a picture of workmen's compensation as we have known it. From what was said in the debate it might appear that the working of the various Acts from 1897 to the present day has been an unrelieved failure—illustrating chiefly the greed of employers and insurance companies, the incompetence of county-court judges and doctors, and the rascality of lawyers. Perhaps only those who have laboured for years in the medical care of industrial casualties fully appreciate the benefits received by the injured workman; and some of these believe that abolition of lump-sum settlements would in itself go far to remove the demerits of the present scheme. They exhort us to count our blessings, instead of starting afresh on new principles.

The fundamental difference between the Government scheme and workmen's compensation as we have known it is that the care of the injured worker shall in future be part of a social service instead of an employer's liability. With that main principle established, the liability is transferred from the employer or his insurance company to a central fund. The fund is to be maintained by equal weekly contributions from the worker and his employer, each of whom contributes five-twelfths, and by the National Exchequer, which contributes a sixth. The notification of a claim by the worker to his employer remains as at present, but the employer then has to notify a pensions officer, who deals with the claim. There will be a right of appeal to a local tribunal, consisting of a chairman with legal training and one member representing the employers and one representing the trade-union, and a further right of appeal to an industrial injury insurance commissioner, whose decision is final. In the debate it was suggested that the worker and his employer should also have a right of appeal to an ordinary court of law, perhaps after the case had been heard by the local tribunal, and the balance of opinion seemed to be in favour of preserving this legal safeguard.

In cases of disablement the benefit will be paid on flat-rates, with allowances for dependants. The rate of benefit will become larger after 13 weeks, or sooner if the tribunal regards the disability as permanent. Then the worker will be awarded an industrial pension assessed on the principles employed by the Ministry of Pensions, except that there will only be one flat-rate; and the pension will not be reduced if the man undertakes work of any kind. The lump-sum settlement disappears—a reform that received almost unanimous approval in the House as elsewhere. Most of the opposition to the Government's proposal was on the question of the amount of benefit. A minority of speakers held that the benefit should be the same as for sickness or unemployment. Others thought that a flat-rate was right but that the amount proposed was insufficient. Opinion was chiefly divided, however, on whether benefit should be related to earnings. The Government spokesman maintained that when the workers contributed equal amounts they were entitled to equal benefit; but this of course might be answered by making the employee pay a higher insurance rate for greater benefit. It was also argued that the benefit should cover not only loss of earning, but also disfigurement and loss of the amenities of life. Mr. ISAACS quoted the case of a compositor who had lost the tips of two fingers, and with them his ability to do his work. This man under an ordinary pension assessment would be entitled to under 20%—less than 8/- a week. The Financial Secretary to the Treasury, in reply, stated that "those cases will be exceptional." But if we may venture to correct Mr. PEAKE, he is mistaken. Careful analysis of the facts will show that such cases are in the majority, first because if a man's disability does not cause incapacity he usually remains at work, and secondly because in industry the most vital member is also the most vulnerable—e.g., the fingers of the engineer, and the back of the meat-porter. Some members spoke of dissatisfaction with the decisions of the pensions tribunal, which are based on anatomical imperfections.

When the Disabled Persons Act was framed it was thought that it would be possible within wide limits to correlate disability with employability. If this were indeed possible, the Government would be on firmer ground in making its proposed change in the methods of assessment. But within the last three weeks a statement has been made by a responsible official of the Ministry of Labour that his ministry has had to abandon its efforts to secure a fair evaluation of working capacity from anatomical assessment: it has decided that a man has to be assessed as a whole. Obviously there can be no just assessment of loss by saying to two men "you have each lost a leg and therefore you have each suffered to the same extent." It has been abundantly proved in this war that, after an injury, the scars of the mind are more disabling and often more unsightly than the scars of the body. If industrial casualties are carefully examined, it is seen that those who carry to their death the scars of mind do so not because of their loss of limb but because of their loss of earning capacity, and with it their loss of social status and "the amenities of life."

As in any debate on social reform, "rehabilitation" cropped up again and again. Dr. HADEN GUEST asked whether it would not be desirable to have a representative of the Ministry of Health present on the Front Bench, as "the whole matter depends on rehabilitation." This drew from the HOME SECRETARY the somewhat astonishing reply that he thought "this is a matter for the Ministry of Labour rather than the Ministry of Health." But the Government do not of course mean to neglect the medical treatment of the injured worker: indeed it appears that he is to have this treatment willy-nilly, for on p. 21 of the white-paper it is laid down that "any arrangements necessary for continued medical supervision will be made by the Ministry of Social Insurance ... there

will be an obligation on the worker to undergo such treatment or training." It is strange that no member of the House of Commons drew attention to this novel clause. What about free choice of doctor?

Drugs for Malaria

THE 1914–18 war was one of the first in history in which the casualties from battle were not vastly outnumbered by those from disease; yet this struggle saw the large British and French armies at Salonica immobilised for long periods by malaria, which disabled far more men than the Bulgarians ever did. A great deal of drainage and other work to control mosquitoes was undertaken, but it is doubtful whether this did much to assist the army to advance; for as soon as the men moved forward they came into country where mosquitoes were as numerous as ever and the infection-rate soon rose again. The most successful antimalarial measure taken is usually held to have been the strict enforcement of daily doses of quinine. But although this suppressed most of the acute attacks of malaria, it did not prevent the development of much debility and low-grade fever which continued to be a heavy drag upon military efficiency until the close of the campaign.

At the opening of the present war the question of malaria did not seem very pressing, for the early campaigns were mostly in Northern Europe. Even when the war shifted to the Mediterranean, this infection was still a relatively minor problem, since the campaign in Greece ended before the malaria season had properly begun, and the subsequent fighting in Egypt and Libya took place in desert regions where mosquitoes were few and far between. Perhaps this attractive but false impression of security explains why medical research in this country paid so little attention to the subject at that stage of the war, although the Americans, not involved in war, began to organise wide research on malaria and its treatment as early as 1940 and 1941. With the entry of Japan the whole picture was altered at once. War had now to be waged in Burma and in the islands between Malaya and Australia, in all of which the warm damp climate is ideal for the growth of mosquitoes and the spread of malaria. Moreover the remedy that had proved so valuable in 1918 soon ceased to be available; for almost all the world's supply of quinine came from Java, and Java was occupied by the Japanese. Under the pressure of these circumstances, investigation of the treatment of malaria in America was intensified, and a year later official organisations to study the problem were set up in this country. The first necessity was to find a substitute for quinine, and here fate had been kinder than we deserved. In 1932 the German IG Farbenindustrie had produced a synthetic antimalarial agent 'Atebrin' or (as it has now been officially renamed) mepacrine. This substance had been studied in various parts of the world during the 1930's and was usually considered to be as effective as quinine; but owing to national inertia, and the absence of any compelling reason for change, British personnel in the tropics relied mainly or entirely on quinine to ward off malaria and to treat it when it developed. With the loss of Java, intensive study was devoted to mepacrine in order to discover its full capabilities and the best method of employing them. Most of this work has been carried out under secrecy, and the complete details cannot be published until the end of the war. But some of the important conclusions that have been reached are shown in the resolutions of the American and British official bodies for the study of malaria which are recorded elsewhere in this issue. The text of these resolutions deserves study in full by all concerned with the prevention or treatment of malaria; but briefly they may be summarised by saying that:

(1) With proper administration mepacrine is no more liable to cause serious toxic effects than quinine is.
(2) Mepacrine is fully as effective as quinine in the therapy of vivax malaria, but neither compound will prevent relapses later.
(3) Mepacrine if properly given will practically always suppress and cure falciparum malaria, while the action of quinine in this respect is less certain.

Since falciparum malaria is much the most dangerous and the most important type, this power of mepacrine completely to sterilise the infection is very valuable; and it should be realised that mepacrine, although forced on us by the loss of Java, is not just an inferior substitute for quinine but would still be used even if our supplies of quinine were unlimited.

The significance of these declarations of the superiority of mepacrine over quinine is far-reaching. When peace returns the relative demands for quinine and for mepacrine will doubtless depend largely on prices. If quinine is produced cheaply enough, it may re-establish its position; but it is equally possible that it may suffer the same fate as indigo and be entirely replaced by synthetic antimalarials. Whatever may be the outcome, one lesson will not have escaped notice—namely, that although malaria has always been of immense importance to the British Empire, we owe our escape from a dangerous position to the enterprise of the German chemical industry supplemented by American energy in applying the product to military purposes. It is to be hoped that British research, which was once so successful in the field of tropical medicine, will be reinvigorated by events and enabled to deal successfully with the many problems of maintaining health in hot climates, with which our overseas trade and possessions will always confront us.

Needs of Europe

OPINIONS differ on the food situation in liberated Europe. In a country where normal transport has almost broken down, and where the black market is pervasive, it is very hard to estimate the true supply situation. Where is the evidence? Stocks cannot be assembled at key points for control. The soldier or press correspondent may note with surprise an abundance of fruit, olive oil, or butter in a particular area, but he cannot assess its general significance. The black market is in itself a complex phenomenon. It has its professional operators who are definitely antisocial. But there are also a vast urban traffic with the farms, a traffic in ration-books, and other by-products of German occupation, where the line between greed and patriotism has become hopelessly blurred; a man may one day be smuggling a goose or a piece of bacon to feed a comrade in hiding, and on another day be trading them illicitly for cash. Such traffic as this cannot be abolished in a country where people are still haunted

by fear of the morrow and may doubt the capacity of the Allied High Command to handle their economic problems. And finally there is the retention of supplies on the farms or in the villages—an invariable reaction of the peasant to unsettlement. To extract hoarded stocks from the countryside two measures are needed: first, the currency must be stabilised so that all risk of fresh inflation is effectively blocked; and, secondly, supplies of food must be imported with as much publicity as possible. Only the sense that the market will set inexorably against him will persuade the peasant to release his stock in a hurry. Even then, however, transport may still be insufficient either to assemble the stocks thus provided or to shift them from the surplus to the deficit areas. The French railways are said to have 60–70% of their rolling stock out of commission; the condition of the Netherlands seems only too evident; and military needs come first.

We shall not quote the various ration levels that are stated to have prevailed in such and such a week in September or October in Paris or Naples or Brussels; it will be better to wait for more evidence. The undeniable fact is that our armies are penetrating into countries with wide divisions of social class and income, and in time of scarcity and violent political discrimination differences of income are certain to be reflected in differences of food consumption. Of course there are restaurants with inflated prices, and there is traffic in eggs, meat and butter, in ice-cream, wine and fruits. Yet 20% or 30% of the town-dwellers may nevertheless be in serious and continual need. The hold-up of butter and of olive oil in the producing areas, through lack of transport, only complicates the picture; and it is a pity that the casual observations of correspondents on the spot should have been expanded into unwarrantable generalisations. Nor is it relevant to our present problem to describe conditions prevalent on the Continent in 1942 or 1943. If there were children starving in Greece two years ago, most of those children are probably now dead. Conditions today may be better or they may be worse. Our business is to assess medically what nutrients are required, and in what proportions, to restore the people, *as we find them*, to their physiological norm and to maintain that norm. The basic needs of the liberated people, whatever they may prove to be, must be supplied; and it is no affair of the physician to say whether the foodstuffs prescribed shall be grown in their own soil or brought from overseas. Incidentally it is curious and somewhat perplexing that in the House of Commons and elsewhere we are being told, in effect, that, since the Continental position is better than was believed, we are not called upon to sacrifice any of our own food to the needs of our neighbours. Curious, because we still yearly receive some 3–4 months' supply of our total calories from overseas countries; and if it were the policy of these countries to divert some of this food to the Continent we could scarcely complain. Perplexing, because the British people seem to be prepared for a measure of dignified self-sacrifice; and these appeals to insular jealousy are apparently not as popular as their contrivers may have expected.

When we have the facts we can act accordingly. But the facts we must have; and it seems as though these will not be available until UNRRA ceases to hold the position of a kind of middleman and enters into full partnership with the liberated governments. For this we may have to wait for months. And though we must acquiesce in the decision that UNRRA shall not operate in a liberated country until the military authorities and the established government request it to do so, we cannot forget that epidemic disease—and perhaps displaced persons—recognise no frontiers. Of two steps that seem immediately necessary the first is the despatch to the liberated countries of teams of trained investigators, applying uniform standards of assessment. (The initiative in arriving at such standards has lately been taken at a conference held in London.) The second is the establishment of some type of international commission, with the whole Continent in its purview, which can do what is necessary to check the spread of epidemics and to regulate the transit of displaced persons towards their homes. This is a matter for planning and not for compulsion, but there can be no security unless the governments concerned accept the unified plan of control. As yet there is no common pattern for the work of UNRRA in the different countries; and we fear that, until the suggested steps are boldly taken, its work will be characterised by an alternation of delays and apprehensive improvisations.

Annotations

IMPREGNATION VERSUS INSECTS

THE idea of rendering surfaces insecticidal over a long period is not particularly new. Excellent moth-proofing agents for garments have been known for a decade,[1] though they languished for want of public demand, and in 1935 Potter[2] developed the use of insecticidal films for protecting stored food. But until the present war protective insecticides had not been widely used against human parasites and disease-carrying insects. The prospect of military operations in all parts of the world introduced an urgent need for protecting troops from typhus, malaria, sandfly fever, scrub typhus, and so forth. To a large extent these dangers have been met by impregnating fabrics with various insecticides and repellents. Typhus was the first problem tackled.[3] In Britain[4] and in Russia[5] methods of impregnating underwear were independently devised which would protect the wearer from lice for several weeks. There were, however, disadvantages in both the insecticides used and these have been superseded by DDT. Garments impregnated with this remarkable substance are not perceptibly different from untreated ones; but they remain poisonous to lice for five or six weeks even if washed weekly.[6] The compound is chemically stable and non-volatile and the only serious cause of loss is mechanical abrasion. Apart from its use in undergarments against body-lice it has shown great promise in residual films on walls, which remain toxic to bed-bugs and houseflies for months. It can even be incorporated in paint, though naturally the poison is partly "locked up" and it is not so highly toxic to insects in this form.[7] But DDT impregnation does not serve all purposes. For one thing, its action on the insect is slow and a poisoned insect may take some hours to die. Furthermore, it is not noticeably repellent to insects which is

1. Hase, A. *Anz. Schädlingsk.* 1934, **10**, 11.
2. Potter, C. *Ann. appl. Biol.* 1935, **22**, 769.
3. See *Lancet*, July 22, 1944, p. 115.
4. Busvine, J. R. *Bull. ent. Res.* In the press.
5. Soboleva, N. I. *Med. Parasitol.* 1942, **11**, 576.
6. Bushland, R. C., McAlister, L. C., Eddy, G. W., Jones, H. A. *J. econ. Ent.* 1944, **37**, 125.
7. Campbell, G. A., West, T. F. *Nature, Lond.* Oct. 21, 1944.

fortunate or they might avoid treated areas. For several tropical diseases it is important to prevent insect bites rather than to prevent chronic infestation. Repellents serve a useful purpose here, and some remarkably effective new ones have been found. Dimethyl phthalate is one of the most widely used of these.[8] But some pests are specific in their dislikes so that other substances or mixtures may be used for particular purposes. At first the obvious method of using repellents was by smearing them on the skin. But it has been found that with impregnated garments or wide-meshed veils the effect lasts much longer.[9] Apart from the Russian experiments quoted, a great deal of investigation is going on in this country and America which will probably be kept secret until the end of the Japanese war. But eventually these innovations will become generally available for public use, and then we shall have new measures of protection against mosquitoes, midges, fleas and harvest mites.

NERVE BLOCK IN THE ARM

BRACHIAL plexus analgesia is likely to become popular, for modern technique makes it certain, simple and safe. Time was when the method was an ordeal for patient and anæsthetist, and there was much wriggling by the parties at opposite ends of the needle. Blame cannot be laid at one door, however, for only in the very ill would the surgeon insist on a local anæsthetic; and then, with hand untried and only an airy intuition as to the exact location of the brachial plexus, the anæsthetist often failed—and little wonder. But there has been a change of front: the method is no longer the potion of the very ill; it finds its chief application in the very fit, the robust with strong muscle. In a little volume[10] Macintosh and Mushin show that there is no particular art about injection of the brachial plexus, and that the operator needs no mystical nerve-divining qualities for success. All turns on knowledge of the anatomy, and the key to success, as Macintosh and Mushin point out, is the first rib. The operator must be able to picture that rib accurately in his mind's eye, and to trace it with the point of his needle. In simple lucid language they describe how this can be done. Teaching is like propaganda—a measure of over-emphasis is essential. Macintosh and Mushin show themselves good teachers: the anatomy and the method are made palpably clear, even for the novice, by an abundance of anatomical drawings in which every step is "Mickey-Moused." The method they present is that described by Patrick in 1940, to which they have added their own improvements. It depends on the saturation by local anæsthetic of the area of the first rib where the brachial plexus crosses it. The first and fundamental step in the operation is accurate localisation of the subclavian artery as it crosses the rib. The older methods relied on transfixing the brachial plexus; as soon as paræsthesiæ were obtained the injection was made. But such paræsthesiæ, as they point out, are felt by only 3 out of 4 patients; and the old methods were so disappointing that brachial injection came to be used only occasionally. Macintosh and Mushin find that by using a 1% solution of procaine it is possible to make the limb insensible yet to leave it capable of full motor power; this has great advantages for the operating surgeon—for example, in tendon repair. Surgeons have been reluctant to employ this method in shocked cases, feeling it might well add to the shock; but with appropriately reduced dosage, it seemingly adds nothing to the risk.

However simple the method and however adept the operator, many patients have horror of the operating-theatre and all its works. Despite firm assurance that the operation will be painless, it is an ordeal for them to be awake: the grating of bones frightens them and they cannot endure the thought of the knife. Since we cannot separate the man from his disease, Macintosh and Mushin insist that his wishes must be respected; if he asks for unconsciousness he must have it, unless there is some definite contra-indication.

8. Phillip, C. B., Paul, J. R., Sabin, A. B. *War Med.* 1944, **6**, 27.
9. Monchadski, A. S., Blagoveschenski, D. I., Bregotova, N. G., Ukhova, A. N. *Med. Parasitol.* 1943, **12**, 56.
10. Local Anæsthesia: Brachial Plexus. R. R. Macintosh, MD, FRCSE, Nuffield professor of anæsthetics, University of Oxford; W. W. Mushin, MB, LOND., first assistant in the Nuffield department of anæsthetics. (Blackwell Scientific Publications. Pp. 56. 10*s*. 6*d*.)

TESTING CANCER CURES

THE testing of supposed cancer cures looks at first sight simpler than it is. No two human tumours behave exactly alike in the symptoms they produce or their rate of growth or spread and killing capacity; thus in tests on humans no strictly comparable control observations can be made. Moreover, it is useless to assess results until at least 5 years have gone by. Bold experiments with poisonous substances are of course ruled out, though such experiments made on animals might provide valuable information. Trial of a remedy on humans is only worth while after it has been tested first against malignant cells in tissue-culture, with normal cell controls, next against transplanted tumours and finally against spontaneous tumours in animals. This does not of course apply when some drug whose pharmacology is already known is to be applied to the relief of cancer symptoms. The remarkable effect of stilbœstrol in relieving the symptoms of prostatic cancer could only have been demonstrated in man. Further experiments in animals may however yet be necessary to find out whether stilbœstrol or some allied substance, possibly more poisonous, can produce an actual cure.

Every cancer research institute which works systematically comes across substances capable of killing malignant cells in culture. Reports on these substances seldom appear in print because they are apt to give rise to false hopes. One substance of this kind has lately received wide publicity, especially in America. It is found in some impurity associated with the yellow pigment of penicillin, and, though penicillin itself will not destroy tumour cells, Cornman[1] and M. R. Lewis have demonstrated that this impurity has the property of killing them while leaving normal cells alive. Earlier trials in this country on crude penicillin failed to reveal any lethal activity on tumour cells, but this negative result does not throw doubt on the American finding, for samples of crude penicillin vary widely. The nature of the tumour-cell-destroying substance in the American product has yet to be determined, as well as the margin between the lethal dose for tumour cells and the survival dose for normal ones. Usually for such substances the margin of discrimination is narrow. Thus a compound given to a mouse in suitable dosage may cause a tumour to shrink until it is barely palpable, and sections show a shrunken mass of dead cells and connective tissue; but if no further treatment is given the apparently dead tumour comes to life and grows again—yet even one more dose of the compound under trial will kill the mouse. The margin of discrimination may sometimes be lost because the agent is unevenly distributed through the body of the animal. And in the preliminary tests with cell-cultures the normal controls consist of a single type of cell that happens to live readily in culture; whereas in the body a vast variety of cells which have never been tested are exposed to the agent. Other pitfalls inherent in the test have already been discussed in these columns.[2]

It is unfortunate that in every character save one malignant and normal cells resemble one another closely. The exceptional property of malignant cells is autonomous growth. Whether the aim of a supposed curative agent is to kill the malignant cell by selective poisonous action or to deprive it of some necessary

1. Cornman, I. *Science*, 1944, **99**, 247.
2. *Lancet* leading article, 1944, **i** 569. Kennaway, E. L. *Ibid*, p. 647.

foodstuff, both tumour and host usually suffer. Recent tests on human tumours with avidin (egg-white)[3] have failed to starve either the tumour or the host of biotin, although as many as 12,564 egg-whites were given to one patient in 315 days. Very likely had any result been evident host and tumour would have shown equal effects of deprivation—just as in crymotherapy both suffer from lack of fluid. This lavish but ineffectual use of egg-white demonstrates again that the human subject is unsuitable for first tests. Of the three test methods, the effect on standard tumours in inbred animals is for the present far the most reliable.

UNIVERSITY DEPARTMENTS OF INDUSTRIAL HEALTH

GREAT BRITAIN has at present no university department devoted to educational work in industrial health, and scarcely any facilities for postgraduate training in industrial medicine. In January, 1943, a select committee of the House of Commons, reporting on the health and welfare of women workers, rightly remarked that "doctors who are new to industrial work have to learn slowly and painfully by experience many lessons that should and could be taught in courses of preliminary training if such were available." It is good news, therefore, that the Nuffield Foundation has offered the universities of Durham, Glasgow and Manchester grants totalling £150,000 to assist them to carry out schemes they have submitted for the development, as soon as suitable staffs can be appointed, of teaching and research in industrial health. These grants will be spread over ten years. Manchester, where it is proposed to create a chair of industrial health, will receive £70,000. Durham has been offered £40,000 for the establishment of a department under a university reader, and a similar amount is being allocated to Glasgow for a subdepartment of industrial health within the existing department of social medicine.

ALLOXAN AND THE PANCREATIC ISLETS

RESEARCH on the action of alloxan, stimulated by the late Professor Shaw Dunn and his colleagues,[4] continues to give interesting and important results. His original observation that intravenous injection of alloxan can cause rapid necrosis of the pancreatic islets has been amply confirmed, and is known to be true for rats and dogs as well as for rabbits. Brunschwig et al.,[5] who injected alloxan intravenously into four human patients with carcinomatosis, report transitory benefit in one of them who was suffering from hyperinsulinism resulting from islet-cell carcinoma; after the administration of alloxan, hypoglycæmic symptoms were abolished for 10–20 days, whereas before treatment there had been 2–5 attacks each day. The other three patients received doses larger (per kg. body-weight) than are required to produce islet necrosis in dogs and rabbits, but the blood-sugar level was affected in only one case, and then but slightly. From this it was concluded that man is more resistant to the action of alloxan than is the dog or the rabbit, and the more interest therefore attaches to Banerjee's description, elsewhere in this issue, of hyperglycæmia and islet changes in monkeys treated with a single moderate dose of alloxan (300 mg. per kg.) by intravenous injection. Banerjee suggests that Brunschwig's observation that alloxan did not affect the islet tissue in his case of islet-cell carcinoma may be ascribed to the use of too small a dose. A demonstration of the susceptibility of the pancreatic islets of the monkey to the action of alloxan may well encourage those who hope to find in this drug a means of destroying malignant islet-cell tumours.

Two main hypotheses have been advanced to explain the transitory hypoglycæmia seen in alloxan-treated animals before they develop hyperglycæmia due to islet necrosis. The first, propounded by Shaw Dunn et al.,[4] suggested that alloxan stimulates the islet cells to overwork, and that in pouring out the insulin that lowers the blood-sugar the cells are exhausted and die. According to the second hypothesis, advanced by Hughes, Ware and Young,[6] the primary effect of alloxan on the islet cells is toxic, and the hypoglycæmia results from the washing out of pre-formed stores of insulin from dead or dying islet cells. In support of this idea Hughes et al. showed that the amount of extractable insulin known to be present in the pancreas of the rabbit was sufficient, when administered to normal rabbits in the form of protamine-zinc-insulin, to bring about a phase of hypoglycæmia similar to that seen after a necrosis-inducing dose of alloxan. Evidence further supporting this hypothesis has lately come from the laboratory of Prof. C. H. Best in Toronto, where it has been shown[7] that though in both rats and dogs, injection of alloxan reduces the insulin content of the pancreas, the pancreatic insulin does not diminish until some time after most of the islet cells have died. Evidence that the hypoglycæmic action of alloxan is the result of its action on the pancreas rather than on the liver or other tissues was obtained by giving alloxan to dogs previously rendered diabetic by pancreatectomy or by administration of alloxan, the diabetes being controlled by administration of PZI. In diabetic dogs alloxan did not exert a transitory hypoglycæmic action, though this was pronounced in normal dogs receiving alloxan. The investigators conclude that the cause of the hypoglycæmia is that alloxan kills islet cells and thus allows their contained insulin to be leached into the blood-stream.

It now remains to be determined why alloxan acts particularly on islet cells, and how it causes their rapid necrosis.

HINTS AND TIPS FOR THE TUBERCULOUS

THE school of wishful thinking which maintained that tuberculous patients fared best when in ignorance about their disease is dying fast. A patient when first diagnosed as suffering from tuberculosis usually suffers more intensely still from tuberculophobia and feels impelled to ask questions and to seek reassurance. To some of his questions his family doctor may not be any too sure of the answers. The chest specialist to whom he may next be referred very likely has a way of putting things different from the GP's. On arrival at the sanatorium the patient finds that the physicians there too seem to speak a different language, and moreover to exhibit a different approach to the whole subject. On the other hand there are patients who display no lively curiosity about their complaint and who submit with unquestioning docility to whatever is prescribed for them. Some of these are doubtless too engrossed in other problems. A few may be too dumb; but many of them are deterred from "asking too many questions" lest they be labelled as "introspective" or "neurotic." And yet, to quote Dr. G. S. Erwin's preface to his *Guide for the Tuberculous Patient* (Heinemann, pp. 112, 3*s*. 6*d*.):

> "In no other disease of common occurrence is the intelligent coöperation of the patient more necessary, ... for the outcome of the treatment can be influenced materially, for good or evil, by the patient himself."

Dr. Erwin's little volume is accurate and well balanced: it cannot fail to dispel the terrors of the unknown, and

3. Kaplan, I. I. *Amer. J. med. Sci.* 1944, **207**, 733.
4. Dunn, J. S., Sheehan, H. L. and McLetchie, N. G. B. *Lancet*, 1943, i, 484; Dunn, J. S., Kirkpatrick, J., McLetchie, N. G. B. and Telfer, S. V. *J. Path. Bact.* 1943, **55**, 245; Dunn, J. S., and McLetchie, N. G. B. *Lancet*, 1943, ii, 384; Dunn, J. S., Duffy, E., Gilmour, M. K., Kirkpatrick, J. and McLetchie, N. G. B. *J. Physiol.* 1944, **103**, 233.
5. Brunschwig, A., Allen, J. G., Goldner, M. G. and Gomori, G. *J. Amer. med. Ass.* 1943, **122**, 966; Brunschwig, A., Allen, J. G., Owens, F. M. and Thornton, T. F. *Ibid.* 1944, **124**, 212; Brunschwig, A. and Allen, J. G. *Cancer Research*, 1944, **4**, 45.
6. Hughes, H., Ware, L. L. and Young, F. G. *Lancet*, 1944, i, 148.
7. Ridout, J. H., Ham, A. W., Wrenshall, G. A. *Science*, 1944, **100**, 57.

it brings reassurance without any taint of false optimism. It answers all the questions in terminology simple enough to be comprehended by patient and physician alike; which means that if only both patient and physician will read it the language barrier between them will drop, and each will understand what the other is getting at. There are of course a few points on which phthisiologists may disagree, but they are all minor issues—such are his emphasis on the danger of swallowing sputum, and the policy of allowing as long as 12 months to elapse between X-ray examinations in suspected or convalescent cases. In the main, the author has included nothing controversial and yet has omitted nothing vital.

But how is the patient to learn of the existence of this guide? For it is unlikely to feature on bookstalls or in the review columns of the lay press. The only possible answer is that all doctors who have dealings with tuberculous patients should keep a copy for short-term loans. Having read it, the patient can then obtain his own copy for future reference.

COLLOID CYSTS OF THE THIRD VENTRICLE

THE diagnosis and treatment of colloid cysts of the third ventricle is one of the most satisfying chapters in neurosurgery. These are benign tumours so situated that they cause hydrocephalus by obstructing the circulation of cerebrospinal fluid through the foramina of Monro, thus causing the common symptoms and signs of increased intracranial pressure. Of symptoms, headache is the most constant and the one that most often leads the patient to seek advice. Sometimes the headache is associated with sudden changes in posture of the head, as in the cases described on another page by Wilfred Harris. This type of headache is attributed to a ball-valve effect of the tumour, intermittently occluding the foramina of Monro, and in view of the physical features of the tumour and its situation this explanation is generally acceptable. But this type of headache is by no means constant in cases of colloid cyst, nor is a headache brought on or relieved by sudden changes in posture of the head pathognomonic of such cysts: it may occur with other tumours of the ventricular system, or indeed with tumours in almost any part of the brain. Although there are more benign causes, the description of such a headache should always give rise to suspicion, investigation and continued observation. In the early stages of a cyst's development there may be no objective abnormalities, and it may be only the discovery of papilloedema on repeated examination that establishes the fact of increased intracranial pressure, and makes investigation by ventriculography imperative.

The diagnosis can only be made with certainty by ventriculography: there may be grounds for a shrewd clinical suspicion, but few surgeons would be rash enough to explore the third ventricle without seeing a ventriculogram first. The appearances are characteristic, and this is one of the few conditions in which both the anatomical and pathological diagnosis can be established by ventriculography. It is essential that ventriculography should be followed at once by operation: Shannon [1] reports a case in which the lesion was clearly demonstrated in a ventriculogram but the patient died two days later without operation. Removal of these tumours is a straightforward procedure for those familiar with the technique of intraventricular operations, and the results are among the best for operations for brain tumours. Functional recovery is usually complete, and there is no tendency to recurrence.

WE regret to record the death in London on Nov. 13 of Sir JAMES DUNDAS-GRANT, consulting surgeon to the Royal National Throat, Nose and Ear Hospital. He was in his 91st year.

1. Shannon, E. W. *Arch. Neurol. Psychiat.* 1944, **51**, 570.

Special Articles

RESETTLEMENT
THE END OF WORKMEN'S COMPENSATION*

R. WATSON-JONES, M.CH. ORTH. LIVERPOOL, F.R.C.S.
HON. DIRECTOR OF REHABILITATION, MINERS' WELFARE COMMISSION; CONSULTANT IN ORTHOPÆDIC SURGERY, R.A.F.; DIRECTOR, ORTHOPÆDIC AND ACCIDENT SERVICE, LONDON HOSPITAL

THE relative importance of good surgery, good rehabilitation and good resettlement in the treatment of fractures may be judged from a review of the recent history of accident services.

Until 30 years ago surgery was bad, rehabilitation was bad and resettlement was bad. In 1912 a British Medical Association committee reported malunion in over 50 per cent. of fractures: there was permanent deformity and shortening; distorted and twisted limbs were accepted as the inevitable sequel of fractures. Thereafter the attention of surgeons was directed to the prevention of malunion; their whole endeavour was concentrated on securing good union in good position and without shortening. When this had been achieved they were satisfied; the problem had been solved; the patient was discharged. We had reached the age of good surgery but bad rehabilitation and bad resettlement. The injured man returned to his home with weak muscles, stiff joints and wasted limbs. The surgeon knew that these were disuse changes and that they would probably recover in the course of time. But the patient did not know: he had no experience; he knew only that if he used the limb it hurt; he had no knowledge by which to distinguish the pain of adhesions which called for more exercise from the pain of unexpected complications which called for more rest. He had been discharged; it appeared that no further treatment was available; he said to himself "If this limb is weak and painful now, how much worse will it be when I go back to work?" Physical fitness represented his assets. He feared the future and turned to the only other refuge he knew—the refuge of financial protection and lump-sum settlement. And then we had the audacity to call him a malingerer.

Malingerers are made—not born. In the vast majority of cases malingering is a complication of fracture treatment no less under the control of the surgeon than malunion, non-union or any other complication. Malingering seldom arises within a few days of injury as a dishonest attempt to make money; it usually arises after many months as a despairing attempt to make sure of security.

The solution lay in the completion of treatment—in the redevelopment of muscles, mobilisation of joints, treatment of adhesions, in the exercises of running, jumping, and climbing, and above all in the instilling of confidence that physical recovery was indeed complete. This was the beginning of good surgery and good rehabilitation. I well remember outlining the requirements of rehabilitation to the Delevingne Committee—the special orderlies, masseuses and occupational therapists, the gymnasiums, playing fields and swimming pools, the residential centres and staff. I was in company with Dr. Charles Hill of the BMA and Sir Walter Citrine of the Trade Union Congress. When the committee had thanked us and shown us out, I think they sighed with relief and reflected "Now the idealists have gone; the men whose heads are in the clouds have gone; let us get down to practical matters." But within a few months of the outbreak of this war, ideals became facts. Every detail proposed to the Delevingne Committee was put into practice, first in the orthopædic and rehabilitation centres of the Royal Air Force, and then in the residential centres of the Miners' Welfare Commission. Thus today we see the miners of Lancashire and Cheshire completing their recovery in

* Part of an address at the opening of Oakmere Hall Rehabilitation Centre on Oct. 28.

magnificent surroundings; there has been good surgery in the fracture centres of the county; there is good rehabilitation here.

WORKMEN'S COMPENSATION

But we are still in need of good resettlement. I recently took the chair at the advisory medical committee of the Commission, a committee which includes pioneers of rehabilitation (Miller of Glasgow and Nicoll of Mansfield), and leaders of orthopædics (Mr. H. A. T. Fairbank and Prof. Harry Platt), industrial medicine (Dr. Donald Hunter), physical medicine (Sir Robert Woods) and surgery (Houldsworth, Smillie, and Walker). We agreed that despite all our efforts in developing rehabilitation our time was wasted while the Workmen's Compensation Act stood as it did. You all know of the tragic attempts which were made to achieve industrial resettlement through the machinery of the county court, the bitterness engendered between employer and employee, and the degrading spectacle of medical conflicts in workmen's compensation claims. One doctor gave evidence that there was full recovery and fitness for any work; another gave evidence with equal emphasis that there was no recovery and fitness for no work. I do not absolve the medical profession from blame; but neither do I absolve the legal profession. It was here that young barristers sharpened their wits and acquired their skill. Medical witnesses often attended court with evidence which was grey, but which by skilful cross-examination was turned either to white or to black. One witness was inexperienced and easily shaken; his evidence was undermined; it was watered; it became white. The other was expert; he was paid large fees by wealthy interests; he resisted the skill of cross-examination; under the stress of it his evidence hardened; his evidence became black. And the next day the newspapers reported "Doctors disagree."

Still worse than the practice within the court was the practice in the corridors outside the court. Compensation cases were often brought with no other object than to enforce settlement on recalcitrant and unwilling workmen. Mazed and bewildered by the unfamiliar scene, by the wigged and gowned counsel who jumped up and down, by the language of which he understood not a word, he was quickly reduced to the state of agonised fear in which the offer of £50 or £100 seemed preferable to the risk of losing all. This was our method of restoring an injured man to industry! Settlement by fear! Give him £50—or £350—and within a few months, or at the most within a year or two, he was back where he was, both incapacitated and impoverished!!

A GREAT REFORM

But we live in a new age. Progress has been made not only in surgery and in rehabilitation but in the social service of resettlement. A few days ago the Government published its proposals for Industrial Injuries Insurance. This white-paper is magnificent; it is the complete answer to the problems of workmen's compensation and resettlement. The new injury allowances and injury pensions will afford at least a degree of security, and yet avoid the danger of the financial attraction of incapacity. The pension is to be awarded in relation not solely to earning capacity, but to every difficulty and handicap. The problems are to be solved not by litigation but by the impartial investigation of medical boards. And, most important of all, the pension is to remain unaltered even if the individual exerts himself by returning to work despite residual disability.

The Disabled Persons' Employment Act removed the fear that return to work would lead only to early dismissal for inefficiency. The Industrial Injuries Insurance Act will remove the other great fear that return to work will lead only to loss of the few shillings still paid for partial incapacity and loss of the right to compensation. These two acts together—tributes to the statemenship of Mr. Bevin, Mr. Tomlinson and Lord Woolton—are measures of social reform no less important than the developments of surgery and rehabilitation. Without them surgical progress would have been of little avail; with them the problems of industrial injury will largely be solved.

No doubt there will be opposition. We may hear of the liberty of the subject, of Magna Carta, and of the dangers of superseding rule of law by administrative decree. There may be opposition from members of the medical profession whose practice depends upon medico-legal conflict. There may be opposition from members of the legal profession. But if you agree with me that this white-paper promises the end of bitterness between employer and employee, the end of degrading medical conflicts in county courts, the end of misfortunes by which in the name of justice men are driven further and further from the real objective of physical recovery, the end of deplorable practices of forcing industrial settlement by fear, and the end of tragedies of lump-sum settlements, then you must say so. You must say so to your representatives in Parliament. You must not allow this reform to be imperilled.

MEPACRINE FOR MALARIA

STATEMENT BY MRC COMMITTEE ON MALARIA

IN view of the great importance of malaria for warfare in the Far East and also in the Mediterranean region, a great deal of work has been carried out during recent years to evaluate the relative merits of the two chief antimalarial drugs available at the present time—viz., mepacrine ('Atebrin,' 'Quinacrine') and quinine. The conclusions reached are shown by the resolutions (reproduced below) which have recently been adopted by the appropriate official bodies in the United States and in this country.

AN AMERICAN RESOLUTION

According to the *Journal of the American Medical Association* (1944, **125**, 977) the Board for the Coördination of Malarial Studies adopted the following resolution concerning the relative value to the armed forces of mepacrine (quinacrine hydrochloride USP), quinine and totaquine (USP):

On the basis of controlled quantitative studies in civilian, Army and Navy establishments, the evidence at hand justifies the following statement:

1. *In the suppressive therapy.*—Mepacrine (atabrine) has proved to have all the antimalarial properties ascribed to quinine in the suppression of malaria during and subsequent to exposure to infected mosquitoes. Effective suppression can be accomplished over long periods of time by proper use of mepacrine. Available evidence indicates that this end may be achieved without danger to the individual.

Earlier reports indicated a significant incidence of gastro-intestinal disturbances in certain groups of men receiving suppressive mepacrine therapy. For practical purposes these adverse reactions can be avoided by proper administration of the drug. Quinine, in doses adequate to assure suppression of malaria equivalent to that produced by mepacrine in the dosage currently used by the armed forces, is frequently attended by symptoms of cinchonism.

Mepacrine has been demonstrated to prevent consistently the development of falciparum malaria when the drug is administered in proper dosage before, during and after exposure.

2. *In the therapy of the acute attack.*—Experience in the past two years has demonstrated conclusively that mepacrine (atabrine) when properly administered is fully as effective as quinine in the termination of the acute attack and is safer than quinine. The intramuscular injection of mepacrine is highly effective in securing a rapid therapeutic response. Evidence is not at hand to decide on the relative merits of mepacrine administered intramuscularly as compared with quinine

administered intravenously in patients with fulminating cerebral malaria.

3. *In the therapy of vivax malaria.*—Neither mepacrine nor quinine can be relied on to prevent relapses in vivax malaria following the discontinuation of therapy, although the interval between attacks is significantly longer following mepacrine than following quinine in the dosage schedules currently used by the armed forces.

4. *In the therapy of falciparum malaria.*—There is convincing evidence that mepacrine not only suppresses the clinical symptoms of falciparum malaria but also cures this malignant form. The evidence of a similar curative effect of quinine is not conclusive.

5. *Totaquine (USP).*—Because of its content of crystallisable cinchona alkaloids, totaquine (USP) has activity which approximates to that of quinine and therefore can be used as a substitute for quinine when given orally. The antimalarial activity of totaquine (USP) is dependent on the amount of crystallisable alkaloids in the preparation rather than on the specific amount of each individual alkaloid. Gastrointestinal disturbances occur more frequently following the use of the present totaquine (USP) than they do following the use of quinine or mepacrine.

On the basis of the foregoing statement it is resolved: (1) That no advantage, and possible disadvantage, would accrue to the armed forces were quinine or totaquine to replace mepacrine for the routine suppression and treatment of malaria. (2) That the large-scale production of quinine or totaquine is not now considered a matter of importance for the management of malaria among Army and Navy personnel. It is possible that a supply of totaquine in excess of the present stockpiles may be required for therapy in civilian populations temporarily under the jurisdiction of the armed forces in occupied territory where immediate dissemination of information concerning the use of mepacrine (atabrine) is not practicable. In this connexion it should be kept in mind that after the war the overall need for all established antimalarial drugs will continue to be great.

The personnel of the Board is: R. F. Loeb (chairman), W. M. Clark, R. G. Coatney, L. T. Coggeshall, F. R. Dieuaide, A. R. Dochez, E. G. Hakansson, E. K. Marshall, jun., O. R. McCoy, F. T. Norris, W. H. Sebrell, J. A. Shannon, and G. A. Carden, jun. (secretary).

BRITISH CONCLUSIONS

The above resolution was considered by the Drug-Prophylaxis and Therapy Subcommittees of the Medical Research Council Committee on Malaria at a joint meeting on August 23, 1944. The members of these subcommittees are: Major-General A. G. Biggam (chairman), Brigadier F. A. E. Crew, FRS, Colonel S. P. James, FRS, Dr. W. D. Nicol, Lieut.-Colonel B. G. Maegraith, Colonel C. S. Ryles, Mr. P. G. Shute, Brigadier J. A. Sinton, FRS, Air Marshal Sir Harold Whittingham, and Dr. F. Hawking (secretary). The various items were discussed and it was agreed that British experience and the extensive investigations carried out in Australia, under the direction of Brigadier N. Hamilton Fairley, led to the same conclusions as those reached in America. In particular, the subcommittees endorsed the resolution that if quinine or totaquine replaced mepacrine for the routine suppression and treatment of malaria, the change would not be advantageous and might possibly be disadvantageous.

It is not possible during war-time to disclose all the extensive investigations upon which these official American and British resolutions concerning the relative merits of mepacrine and quinine have been based, but when peace returns full details will doubtless be published in the scientific press. Meanwhile the position may be summed up by saying: under proper administration mepacrine is no more liable to cause serious toxic effects than quinine is; mepacrine is as effective as quinine in the therapy of vivax malaria, but neither compound will prevent relapses at a later date; mepacrine if properly given will practically always suppress and cure falciparum malaria, while the action of quinine in this respect is less certain.

Accordingly it must be realised that mepacrine is not an inferior substitute for quinine forced upon us by the loss of Java, but it is a more effective agent against malaria which would still be employed even if the supplies of quinine were unlimited.

BRITISH MEDICAL STUDENTS' ASSOCIATION

MR. WILLINK ON THE WHITE-PAPER

THE second annual general meeting of this association was held in London on Nov. 10–11. In a discussion of the findings of the BMSA questionary on the National Health Service white-paper (see *Lancet*, Aug. 19, p. 258), Mr. DAVID PYKE, the president, said that the replies received represented the opinions of about 25% of all British medical students. There was an almost 3 to 1 agreement that a complete medical service should be available to everyone free of charge, but there was qualified welcome to a number of proposals in the white-paper, which would be more generally popular if changes were made.

Representatives from many schools voiced their constituents' doubts about centralised control of the profession. At St. Mary's some 80% of students attending meetings were unsatisfied with this control. Durham University medical students were uncomfortable about the composition of the proposed Central Medical Board; they suggested that a nucleus of full-time members should perform its day-to-day work, whilst a larger committee, including part-time members who were practising doctors, should decide questions of policy. Liverpool University pleaded for "democracy at every level"; they asked that local and national policy should be controlled by representatives elected by the profession, and that these should publish an annual report. London Hospital students believed that the Central Health Services Council should be elected by the profession, not selected by the Minister. Another school, which also wanted the Central Medical Board to be elected, claimed that coöperation was more easily obtained at a local than a central level. Speakers from Manchester and St. Andrews further underlined the danger of the medical services coming under the control of an organisation far removed from the profession as a whole. A Cambridge representative, however, suggested that demands for professional self-government might undermine the established principles of our political democracy—principles demanding that an elected representative of the people should be responsible to the people for the conduct of any national service. A member of the executive committee warned delegates not to forget the immense advance proposed in the white-paper, which permitted the profession very considerable measures of executive and administrative authority.

Mr. H. S. SOUTTAR, FRCS, took the chair at a public session when he warmly welcomed Mr. Henry Willink, Minister of Health. Mr. PYKE, in presenting the results of the questionary to the Minister, said that the BMSA did not think a reformed medical service alone sufficient to safeguard the health of the nation. In 5 years' time the medical students of today would constitute about a fifth of the profession. While they were conscious of the necessity of change, and approved the conception of health centres, they would want to be free in their medical practice and under no compulsion to enter a national service.

Mr. WILLINK said that the BMSA had grown rapidly in wisdom and stature, and was of mutual benefit to students and their seniors. He described the impetus that the war had given to social reform and explained how the white-paper had been designed to deal with several important deficiencies in the existing services by means essentially evolutionary. Answering questions from delegates, he emphasised that there was nothing definitive about the white-paper and said he hoped to start detailed discussions with the profession very soon. Any future service would be based on "the traditional personal confidential relationship of people with doctors of their own choice," and would not involve compulsion of the doctor nor his metamorphosis into a civil servant. The Minister announced that he would consult with the BMSA again before the white-paper was formed into a bill.

MEDICINE AND THE LAW

Inquests and Publicity

THE Home Secretary's answer on Nov. 9, set out in another column, made clear the official view that a coroner's court is an open court. He had been asked about a recent case where the coroner and the police had refused to communicate to the press the verdict reached at the inquest. "I have no reason," he said, "for thinking that as a general rule representatives of the press are not given an opportunity to attend at an inquest"; if inquests were held at such short notice that the press could not attend, it was reasonable that, on request, the coroner (or his officer on his instructions) should give adequate particulars.

This seems a broader view than that which the Home Office formulated in the debate on the Coroners (Amendment) Bill at the end of 1926. It was then said that it was necessary as a rule to hold inquests in public but there might be cases when this was not desirable. This 1926 statement was based on the 1910 report of the departmental committee on coroners in which the late Sir Mackenzie Chalmers used to take such active interest. The committee had heard evidence from Mr. J. T. Smith, subeditor of the *Daily News*, representing the London branch of the National Union of Journalists, but it declared that there were many cases where no public end was gained by reporting inquest proceedings. "The gratification of a public curiosity cannot be weighed for a moment against the intense pain caused to the relatives of the deceased by the disclosure of family matters which may have nothing to do with the cause of death." The committee on coroners thought the presence of a jury was a sufficient safeguard. Its opinion needs perhaps to be revised in days when juries are so largely dispensed with. When Smith drowned his third wife in the series disclosed in the "brides in the bath" case, the details of that inquest might conceivably have been withheld out of sympathy for the family; their publication led to the arrest and conviction of the murderer.

The dispute between coroners and newspapers is an old one. In 1933 a daily paper criticised the Leeds coroner for holding an inquest in private. He replied robustly that he had held over 80 inquests in private in the previous year—a statement which the newspaper fastened upon as justifying the abolition of his office. Five years afterwards the late Lord Atkin, always a champion of public rights, criticised the practice of coroners in announcing after inquests had been begun in cases of industrial accident that they intended to take the rest of the proceedings in private. He was addressing the Coroners' Society at its annual dinner. The public, he said, were immensely interested in ascertaining how and by whose fault such accidents happened. He hoped sincerely that coroners would inquire into these deaths in public and have the whole facts disclosed.

The law is clear enough. The coroner has the same right to exclude the public from his court as is possessed by examining magistrates under section 19 of the Indictable Offences Act of 1848. He can decide upon the extent of the publicity he will allow; he can order the expulsion of a person from his court. There is seldom any complaint of the exercise of this discretion. "I think," added the Home Secretary last week, in answer to a supplementary question, "that one day, when there is time, the whole proceedings of coroners might be the subject of discussion here." Material for such a discussion was provided, of course, by the report of Lord Wright's committee in recent years; but the conclusions to which the committee came were not so sympathetic to the medically qualified coroner that we should desire to see them implemented by statute as they stand.

Overdose of Carbachol

As postscript to our note on this subject a fortnight ago we should add that the successful defence of Dr. Lovas was undertaken by the London and Counties Medical Protection Society. From a fuller account of the judgment, now available, it appears that the defendant firm of chemists and druggists was held by the judge to have been negligent in two specific actions—in packing 'Moryl' crystals in an ampoule, and also in putting into a box containing ampoules of crystal moryl a pamphlet similar to that put into boxes containing ampoules of the liquid drug.

In England Now

A Running Commentary by Peripatetic Correspondents

IT was just midnight and I had finished writing one of those futile letters answering an advertisement about a house or flat, saying how anxious we are to pay four and a half guineas a week for two rooms. I also have to say that although we have two small children we can furnish any references they may require. Of course we know all the time that it has gone to someone who rushed in and offered six with a quarter's rent in advance. But we do it because, in the favourite Service phrase, "Everything that can be done has been done," and the stones and avenues treated appropriately.

As I was saying, I walked out to post this letter in an invigorating moonlit night. There was the whine of aircraft high above—the kind that sound like a flying bomb so that one subconsciously waits for the engine to stop—and I thought of the men up there in their dark, cold, confined, metallic world. Their sense of duty had dragged them from their homes and families to face conditions that are hazardous even with no enemy to fight. They seemed heroes to me. Then came the thought that creeps niggling at the spirit of national unity. I saw them singly, each with a wife and some with children, searching for somewhere to live, while the billeting officer says, "We only deal with official evacuees," and the advertisements say, "Business lady only," or "No children," and all the time there is the suspicion that what the poor wretch wants—two rooms "with the use"—could be found in a hundred houses which thoughtlessness keeps empty.

* * *

Having climbed the seven hundred and seventy seven steps up to San Michele (no, I didn't count them), we were not likely to be put off by anything so trivial as it being the wrong afternoon, so we hammered on the door until someone came. The outside is less imposing than I had expected, but inside it was just as I had imagined—old pillars, Roman pitchers, statues and assorted works of art all scattered around and built into the place in bewildering profusion. The cypress avenue is there, the dog cemetery is there, and there is a friendly old alsatian, who we were told is waiting for his master to return, as everybody thinks he will. The woman showing us round declared herself to be the daughter of Rosina, who now lived at Materita, where most of the treasures were kept. Discovering I was of the cloth, she offered to send her son to show us the way, so that we might see them—a great privilege, as visitors are discouraged there. But it was getting late, so we thanked her and said we would go tomorrow. Then along the loggia at the top of the precipice on the way to the chapel. No wonder he wanted to stand there for ever. The air was getting cold as we stood by the sphinx, watching the sun set, bathing the whole bay and the island in a purple light. "Wish, with your hand on the sphinx," she said, "and your wish will come true." So we wished, of course, to stay in Capri a little longer. But the sphinx must be hard of hearing, or does not like strangers, for we sailed the next morning. (But we climbed the sanctuary mountain, though I heard only one bird and saw none.) As we were leaving the villa, I was struck by a notice saying that the place would be closed to visitors if anything was missing. Either all the more portable souvenirs had already been taken or someone has a sense of humour. I was irresistibly attracted to the idea of walking out with an enormous Horus, casually tucked underneath my arm.

* * *

The plea for bodies for dissection would be more successful if donors were asked to supply an autobiographical sketch with pathological details. We all thoroughly enjoy discussing our own structural defects and dilapidations, and besides it would make a little personal link between dissector and dissectee. Moreover, on the principle of the Laugh-Cry Law which states that an emotion automatically evokes the countervailing emotion (how few of us have spotted the therapeutic and hardening value of operational anecdote and funereal tale!), the writing of such would have a very heartening effect on the prospective corpse. When I

feel depressed I open the safe and pull out my own MSS, which started as a sort of Local Guide to supplement *Cunningham*, but gets every month more like *The Frogs*. "Brekekekex Co-ăx Co-ăx," sing my chorus as they sharpen scalpels. The Corpse bobs in and out of the whole play with reminiscence and admonishment, a bit bossily perhaps. For instance, to Omphalos who is dissecting my abdomen and complaining that he is being given short measure for his ten bob in that there is no appendix, he says:

Would'st thou'd been there when that fell wound was made!
The theatre stands aghast, the dressers flee!
O wretched youth, let reverent hand be laid
on this Thermopylae!

Or to Laktistes and Sitagogos who are on my right leg, which they describe as "a bit scraggy":

Remember now, that gastrocnemius once
when playing for the Old Bunhillians B
converted from the touch-line's dismal chance
amid the cheers of half a dozen men
who turned right round to watch our lesser game!

And surely it will add interest to dissect

the eyes that once saw Lister in the flesh
and Queen Victoria in a tartan shawl.

and

My Corti, that vibrated to the thrill
of Melba's peachy voice—and ITMA too!

Well, well. Back to the safe again with my will and the fire insurance goes now this well-thumbed script. I'm feeling much better, thank you.

* * *

"You are looking petulant, doctor," said Sister. "I have cause to be," I answered with asperity. "Is this hospital run for the benefit of the doctors or the nurses or the patients? If the patients' welfare comes first, then why must we be wakened in the middle of the night to have our temperatures taken, to be washed and breakfasted?" "You know perfectly well," said Sister comfortably, "we would never get the work done otherwise." I dug my toes in, determined to convert her if it took all day. But she smiled like a mother to a cross child and swept out. It is not, so far as I know, a Natural Law that patients must be washed by the night nurse or that breakfasts should be given at the unearthly hour of 6.30; nor is it impossible for day nurses to carry breakfast trays. For most people the pattern of sleep and waking is well defined and deeply ingrained into the habit of life, and I cannot believe that a sudden radical alteration in that pattern is therapeutically beneficial. When the ordinary man wants extra sleep he adds to the end of a night's rest if he possibly can. On a holiday of the kind intended to be a good rest, he does not go to bed a couple of hours earlier than when at home, he rises an hour later. Why then, when he reaches hospital, must all the canons of physiology and psychology be shattered, lights extinguished at 9.30 PM, and the patient condemned to spend an uneasy couple of hours or more seeking sleep? After a poor night this being roused at the crack of dawn leaves one disgruntled and exhausted (all right; peevish if you like), restlessly trying to snatch a little sleep all morning against the clash and clamour of the ward's activities. No, I have a great admiration for the nursing profession, but the welfare of patients must come before administrative conveniences of matron and sisters. My contribution to Hospital Planning is the slogan, *The patients' day begins at* 9 AM—*or later*.

* * *

She was the telephonist for whom I had been waiting for about a couple of years for she was admitted to my ward with an acute exacerbation of her chronic asthma. As I proceeded to examine the chest, I turned to my acolytes and observed that it would be folly to ask this patient to "say 99" since in accordance with her professional instinct she would be bound to give us the wrong number. Yes I had better come clean. I had kept this in cold storage hoping that the coincidence would present itself one day.

* * *

"Please, Doctor, the railway company says if I gets a sustifikit from you to say I got diarrhœa I shan't 'ave to stand in the train goin' 'ome."

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

ENGLAND is being bombarded by the stratosphere rocket over what the Prime Minister described as "widely distributed areas." Casualties so far are not great. Morale remains good and, undisturbed by these new weapons. The House has given two days' consideration to the new proposals by which Workmen's Compensation will become a communal service instead of a right to be claimed by litigation. Under the new arrangements emphasis will be shifted from the lawyer's opinion to the doctor's opinion. To take Workmen's Compensation out of the hands of insurance companies will give us the opportunity of using it for better medical treatment and for rehabilitation. One medical MP urged that in drafting the new bill the right to medical treatment and to rehabilitation should be made the subject of a special clause.

Everyone talks about rehabilitation as though it could be turned on by a tap and as though it was available everywhere, but the House was reminded that except in the Services and in some favoured areas—such as Mansfield—there is very little rehabilitation available. The work done at the cripples' home at Gobowen, Salop, under Dr. Rhaiadr Jones, adviser on rehabilitation to the Ministry of Health, was cited as an example of what could and should be done. The need to get what must be a big service on to right lines at the beginning demands that this admirable example should be closely studied.

The House spent a third day passing the bill to set up a Ministry of Social Insurance, which is the first step necessary to give effect to the proposals. Mr. Attlee, who introduced the bill, described it as a pilot engine, but Mr. Greenwood said it had neither fuel nor power at present and pressed for the inclusion of social insurance in the King's Speech.

These bills and discussions all show that the House has now turned away from the purely financial side of Workmen's Compensation to its social-medical aspects. And the same trend is to be seen in other legislation. Legislation is turning from the purely juridical to the socially constructive, and it is high time not only that professors of social medicine were appointed, but that there were more informed exponents of social medicine in the House.

Prof. A. V. Hill, FRS, is probably not standing again, as the calls of research cannot be refused, and he will be a loss to the House. But it is to be hoped that the number of medical MPs and of those who are not afraid to expound the social medicine point of view is increased and not diminished at the general election.

INDUSTRIAL INJURY INSURANCE

IN the House of Commons on Nov. 8 Mr. HERBERT MORRISON, Home Secretary, in submitting a motion approving the Government's new scheme of Industrial Injury Insurance said that the proposals in the white-paper were a revolutionary advance in the administration of workmen's compensation. They substituted a new principle for that upon which workmen's compensation had been based since it began in 1897. Under the 1897 Act responsibility for the casualties of industry was placed upon the employer. In its day even this was revolutionary, because it imposed a liability upon the employer to pay compensation independently of whether there had been negligence, not only on the employer's part or of anyone employed by him, but also on that of the workman himself.

Since 1897 the scope of the act had been extended and the benefits increased, but the principle on which it was based had stood. During the war there had been further improvements. For example, the prewar maximum of 30*s*. a week had been supplemented so that a single man now got 35*s*., a married man 40*s*., and after thirteen weeks they got 40*s*. and 50*s*. respectively. There was also now a payment of 5*s*. for each child. But Mr. Morrison was aware that a radical recasting of the old system, which had served well in its time, was overdue.

The revolutionary feature of the new scheme was that for the first time it transferred to the community as a whole the responsibility for the casualties of industry.

Under its new title of industrial injury insurance workmen's compensation would become a social service administered for the community by the new Ministry of Social Insurance. Mr. Morrison admitted he would be sorry to lose this subject from the Home Office, for he felt that if the Home Office became purely a prison and police department, detached from other social problems, it would be a bad thing for the administration of justice in this country.

A number of proposals from the Beveridge report had survived, but the Government had rejected the proposal for a special levy on the hazardous industries since they were hazardous because of their nature and not because of the carelessness of the people engaged in them. He thought it right that risks should be pooled. The new scheme was comprehensive; it applied to everybody over school-leaving age, and many contributors, including well-paid people in non-manual employment, were unlikely to claim under the scheme. But once the principle of communal responsibility was established, it followed that it was right that contributions should be widely spread.

A FLAT RATE OF BENEFITS

The Government's next principle was a flat rate of benefits with supplements for family responsibilities, but there was nothing to prevent voluntary supplementary schemes of insurance being elaborated within the industries themselves. In the past there had been more discussion about the basis of estimating the loss of earning power than about anything else, and in future compensation must be based on degree of disablement instead of loss of earning capacity. If a workman lost an arm, a leg or an eye, or some other identifiable personal physical loss, we must put a value on what he had lost for itself, and he must go on getting his pension whatever his future earnings might be. Mr. Morrison regarded this change as essential to the whole of the proposals in the white-paper.

Up to now the workman had claimed compensation from the employer or the insurance company and arguments had ensued. Mr. Morrison wanted the workman to have social rights conferred upon him because of his injury. Claims would be paid by officers of the Ministry of Social Insurance, and there would be an end to wrangles which were inevitable where the compensation for one came out of the pocket of another. The workman would also be encouraged to coöperate in the restoration of his health and earning capacity without fear of losing his compensation.

Turning to the problem of lump-sum payments Mr. Morrison said that those who were experienced held there were many evils connected with this method. Sometimes a lump payment put the workman on his feet in a little business, but often the business failed and the money was gone. The lump sum was not only compensation for the workman—his wife and family perhaps also had an interest in the sum. Mr. Morrison thought that from all points of view it should go and the industrial injury pension succeed it, except for small payments where as a matter of administration it was convenient to get the case out of the way.

The scheme would apply to personal injuries arising out of and in the course of employment and to specific industrial diseases, for which it was proposed to adhere generally to present principles. There would be a central fund from which all benefits and administrative charges would be paid. This fund would be maintained by weekly contributions of 3*d.* per man and 2*d.* per woman, from both employer and employee, and there would be an Exchequer contribution of a sixth of the total cost. The rate of contribution for juveniles would be a half.

In the development of the scheme the Government wished for the collaboration of industry. It was proposed to set up an advisory council with equal representation for employers and employees. There would also be equal representation on the local appeal tribunals. In the first place claims would be dealt with administratively by a pensions officer, and secondly there would be the right of appeal to the local appeal tribunal to which the pensions officer himself would also be able to refer cases. There would also be a further right of appeal on questions of law, or other questions, which might be put to a commissioner with legal qualifications, whose decision would be final. Benefits were at a higher rate than those proposed under Part I of the social insurance scheme. If the workman was injured in the course of his employment he was entitled to more consideration than the citizen who had bad luck in the ordinary course of affairs.

Mr. Morrison went on to assure Mr. Ness Edwards that many workmen adjudged 100% incapacitated did work and earn wages. He hoped that in the future this might increase. Allowances would be unaffected by subsequent earnings. "You have to be very careful about discouraging people from earning in administering a scheme of social insurance," Mr. Morrison added. Industrial pensions, which would be assessed by a medical board, would be based on the degree of disablement resulting from the injury. They would be compared with a normally healthy person in the ordinary run of the same age and sex. That was an important improvement on the existing scheme. In cases of minor disablement there would be provision for a final settlement by gratuity or temporary allowance at a special rate. In fatal cases they substituted a pension for a lump-sum payment. At the start widows and children would have temporary benefit as provided for under Part I of the social insurance scheme. Afterwards there would be a pension of 30*s.* a week for widows of fifty and over, and under fifty if they had dependent children or were otherwise incapable of support. There would be 20*s.* for widows under fifty without dependent children. There would be 12*s.* for an orphan and 7*s.* 6*d.* for the first child. Other children of course were covered by the family-allowance proposals. There would also be provision for dependent parents, and where there was no pension for a widow, for payment of one adult dependent member of the household. It was impossible to apply these proposals to past cases. They must start afresh with the new scheme, and they had come to the conclusion that the right course was to leave the liability in past cases on the employer in accordance with the existing law. The Temporary Increases Act of 1943 would be continued in force subject to any appropriate adjustment in respect of family allowances. In addition, in past cases a workman who was deemed to be unemployable as the result of an injury would be able to claim from the fund a weekly supplement of 10*s.* This would apply irrespective of the date of the injury.

FIVE POINTS OF CRITICISM

Mr. DAVID GRENFELL welcomed the scheme, but offered five points of criticism. He wanted to remove the 13-weeks disqualification so that the workman would get his full benefit from the first week. Secondly, he wanted payment to the person temporarily disabled to be fixed at not less than the figure given in the white-paper, provided his total receipts in compensation were not less than two-thirds of his average weekly earnings during three years. He wanted the injured person to have the full advantage of children's allowances and to have for himself, his wife and first child at least two-thirds of his average earnings during three years. He also wanted lives and health to be saved by the efforts of a body appointed specially for that purpose; he wanted attention to dust conditions and industrial hygiene. He wanted a medical service to be provided for the injured workman whatever neglect might lie elsewhere on the part of the workman himself or those with whom he lived. When a workman was injured and became incapacitated he should be taken to hospital, and treatment of the right kind should follow. Lastly Mr. Grenfell advocated the setting up of special industries under the auspices of the state where certain operations could be carried on by disabled men to a greater degree than in ordinary industries.

Mr. A. COLEGATE said that in addition to this scheme there should be, during the first five years at least, an allowance to compensate people who had to pay exceptionally high rents.

Mr. TOM BROWN thought the rates of benefit offered were far too low. Could they expect a man who now received £5 a week to fall back to 35*s.* if he was injured?

Mr. QUINTIN HOGG described the scheme as a false step. He agreed that the prewar system of workmen's compensation was obsolete, but the benefits offered in the new scheme were too low. A workman who was 100% incapacitated was to receive not a proportion of his earnings but 40*s.* a week. If this scheme was carried through it would pauperise the injured skilled worker for

a generation to come. The only way in which compensation could be related to earnings, which was what human society all over the world demanded for the injured workman, was to make the source from which the workman drew his compensation a different source from social insurance. For that reason he suggested a "double-decker" scheme under which the workman would receive from the state the full amount of the ordinary social insurance benefit, and would also be able to look to his employer for a sufficient sum to give him two-thirds of his pre-accident earnings. This idea was rejected in the white-paper for reasons which Mr. Hogg thought inadequate. Under the Government's scheme the protection was wholly unorganised and unprotected by any legal right—whereas in the double-decker scheme the obligation was thrown upon the employer to insure and to pay the workman. In regard to the assessment of incapacity, the existing law required a difficult technical investigation in which witnesses were called and examination and cross-examination took place. Therefore the Government proposed to abolish that system and set up another whereby a doctor could just scribble out his certificate and say what percentage of incapacity was to be granted. Behind all this was simply and solely a desire to get rid of the courts.

Decisions would be given under the new procedure presumably without argument, without assigning full or definite reasons, and at any rate without a judicial hearing in the true sense. For these reasons Mr. Hogg regarded the scheme as irremediably faulty.

SUPPORT FOR MAIN PRINCIPLES

Sir WILLIAM BEVERIDGE said the report he had laid as a baby on the doorstep of HM Government two years ago appeared in the invigorating air of Whitehall to have become a twin—rather a Siamese twin. He would do his best to make it rather more Siamese and less of a twin, by bringing about a greater coördination between Parts I and II of the Social Security scheme. He gave cordial support to all the main principles of the Government white-paper, including those which differed from the principles in his own report, and even the principle which had been attacked so vigorously by Mr. Quintin Hogg. The way to encourage the injured man to overcome his disabilities was to make him feel that however much he recovered or earned that would not affect the compensation for his injury. Having decided that benefits for other forms of interruption of earnings should always be adequate for subsistence, benefits for industrial injury should be made at least 50% higher. That referred, of course, to cases of serious industrial injury. There was no need to differentiate between benefit rates in the case of short-term disability. Instead of spending industrial injury contributions on higher benefits for slight accidents he wanted to keep the money for those permanently incapacitated or killed by industrial accidents. Another point of criticism of the Government's scheme was the anomalous treatment of family responsibilities as between Part I and Part II. What was the sense of such varying figures? He suggested that the Government should reconsider both the rates of benefit and the family allowances in order to remove anomalies and by cutting down on the short cases and not giving the single man more than he really needed, make more money available for the real needs of those who were incapacitated permanently. He was still a little sorry that the Government should have rejected his proposal for a levy on dangerous trades, because although it was true that accidents happened in dangerous industries because they were dangerous, it was not true that one could not by taking care reduce accidents. The main incentive to care must be through factory inspection, but if he were a factory inspector he would feel himself on stronger ground in urging employers to take precautions if he could argue that if they did not do so they would have to pay more for accidents. He hoped that the Government would explore the possibility of a double-decker scheme with a lower deck of flat benefits provided by graded contributions and an upper deck for higher industrial pensions provided by a levy on dangerous industries.

Dr. HADEN GUEST, speaking as a doctor who had worked in connexion with workmen's compensation cases and workers' insurance societies, said that he knew that the object of the insurance society was to pay the least possible amount of money to the insured. This often resulted in very serious injustice. Certain companies actually employed doctors for the purpose of bullying their clients into accepting unfair payments. He believed that a great deal more could be done by medical treatment and rehabilitation than was known even by trade-union members of the house. He had recently visited EMS hospitals where treatment and rehabilitation of the wounded was carried out for the Army, and it was really a revelation of what could be done. It was not only the proportion of cures in the ordinary sense of the word that was very high indeed, but also the proportion returned to 100% capacity. He warned the House that outside military establishments there was at present more talk about rehabilitation than application of it. If it had not been for the improved medical treatment and the improved rehabilitation in our Army medical services, we could not have fought this war to a successful conclusion. But it would be just as important after the war to rehabilitate those who were wounded in industry. In the legislation to give effect to the Government's social insurance scheme there should be a clause giving workpeople a definite right to medical treatment and rehabilitation. There were not enough medical and rehabilitation institutions in the country to deal with the industrial situation, and more of them must be provided.

THE DEBATE CONCLUDED

Sir D. MAXWELL FYFE, the Solicitor-General, in opening the second day's debate, pointed out that the employer's liability, for industrial injury insurance was peculiarly inappropriate in respect to industrial diseases, when gradual onset and recurrence often made administration difficult. Under the present system it was also difficult for the man who had the disease to get a job, and there was a lack of provision for medical and post-medical rehabilitation. In the Government plan there were grants for maintenance in hospitals, treatment and constant attendance, but the medical treatment and rehabilitation of the injured workman, and his post-hospital rehabilitation and training, would be provided as part of the general medical and rehabilitation services organised by the Ministry of Health and the Ministry of Labour. The Ministry of Social Insurance would coördinate these activities. Light work had been used to stop compensation, and that was wrong. It destroyed the real thing that work could do, which was to restore and rehabilitate. The Government's proposals eliminated the idea of deciding how far a workman had recovered his earning capacity; they eliminated the grievance that an increase in earning capacity resulted in a reduction in pension. Speaking from his experience as a lawyer, Sir D. Maxwell Fyfe frankly admitted that he now believed that it would be an advantage to remove this matter from the law courts and bring it into the different atmosphere of the appeal tribunals.

Mr. F. G. BOWLES felt that whether a man was unable to work because of bad health or of injury arising out of his employment, or because he was too old, or because there was no employment for him, he should be treated in the same way. Mr. NESS EDWARDS did not think that the Home Office had played square with the workmen in regard to contributions. But for saving the employers some £10 million a year, which the state and the workmen would have to provide, benefits could be raised by a third. Mr. G. NICHOLSON did not see why a workman should have to pay towards insurance for injuries caused by his employment. The cost of injuries should be borne by industry and passed on to the consumer. Mr. A. SLOAN thought that if the benefits under this scheme were typical of the great new world before us then the outlook was dark and drear.

Dr. H. B. MORGAN viewed the new scheme with good will but misgivings. He would have preferred to take the Ontario scheme as a model. He knew of no more damaging evidence against medical tuition than was to be found in the Workmen's Compensation Acts. Doctors in the past had not been taught anything about the assessment of injury, or about industrial diseases. He agreed that Workmen's Compensation should be treated as a branch of social service, but it should be something different from, though buttressed by, the general insurance scheme. This scheme would relieve employers of a great deal of expense; they would have no urge for

prevention. The late Sir Thomas Legge, who was one of the authors of the third test, which meant that a disease must be proved to be specific to the employment before it could be accepted for the schedule, had said after considerable experience that he thought the test should be changed, but nothing had been done. It had been necessary to fight the Home Office committee again and again before many diseases were scheduled. Chronic carbon monoxide poisoning was scheduled in Australia, but not in Great Britain. Vibrational diseases contracted in boot factories and road repairing were scheduled in Germany, but not in Great Britain. None of this was changed under the new scheme. In conclusion Dr. Morgan urged that something should be done for our seamen.

Mr. O. PEAKE, financial secretary to the Treasury, in closing the debate, agreed that the scheme might be in some respects as Dr. Morgan suggested, incomplete. But the Government wished to consider the views of Parliament, and to consult the great interests concerned, before embodying the proposals in legislation. If it was humanly possible, it was intended to introduce a bill next session. The motion moved by Mr. Morrison welcoming the Government's intention to replace the existing system of workmen's compensation by a new scheme of industrial injury insurance was agreed to.

QUESTION TIME

Flour Extraction from Wheat

Mr. WALTER GREEN asked the Minister of Food whether he was aware that the recent order of his ministry to millers reducing the admixture of imported white flour from 12½% to 5%, and the increase in the usage of home-grown wheat in the grist would more than offset the recently announced reduction from 85% to 82½% in flour extraction from wheat; and if he would take steps to provide the promised whiter loaf.—Colonel H. LLEWELLIN replied: The proportion of imported white flour was purposely lowered from 12½% to 5% in order to ease the disposal of the flour which had already been milled at 85% extraction. The admixture-rate has now been raised to 10% and the home-grown grain forms only 40% of the grist as compared with 60% in some areas last season.

Coroners' Proceedings

Earl WINTERTON asked the Home Secretary if, in view of the constant criticism in many quarters of the action of coroners, he would consider whether he had sufficient power to see that their proceedings were in accordance with common sense and justice.—Mr. H. MORRISON replied: Coroners are judicial officers. One day, when there is time, the whole subject might be discussed by the House.

Mr. T. DRIBERG asked the Home Secretary if his attention had been drawn to the refusal by a coroner and by the police to communicate to the press the verdict in an inquest which was held at such short notice that press representatives were unable to be present; and if, for the information of the public, he would instruct that particulars in such cases should be available to press representatives through the police.—Mr. MORRISON replied: A coroner's court is an open court, and I have no reason for thinking that as a general rule representatives of the press are not given an opportunity to attend at an inquest. If, in any particular case, for special reasons an inquest has to be held at such short notice as to make it impracticable for the press to attend, it is, in my view, reasonable that the press should be given adequate particulars upon request, either by the coroner or, on his instructions, by the coroner's officer. That officer may happen to be a policeman, but the police have no responsibilities or duties in the matter and are not necessarily aware of the proceedings at an inquest.

Relief for Greece

Mr. M. PETHERICK asked the Secretary of State for War what plans were made by the British military authorities for introducing relief supplies into Greece immediately following its liberation.—Sir JAMES GRIGG replied: For many months there has been planning by the British and American military authorities for the shipment of essential relief supplies to Greece at the earliest possible moment. To this end grain and other commodities have been accumulated and stored in the Middle East, and when the British troops sailed for Greece stocks were immediately called forward as part of the settled plan. Over 60,000 tons of food-supplies have either been landed or are in the process of shipment.

Letters to the Editor

DOCTORS FOR GERMANY

SIR,—In your issue of Sept. 30, you gave publicity to UNRRA's probable need for doctors to assist in the control of displaced persons in Germany. At that date it appeared that the military occupation of Germany might be imminent: unfortunately it now looks as if we must wait a little longer for the consummation.

By earlier direct application and through the good offices of the Central and Local Medical War Committees we have now the names and records of a considerable number of doctors available for service. Arrangements are being made to interview selected applicants in the near future, and those not selected will be informed that there is either no, or no immediate, likelihood that their help will be required.

I am extremely grateful to the large number of doctors who have expressed their desire to undertake what would be an arduous and possibly thankless task.

European Regional Office, United Nations Relief and Rehabilitation Administration, 11, Portland Place, London, W1.

ANDREW TOPPING, Director of Health.

ACTION OF PENICILLIN

SIR,—In your issue of Oct. 14 (p. 497) Lieut.-Colonel J. W. Bigger describes experiments from which he concludes (1) that penicillin is bactericidal, (2) that it kills bacteria only at the time of their division, and (3) that penicillin treatment may fail owing to the presence of a few organisms ("persisters") in a "dormant non-dividing phase" which consequently survive. He therefore recommends that treatment with penicillin should be intermittent, these dormant organisms being thus enticed into vulnerable activity on the same principle as that of tyndallisation.

With his first conclusion I agree. I have found the LT 50 [1] for *Staph. pyogenes* (Oxford H strain) of different samples of penicillin in concentrations between 1 and 1000 units per ml. in broth at 37° C. to vary between 105 and 450 minutes: that of almost pure penicillin—of a potency of 1360 units per mg., for a small quantity of which I am indebted to ICI (Pharmaceuticals) Ltd.—was between 105 and 120 minutes for all concentrations within this range. This rapid rate of death seems explicable only in terms of bactericidal action, although bacteria *kept at* 37° *C.* and simply prevented from multiplying will certainly die, if at a somewhat lower rate.

His second conclusion is more difficult of proof. The evidence adduced that penicillin kills only dividing bacteria is that killing is prevented or diminished by conditions interfering with growth—viz., cold, lack of nutriment, and the addition of a small amount of boric acid. If the influence of temperature is to be interpreted in this way, then all disinfectants must be credited with this type of action, for all are influenced in varying degrees by this factor. When the LT 50 at 37° C. was 110 minutes, I found it to be 320 at 20° C. and 1020 at 10° C.: differences of this order would be observed with phenol. That the inactivity of penicillin in the cold indicates an action only on dividing bacteria is argued also by Miller and Foster [2] and by Hobby and Dawson,[3] but I suggest that it means no more than that penicillin has a fairly high temperature coefficient. I am particularly interested, however, in the suggestion that the presence of another bacteriostatic agent will interfere with the bactericidal action of penicillin. I have no experience of boric acid in this capacity, but as a purely bacteriostatic agent for staphylococci I can think of nothing better than sulphathiazole. On reading Colonel Bigger's paper I therefore made an experiment in which a small inoculum of *Staph. pyogenes* in broth at 37° C. was exposed to the action of penicillin alone, sulphathiazole alone, and the two agents together. From the results of this it appears that the presence of a bacteriostatic concentration of sulphathiazole reduces the velocity of disinfection by penicillin by about one half. A similar observation, using sulphadiazine, has been reported by Hobby and Dawson.[3] This is disturbing from another

1. Withell, E. R. *J. Hyg., Camb.* 1942, **42**, 339.
2. Miller, C. P., Foster, A. Z., *Proc. Soc. exp. Biol. NY*, 1944, **56**, 205.
3. Hobby, G. L., Dawson, M. H. *Ibid*, p. 181.

point of view, since Bigger [4] has recently advocated that penicillin and sulphathiazole should be used together in treatment. Am I mistaken in discerning an element of contradiction between this idea of synergic action and the hypothesis in his present paper?

The purpose of this letter is to suggest caution in translating present laboratory findings into terms of therapeutics. We do not yet really understand the nature of the action of penicillin: some of my own results in experiments of this kind are incapable of full explanation by any hypothesis which has yet been put forward. One serious obstacle to arriving at the truth is the fact that we are not dealing with a pure substance. No two lots of penicillin are the same, and to my mind the first thing to do when an experiment has given an important or peculiar result is to repeat it with another sample of penicillin, preferably of higher potency. Colonel Bigger may be right about "persisters," but I venture to suggest that his evidence is not strong enough to justify the radical change in therapeutic policy which he proposes. A great weight of clinical evidence suggests that failure in penicillin treatment is due, not to such a residuum of dormant bacteria, but to the existence of a focus in which normal bacteria can persist, such as an area of diseased bone, and undrained abscess, or an endocardial vegetation. If a property of the organism itself rather than the morbid anatomy of the disease be the factor determining success or failure, why do patients without the handicap of these inaccessible foci so regularly recover?

Hill End Hospital and Clinic, St. Albans. LAWRENCE P. GARROD.

SIR,—In connexion with Lieut.-Colonel Bigger's experiments published in *The Lancet* of Oct. 14 (p. 497) on the bactericidal effect of penicillin, I would like to add to the still little published evidence to the same effect a short abstract of my experiments as reported in the March, 1944, session of the Pathological Society of Great Britain.

Similarly to Colonel Bigger's findings I noted three factors involved in the exertion of a bactericidal effect on *Staph. aureus* and on *Strep. hæmolyticus*—the potency of penicillin, the biological phase of bacteria, and the time for which bacteria are exposed to the action of penicillin. To test the effect of penicillin on bacteria in their logarithmic phase I used digest broth cultures; to test the effect of penicillin on *Staph. aureus* in a resting stage I used glass beads coated with a dried suspension of a 24-hour culture; to enumerate the live bacteria, plate-counts were performed.

In experiments with mice, a standard suspension was injected of an 18-hour culture of *Strep. hæmolyticus* exposed to different concentrations of penicillin for varying times. The only group of mice which gave 100% survivals was that injected with a suspension of *Strep. hæmolyticus* left in contact with 400 Oxford units of penicillin for 2 hours. I did not succeed in demonstrating the bactericidal effect on the *Staph. aureus* strain which I used with lower concentrations of penicillin than about 100 units per c.cm. left in contact for not less than 5 hours at 37° C. This is in contrast to Colonel Bigger's findings, and may be due to the strain which I used being of lower sensitivity.

I have found that to achieve complete sterilisation of a *Staph. aureus* suspension, higher concentrations of penicillin than those used by Fisher or Bigger are necessary; the total amount required depends on the time of exposure and sensitivity of the strain. It may therefore be of value in some instances to test the degree of sensitivity of the strain to penicillin, and, in infections caused by strains of low sensitivity, to increase the total dosage used. A method which we found useful is as follows:—

> To one tube containing 2 c.cm. of broth and 200 Oxford units of penicillin add an 18-hour suspension of the tested organism to give a concentration of 1 million per c.cm. To a second control tube containing the same volume of broth and penicillin add an equal suspension of the standard strain (e.g. Oxford *Staph. aureus*). After 24 hours' incubation at 37° C., penicillinase (in 5 times the strength necessary to inactivate the penicillin) is added to the tubes, left in contact for 1 hour at 37° C., after which time plate-counts are made to estimate the number of survivals of the tested strain as compared with the number of the standard strain.

The intermittent sterilisation method recommended by Colonel Bigger may prove to be of clinical value, assuming that a higher dosage of penicillin is given as suggested by him and the intermissions are properly spaced and frequent. This applies not only to general systemic treatment but also to local treatment.

Harrow and Wealdstone Hospital, Middlesex. J. UNGAR.

4. Bigger, J. W. *Lancet*, July 29, 1944, p. 142.

BLACKWATER FEVER AND VASCULAR COLLAPSE

SIR,—In your issue of Sept. 23 Lieut.-Colonel Maegraith and Brigadier Findlay demonstrate generalised vascular disturbance in blackwater fever, and explain the oliguria as a local aspect of the general vascular collapse. Involvement of the blood-vessels themselves in conditions of intravascular hæmolysis has been noted in a variety of diseases. Witts [1] in a paper on the hæmoglobinurias written, as he says, in the hope of throwing light on blackwater fever, points to the tendency to blood-vessel involvement in the hæmoglobinurias and to the presence of shock. Felix Smith and Winston Evans [2] also call attention to shock as an aspect of blackwater fever and think that the degeneration of renal tubules may begin as a local anæmia.

Shock is clearly a disturbance including both spasm and increased permeability of the various parts of the vascular system; it may be more pronounced in some particular organ or area, and probably different phases or aspects may exist at the same time in different areas. Such a definition would also cover experimental animals suffering from so-called anaphylactoid shock.

The action of auto-antibodies is being demonstrated in an increasing number of hæmolytic disease conditions [3] and includes normal auto-agglutinating or hæmolytic factors [4] which are either abnormally increased, or are helped in their action by certain pathological conditions such as stasis, altered pH, or altered fragility of the cells. The actual cause of the lysis in blackwater fever is not known, but the difficulty of cross-grouping for transfusion in these cases in itself strongly suggests the presence of antibodies. The occurrence of vascular involvement makes this still more probable.

With W. R. Feasby in 1941 I recorded two cases in which high-titre cold-agglutinins were associated with severe Raynaud's disease.[5] Stats and Bullowa [6] in reporting another severe case of this type remark that in many of the cases published because of the presence of cold-agglutinin, signs of vascular involvement had been noted. Implication of the blood-vessels in the form of severe types of Raynaud's disease is a still more obvious accompaniment of hæmoglobinuria e frigore.

In most conditions of intravascular hæmolysis the products of blood destruction are usually blamed for those dangerous sequelæ, kidney incompetence and vascular shock, although the degree of shock is not necessarily proportionate to the amount of hæmolysis; nor, as Maegraith and Findlay point out, is the renal incompetence directly related to the amount of blood destroyed.

Taking the "cold" antibodies as an illustration I have carried out some experiments with rabbits,[7] injecting intravenously a small amount of high-titre cold-agglutinating serum from a patient with Raynaud's disease. Such a serum has proved very lethal, for the animals die in a few minutes with an anaphylactoid shock in which pulmonary artery spasm is the chief factor; the vascular spasm is also seen in the ears which at once become pale and cold. The renal condition has not been fully investigated, but the kidneys are usually deeply congested, and sections, in one case studied, show an intense spasm of the arcuate arteries. The blood shows some lysis. Serum containing high-titre heterophilic antibodies is well known as a potent cause of anaphylactoid shock when injected intravenously, and rabbits are perhaps particularly susceptible,

1. Witts, L. J. *Lancet*, 1936, ii, 115.
2. Smith, F. and Evans, R. W. *Brit. med. J.* 1943 i, 279.
3. Dameshek, W., Schwartz, S. O. *New Engl. J. Med*, 1938, **218**, 75.
4. Dacie, J. V., Israels, M. C. G., Wilkinson, J. F. *Lancet*, 1938, I, 479.
5. Benians, T. H. C., Feasby, W. R. *Ibid*, 1941, ii, 479.
6. Stats, D., Bullowa, J. G. N. *Arch. intern. Med.* 1943, **72**, 506.
7. Benians, T. H. C. *J. clin. Lab. Med.* in the press.

but the average serum has no such effect on them. Putting terminology on one side we can recognise here hæmolysis and vascular spasm occurring simultaneously as a result of the injection of antibodies.

This is apparently an example of an antibody, or antibodies, acting on the red cells and arterial musculature simultaneously. It is suggested that some such mechanism may underlie those cases of intravascular hæmolysis, due to antibody action, in which the blood-vessels themselves are also found to be affected. In the animal experiments above referred to, an attempt at prophylaxis was made by injecting suspensions of lecithin immediately beforehand. The idea was that the free antibodies might be deflected from the blood-cells (and blood-vessels) by this alternative "antigen." This treatment had a considerable degree of success, and it seems possible that some such measure might be tried in clinically suitable cases, of which blackwater fever may ultimately prove to be one, although lecithin, itself a lytic agent in some circumstances, might not be the lipoid appropriate for the purpose.

London, N. T. H. C. BENIANS.

POSTURE AFTER ABDOMINAL OPERATION

SIR,—May I say how thoroughly I agree with the opinion of the Fowler position expressed by Major Mustard in your issue of Oct. 28? This position is excellent in cases of cardiac dyspnœa—the patients can bear no other. But in abdominal cases it is unnecessary, tiring, distressing, and, worse, by it the tension on the abdominal wound is increased, and the heart has to work harder. In cases of infection, in my view, nothing is gained by it. Fowler advocated it at a time (about 50 years ago) when surgery was not as good as it is now.

The same argument holds for obstetric cases—whether delivery is natural, instrumental or by cæsarean section. Charles White of Manchester, late in the 18th century, recommended sitting women up after parturition in the hope of preventing puerperal fever. There is reason, however, for thinking that in this position the body of the uterus is more flexed on the cervix, tending to prevent the exit of discharge from the uterus; whereas the supine or preferably the lateral and even the prone would more readily allow it.

Rugby. R. H. PARAMORE.

MEASUREMENT OF VITAL CAPACITY

SIR,—In your issue of Sept. 23 Colonel Goadby described an indirect method of calculating vital capacity from measurements made on the chest during inspiration and expiration. Two of us had previous acquaintance with the method, and had good reason to question its accuracy and its convenience. We have therefore made a series of experiments and calculations to put the method to a thorough trial. We had at our disposal Goadby's own figures, and a large number of measurements made in sextuplicate on young men. In addition we made simultaneous readings by the spirometer and Goadby's method on 8 male volunteers (nine double estimations per subject). Our conclusions are as follows:

1. Goadby's method is unsound from the theoretical point of view. The human trunk does not resemble, even to the roughest approximation, the shape postulated by Goadby; and if it did, the formula given would be inaccurate. Nor do the heights of all the "truncated cones" expand equally during inspiration. Careful measurements on our volunteers showed wide individual variation. Some of the dimensions actually decrease.

2. The results obtained on the same subject in successive estimations at the same session are highly discordant among themselves. The standard deviation of such measurements is nearly 500 ml. By contrast, duplicates on the spirometer agree quite well. Seven replicates by Goadby's method would be required to secure the precision of three readings on the spirometer.

3. The results obtained by Goadby's method do not agree at all closely with those secured from the spirometer. In this respect, our discordancies tally very well with those given by Goadby in his paper. If the Goadby reading is used as a means of estimating the spirometer value, the standard error of estimate is over ± 500 ml. This means that in any particular case the two methods could not be trusted to agree to within one litre.

4. Goadby's method takes much longer and is much more troublesome than spirometry, and involves subjective effects depending on the observer, from which spirometry is relatively free. In our experiments, in which an inspiration and expiration were measured by Goadby's method and recorded simultaneously on the spirometer, it was noteworthy that while four observers were kept busy all the time with tape-measures, the spirometer readings were so little trouble that they seemed almost to do themselves. Nor is that the whole story. The calculations of results by Goadby's method is a tedious process. Timing experiments showed that it took two skilled computers, using either a calculating machine or Goadby's tables, at least five minutes to work out one single estimation. If replicates are done, the time consumed in calculation is prohibitive.

5. Alterations in methods of breathing, such as those produced by training, may give by Goadby's method increases of 100% or more in vital capacity in one day. Simultaneous spirometer readings showed that these changes were entirely spurious. Goadby's method is especially sensitive to small errors or changes in his dimension "L." An alteration of half an inch is sufficient to make a difference of between 500 ml. and 1500 ml. in the final calculation.

We can find no objections to the use of the spirometer in estimations of vital capacity. It is simple and rapid; the readings are self-concordant; it is a direct measure of what it professes to measure; and the results require no elaborate calculations. In every respect the Goadby method has the worst of the comparison.

ROBERT A. M. CASE. JOHN A. H. WATERHOUSE.
DANIEL R. DAVIES. BARNET WOOLF.
University of Birmingham.

SPINAL ANÆSTHESIA FOR CÆSAREAN SECTION

SIR,—In entering the correspondence lists on this subject we would disarm criticism by confessing that our practical experience is very limited. On commonsense grounds, however, it appears to us to be a bogy to suggest that pregnancy makes a woman peculiarly susceptible to the effects of spinal analgesia. A large abdominal tumour of any sort (ovarian tumour, full-time gravid uterus) limits excursion of the diaphragm, and the resulting respiratory embarrassment is greatly increased by abdominal packs and even a mild Trendelenburg position. If on top of this the action of the intercostal muscles is abolished by unduly high spinal analgesia the patient collapses from anoxia unless carefully supervised by a skilled anæsthetist. If heavy 'Nupercaine' is used for any abdominal operation the injection should be made with the patient on her side and the whole table tilted a few degrees head down. This ensures uniform results since all the heavy anæsthetic fluid runs cephalwards and none is lost in the hollow of the sacrum. As soon as the injection is finished the patient is rolled on to her back and the slight Trendelenburg position maintained. The dose of nupercaine for cæsarean section should not exceed 1·5 c.cm. Oxygen should be given throughout.

Nuffield Dept. of Anæsthetics, Oxford. R. R. MACINTOSH. WILLIAM W. MUSHIN.

MEDICAL FILMS

SIR,—The articles which appeared in THE LANCET of Nov. 4 have done much to hearten those of us who have been working strenuously for a wider recognition of the value of the medical films which are really good, both in matter and photography, films dealing with a great variety of medical subjects, and in particular with those of use in medical education, whether undergraduate or postgraduate.

The Medical Standing Committee of the Scientific Film Association (SFA), of which I am chairman, is seeking to collect details of, and make a library from, good medical films, seen and appraised by experts in the different branches of medicine, and considered worthy of inclusion. It is hoped that by grouping and indexing them, in a similar way to that of a book catalogue, any practitioner, group of practitioners or society may without trouble find the films they desire, and be told how to obtain them for viewing. It would be of the greatest value if all doctors who possess films made for them would at once apply for a form on which to

write details, to the hon. secretary, MS Committee of SFA, 14, Hopton Road, London, SW16.

The SFA is a voluntary body and needs funds whereby to carry on its work. These funds can be increased by anyone interested becoming an individual member, or by firms joining as corporate members. Forms for membership can be obtained from the hon. secretary.

London, W1. W. McADAM ECCLES.

ASSOCIATION OF MUNICIPAL SPECIALISTS

SIR,—At a meeting at the Royal College of Physicians on Oct. 26 it was decided to form an association of "registered medical practitioners who are specialists principally engaged in clinical work, pathology or radiology, and who are employed whole-time by a local authority." The term "specialists" was defined as those medical men who are looked upon by their professional colleagues as specialists.

I am anxious to get into touch with those who are qualified to become members, and I should be obliged if medical officers of health would send me, or ask one of their specialists to send me, a list of such persons employed by their local authority. We have no other means of getting in touch with them.

12, Manchester Square, London, W1. GEORGE F. STEBBING, Hon. Secretary.

Obituary

JOHN FREDERICK HALLS DALLY

M D CAMB., M R C P

Dr. Halls Dally had been in failing health for the last two years, but had gone on working despite recurrent illness. He died on Nov. 4, aged 67.

Son of the late Frederick Dally, he was educated at Wolverhampton School, and St. John's College, Cambridge, studying medicine at St. Bartholomew's and afterwards in Florence. After qualifying in 1901 he held a variety of appointments at many hospitals, including that of senior medical officer at the Royal National Hospital for Consumption at Ventnor. He gained wide experience of skins, chests and hearts, and worked as a school doctor for the London County Council, and tuberculosis officer in Hampstead. He was a pioneer in the treatment of rheumatism in children, and his clinic at the St. Marylebone General Dispensary, where he was physician, was one of the first to be set up in London. As a member of the honorary staff of the Mount Vernon Hospital he continued his work on tuberculosis, and he wrote much on respiration; but it was by his writings on high and low blood-pressure that he was best known, his *High Blood-pressure and its Management* reaching several editions.

The historical side of the medical art also attracted him. He was for many years secretary to the historical section of the Royal Society of Medicine and was several times its president. As a Freemason he reached the rank of grand officer, an honour to which only carefully selected and prominent members of the craft can ever hope to attain. He was moreover a widely travelled man and never lost an opportunity of enlarging the range of his knowledge by visits to other countries. During the war he had become a member of his local medical war committee. "Dally," writes a colleague, "possessed a clinical acumen of no mean order. His courteous and urbane manner gave him an attractive personality and many friends."

He married in 1909 a daughter of the Rev. P. E. Curtois, and had one son.

JAMES JENKINS PATERSON

M D LOND., D P H

Dr. Paterson has died while serving abroad with UNRRA, for which work his long experience of public health specially fitted him. Trained at Cardiff and St. Bartholomew's, he took the B Sc of London University in 1903, and qualified MRCS in 1906. His university qualification followed in 1908, and he took his DPH in the same year; his MD, in the subject of state medicine, was taken in 1911. He won the Samuel Brothers' scholarship of Cardiff Medical School, and was senior science scholar of Bart's, where he also held an appointment as demonstrator in physiology. After qualifying he held a resident appointment at the Borough Hospital, Croydon, and afterwards took up his public health career, serving for a time as assistant MOH at St. Helen's, and later as school medical officer and superintendent of the infectious diseases hospital at Maidenhead, and MOH to East Berkshire. His colleagues knew him as a good friend and a hard worker, with great initiative; the health services in his area were thoroughly well planned. For this reason the London School of Hygiene was accustomed to send foreign postgraduate students to see Paterson's work, and it may have been partly his international associations that moved him to apply for service with UNRRA. A. T. writes:

"By the sudden and untimely death of Dr. Paterson, UNRRA has lost an extremely valuable member of its medical staff. Everyone interested in public health work, particularly in its international aspects, knows how much he did to develop and foster it. The conclusion of his long and successful tenure of the post of MOH to East Berkshire would have seemed to most men a fitting moment to retire from active work. Paterson, however, thought otherwise and was one of the first to volunteer for work on Balkan relief. He survived a strenuous summer in refugee camps in the Middle East, and it was just as he was on the point of leaving Italy for Yugoslavia that he collapsed and died. Ten minutes before his death he had been busily engaged in discussing plans with the other members of the mission, and seemed as bright and efficient as ever."

He leaves a widow.

On Active Service

CASUALTIES

KILLED

Captain H. E. GISLASON, RCAMC
Captain GARTH FITZALAN HOWARD DRAYSON, MB EDIN., RAMC

WOUNDED

Captain A. ANDERSON, RAMC
Captain T. G. GRAY, MB ST. AND., RAMC
Captain D. R. HUGHES, RAMC
Captain G. P. MITCHELL, MB ABERD., RAMC
Captain H. B. S. WARREN, MRCS, RAMC

AWARDS

DSC

Surgeon Lieutenant J. M. COUCHMAN, BM OXFD, RN

MENTION IN DESPATCHES

Surgeon Lieut.-Commander J. W. BUCHANAN, MD EDIN. RNVR
Surgeon Lieutenant A. C. SMITH, MB, RNVR
Surgeon Lieutenant T. A. M. JOHNS, BM OXFD, RNVR

MEMOIR

Lieutenant R. RUSSELL WADDELL, who was killed in action in Normandy at the age of 24, was the only son of Mr. J. R. Waddell, of Baillieston, Lanarkshire. In 1937 he was dux and sports champion of Hutchesons' Grammar School, Glasgow, and in the same year he won the Scottish Youths' 100-yards championship. When he went up to Glasgow University to study medicine, Waddell became one of the mainstays of a strong running team, gaining his blue and in 1942 winning the inter-university 220-yards at Edinburgh in record time. During his medical course he took several prizes, and in his final year was awarded the Gairdner medal. After graduating MB in 1942 he went into practice, at first in Coatbridge and later in Huddersfield, till he joined the RAMC in 1943. Waddell was a tall man of fine physique, quiet-mannered and a good mixer. Although his chief interests were medicine and sport, he took part in many of the corporate activities of the university, and gave his quieter moments to music and literature.

Mr. C. R. HARINGTON, FRS, director of the National Institute for Medical Research, has been awarded a Royal medal by the Royal Society for his work in the analysis and synthesis of thyroxine, and in immunological chemistry.

Notes and News

DEVELOPMENTS FROM PENICILLIN

AT Edinburgh on Nov. 9, delivering the first Lister lecture f the Society of Chemical Industry, Sir Alexander Fleming, RS, said that like the sulphonamides, penicillin is highly pecific, affecting certain microbes but having little or no ction on others. It seems unlikely that we shall ever get an ntiseptic which will affect all microbes without being poisonus to some human cells; we shall have to arm ourselves with series of chemicals covering the whole range of microbic rowth. Another respect in which penicillin is not perfect s that it is rapidly destroyed in the stomach, and so is ineffecive by mouth. There is still scope, however, for the chemist o synthesise it, and then tinker with the molecule so that the mperfections can be remedied. Moreover, there are thousands of other micro-organisms which may be capable of manufacturing antiseptics even better than penicillin, or ones which might give a clue to the chemical linkages responsible for the destruction of bacteria. "The work is not finished. It is just beginning."

THIRTY YEARS OF NURSING ORGANISATION

THE Central Council for District Nursing in London has published a short account of its birth and history—a record of hard and useful work. Elizabeth Fry, that practical woman, was the first to establish an institute of sisters to nurse the London poor in their own homes. Some 18 years later, in 1868, the first London district nursing association was founded, and the National Association for Providing Nurses for the Sick Poor, and the Queen's Institute of District Nursing followed. By 1913 it was clear that the work should be coördinated, so as to avoid a dearth of service in some parts and overlapping in others. A conference was held in the offices of the Local Government Board to discuss it, and as a result the Central Council was founded in 1915, under the chairmanship of Sir William Collins, FRCS, who still holds the office.

Since that time the council has investigated the needs of areas lacking nurses, has stimulated local committees, and has advanced funds. Many bodies have supported district nursing, including London Parochial Charities, the City Guilds, the Peabody Fund, and the Guinness and Samuel Lewis Trusts. War has brought special problems: the closure of school clinics, because of evacuation, meant that many associations found themselves for a time overstaffed with nurses, and later of course there was a shortage. Having got over these and other difficulties, the council looks forward confidently to the growth and change to be expected in the coming years.

SEVENTH ADDENDUM TO THE BP

A further addendum to the *British Pharmacopœia* 1932 will be published in February. Apart from amendments to existing monographs, including some alterations in the composition of familiar ointments, the amendment will contain new monographs on: amethocaine hydrochloride, amphetamine and its sulphate, aqueous ointments of ammoniated mercury and zinc oxide, cyclopropane, dextrose hydrate, injection of protamine insulin with zinc, œstradiol monobenzoate, œstrone, pentobarbitone soluble, potassium sulphate, progesterone, solution of sodium citrate (anticoagulant or with dextrose), sulphacetamide (and soluble), sulphadiazine (and soluble), sulphaguanidine, sulphapyridine (and soluble), sulphathiazole (and soluble), theophylline and ethylenediamine, and thiopentone soluble. There will also be a general monograph on the production of tablets, with standards of weight and a disintegration test.

A REGISTER OF DIETITIANS

THE Board of Registration of Medical Auxiliaries has now published a list of dietitians[1] which should be welcome to hospital committees and all who have the feeding of sick people at heart. It is, unfortunately, a slender register, containing only some 140 names. Those appearing in it are recommended by the board to our profession, to hospitals and education authorities, and the recognised qualification is membership of the British Dietitic Association. Dietetics is described as "the interpretation and application of the scientific principles of nutrition in health and disease"—a definition which gives ample scope for the study not only of the principles of nutrition but of the tasks, in some respects more formidable, of buying, costing, catering, kitchen management, and serving. It is to be hoped that the postwar years will see a rapid increase in the size of the register.

1. Obtainable free of charge from the secretary of the board, at BMA House, Tavistock Square, WC1.

EXHIBITION OF HEALTH CENTRES

AN exhibition at the Housing Centre, 13 Suffolk Street, Haymarket, London, by Erno Goldfinger and Ursula Blackwell, now in progress, will be open till Nov. 30. It consists of posters illustrating the effects of bad environment, and the improvement in health to be expected from good surroundings. Examples of existing health centres are shown, and the possible layout of new health centres illustrated.

SHEETS FOR MOTHERS

EXPECTANT mothers who need them are to be allowed to purchase extra sheets. It seems that many women are seeking to be delivered in hospital because they are short of linen, and it is thought that an opportunity to buy sheets might encourage some of them to spare hospital beds by staying at home for their confinement. The Ministry of Health has arranged (circular 154/44) that a woman may buy two—or at most three—sheets at controlled prices, free of purchase tax. Priority dockets for this purpose will be issued by welfare authorities on presentation of a certificate signed by the midwife stating that the need is genuine.

Royal College of Surgeons of England

At a meeting of the council held on Nov. 9, with Sir Alfred Webb-Johnson, the president, in the chair, Mr. V. Zachary Cope, Mr. C. E. Shattock, Mr. E. W. Riches and Mr. W. H. C. Romanis were re-elected, and Mr. V. C. Pennell and Mr. A. J. Gardham were elected members of the court of examiners. Mr. L. E. C. Norbury was nominated representative on the Central Council for District Nursing in London for a further period of three years. Dr. D. H. Tompsett was appointed prosector to the college. The Hallett prize was awarded to Dr. J. D. Green. Diplomas of membership were granted to R. A. Allen and to the candidates named in the report of the comitia of the Royal College of Physicians in *The Lancet* of Nov. 4, p. 615 (with the exception of R. Astley, F. Batley, M. F. Bethell, L. G. Fison, P. H. Friedlander, Alison Hay-Bolton, Adrian Hill, J. G. Kendall, B. C. Lee, R. J. P. Pugh, Sydney Sheare, I. B. Smith and A. M. Walker).

Royal Faculty of Physicians and Surgeons of Glasgow

At a meeting of the faculty on Nov. 6 the following office-bearers were elected: president, Mr. W. A. Sewell; visitor, Dr. Geoffrey Fleming; treasurer, Mr. Walter Galbraith; librarian, Dr. W. R. Snodgrass; representative on the General Medical Council, Mr. Andrew Allison. The following were elected councillors of faculty: Mr. J. Scouler Buchanan, Dr. John Gardner, Mr James MacDonald, Dr. Donald McIntyre, Mr. G. T. Mowat, Mr. J. Forbes Webster, Mr. Matthew White, Dr. J. H. Wright and Mr. Roy Young.

Royal College of Physicians of Ireland

At a meeting of the college on Nov. 3, the following were admitted licentiates and members: Violet K. St. G. Breakey, MB, E. de Valera, MB, and S. P. O'Tool, MB.

Medical Society of the London County Council

A society has been formed under this name to encourage contact between the medical staffs of LCC hospitals, of neighbouring municipal and voluntary hospitals, and general practitioners, and to collaborate with the clinical research committee of the LCC public health department. The first meeting is to be held in January, and all whole-time medical officers of the LCC medical service who have completed at least six months' continuous service are invited to apply for foundation membership to the secretary of the society, County Hall, SE1, by Dec. 1.

MOH Fever Group

A meeting will be held at Tavistock House, London, WC1, on Friday, Nov. 24, at 3 PM, when Dr. Maurice Mitman will deliver his presidential address on aerial infection.

Medical Film Show

At 5.30 PM on Thursday, Dec. 7, at 1, Wimpole Street, London, W1, the Scientific Film Association is presenting a programme of recent films of medical interest, selected by its medical standing committee. Medical practitioners, students and nurses in the London area, should apply for tickets to the secretary, 14, Hopton Road, SW16, before Dec. 1.

University of Sheffield

Dr. C. H. Bösenberg has been appointed temporary lecturer in diseases of children, and Dr. Andrew Wilson temporary lecturer in medicine for dental students.

University of Melbourne

Mr. W. Russell Grimwade, chairman of the directors of Drug Houses (Australia), has given £50,000 for the foundation of a school of biochemistry in the university.

Food Education Society

At 2.30 PM on Monday, Nov. 20, at the London School of Hygiene, Keppel Street, WC1, Sir Joseph Barcroft, FRS, will speak on the nutritive value of processed food.

Evolution of Social Medicine

Dr. Douglas Guthrie is to give four lectures on this subject in the department of zoology of the University of Glasgow, on Mondays and Thursdays at 4 PM, beginning on Nov. 27, when he will speak on magic, folk-lore and priestcraft. The titles of his other lectures are public health in the middle ages (Nov. 30), philanthropy and sanitation (Dec. 4), and the dawn of social medicine (Dec. 7). The lectures are open to medical practitioners and students.

Royal Society of Medicine

The section of pathology will meet on Tuesday, Nov. 21, at 4.30 PM, at Archway Hospital, London, NW10. On Nov. 23 at 5 PM, at the society's house, 1, Wimpole Street, the section of urology will hold a clinico-pathological meeting. On Nov. 24, at 3 PM, at the section of epidemiology and state medicine, Sir Leonard Rogers, FRS, will read a paper on small-pox incidence and vaccination in India. Dr. C. Killick Millard will also speak. On the same day at 4.30 PM, at the section of disease in children, Commander R. C. Eley, USNMC, and Captain D. W. Tanner, USAMC, will open a discussion on subdural hæmatoma in infancy.

Ulster's Advisory Health Council

The council which the minister of health for Northern Ireland has appointed to advise him in the general administration of the health and medical services includes the following medical men: Dr. B. R. Clarke, Dr. J. M. Hunter, Dr. G. G. Lyttle, Dr. F. P. Montgomery, Mr. H. L. McClure, Mr. Howard Stevenson (chairman), Prof. W. J. Wilson, and Mr. C. J. A. Woodside.

Royal Institute of Public Health and Hygiene

Sir Alexander Fleming, FRS, will deliver the Harben lectures at 28, Portland Place, London, W1, on Monday, Tuesday, and Wednesday, Dec 11, 12, and 13, at 3 PM. He will speak on penicillin—its discovery, development, and uses in medicine and surgery.

British Empire Cancer Campaign

The British Empire Cancer Campaign has allocated £39,000 for research during 1945. The principal grants are as follows: £10,613 to the Royal Cancer Hospital (Free), including the Chester Beatty Research Institute; £8000 to the Middlesex Hospital; £3500 to St. Bartholomew's Hospital; £1800 to the London Hospital; £2743 to Mount Vernon Hospital and the Radium Institute; £850 to St. Mark's Hospital; £1100 to the Marie Curie Hospital; £120 to the Bristol University cancer research committee; £2300 to the Cambridge University cancer research centre; £1740 to the Oxford University cancer research centre; £1125 to Westminster Hospital and £5165 for the expenses of cancer research at the Glasgow Royal Cancer Hospital, Glasgow University, University of Edinburgh institute of animal genetics, Nottingham University College and St. Thomas's Hospital. The 1945 allocation brings the amount voted by the campaign at headquarters during the war to £207,000.

Dr. G. W. HINCHCLIFF of Dover has been commended for brave conduct when attending to wounded under shell-fire.

RAILWAY PRIORITIES FOR INVALIDS.—Mr. NOEL-BAKER, replying to a question in the House of Commons, said that the railway companies have authority to reserve seats for invalids and disabled ex-Servicemen and women who produce a medical certificate.

MILK PRODUCTION.—Mr. TOM WILLIAMS announced that supplies of milk in England and Wales during September and October, far from showing a reduction on the corresponding months of 1945, showed an increase. They were substantially greater than prewar supplies in those months.

Course for the DPM

The usual course of lectures and practical instruction for the diploma in psychological medicine will be held in January, 1945, at the Maudsley Hospital, Denmark Hill, London, SE5, if a sufficient number enrol before Nov. 30. Clinical instruction in psychiatry and neurology will be arranged if required. Further information from Dr. W. W. Kay, acting director of the Maudsley Hospital medical school, at West Park Hospital, Epsom, Surrey.

World Health Organisation

In New York on Nov. 3 Dr. Thomas Parran, surgeon-general of the US Public Health Service, said that it will be necessary for the United Nations to create a permanent international health organisation ultimately to become world-wide. Future coöperation among nations in this sphere must go far beyond exchange of epidemiological intelligence and application of uniform quarantine measures. A world health body should carry forward the League of Nations' standardisation of biological products, and ensure minimum commercial food quality standards; it should exchange health personnel through study tours, leading to international schools of hygiene; it should appoint commissions for major diseases such as malaria, leprosy and typhus; it should foster health education on an international scale; and it should give guidance to other organisations concerned with welfare, such as the prospective international food organisation and the International Labour Office.

Infectious Disease in England and Wales

WEEK ENDED NOV. 4

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 2149; whooping-cough, 1135; diphtheria, 633; paratyphoid, 3; typhoid, 5; measles (excluding rubella), 4827; pneumonia (primary or influenzal), 520; puerperal pyrexia, 155; cerebrospinal fever, 42; poliomyelitis, 14; polio-encephalitis, 0; encephalitis lethargica, 0; dysentery, 256; ophthalmia neonatorum, 74. 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 Nov. 1 was 732. During the previous week the following cases were admitted: scarlet fever, 53; diphtheria, 16; measles, 21; whooping-cough, 19.

Deaths.—In 126 great towns there were no deaths from enteric fever, 4 (1) from measles, 3 (0) from scarlet fever, 7 (0) from whooping-cough, 8 (0) from diphtheria, 45 (3) from diarrhœa and enteritis under two years, and 18 (3) from influenza. The figures in parentheses are those for London itself.

Birmingham reported 6 deaths from diarrhœa.

The number of stillbirths notified during the week was 228 (corresponding to a rate of 33 per thousand total births), including 19 in London.

Appointments

YOUNG, WATSON, MB GLASG.: examining factory surgeon for Kilsyth, Stirling.

Births, Marriages and Deaths

BIRTHS

DE COVERLEY.—On Aug. 19, in Poona, to Dr. Jean de Coverley (née Drury-White), wife of Captain Roger de Coverley—a daughter.

GILMOUR.—On Oct. 28, at Westcliff, Essex, the wife of Dr. J. R. Gilmour—a son.

HUTSON.—On Nov. 3, at Newcastle-on-Tyne, the wife of Captain C. S. M. Hutson, RAMC—a daughter.

THOMPSON.—On Nov. 7, at Watford, the wife of Major Charles A. Thompson, RAMC—a daughter.

WEBBER.—On Nov. 7, at Windsor, the wife of Dr. B. P. Webber—a son.

DEATHS

ASH.—On Nov. 9, at Littleover, Derby, Walter Martin Ash, OBE, MB LOND., FRCSE.

BARBOUR.—On Oct. 20, John Humphrey Barbour, MB RUI, major RAMC retd., aged 71.

BLAIR.—On Nov. 10, at Glasgow, Duncan MacCallum Blair, MB, D SC GLASG., FRFPS, aged 48.

DUNDAS-GRANT.—On Nov. 13, in London, Sir James Dundas-Grant, KBE, MD EDIN., FRCS, aged 90.

MASON.—On Nov. 9, at Portsmouth, William Blaikie Mason, MRCS.

RICHARDSON.—On Nov. 8, at West Wimbledon, Henry Edward Richardson, LRCPE, aged 86.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

PSYCHOSOMATIC FACTORS IN CUTANEOUS DISEASE

R. M. B. MACKENNA, MD CAMB., FRCP
BRIGADIER; CONSULTING DERMATOLOGIST TO THE ARMY

IN recent years increasing attention has been given to the psychosomatic factors in skin disease. Many papers about them have been published (e.g., O'Donovan 1927, Stokes 1935, Klauder 1936, Klaber and Wittkower 1939, Rogerson 1939, Stokes and Beerman 1940, Hodgson 1941, Hellier 1944), and even textbooks and handbooks show growing awareness of their importance (e.g., Becker and Obermeyer 1940, Stokes et al. 1942).

In some quarters the whole subject is anathema; in others so much stress is laid on the psychological factor that the importance of the somatic component is forgotten. Therefore one must emphasise that the physician who fails to realise that an individual is composed of both psyche and soma—mind and body—and does not pay at least as much attention to the latter as he does to the former, is in danger of falling as grossly into error as his colleague who disregards the mental factor entirely.

In practice, however, the matter is not so easy as these statements may suggest. The dermatologist is usually averse from meddling in another branch of medicine, and the psychologist is often handicapped by a scanty knowledge of dermatology. There seems to be but little common ground in their approach to cutaneous disease. Is it possible to suggest a simple scheme of linkage so that when, for example, the psychologist says "I find that this patient is a tense, restless, conscientious man, preoccupied with matters of cleanliness, order and routine," the dermatologist can assert with reasonable accuracy "Then if he develops a skin eruption, he will be prone to certain cutaneous disorders—viz., W, X, Y and perhaps Z."

Possibly to make such an attempt at the present time is to allow vaunting ambition to o'erleap itself, but the following views may be thought worthy of consideration.

Intelligence and Personality

With certain obvious qualifications, the British Army at present may be regarded as a cross-section of the community of the United Kingdom; and therefore findings with regard to intelligence in the Army are in the main applicable to the community as a whole.

Since 1940, the intelligence of all men entering the service has been investigated by means of Raven's progressive matrices, and six so-called "selection grades" are recognised. In this method of assessment those of the highest intelligence are placed in selection grade 1 while the lowest intelligences are in selection grade 5. When the personnel are thus classified, the distribution in each selection group, stated in "round figures" as a percentage of the whole, is as follows:—

Selection grade	%	*Selection grade*	%
1	10	3 –	20
2	20	4	20
3 +	20	5	10

It will be noted that in this assessment, from which lunatics and mental defectives are excluded, 40% of the personnel fall within the category SG 3 which therefore is subdivided into two portions. Detailed information on the evaluation of these tests will be found in standard works on psychological testing such as *The Measurement of Abilities* by Vernon (1940).

Psychological Types

The following argument, which was first suggested to me by G. A. Hodgson in 1943, gives an easily remembered and practical exposition of the influences of psychological trends in the ætiology of cutaneous diseases.

PERSONALITIES WITH HYSTERICAL FEATURES

A hysterical person is one who openly—or without himself recognising it—makes use of illness as a method of obtaining sympathy or privileges, usually by emotional blackmail or social manipulation. He may or may not possess obvious histrionic ability. Since the days of Charcot it has been widely accepted that hysterical persons are prone to develop areas of partial or complete local anæsthesia and may mutilate themselves with injuries that may be apparently purposeful or apparently purposeless in type. With obvious reservations therefore, it can be postulated that if a hysterical patient develops a skin eruption, there will be a reasonable likelihood that that eruption may be self-inflicted.

Besides the hysterical type, what other types of personality are fairly common and easily recognisable? For present purposes, it can be said that there are three which are of predominant interest to the dermatologist—viz., personalities with obsessional features; personalities with severe anxiety, open or concealed; and personalities with narcissistic features.

PERSONALITIES WITH OBSESSIONAL FEATURES

The obsessional man is usually highly intelligent. He is tense, restless, over-conscientious, and preoccupied with cleanliness, order and routine, and in his own words "likes to have matters arranged 'just so.'" He may be obsessed with the importance of his work, his mission or his beliefs. Often he drives himself relentlessly to achieve the highest and most difficult aims to which his keen and competent mind aspires. He is prone to compulsion neuroses. If such an individual develops a skin eruption he tends to develop localised or general pruriginous eruptions which frequently are lichenified. Neurodermatitis (lichenification), pruritus ani and diffuse simple prurigo are the types of eruption to which he is prone, while the hazard of dermatitis medicamentosa is one that he seldom escapes.

Many medical men are obsessional types and every dermatologist has treated colleagues who have the characteristics of the breed. An intelligent obsessional patient who develops scabies usually "is driven mad with the itching." His disease becomes an obsession, he never forgets it. At times he excoriates himself madly: invariably he overtreats himself, applying first benzyl benzoate emulsion in conformity with modern doctrine, and then, because he still continues to itch, plastering himself with sulphur ointment. If his complaint is merely scabies, usually with firm handling he is soon cured. Suppose that it is not scabies: suppose that because of some slight local infection, or some deeply rooted "complex," he becomes obsessed with his anal sensations: then unless he is handled very carefully, he will easily retrogress into the condition of the chronic case of pruritus ani, than which few diseases are more intractable.

PERSONALITIES WITH SEVERE ANXIETY, OPEN OR CONCEALED

The morbid mental perturbation, agitation and distress of these patients is well recognised, but often they mask their psychological symptoms so that only the astute observer recognises at an early stage of therapy that the patient is in fact troubled by an anxiety neurosis.

Rosacea is the classical example of the eruption to which anxiety types are prone; but it should be noted that Klaber and Wittkower (1939), who first drew attention to the psychosomatic factors in this disease, postulated that a pathological change (loss of contractile power) in the small blood-vessels of the face was necessary for the establishment of the eruption. Thus they emphasised the oft-forgotten fact—stressed at the commencement of this paper—that the psychological is but one factor in the ætiology of this, as of many other diseases. In Klaber and Wittkower's series of cases 72% of the patients had abnormal degrees of social anxieties, 40% had long preceding social or sexual stress and 26% had suffered acute psychological trauma immediately before the rosacea developed. In the opinion of these authors, the predominant factors in the psychodynamics of rosacea are an abnormally high level of self-esteem, and life-situations that lead to the production or activation of guilt. "The quality which distinguishes this particular group is their frank and conscious preoccupation with feelings of guilt and shame."

Pompholyx, either of the hands or feet, is common at the present time. Certain cases are due to fungoid infection of the skin, others have evident causes. But there are cases for which no concrete cause can be

found. In these the man may be indicating by a psychological mechanism that he cannot use his hands or feet: if he is a soldier, despite the protests of his conscious mind, he may be dumbly stating the violent belief of his subconscious "My feet must not be used to carry me away from my family and into danger" or "My hands must not be available to do this fearful work." Often by reassurance and suggestion such a case can be patched up; but he is leaning too heavily on the dermatologist or—if the transference is successfully effected—on the unit medical officer. Fundamentally he is an unreliable man and will crack when his unit goes under strain. Units liable to battle service should not be burdened with this type of case; units employed in lines of communication, or preferably at the base, may perhaps be able to carry him.

Besides rosacea and pompholyx, dysidrosis may be a manifestation of unspecific forms of anxiety: that is so well recognised that the colloquial phrase "to sweat with terror" is recognised by most writers as a cliché. It is less well appreciated that chronic dysidrosis is often the result of chronic states of anxiety.

Our colleagues in France have for long recognised that the condition they have named *acnée excoriée des jeunes filles* is largely due to the psychological trends of the affected person in which anxiety may predominate.

There is some little evidence—possibly more a traditional belief than an accepted fact—that lichen planus may be associated with anxiety, with mental worry and with overstrain. Behind the efflorescence of a diffuse seborrhœic dermatitis there may lurk an acute anxiety or a difficult obsession.

Exacerbations of psoriasis may also perhaps be associated with the cumulative effect of a dominating anxiety. It is often stated that "alcohol is bad for psoriasis." The late W. E. Dixon used to teach that the man who takes to drink or drugs usually does not do so through pure viciousness. The patient has usually serious emotional problems and to him the friction of life and the hostility of others causes much more disquiet than to the average person: with the help of a little alcohol or phenobarbitone or cocaine, life becomes much more bearable. So in the case of the man who has a tendency to psoriasis: life becomes difficult and he turns to alcohol for assuagement. Simultaneously the psoriasis effloresces; the physician may blame the alcohol for the efflorescence, but probably he should blame the mental trauma for the exacerbation of the eruption and for the craving for alcohol.

One may here note in parentheses the similarity that may exist between alcoholism and rosacea—although, despite traditional belief, most rosacea cases prefer caffeine to alcohol. Usually—and particularly if they are women—they are heavy tea-drinkers.

PERSONALITIES WITH NARCISSISTIC CHARACTERISTICS

For present purposes, a narcissist may be defined as a person who is self-centred and self-absorbed to a pathological degree; he is unable to outgrow the phase of primitive self-absorption of the infant and to develop a mature capacity for warm human relations. The narcissist has deep convictions of inadequacy. It is noteworthy that usually he is possessed of some infantile physical features, of which an unwrinkled facial skin and an unlined brow are characteristic.

Recently Major E. Miller (1944) has drawn attention to the phenomenon of conceit and narcissism as a factor in the production of dermatoses. The suggested mechanism in some cases is as follows:

The patient tends to be of the conceited type, with an apparent ease of social manner and a facility for making personal contacts. He wears a uniform like a popinjay, as an outward symbol of his awe-inspiring personality. Then, under Service discipline, he slowly or quickly learns that a uniform is designed for much more than personal adornment: a battledress is a dress for battle, and to train for battle a high standard of personal efficiency and knowledge is required. He finds that he is being outstripped in learning by his companions: he begins to feel inadequate: deep down within him he may realise that for all his bravado, battle, woundings and sudden death are more than he can face. His feeling of inadequacy changes to a feeling of guilt, for he knows that sooner or later he will inevitably let down his comrades: he, who posed as the tough soldier, the envied of the unit and the idol of the womenfolk, will fail—and will be debunked and shamed before his fellow men and women.

Now throughout the years of his pride, his personal appearance was the focus of his self-esteem, and because he has concentrated on the importance of his physical beauty, it is his skin that nature selects as the tissue in which the visible signs of the deep mental conflict became manifest; the debunked narcissist solves his mental turmoil and escapes from an insupportable position by means of a skin eruption, which is usually of an exudative type: an eruption which will be singularly resistant to treatment, and prone to relapse unless he can be posted to some unit where his personal safety is ensured and full play can be given to his narcissistic tendencies, or else returned to civilian life where he can cover his inadequacies by boasting of deeds of which—in the event—he never would have been capable.

Hazards of Low Intelligence

So far we have chiefly discussed the influence of certain neurotic trends of personality. In order to develop the argument the issues have been simplified to a degree which is seldom found in practice, and no notice has been taken of the fact that certain neurotic trends overlap; for example an obsessional type of person may be very prone to anxiety neurosis. This matter cannot at the present time be further pursued; instead let us turn to a consideration of the men and women who, we will assume, have no neuroses but who are of low intelligence and have been placed in selection groups 4 and 5.

It has been shown by Hodgson (1941), Winner (1943), Rollin (1943), Hargreaves and MacKenna (1943) that a positive significant relationship does exist between infestations (with *Pediculus humanus and Sarcoptes scabiei*) and subnormal intelligence. This view has been disputed by Mellanby et al. (1942). Nevertheless, though none would say that a person of low mentality has a constitutional hypersusceptibility to ectodermal parasites, such a person runs more risk of contracting infestations than most people because he is less fastidious than others about his associates and also about his standards of personal cleanliness. Also, when he has contracted scabies, the subjective symptoms do not cause him the same degree of mental discomfort as they would cause an individual of superior intelligence, and the disease is therefore well established before he comes for treatment. Often it is the pain of septic lesions which have arisen as secondary complications which drive him to seek advice. Usually he does not coöperate satisfactorily in treatment. For these and other reasons one expects and finds a higher incidence of scabies and pediculosis among persons of low selection gradings—and one finds that these diseases tend to be more severe, more complicated by sepsis and more prone to relapse in these cases than when infestations are encountered in persons of greater mental ability.

The relations of intelligence and personality to types of skin lesion are set out in the accompanying table.

INTELLIGENCE AND PERSONALITY IN RELATION TO SKIN LESIONS

Low intelligence*	Hysterical features	Narcissistic features	Gross states of anxiety	Obsessional trends
Infestations	Self-inflicted lesions.	Exudative dermatoses	Excoriated acne. Hyperidrosis. Pompholyx. Rosacea.	Lichenification. Prurigo simplex. Pruritus ani. Pruritus vulvæ.
Sepsis.				

* i.e., low inborn capacity to learn.

Practical Applications

There are many obvious ways in which these psychosomatic concepts can be applied.

Firstly, persons of low intelligence should be medically supervised with much greater stringency than the average. From the military standpoint, health inspections should be more frequent and more carefully performed in units in which such backward types predominate. In typhus areas, because body-lice are the vectors of typhus, men of low selection gradings

must be carefully watched. Persons of low intelligence do not coöperate satisfactorily in treatment. It is useless, wasteful and perhaps dangerous to leave men of such a type to carry out their own treatment without supervision. A corollary is that because of this lack of coöperation, orderlies dealing with scabies patients should be carefully selected for their efficiency.

It has been suggested that in skin wards it would be a good thing to mix the scabies, ecthyma and sycosis cases with the more mentally alert cases of eczema, prurigo, psoriasis, &c., so that the brighter men might assist the dull ones. But in practice this does not work. The bright intellectuals are afraid of contracting an infective dermatitis or an infestation, while the duller men prefer to keep to themselves in order to preserve the integrity of their egos and thus to prevent feelings of inferiority.

In prescribing treatment for patients it is well to attempt to assess their aptitude, ability and willingness to conform with one's instructions. The obsessional patient, for example, is a ritualist. He likes to perform a precise and elaborate ceremonial of cleaning with oils, bathing with lotions, anointing with unguents and covering with bandages. He will over-elaborate every treatment prescribed, and may tend to add a few surprising rituals and applications to the prescribed regime. He requires to be carefully watched lest he develops dermatitis medicamentosa.

Patients with covert anxiety benefit from reassurance to a great degree. It helps them greatly to see a doctor each day—to discuss their case, their problems, their worries. A vigorous, hearty and strengthening approach assists them enormously. The cloud of their anxiety lifts while one talks to them and then—after one has gone—slowly descends like a thick fog, the promise of next day's visit being the beacon of hope for them in a black world.

There are certain trends which patients suffering from skin diseases show, and their anxieties and troubles in these respects can be alleviated by a careful approach. For example, adults suffering from impetigo, from seborrhœic dermatitis and sometimes from herpes zoster and acute eczema, are prone to develop a leper complex. They feel that they are unclean and that—rightly—men should shrink from them. These cases may be much helped by reassurance, but from the point of view of the therapist it is well to remember that persons with a leper complex tend to overtreat themselves; for example, unless warned not to do so, they will bathe their lesions frequently in warm solutions of antiseptics, and wash their sores and their persons vigorously with antiseptic soaps before applying the remedies which have been ordered. This is one reason for failure of therapy which, unless recognised, may baffle the practitioner.

Chronic psoriasis is often linked with deep repressed emotional factors and the intractability and chronicity of the eruption seems in many cases to depend on the psychological state of the patient. Many feel that when others see their lesions they think that they are syphilitic and unclean. In the Services the life of these men has often been made tolerable by the reassurance of the unit medical officer who has told their immediate companions that the patient's condition is not contagious and not due to his fault, and that he is not to be treated like a leper. If the companions respond to these suggestions, the psoriasis case may lose much of his anxiety and his eruption then usually improves.

Psychiatrists have drawn attention to a technique of case-taking which is of considerable importance to those interested in the practical application of psychological theories to dermatological practice. Briefly the technique consists in taking a carefully dated clinical history from the patient, and then, after a short interval, taking a carefully dated personal life-history, dealing with phases of emotional and social difficulty, successes and failures. The histories are compared, and interesting correlations can often then be detached. By this technique one can uncover emotional situations that have occurred in the patient's life which may have precipitated physiological disturbances and illnesses. The remarkable failure of patients to associate phases of continual strain with phases of illness is not the result of lapse of memory but is a process of active forgetting which in itself is of deep psychological importance.

SUMMARY

Psychosomatic factors in relation to cutaneous diseases are discussed; it is emphasised that these as well as somatic factors should be considered in the evaluation of cutaneous diseases.

A scheme is suggested, based on Hodgson's original observations, whereby certain mental trends can be linked with a proneness to certain types of skin diseases.

The facts uncovered in the course of investigation can be used practically in devising treatment.

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SMALLPOX IN THE MIDDLE EAST

LESSONS FROM 100 CASES

R. S. ILLINGWORTH, MD LEEDS, MRCP, DPH, DCH
W. A. OLIVER, MD LOND., MRCP
MAJORS RAMC; MEDICAL SPECIALISTS

DURING 1943 and 1944 there was a large epidemic of smallpox among the civilian population in Egypt and this resulted in a considerable incidence of the disease among Allied troops stationed there. Since the accepted descriptions of smallpox differ in so many essential respects from our experience, we have thought it important to describe in some detail 100 consecutive cases seen by us in a military hospital.

MATERIAL STUDIED

Of the 100 cases, 95 were military personnel between the ages of 20 and 40. The remaining 5 consisted of 4 adult civilians and 1 baby. All the cases were drawn from the area served by this hospital—an area in which intimate contact with the civilian population was inevitable. Cases occurred in white and coloured troops alike from nearly every nation comprising the Allied Forces in the Middle East. The monthly incidence was as follows.

Month	*Cases*	*Month*	*Cases*
May 1943	10	Nov. 1943	2
June "	10	Dec. "	7
July "	3	Jan. 1944	13
Aug. "	2	Feb. "	18
Sept. "	2	March "	57
Oct. "	1	April "	19

Some of these cases are not included in our series because although they occurred in the same area they were evacuated direct to an outlying isolation hospital without passing through this centre. Six cases were admitted in the pre-eruptive stage and developed smallpox in general medical wards, but thanks to prophylactic vaccination there was only one secondary case.

The cases were of all degrees of severity—54 were of the mild, so-called modified type, in which the rash matured rapidly; 24 were considered to be unmodified, the rash running a normal course; 14 of these were classed as mild and 10 as severe with danger to life; 22 showed hæmorrhagic manifestations and of these 17 were severe.

INVASIVE STAGE

The early symptoms in our cases were entirely non-specific, being similar to those of other acute febrile disorders, such as sandfly fever, malaria, poliomyelitis or enteric fever. Six were admitted to general medical wards as sandfly fever. The symptoms were headache, often severe, with pain behind the eyes, general aches

and pains in the arms and legs, shivering, loss of appetite and occasionally vomiting. Backache, said to be a diagnostic feature of smallpox, was not prominent, and if present was no worse than in many other febrile disorders encountered in the Middle East.

Days of prodromal fever	Cases	Days of prodromal fever	Cases
1	18	5	4
2	11	6	2
3	30	No record available ..	8
4	27		

Most of our cases had prodromal fever for 3 or 4 days before the appearance of a rash, but this was by no means invariable. In 29 cases the prodromal fever lasted less than 3 days, in 18 less than 2 days and in 7 cases the specific rash, in no case a prodromal one, developed on the same day as the fever. Two of these 7 cases died with the severe hæmorrhagic type; one of the 2 was in this hospital for another complaint at the time of onset and we saw the rash begin within 12 hours of the first rise of temperature and develop as a typical smallpox eruption. But most of the other cases with a short prodromal fever were of the modified variety. In 8 cases, usually owing to language difficulties, no accurate estimate of the length of prodromal fever was possible.

Prodromal rashes, which we define as rashes which appear before and disappear with the development of the specific rash, were seen in only 5 cases. The rash was scarlatiniform in one and morbilliform in 4; of the latter, 2 were generalised, 1 localised to the shoulders and 1 to the abdomen. Prodromal petechial rashes were not seen, though petechiæ as the sole hæmorrhagic manifestation of the specific rash were present in 5 cases described below.

SPECIFIC RASH

Non-hæmorrhagic cases.—In all the 78 cases of this type, the specific rash appeared first on the face and trunk (and especially on the back) and never on the extremities. In the earliest stage, therefore, all had the same distribution as chickenpox, and it was only as the disease progressed that more and more spots appeared on the extremities, first on the arms and then on the legs, until at the end of 4 or 5 days the final distribution of the rash was manifest. But in the mildest cases no new lesions appeared after 24–48 hours had elapsed from the first appearance of the spots, so that the rash never developed properly on the extremities and the rash throughout exactly resembled chickenpox. In all these cases two facts were outstanding—that usually there were more lesions on the trunk and face than on the extremities, never the opposite; and that there was never a significantly greater number of lesions below the elbow and knee than above them, the distribution in these areas being equal. The adjective centrifugal applied to the rash was therefore meaningless.

It is well known that the distribution of the rash is modified by previous skin irritation, and this was clearly shown in 2 patients, one of whom had a confluent rash where he was sunburnt and a very sparse vesicular eruption on the unexposed bathing-drawers area. In the other case an infected epidermophytosis of one foot determined a well-marked concentration of smallpox lesions around the infected area.

The modified cases almost always presented with a vesicular rash and practically never with a papular one. The lesions developed very rapidly and the vesicles were often fully mature in 48 hours. Thereafter they either aborted completely or quickly became pustules which had dried to form scabs within a further 2–3 days. Owing to the fact that new lesions continued to appear for 4–5 days "cropping" was simulated in many of the cases. This modified rash in its character, distribution and course was often clinically indistinguishable from that of chickenpox. In nearly all the cases hard shotty lesions, which were often better felt than seen, developed on the palms and soles at an early stage. Though not diagnostic we considered these lesions very suggestive of smallpox. Vesicles on the palate and on the conjunctival mucous membrane were common even in the mildest cases.

A small local outbreak among coloured troops well illustrated some of the features mentioned above. A Jamaican was admitted with a very sparse vesicular rash of about 20 or 30 spots, none of them on the palms or soles, preceded by 3 days of prodromal fever. The rash never developed fully and the distribution remained that of chickenpox. Because of the prodromal fever he was isolated in a smallpox observation tent. Twelve days later 2 more Jamaicans from the same hut in his unit were admitted, each with a still more sparse vesicular rash which had appeared after 1–2 days fever. They remained clinically indistinguishable from chickenpox, but the elementary bodies of smallpox were found in scrapings from their lesions (see below). Two days later 3 more cases were admitted, again from the same hut, 2 with typical mild smallpox and 1 with a rash exactly resembling chickenpox. Finally, after a further 12 days, 3 more cases were admitted from the same hut, all with typical mild smallpox, one with the classic period of prodromal fever, the other 2 with fever for only a day. Four of these 9 cases remained clinically indistinguishable from chickenpox throughout their course, but 2 of them had the typical 3-day prodromal fever, all came from the same hut in the same unit and in 6 the elementary bodies of smallpox were recovered from their vesicles.

The unmodified cases presented with either a papular or early vesicular rash. Some of them on the first day or two closely resembled chickenpox on account of the early distribution, but when the rash was fully developed the diagnosis was obvious. The rash in this group developed at the normal rate, the pustular stage being reached in 5–6 days. The more severe the case the slower was the maturation and the greater the tendency for the innumerable spots to become confluent. Rarely a case which was judged to be severe from the initial density of the eruption proved quite mild, nearly all the lesions aborting from the early vesicular stage. Lesions on the palate, conjunctiva and glans penis were almost invariable in these cases and caused much discomfort. The troublesome cough and sore throat which were usually present were attributed to lesions in the larynx and trachea and on the pharynx. These unmodified cases ran a long course chiefly due to the time required for the last scabs to separate from the feet. Pitting was rarely observed and was confined to those patients who had had confluent rashes.

Splenomegaly was noted in about half of these 78 cases and in a few a generalised lymph-node enlargement was present. All except 3 or 4 of the patients had a high temperature on the first day of the rash. In the mild cases, whether modified or not, this settled to normal quickly, whereas in the severe cases lysis was gradual and there was secondary fever during pustulation.

Of the modified cases none died, while in the unmodified cases there were 2 deaths, one an adult and the other a baby, both with confluent rashes.

Hæmorrhagic cases.—This group consisted of 17 cases with gross hæmorrhagic lesions and of 5 in which numerous petechiæ in the groins and axillæ were the only hæmorrhagic manifestations. The former all presented with a maculopapular rash and never with a vesicular one. As in the non-hæmorrhagic cases, the rash developed first on the face and trunk, and the distribution, if the patient lived long enough for development to be completed, was similar in the two groups. Chickenpox, however, was never simulated. "Measles" was the diagnosis of most cases on admission, though 2 of the series were sent to hospital with the diagnosis of scarlet fever, on account of the so-called lobster rash, the rash *ast-acoïde* of the French authors. They had a diffuse bright red erysipelatoid swelling of the skin, which was tense, hot and painful. Six of our cases had this type of rash; in 3 it was confined to the face while in the others it was generalised. We have not called it a prodromal rash, because it continued to increase up to the time of death, pari passu with the development of the papules, which usually however were few and failed to mature.

One of these cases died on the 5th day of illness without developing a single papule: he developed the lobster rash on the 3rd day of high temperature and was at first mistaken for hypertoxic scarlet fever. Gross hæmorrhages into the skin and from mucous surfaces soon appeared, associated with a remarkable condition of the hands and feet. At first these were merely involved in the generalised intense

erythema and associated brawny œdema, but later the skin of the palmar surface of the finger tips and of the plantar surface of the toes and feet became a greyish-white parchment-like colour with a clear-cut line of demarcation from the intensely inflamed adjacent skin of the feet. These areas looked gangrenous but were not anæsthetic. It was impossible to feel pulsation in either dorsalis pedis artery, though pulsation in the posterior tibial arteries was present. The cause of these phenomena was not apparent, but they have been described before (Wilkinson [1]). It is considered possible that they represented true cutaneous gangrene from strangulation of the blood-supply by the intense œdema.

The cases without the lobster rash all showed dark red macules and papules surrounded by an angry looking crimson halo, in striking contrast to the pink papules in the non-hæmorrhagic cases. It was unusual for more than a few of the papules to vesiculate. The first hæmorrhagic manifestations were cutaneous in all but 2 cases, which began with hæmaturia, and appeared between the 1st and 4th day from the beginning of the rash, in most cases on the 1st or 2nd. In 4 cases the hæmorrhages were confined to the vesicles and in these the normal maturation of the lesions was more apparent (variola hæmorrhagica pustulosa). In the other 13 cases cutaneous purpura was widespread from the start and quite independent of the papules (purpura variolosa). Bleeding from mucous surfaces very soon followed the cutaneous hæmorrhages. Palatal and conjunctival hæmorrhages were universal, and hæmoptysis and hæmaturia, more or less severe, were common. Seven cases had naked-eye hæmaturia. Melæna was present in 2. The very sudden death in one case with diffuse hæmorrhages suggested a cerebral hæmorrhage, but no autopsy was held and this could not be confirmed.

Specific lesions in the mouth were characteristic of the hæmorrhagic cases, and were important in diagnosis. In 6 cases very small grey-white specks were found in the buccal mucosa closely resembling Koplik's spots, but slightly larger and not on a red base. Within 12–24 hours they spread to the gums and palate, and in 24–48 hours had coalesced to form a very characteristic white slough entirely covering the palate and in some cases the tongue. In 5 more cases this white slough was present on admission, and in one East African was of great value in diagnosis since it was difficult to observe the characters of the rash on his black skin. All except 2 of the cases exhibiting these mouth lesions died. The lesions were quite distinct from the ordinary vesicles on the palate seen in the less severe cases.

In 5 of the cases numerous petechiæ in the groins and axillæ, appearing first at the end of the prodromal fever and simultaneously with specific macules, were the only hæmorrhagic manifestation.

In all 17 of the true hæmorrhagic cases constitutional symptoms were very severe and life was endangered from the start. In the 4 cases in which the hæmorrhages were confined to the vesicles, there was some semblance of the usual fall in temperature with the development of the rash. In most of the others the temperature was high throughout, though in 4 it was normal for the last 3 days of life, with a rising pulse-rate. Death occurred in 12 of these cases between the 5th and 12th days of the disease, mostly between the 8th and 9th day, associated in 3 with a terminal bronchopneumonia.

WHITE-CELL COUNTS

Leucocyte counts were done in 19 non-hæmorrhagic cases immediately before or during the first 3 days of the rash. They varied between 3000 and 15,400 per c.mm., averaging 8100. As in most other virus infections, granulopenia was the rule in the leucopenic cases. Counts were done on 12 of the true hæmorrhagic cases and varied between 8800 and 30,000 per c.mm., averaging 15,200. The total count was much higher if repeated at a later stage. In one the count was 18,000 on the 2nd day and 38,000 per c.mm on the 4th day. The differential counts in these cases showed a leuco-erythroblastic blood-picture without significant anæmia. This was a striking feature present to a greater or less degree in every case examined. The findings in 2 typical cases are shown in the table.

1. Wilkinson, P. B. *Lancet*, 1943, i, 120.

WHITE-CELL COUNT IN 2 CASES OF HÆMORRHAGIC SMALLPOX

Type of cell	Case 1 Total 30,000	Case 2 Total 38,000
	%	%
Myeloblasts	1·0	—
Promyelocytes	1·0	0·5
Neutrophil myelocytes	5·0	3·5
Polymorphs		
Young form	4·0	11·0
Band form	10·0	22·5
Segmented	11·0	39·0
Eosinophil	4·5	1·0
Lymphocytes		
Prolymphocytes	3·5	3·0
Medium	23·0	8·0
Small	31·0	11·0
Monocytes	0·0	0·5
Polychromatic normoblasts	6·0	Many

Platelet-counts were done in 2 cases. In one case on the 3rd day the count was 60,000 per c.mm., coagulation-time 3½ min. and the bleeding-time longer than 10 min. On the 4th day the platelet-count was 33,000 per c.mm. In the other case the platelets were so grossly reduced in numbers that an accurate count was difficult, but the coagulation-time was 8 min. and the bleeding-time 9 min.

VACCINATION STATE

All except 4 cases had been previously vaccinated. The total number of vaccinations performed on the remaining 96 was 217; 70 of the 96 had been vaccinated successfully within 2 years and 16 between 2 and 8 weeks before the disease started; 3 of these 16 vaccinations were performed in this hospital and the so-called immune reaction was observed after 48 hours, but one of the patients died 2 months later of hæmorrhagic smallpox. The 22 hæmorrhagic cases had had a total of 42 vaccinations; 11 had been vaccinated within 2 years and 18 within 5 years.

The 14 fatal cases had had a total of 19 vaccinations and only one had never been vaccinated; 2 had been vaccinated between 2 and 8 weeks previously, one successfully, the other unsuccessfully; 8 had been successfully vaccinated within 2 years and 10 within 5 years. Scars were present in at least 8 of these cases.

Of the 4 unvaccinated cases, 3 lived, though 2 of these had a very severe but non-hæmorrhagic attack. The patient who died had a severe unmodified attack with a confluent rash.

PROGNOSIS

It is clear from the foregoing facts that even very recent vaccination is no guarantee of a modified attack, for one patient vaccinated by one of us, and observed to have a typical immune reaction after 48 hours, died with gross hæmorrhagic manifestations 2 months later. But 14 of the 16 cases vaccinated within the previous 2 months were of the modified type. Successful vaccination within 2 years is of still less value as a prognostic criterion, for 33 of the unmodified and hæmorrhagic cases had records of such successful vaccination.

Neither the length nor the severity of the invasive stage was any guide to prognosis. Many of the modified cases were severely ill during this stage. True prodromal rashes were likewise of no prognostic value, for of 5 cases, 3 had modified and 2 had unmodified attacks.

The character of the specific rash in its early stages was found to be of considerable value in prognosis. Cases presenting with sparse vesicular rashes always had mild non-hæmorrhagic attacks, whereas cases presenting with a profuse macular or papular eruption were usually severe, though very occasionally such rashes aborted after 2–3 days and the attack was mild. No case resembling chickenpox in its early stage died. But of the cases in which the initial macules were surrounded by a crimson flare—the type resembling measles—all became hæmorrhagic and nearly all died, though in one such case the rash aborted on the 5th day and the patient rapidly recovered.

The rate of development of the specific rash was also found important. Vesiculation within a day, and the development of but few new lesions within 24 hours of the first appearance of the rash, were evidence of a modified attack, while slow maturation of papules and the appearance of numerous new lesions for 4 or 5 days indicated an unmodified attack.

Of the cases with hæmorrhagic manifestations, none with petechiæ alone died. One of the 5 had a modified attack and the other 4 unmodified, 3 with danger to life. Of the 13 cases with ecchymoses (purpura variolosa), 10 died and the 3 others had very severe attacks. Of the 4 with hæmorrhages confined to the pustules (variola hæmorrhagica pustulosa), 3 died and the other had a moderately severe attack. All cases with hæmatemesis, hæmoptysis or hæmaturia died. All 6 cases with the lobster rash and 9 of the 11 with the white slough in the mouth were fatal. The bad prognosis of hæmorrhagic manifestations is thus evident.

DIFFERENTIAL DIAGNOSIS

Before the appearance of the rash, we found, even in the presence of an epidemic, no features sufficiently constant to be of diagnostic value. The symptoms were simply those of an acute infection and had no specific characteristics. After the appearance of the rash, we found little difficulty in diagnosing the unmodified cases, though the typical characters and distribution of the rash were often not apparent for 4–5 days. It was in the modified cases that we experienced the most difficulty.

Modified cases.—These all resembled one disease only—chickenpox—the mildest ones throughout their course, the more severe ones for the first 1–2 days only. We found the following points of value in the diagnosis.

(*a*) *Length of prodromal fever:* When this was longer than 2 days, smallpox was the probable diagnosis, but it is important to note that 7 of our cases of smallpox developed specific rashes on the 1st day of fever and 11 others had prodromal fever for less than 2 days.

(*b*) *Distribution of the rash:* In chickenpox we always found the classical centripetal distribution with far more lesions on the trunk than on the extremities and with very few lesions on the palms and soles, and if there were such lesions they were invariably soft and superficial. In the earliest stages of smallpox the distribution was exactly similar and it was only after 2–3 days that the appearance of more and more spots on the limbs, both above and below the elbows of knee, and the development of hard and deep lesions on the palms and soles, made differentiation possible. Even when the rash was very sparse, a few such lesions on the palms and soles were almost always present and in our opinion were very suggestive of smallpox. We could not agree that the lesions of smallpox avoid the flexures.

(*c*) *Examination of scrapings from the base of the vesicles for elementary bodies of variola:* These elementary bodies were found in 47 out of 50 cases proved by their course or the development of associated cases to be smallpox. Diagnosis was possible on the first appearance of papules or vesicles and therefore on the first day of the rash. The test was therefore of great value in the early elimination of chickenpox. Details of the test and findings in these cases are being published elsewhere (Van Rooyen and Illingworth).

(*d*) *Splenic enlargement* in the presence of a vesicular rash was slight evidence in favour of smallpox, though little reliance could be placed on this finding in our cases owing to the frequency of previous malaria with residual splenic enlargement.

The following points were found to be of no diagnostic value.

(*a*) *Previous vaccination:* As shown above, previous and even recent vaccination by no means ruled out the possibility of smallpox.

(*b*) *Rapidity of maturation of the rash:* In many of the modified cases maturation was even more rapid than in chickenpox.

(*c*) "*Cropping*": Owing to this rapid maturation in modified cases and to the fact that, except in the very mildest cases, new lesions continued to appear for 4–5 days, it was inevitable that all stages of the rash from vesicles to scabs should be present at the same time, thus closely simulating the classical cropping of chickenpox.

(*d*) *Umbilication* was often present in chickenpox and as often absent in modified smallpox.

(*e*) *The shape of the lesions:* If allowance was made for the modification in shape by the site of any particular lesion, there was no significant difference between smallpox and chickenpox. In both the lesions tended to be oval in the skin folds and round on exposed parts.

(*f*) *General condition:* After the invasive stage was over, patients with modified smallpox were at least as well as those with chickenpox.

(*g*) *Successful vaccination during the disease;* We vaccinated 19 proved cases of smallpox, including unmodified cases, 1–14 days after the appearance of the rash; 16 showed the typical immune reaction in 48 hours when compared with control uninoculated scratches. Successful vaccination therefore did not exclude the diagnosis of smallpox.

In short, there was no single point other than a positive vesicular scraping which was entirely reliable for diagnosis. But consideration of a history of recent exposure, the length of the prodromal fever and the distribution of the fully developed rash enabled a clinical diagnosis to be made in most cases.

Hæmorrhagic cases.—Those with lobster rashes initially resembled scarlet fever, with which diagnosis 2 of them were admitted, but the red brawny swelling of the skin with a few interspersed angry looking macules surrounded by a crimson flare established the correct diagnosis. The rest all resembled measles. In both measles and smallpox there are usually a 3-day prodromal fever, soreness of the eyes and throat and cough, and in measles there may be a hæmorrhagic element. The early character and distribution of the rash in the two diseases may be very similar, but the measles rash tends to be pink and the severe smallpox more crimson. There is no true catarrh in smallpox. Vesiculation could not be relied on for differentiation because many of the severe cases of smallpox died before vesiculation began.

The absence of true Koplik's spots we did find of diagnostic value, but the earliest mouth lesions in hæmorrhagic smallpox, before their coalescence and the formation of the characteristic white slough, in some cases gave rise to considerable difficulty. Scrapings from the base of the papules showed the elementary bodies of smallpox in very large numbers, so this laboratory test was again of value in distinguishing doubtful cases.

It is possible that the association of purpura with fever and a leucoerythroblastic blood-picture might be a source of confusion with some acute blood diseases, though the presence of a few typical macules and the mouth lesions are sufficiently diagnostic in most cases. We were interested to note however that one of our fatal cases came from a house in which about 10 days previously there had been a case diagnosed by a civilian doctor as acute leukæmia with hæmorrhagic manifestations.

TREATMENT

In the absence of any specific therapy, good nursing is the most important part of treatment. Often much tactful persistence was necessary on the part of the nursing staff to maintain an adequate calorie and fluid intake when buccal and œsophageal lesions made deglutition so painful. A sedative, usually phenobarbital but sometimes morphine, was always necessary in the cases with profuse eruptions to allay the irritation and tense feeling of the skin. The skin was washed with soap and bathed 4-hourly with 1:4000 perchloride of mercury from the first day. As soon as the acute stage had passed the feet and hands were soaked for 15 minutes three times a day in hot water, followed by the application of soft paraffin to soften the deep lesions of soles and palms, the desquamation of which always considerably prolonged stay in hospital. For acutely tender areas of skin tulle-gras gave relief. A cradle was used to keep bedclothes off the feet. The eyes were irrigated 4-hourly with normal saline and if conjunctivitis developed 10% silver protein drops were instilled twice daily. The mouth was treated with saline or potassium chlorate and phenol mouth-washes 4-hourly.

Sulphonamides, chiefly sulphanilamide and sulphathiazole, were given in ordinary doses to most patients, in the severe cases from the onset and in the others when pustulation commenced. Though no controlled work was done on their effect, there was no evidence that they were of benefit—14 of the treated cases died. It is true that pocking was rare in our cases but there is no evidence that sulphonamide therapy was responsible. In order to determine whether sulphonamide-sensitive organisms were present as secondary invaders in the pustular stage, we cultured the contents of unbroken pustules in 15 cases and every culture was sterile. It is

therefore difficult to see how sulphonamides could be expected to be of value.

Convalescent serum (30–50 c.cm.) from recently recovered cases was given to 3 patients expected to have severe attacks, but all died.

DISCUSSION

We have described 100 consecutive cases of smallpox as we actually saw them. It is clear from this description that many of the accepted diagnostic criteria are not always tenable, at least so far as concerns smallpox in Egypt. There are some points we should like to emphasise. Modified smallpox cannot be diagnosed with certainty from chickenpox from the distribution of the rash alone until the rash has fully developed—i.e., 3–5 days from its first appearance. For the diagnosis of smallpox reliance on 3–4 day prodromal fever, on the commencement of the rash on the extremities, on centrifugal distribution and on the absence of cropping will inevitably lead to serious error. It should therefore be admitted that often an early clinical diagnosis is impossible, and dogmatism without laboratory support in the early stages should be avoided. We have found the examination of papular and vesicular scrapings extremely reliable and feel that the test may become a routine procedure. The very close resemblance of the early stages of the hæmorrhagic cases to measles has not been adequately emphasised in the textbooks and reports to which we have had access. It will be remembered that the Glasgow and Rickmansworth outbreaks were due to this confusion. We draw particular attention to what we have called "pseudo-Koplik spots"—the early small white lesions in the buccal mucosa characteristically present in the hæmorrhagic cases, which at least for some hours closely simulate the true Koplik's spots of measles.

The considerable incidence of severe smallpox in recently vaccinated personnel requires further investigation. We cannot say how many of the vaccinations enumerated by us were successful, but in view of the simplicity of the procedure we cannot believe that the recording of false positives was a significant source of error if the lymph was satisfactory. Nevertheless, the interpretation of the immune reaction demands some experience, especially in dark-skinned races, and may be impossible without a control scratch. Even so an apparent immune reaction may be due to low grade sepsis or sensitivity to protein in the lymph. A control scratch had not usually been made in the area from which our cases were drawn until 1944.

It is a remarkable fact that of the civilian cases arising in the same epidemic in the same area, less than 0·1% were hæmorrhagic and in consequence the mortality was very much less than in our cases. But the total incidence of smallpox was much higher than among military personnel, as is to be expected. Both communities have been vaccinated with lymph obtained from the same source. After the epidemic started the Egyptian public health department advised a three-scratch technique, whereas for most of the period during which our cases occurred a single-scratch technique was the routine method used by Service medical officers. It is reasonable to conclude that this significant lessening of the severity of smallpox among a community theoretically much less well protected may be due to the better protection afforded by their method of vaccination, and that the protection afforded by vaccination is in fact proportional to the area of skin inoculated.

In conclusion, we see no value in the use of cumbrous and confusing names, such as variola hæmorrhagica pustulosa, purpura variola, varioloid, alastrim and variola vera, to describe cases of different grades of severity. In this epidemic we saw all these types of case and there was no doubt that they were one and the same disease.

SUMMARY

The 100 consecutive cases of smallpox in a Middle East military hospital here described were of all degrees of severity, including 22 with hæmorrhagic manifestations. The case-mortality was 14%.

Clinical diagnosis in the early stages is often impossible. Little reliance could be placed on 3–4 day prodromal fever, commencement of the rash on the extremities, centrifugal distribution or absence of cropping. The hæmorrhagic cases closely resembled measles in the early stages, even to the presence of buccal lesions resembling Koplik's spots.

Examination of scrapings from papules or vesicles for elementary bodies was of great assistance in the differentiation from chickenpox.

All but 4 of the cases had been vaccinated, most of them by the routine one-scratch technique, and 70 within 2 years. Hæmorrhagic and fatal cases were very few among civilians in the same epidemic, vaccinated with the same lymph, but by a three-scratch technique.

Our thanks are due to Major C. E. van Rooyen for examining scrapings from our cases; to Lieut.-Colonel R. Bodley Scott, officer in charge of the medical division, who saw most of our cases; to Colonel W. B. Stevenson, officer commanding the hospital; and to Major-General J. C. A. Dowse, Director of Medical Services, Middle East Forces, for permission to publish this paper.

USE OF THE BOTH RESPIRATOR TO REDUCE POSTOPERATIVE MORBIDITY

WILLIAM W. MUSHIN, M B LOND., D A
NANCIE FAUX, M B LOND., D P H, D A

Nuffield Department of Anæsthetics, University of Oxford

ANÆSTHETISTS and surgeons alike should by now be alive to the salient facts about the ætiology of postoperative chest complications. The type and site of the operation are undoubtedly the most important determining factors. Others of significance are the presence of sepsis, a pre-existing respiratory infection, including that found in the heavy smoker, and the patient's sex, age and general health. We would refer those who have not had the opportunity of following up the postoperative course of their own patients to the important papers by King (1933) and Brock (1936). We agree with Brock in exonerating the anæsthetic agent as being of importance and we concur when he says, "To imagine that the simple replacement of inhalation anæsthesia by local or spinal, for a patient known to be a bad risk, will avoid such a complication, shows a child-like faith borne of inexperience or insufficient observation."

Impaired mobility of the diaphragm after abdominal operations was recorded as long ago as 1890 by Pasteur, and Rees-Jones (1941) has demonstrated radiologically that it exists even before the patient has recovered from the anæsthetic. Anyone with a personal experience of abdominal section will be familiar with the disinclination to breathe deeply or cough when there is a painful abdominal wound. Contributing factors to inadequate respiratory movements are morphinisation and tight bandaging. Surgeons and nurses commonly regard the sitting posture, perhaps a legacy of Fowler, as necessary for the postoperative treatment even of clean abdominal operations. Although this position may make breathing easier, it detracts from the value of coughing, since the sputum now has to be brought up against gravity (Brock 1936, Nosworthy 1944). The sitting position keeps pus in the pelvis but it also keeps secretions in the bronchi. If pulmonary secretion, normal or pathological, is not removed, bronchial obstruction of some degree is inevitable and the stage is set for the development of atelectasis and its sequelæ.

TRIAL IN 24 PATIENTS

An attempt was recently made to ascertain whether by ensuring full respiratory movements major respiratory complications could be avoided. Macintosh (1940) reported two cases of gastrectomy that had been nursed in the Both respirator for 24 hours immediately after operation, with excellent results. We proposed to carry out this form of treatment on a larger number of patients.

In its original conception the experiment was simple. Nothing seemed easier than to take patients from the operating table to the respirator and submit them to what was at worst a harmless procedure. We could not however prevent "Both respirator" being translated into "iron lung" nor foresee how sinister these words would sound both to the public and to our surprise to some of our surgical and nursing colleagues.

It would be incorrect to say that the patients enjoyed their brief spell in the Both respirator. They were not apprehensive, but owing to the physical constraint were glad to be taken out at the end of 24 hours. On no occasion did the treatment give rise to any anxiety on our part. The nursing problem is no different to that encountered in cases of poliomyelitis. The combined effects of operation, anæsthetic and postoperative morphine make the recollection of the first 24 hours after a major operation hazy to the great majority of patients. Our series were no exception, and on subsequent inquiry none of our patients felt that their stay in the Both respirator had added to any discomfort they may have experienced.

Our group is admittedly small. It would have been greater even in war-time but for the inertia to be overcome in carrying out clinical research on patients in whom the anæsthetist has no "proprietary rights." However, we hope that our results, while in no way conclusive, will justify a repetition of the experiment, and we feel that this would be best done under the stimulus of a surgeon.

Results.—Twenty-four patients were nursed in a Both respirator for 24 hours after abdominal operations. Fourteen out of the twenty-four patients had no detectable complication whatever. The remaining ten patients had minor respiratory complications only. These ten were not obviously ill and had no gross physical signs in the chest. They are included however because they had a cough and some of them a temperature not exceeding 100° F. Seven of this group of ten gave a history of heavy smoking or of bronchitis or other respiratory ailment previous to the operation. No patient in the whole series suffered any major respiratory upset, such as atelectasis. We have not listed the 10 minor complications that occurred since minute subdivision would be unprofitable in so small a series. The encouraging nature of these results will be appreciated by reference to the operations done.

Cholecystectomy	8	Pelvic operations	4
Gastrectomy	1	Herniorrhaphy	7
Colectomy	1		
Appendicectomy	3	Total	24

Without such mechanical duress, it is difficult to conceive of an upper abdominal operation not being followed by some impairment of respiratory function. The frequency with which postoperative complications are recorded inevitably varies with the diligence with which they are sought. In a training school for young anæsthetists we have deemed it good discipline to avoid complacency. In recording postoperative complications we therefore strain at gnats; recent literature would suggest that some are prepared to swallow camels. We feel on this account it would be useless and indeed misleading to compare our results in this series with those published by others, since, to put it kindly, the yardsticks by which complications are deemed worthy of record differ with individual anæsthetists. We have, however, compared them with a series of patients of our own, operated on in the same period but not nursed in the Both respirator. We are aware of the fallacies of making deductions from small numbers, but we record that in this control series of twenty-four abdominal sections the incidence of postoperative chest complications was higher and in fact included two cases of lobar atelectasis.

SUMMARY

A series of 24 patients who had been subjected to abdominal section were nursed in a Both respirator for twenty-four hours postoperatively.

The operations done are known to have a high incidence of postoperative respiratory morbidity but none of the 24 patients suffered a major respiratory complication.

We are indebted to Prof. R. R. Macintosh for the original conception of this research and for his encouragement, and to the Matron and nursing staff of the Radcliffe Infirmary for their coöperation.

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TRAUMATIC SUBDURAL EFFUSION IN CHILDREN

JOHN P. LANIGAN, FRCSI
ASSISTANT SURGEON TO THE NEUROLOGICAL DEPARTMENT, RICHMOND HOSPITAL, DUBLIN

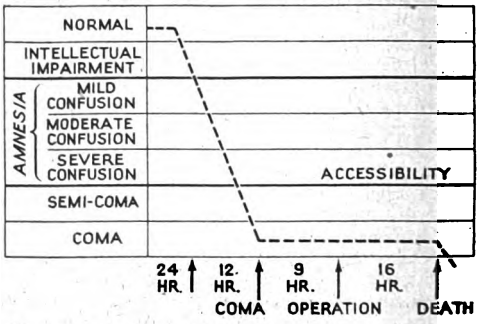
WITHIN six months 3 children in the Richmond Hospital, Dublin, have had subdural hydroma or effusion after a head injury which was not associated with any initial concussion or amnesia and therefore gave no cause for immediate anxiety. After such injuries two possible developments must be kept in mind: (1) an extradural hæmorrhage, and (2) a subdural lesion, either a hæmatoma or effusion. Any of these conditions can follow a trivial accident and have serious consequences if left untreated.

CASE-HISTORIES

CASE 1.—A girl, aged 3, fell down twelve steps of stairs at 12.40 PM on Feb. 26, 1944. The father (who was a doctor) testified that the child was well for half an hour and then developed a paralysis of the right arm and leg. This lasted about an hour and then apparently cleared up, to be followed by a severe convulsion lasting 30 minutes. At 4 PM, when admitted to hospital, she was conscious but very irritable; temp. 97·8° F., pulse-rate 180. In addition, there were twitchings of the right arm and leg, with incontinence of urine. Radiography of the skull was negative. At 6.15 PM the child was quiet, but had an obvious paresis of the right limbs. A provisional diagnosis of an expanding lesion on the left side, possibly an extradural hæmorrhage, was made. At operation (A. A. McConnell) under local anæsthesia a left temporal trephine opening was made without revealing any extradural lesion. However, on puncturing the dura a considerable quantity of clear fluid escaped. Further fluid was obtained by enlarging the dural opening and passing a curved director in all directions. The brain, which was not pulsating when first exposed, was then pulsating freely. The wound was stitched without drainage and the patient returned to the ward. The child was now bright and alert and able to move the right limbs freely. She was discharged on the 9th postoperative day, having made an uninterrupted recovery.

Fig. 1

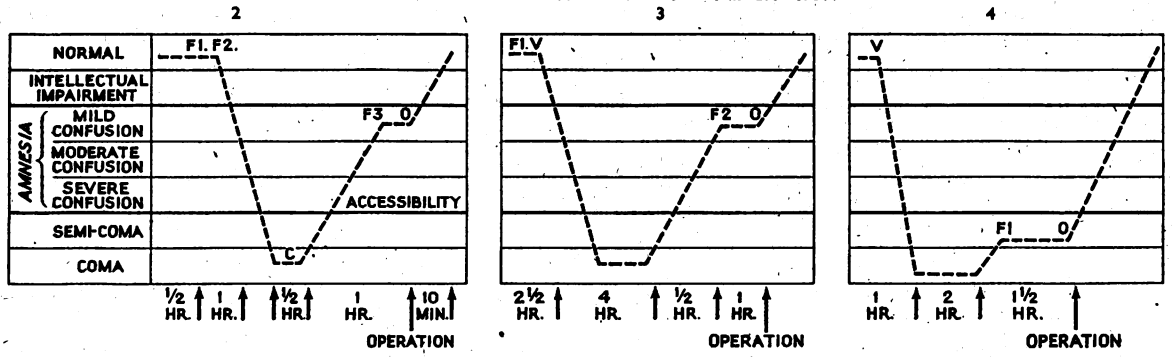
PROGRESS OF CASE OF EXTRADURAL HÆMORRHAGE



It will be noted that the amount of cerebrospinal fluid in the subdural space was not sufficient to impair consciousness except during the actual convulsion, but was sufficient to produce focal signs.

CASE 2.—On May 1, 1944, at 4.30 PM a girl of 4 fell off a wall. She was able to walk home immediately and describe the accident but later there was difficulty in speech and she vomited. At 7 PM she became unconscious and was taken to a near-by hospital where she regained consciousness 4 hours later. On admission to the Richmond Hospital at 11.45 PM she was drowsy but able to give some account of herself. There was a definite paresis of the right arm and hand, with a right facial palsy of upper-neurone type; temp. 97·2° F., pulse-rate 108. Radiography of the skull did not reveal any fracture. There was no evidence of aphasia though the patient was right-handed. At 12.45 AM (May 2) bitemporal trephine openings were made under local anæsthesia, and a condition similar to that described in the previous case was found on the left side, and to a much lesser extent on the right side. Before leaving the theatre the child was able to hold a cup in the right hand and take a drink. At 9 AM there was a slight attack of twitching of the right side of face and the right hand, but this only lasted a few minutes and subsequent recovery was uneventful, with discharge on the 10th day.

PROGRESS OF THREE CASES OF SUBDURAL EFFUSION



F1 = onset of right hemiplegia. F2 = end of hemiplegia. C = convulsion. F3 = right hemiparesis.
F1 = aphasia. F2 = hemiparesis, right arm and face. V = vomiting.
V = vomiting. F1 = left hemiplegia.

An interesting feature of this case is the lack of progression or persistence of the focal signs. Shortly after the accident there was a degree of aphasia accompanied by vomiting, to be followed 2½ hours later by coma which lasted 4 hours. Such waxing and waning of signs over so short a period would be unusual with hæmorrhage, and may help in differentiating these lesions before operation.

CASE 3.—On June 1, 1944, at 9 AM a boy of 2 fell off a chair striking the back of his head. He cried, and was put into a perambulator by his mother who noticed nothing unusual about him. During the next hour he vomited twice, and at 10 AM he was seen to be unconscious. A doctor verified the comatose state, and the child was admitted at noon to the Richmond Hospital, where after examination by Mr. Bouchier Hayes, he was transferred to the neurological department. He was now semicomatose with a spastic left arm, flaccid left leg and a double Babinski sign; the pupils were equal and reacting to light; pulse-rate 132. This state was interrupted at intervals by short attacks of twitching of the left limbs.

In the light of our previous experience a diagnosis of a subdural effusion was made, and the child was prepared for operation. Shaving the scalp revealed a small bruise over the right occipital region. At 1.30 PM a right temporal trephine opening was made without revealing any extradural lesion. However, on opening the dura in the usual manner a free flow of fluid was obtained which filled the trephine opening several times. Further fluid was obtained by enlarging the dural opening and passing a director. The brain, which at first was not pulsating, was now doing so freely and coming up to dural level. The wound was closed without drainage. At the end of the operation, which was performed under local anæsthesia, the patient was accessible and could move his left limbs, though not as freely as the right. The bilateral Babinski sign had disappeared, and before leaving the theatre he was able to ask for, and hold, a cup of water using both hands. At 6 PM there was no evidence of any focal sign, and he was discharged on the 8th day.

This case consolidated our beliefs as to the points of difference between a subdural effusion and a hæmorrhage.

DISCUSSION

It may be useful to compare these cases with one of middle meningeal hæmorrhage in which the patient was found unconscious in bed 36 hours after being struck on the head with a stone, and was admitted to the Richmond Hospital 9 hours later (Lanigan 1942). Here a large extradural hæmatoma was evacuated on the left side, but he died 16 hours afterwards without regaining consciousness. The course of events (fig. 1) indicates a progressive expanding lesion with the usual fatal result when cerebral compression has been left untreated so long. Presumably the patient's condition deteriorated during the night, for he went to bed "perfectly well," and nothing abnormal was noticed until it was found impossible to waken him at 6 AM.

Figs. 2–4 show that in the cases of subdural effusion there was some improvement before operation—cessation of the convulsion in case 1, recovery from coma in case 2, and the change from coma to semi-coma [1] in case 3. In all of them, however, the focal signs persisted, and though further improvement might have taken place without operation the question how long it is safe to wait for focal signs to clear is, I think, of academic interest only.

It is important to be aware of the possibility of a subdural effusion, because it can be removed by a simple operation without adding any risk. When an extradural hæmorrhage is suspected but cannot be found, the operator must look for another lesion to explain the patient's state.

In this paper I have used the term "subdural effusion," though earlier writers referred to fluid between the dura and the arachnoid by a variety of names, of which "subdural hydroma" is perhaps the most common. In the cases recorded here the condition appears to have been an extravasation of cerebrospinal fluid through a tear in the arachnoid membrane—though such a tear was never actually seen, and all injury to the arachnoid was carefully avoided at operation. Similar cases have been reported by da Costa and Adson (1941) and McConnell (1941), who give references to the relevant literature. All of them may be regarded as examples of pure extracerebral lesions, for there was no sign of any initial involvement of the brain

1. See Medical Research Council War Memo no. 4, 1944, for psychological terms used.

SUMMARY

Three cases of subdural effusion in children are reported. The lack of progression and persistence of symptoms is emphasised by comparison with a case of extradural hæmorrhage. It is suggested that such cases are best treated by early operation.

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COMPARISON OF SULPHONAMIDES IN BACILLARY DYSENTERY

D. G. FERRIMAN
DM OXFD, MRCP
SQUADRON-LEADER, MEDICAL SPECIALIST, RAF

G. K. MACKENZIE
MB EDIN.
SURGEON LIEUTENANT RN

SULPHATHIAZOLE, sulphaguanidine and sulphanilamide have been compared in 56 cases of bacillary dysentery at an RAF hospital in West Africa. Every case passed at least one pure blood and mucus stool. Dysentery bacilli were isolated in 27 of the cases. No case received anti-amœbic treatment, nor was *Entamœba histolytica* seen in the stools. Malignant tertian malaria had to be excluded. Cases with blood-smears positive for malarial parasites have been rejected. Cases of malarial dysentery with negative blood-smears may recover without antimalarial therapy; good reasons exist for believing their probable numbers to be negligible.

Time of return of stools to normal (in days) was taken as the measure of efficacy. Twenty-four hours' constipation was often the first intimation of recovery in cases responding rapidly; this was counted as half a day. Drugs were each tried in a small series of cases, and then given in strict rotation. Sulphaguanidine was prescribed in initial 6 gramme doses, followed by 3 g. four-hourly. The other two drugs were given in initial 2 g. doses followed by 1 g. four-hourly. Treatment became six-hourly when stools reached normal, and lasted a minimum of six days.

The average times to recovery were for sulphanilamide 3·6 days (18 cases), sulphaguanidine 3·4 days (18 cases), and sulphathiazole 2·7 days (20 cases). The numbers of cases which took longer than 3 days were as follows: sulphanilamide 13 cases (2 took 5 days, 1 took 4½ days, 5 took 4 days, 5 took 3½ days); sulphaguanidine 10 cases (1 took 5 days, 8 took 4 days, 1 took 3½ days); sulphathiazole 2 cases (both took 3½ days).

Average recovery times, and more so the relative frequencies of the longer periods, suggest that sulphathiazole is distinctly more effective than sulphaguanidine. Sulphanilamide appeared to be effective, though less so than the others. Paulley (1942) found sulphapyridine more effective than sulphaguanidine. Scadding (1944) apparently found the same; he comments on sulphapyridine's tendency to cause vomiting. We found sulphapyridine extremely effective but abandoned it on account of vomiting. Paulley's suggestion that sulphonamides act as much on the organisms in the bowel wall through the blood-stream as directly on those in its lumen may explain the greater effectiveness of these soluble drugs. Choice depends partly on toxicity, however, and sulphaguanidine is generally considered to cause less complications; but its solubility and toxicity may be greater than was at first thought (see *Lancet*, 1944a b). We decided that sulphaguanidine was the choice in mild cases, and in those with dehydration where the risk of renal complications was greater. Sulphathiazole was considered valuable in other severe cases, notably because of its rapid relief of discomfort.

We wish to thank the Medical Directors General of the Royal Air Force and Royal Navy for permission to publish this paper; and Squadron-Leaders R. J. O'Connor and M. Nelson for laboratory assistance.

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Scadding, J. G. (1944) *Ibid*, i, 784.

CHANGES IN THE MARROW SMEAR IN EARLY MEGALOBLASTIC HYPERPLASIA

M. L. THOMSON, M D ABERD., M R C P
ASSISTANT PHYSICIAN, SALFORD ROYAL HOSPITAL

THE appearance of the marrow smear in severe megaloblastic anæmia is familiar, but deviations from normal in the early stages of megaloblastic hyperplasia are less well known. Patients are rarely subjected to sternal puncture until the peripheral blood shows definite changes, so opportunities for the study of early megaloblastic changes are limited. The marrow findings in the following case are thus of interest.

CASE-HISTORY

A man, aged 43, was referred by Dr. D. H. Mackenzie with a history of increasing ataxia over eleven months. Onset insidious. Difficulty in walking accompanied by a feeling of "walking on boards" with some stiffness of the legs. Recently there has been a sensation of tightness encircling the abdomen. Some urgency of micturition and occasional incontinence. The symptoms have been progressive with no intermissions. No previous serious illness.

He was spare, with no apparent anæmia, and a normal tongue. No abnormal findings in heart, lungs, or abdomen. Urine clear. Cranial nerves and upper limbs normal. His abdominal reflexes were absent, but he had no sensory loss on the trunk. Motor power was impaired in the lower limbs, but there was no apparent muscle wasting. Skin sensation normal. Impaired vibration sense in the left leg. Joint sense impaired. Tendon reflexes equal but much exaggerated; plantars flexor; ankle-clonus present. Rombergism; gait seriously ataxic, some spasticity. Cerebrospinal fluid: 4 lymphocytes per c.mm.; total protein 50 mg. per 100 c.cm.; chlorides 720 mg. per 100 c.cm.; Lange gold curve 0000000000; Wassermann reaction negative.

A fractional test-meal showed complete achlorhydria.

Blood-counts before and after treatment with 'Hepatex,' 4 c.cm. daily for a week, are shown in table I, and marrow-counts in table II. The diagnosis made was subacute combined degeneration of the cord with early pernicious anæmia.

TABLE I—BLOOD-COUNTS BEFORE AND AFTER TREATMENT WITH 'HEPATEX,' 4 C.CM. DAILY FOR 1 WEEK

Findings	BEFORE TREATMENT	AFTER TREATMENT
Hb.	92% (Haldane)	112%
Mean diameter of red cells	7·6 μ	7·2 μ
Red cells	4,590,000	5,850,000
	Anisocytosis and some poikilocytosis	Stain normally
Colour-index ..	1·0	0·95
White cells	9800	7000
Polymorphs ..	66%	74%
Monocytes ..	6%	2%
Lymphocytes ..	28%	24%
	Some macrocytes (megalocytes) present	
Marrow smear ..	Early megaloblastic hyperplasia	Normoblastic reaction

INTERPRETATION OF MARROW FINDINGS

Before considering the changes in the marrow smear in detail certain considerations must be taken into account. An attempt to give an accurate picture of a marrow smear presents difficulties. The nucleated red cells—particularly the more immature types—tend to occur in groups and many of the larger cells are pushed to the margins of the slide in making the smear. The leucocytes have a similar uneven distribution. To obtain a representative count the film must be examined from margin to margin over a considerable area. For the purpose of this paper 1000 nucleated cells were counted on this principle. A further difficulty arises from the presence of a percentage of cells which defy classification. These consist of deformed or smear cells and of nuclei which appear to have no cytoplasm. Some of the latter resemble the nuclei of lymphocytes, others are larger and lack any clear morphology while the remainder are probably pyknotic nuclei extruded from mature red cells. Many hæmatologists believe that nucleated red cells can be grouped only on broad morphological differences (megaloblasts, early and late erythroblasts, normoblasts) and do not recognise any finer differentiation. The point at which a megaloblast becomes an early erythroblast must necessarily be ill-defined and much confusion arises from the varying conceptions of the cells included under the term "megaloblast." The work of Israëls[1] has been outstanding in clarifying the position, and his classification and terminology are used in this report. The recognition of early megaloblastic changes has practical

TABLE II—MARROW-COUNTS (ISRAËLS'S TERMINOLOGY); 1000 CELLS COUNTED ON EACH OCCASION

Findings	BEFORE TREATMENT Hypercellularity definite	AFTER TREATMENT Rather less definite	Findings	BEFORE TREATMENT Hypercellularity definite	AFTER TREATMENT Rather less definite
	%	%		%	%
Pro-erythroblasts	1·4	0·6	Intermediate myelocytes	14·7	14·1
Megaloblasts A	2·5	0·0	Late myelocytes	21·4	24·5
,, B	6·1	0·0	Polymorphs ..	14·5	17·4
,, C	1·8	0·0			
Normoblasts A	0·4	2·4	Lymphocytes	5·6	4·3
,, B	1·4	4·5	Monocytes ..	0·2	0·4
,, C	4·8	7·4	Türk cells ..	0·1	0·4
			Smear cells ..	4·2	4·5
Myeloblasts ..	1·7	1·4	Nuclei ..	7·0	10·0
Early myelocytes	12·2	8·1	Erythro-myeloid ratio	1 : 3·5	1 : 4·4

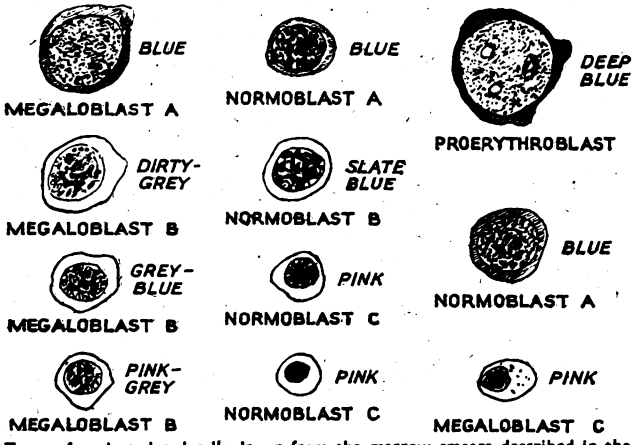
value, and it is at this stage that classification of red cells on broad differences alone is likely to fail diagnostically.

Israëls's classification demands a close study of nuclear detail and involves difficulties which must be clearly stated. Though the pro-erythroblast may well include two cells of differing developmental type (the pronormoblast and the promegaloblast), they cannot at this early stage be differentiated morphologically. The megaloblast A does, however, present recognisable differences in nuclear pattern from the normoblast A and the great majority of these cells can with experience be placed in their proper group. At the next stage in maturity the megaloblast B with its finely reticular nucleus is in contrast to the normoblast B in which the nucleus contains condensed chromatin clumps. At the C stage, however,

1. Israëls, M. C. G. *J. Path. Bact.* 1939, **49**, 231; *Ibid*, 1940, **50**, 145.

differentiation is blurred, since the nucleus has become pyknotic in both types. Nevertheless some of these late cells can be recognised as megaloblasts C. Fortunately differentiation at this stage is unnecessary for purposes of diagnosis.

In the description which follows only those cells about which no doubt was entertained are described as megaloblasts. Types of varying degrees of maturity occur which are intermediate between megaloblasts A, B and C, but since only pathological cells are described as megaloblasts intermediate cells are included under the group which they most closely resemble and do not affect in any way the trend of the picture. When pro-erythroblasts are described as "megaloblasts," their differentiation from early erythroblasts presents a different problem and a real difficulty which will be discussed later.



Types of nucleated red cells drawn from the marrow smears described in the text. Colour of the cytoplasm is indicated (Leishman's stain).

The types of cells described are illustrated in drawings made from the marrow smears (see figure). Whitby and Britton[2] have a good coloured plate showing erythroblasts.

DISCUSSION

The most noteworthy features of the marrow before treatment are the high percentage of megaloblasts B and the marked general hypercellularity. The myeloid series shows considerable hyperplasia of normal type, but with a shift to the left. The diagnosis, however, rests primarily on the high percentage of megaloblasts B. Yet some hæmatologists do not recognise these cells as megaloblasts, but restrict the term to pro-erythroblasts and megaloblasts A. In this case the pro-erythroblasts show no great increase, nor does the percentage of pro-erythroblasts and megaloblasts A taken together. Nevertheless the marrow is megaloblastic. If normal cells (pro-erythroblasts) are described as "megaloblasts," it is important that normoblasts A should be clearly differentiated. Since pro-erythroblasts normally develop into normoblasts A, intermediate types are met with and normoblasts A can be clearly recognised only when they have attained a certain maturity. A possible source of error in marrow interpretation is the inclusion of normoblasts A as "megaloblasts," and the description of intense normoblastic hyperplasias (in which pro-erythroblasts and normoblasts A may be present in significant numbers) as "megaloblastic" or "mixed megaloblastic and normoblastic" reactions. By limiting the name "megaloblast" to pathological cells Israëls has done much to overcome this difficulty.

In the present case, after daily liver injections for a week, the marrow reverted to a normoblastic type with lessening of the myeloid hyperplasia and of shift to the left. The peripheral blood showed a corresponding improvement.

SUMMARY

A case of subacute combined degeneration of the cord showing early blood changes is described.

The details of the marrow smear before and after treatment with liver are given, and the appearance of early megaloblastic change is discussed in detail.

I am indebted to Dr. A. A. Lovett for the peripheral blood-counts.

2. Whitby, L. E. H., Britton, C. J. C., Disorders of the Blood, London, 1944, plate III, p. 11.

Reviews of Books

The Venereal Diseases

JAMES MARSHALL, MB LOND., command venereologist to Eastern Command and London district; lately senior RMO at London Lock Hospital. (Macmillan. Pp. 340. 21*s*.)

IN this country, before the war, the diagnosis and treatment of venereal disease was largely left to the specialist. Undergraduate instruction was superficial, and the average practitioner, faced with a case, usually referred the patient immediately to the clinic. The increase in venereal disease since 1940 has again brought the importance of its diagnosis and treatment to the fore, and many practitioners have found themselves ill prepared for these tasks. This book will supply their want. The first three parts deal adequately with gonorrhœa, syphilis and the rarer venereal diseases, including also a useful chapter on other conditions encountered in venereology—e.g., non-gonococcal urethritis, phimosis, paraphimosis, balanitis, condylomata acuminata, scabies and *Trichomonas vaginalis* infestation. The final part describes in detail the technique of urethral irrigation, urethroscopy, dark-ground examination for *Spirochæta pallida*, the collection of blood for serological tests, intravenous and intramuscular injection, lumbar puncture, circumcision, fever therapy and chemical prophylaxis.

The book has over 100 illustrations, 8 coloured plates, case-histories and tables; with very few exceptions the facts are presented accurately and the teaching is sound and orthodox.

Industrial Toxicology

DONALD HUNTER, MD LOND., FRCP, physician to the London Hospital. (Clarendon Press. Pp. 80. 10*s*.)

Dr. Donald Hunter's Croonian lectures for 1942 (*Quart. J. Med.* 1943, **12**, 185) have now been republished in book form. He does not deal with all the toxic substances encountered in industry but has selected the most important. The book is divided into four main sections: the metals, the aromatic compounds, the chlorinated hydrocarbons and the glycol group. The section on lead poisoning bears the stamp of Dr. Hunter's special experience of both clinical and experimental aspects, and he writes with equal authority on the organic mercury compounds, benzol, and tri-ortho-cresyl-phosphate. The article on benzol supports the view that it is better not to use this solvent at all, but that if it is used ventilation should be as good as possible; in a workshop the characteristic odour of benzol should be regarded as a danger signal. The clinical picture of industrial poisoning by tri-ortho-cresyl-phosphate is that of a polyneuritis with a flaccid paralysis of the distal muscles of the upper and lower limbs. Recovery is slow but usually complete. Non-industrial cases of poisoning had been known for 40 years before the first industrial case was reported; they were seen in patients with pulmonary tuberculosis treated with phosphocreosote, in people who had drunk Jamaica ginger or "jake," in women who had taken apiol as an abortifacient, and in those using a soya-bean cooking oil which had been accidentally adulterated. All these substances were found to contain varying proportions of the compound. Experimental evidence suggests that the phenyl ester and also the meta- and para-cresyl esters are harmless.

The book is a welcome addition to British works on industrial medicine, attaining a high standard both in scholarship and readability.

Biology Staining Schedules

(2nd ed.) R. R. FOWELL, M SC. (Lewis. Pp. 24. 2*s*.)

THIS pamphlet gives an adequate description and explanation of simple routine staining methods, and is suitable for elementary students to have with them in the laboratory.

Sir Humphrey Milford is publishing the English edition of COBB'S *Borderlands of Psychiatry* (*Lancet*, 1944, i, 54) at the Oxford University Press on Nov. 30. The price is to be 14*s*.

Medical Societies

MANCHESTER MEDICAL SOCIETY

A MEETING of this society on Oct. 4 was devoted to

Thyrotoxicosis and Thiouracil

Dr. M. L. THOMSON said that treatment with thiouracil seemed to be symptomatic rather than curative, and the hope of a cure lay in maintaining the patient's health until the thyroid gland returned to normal. Among 109 published cases there was 1 fatal case of agranulocytosis in a patient receiving 2 g. daily. Of 13 cases he himself had treated over periods up to 9 months, 3 were submitted to operation, 1 because of rapid increase in the goitre (in a girl aged 15), 1 because of neutropenia a week after treatment began, and 1 at the patient's request. The remaining 10 showed a good response to the drug, but relapsed 2–8 weeks after it was discontinued. During the initial 10 days when 0·6 g. was given daily the patient should be in the ward and frequent white-cell counts were needed. Later at least weekly attendance as an outpatient was essential for white-cell counts and observation. During this period a dosage of 0·2 g. daily was usually necessary until the patient's weight returned to normal. As a further maintenance dose 0·1 g. or even 0·05 g. daily might suffice. There were 3 cases of chronic auricular fibrillation and 1 was regularised by thiouracil. There were no toxic complications apart from neutropenia in 1 case, transient maculopapular eruption (1), transient itching of the skin (2), and doubtful drug fever (1). The impression gained was that the main field of usefulness for thiouracil at present was in cases judged unsuitable for operation or where the risk of operation was higher than usual. Until the potentialities of the drug had been fully explored, all patients should be treated at centres where facilities for control were available.

Prof. JOHN MORLEY said that at the moment surgical treatment seemed to give the best results; the objections to thiouracil were that it does not cure, increases the size of the goitre (requiring more urgent removal), necessitates continuance of treatment, and carries a great risk of agranulocytosis. Its effects were slower than, and inferior to, those of iodine in preoperative treatment, and it produced troublesome vascularity of the gland. His operative results showed only 51 (2·4%) deaths in a series of 2094.

Mr. R. W. WYSE referred to the operative difficulties, arising from increased vascularity, in those of Dr. Thomson's cases requiring surgical treatment after taking thiouracil.—Mr. WILSON HEY was interested in the possibility of using thiouracil as a diagnostic test.—Dr. J. F. WILKINSON emphasised the need for care in testing these new drugs, in view of the risk of undesirable toxic effects such as agranulocytosis, acute hæmolytic anæmia, and thrombocytopenic purpura. Such treatment should be given only in hospitals or clinics where adequate constant control could be maintained. He had had good results with thiouracil in cases unsuitable for X-ray or surgical treatment or where these had failed.—Dr. REGINALD ELLIS had noted vomiting after the use of thiourea, with immediate relief on cessation of the treatment; iodine subsequently produced its normal response. One patient had remained well for 3 months after initial treatment with thiouracil but had then shown a sudden recurrence of thyrotoxic symptoms which did not respond to thiouracil.

New Inventions

DISTRACTOR FOR FRACTURED LEG

THE appliance described here was originally devised to suit emergency conditions at an EMS hospital with limited orthopædic equipment, but reduction with this distractor has proved to have definite advantages which may justify its wider use.

The apparatus consists of a footboard with a groove cut to fit the leg of whatever table is in use (fig. 1). Through the pulley fitted into the same board runs the traction cord, which is attached to the shorter arm of a lever supported by a block two or more inches high to give the lever a sufficient range of excursion. No screws or turnbuckles are needed.

The patient is placed on the table with the fractured leg hanging at a right angle over the edge or over a firm support (fig. 2). A pin or wire through the os calcis is connected with a stirrup and the cord is attached to the stirrup. The operator sits in front of the leg. He can now depress the lever with his foot while his arms are free to manipulate the fracture. He can achieve the desired degree of distraction with a minimum of effort and with no time lost with screwing and unscrewing, as with the rigid types of distractors. The "elasticity" of the device enables him to feel his way through all the stages of the reduction, and he has only to relax slightly the pressure on the lever and his sense of touch will tell him whether impaction has taken place.

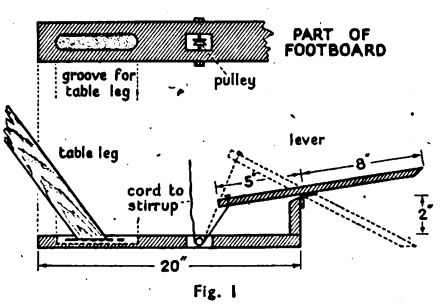


Fig. 1

Herein lies one of the principal advantages of the apparatus. Screw devices convey sometimes a false sense of security, and radiograms do not always tell us the degree of impaction with certainty. The dangers of distraction of fragments, especially in lower leg fractures, need no emphasis. Occasionally one may overestimate the chances of manipulative reduction in a particular fracture—e.g., in some spiral fractures—and little will then have been lost by using this method in the first place. Relaxing the pressure on the lever allows one to detect the case in which repeated displacement of the fragments occurs; one will then be able to proceed without delay to open reduction and internal fixation, if so desired. The operator will be spared the unpleasant surprise of "slipped" fragments some days or weeks later, after the leg has been put into plaster-of-paris.

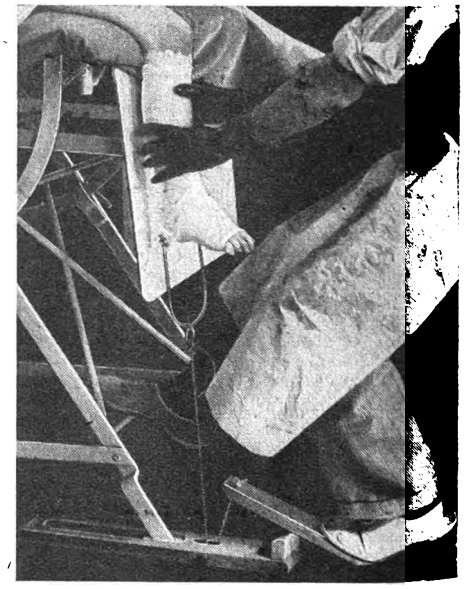


Fig. 2—The distractor apparatus.

Once the fracture is reduced, a plaster cast is applied with the pin or wire incorporated. It may sometimes be tiresome to keep the foot on the lever all the time until the plaster cast has set or while a compound fracture is dealt with, and an attendant can then fix the traction cord by fastening a clip to it just behind the pulley.

The device can be made by any hospital joiner without difficulty at the cost of a few shillings. My model was made by Mr. G. Rollisson, our joiner, who assisted me with his technical advice. The apparatus has also proved satisfactory at the EMS Orthopædic Hospital at Pinderfields in more than a score of suitable cases. I have to thank Mr. Geoffrey Hyman, consultant orthopædic surgeon at that hospital, for putting it on trial and for his constructive criticism.

County Hospital, Keighley. M. P. LAUFER, MD BRNO.

THE LANCET

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Psychiatric Clinics

THE Goodenough report on medical schools has an important chapter on the teaching of psychiatry. The writers demonstrate clearly the need for bringing psychiatry into closer relation with general medicine, and the need therefore for better instruction in the subject both for the future practitioner and for the future psychiatrist. Some readers of the report, however, believe that the practical proposals made would have the unwelcome effect of stereotyping the instruction provided; and so serious a possibility demands consideration. The Goodenough Committee, it is suggested, have underestimated the value of the independent clinics established by psychotherapists at a time when psychological teaching and treatment were lacking in our great hospitals. Also they remark that the teaching of normal psychology "should avoid sectarian disputes," and though this phrase may only be equivalent to saying that the time of biology students should not be wasted in examining disputes about evolution, it has been interpreted in some quarters as a threat to academic freedom. In the light of history it is regarded as an anemographic straw.

Under various guises a fundamental difference of outlook has shown itself again and again through the centuries. Should we look for the explanation of human behaviour in terms of humours, chemistry, nerve-cells, conditioned reflexes and the like; or must we consider the reactions of the man as a whole, under the stimulus of desires and instincts that call for conceptions belonging to a sphere other than that of test-tubes and microscope slides? Nineteenth-century medicine chose the first alternative, and several generations grew up accepting it without question. To those who qualified thirty years ago psychology was still an embryonic study, while the term "functional nervous disorder" was intended to describe one that had its origin in a disturbance of some physiological function of nerve tissue. Then came FREUD'S new conception of those disorders, involving emotions and instinctive urges and mental processes beyond the consciousness that had hitherto been accepted as the whole of what we call mind. This attack on fundamentals called forth strong opposition, but gradually the new ideas permeated medicine. At the height of the controversy psychiatrists were generally on the side of the opposition while psychotherapists represented the new ideas. Differences of opinion there must still be in this vigorous and expanding specialty, but controversy is all to the good so long as it is scientific.

The report suggests that, in the course of time, as the various medical teaching centres throughout the country build up their psychiatric departments, each will take its share of training specialist psychiatrists; meanwhile it will be necessary to look to Edinburgh and London as the principal centres. In London the Maudsley Hospital, aided by the resources of the London County Council's mental health service, could, in association with the British Postgraduate Medical School, develop as the European centre of progress in psychological medicine. Such a result would be a source of pride, and the suggestion is welcome provided alternative or competing psychiatric views have their opportunity. So far as postgraduate teaching is concerned, such opportunity is provided at present by some of the medical schools, with their psychological departments, and by those independent clinics whose psychotherapeutic approach to psychoneurosis has helped to enrich our understanding of the processes of the mind. The high standard of work of these clinics is indicated by the part taken by their members today in Army psychiatry, where psychiatrists of all shades of opinion are working together harmoniously and efficiently. The question, then, must be: how should these independent clinics be incorporated into the system of official medical education? Should they be embodied in the existing university schools, or affiliated to the university psychiatric clinic? The Goodenough report was of course concerned only with organised teaching. Nothing proposed in its pages could hinder the development of non-university clinics by the same means as in the past: they would still be at liberty to follow any line of study that seemed good to them, and to teach those who wished to learn. It is reasonable to assume, however, that if development is along the lines suggested by the Goodenough Committee money may not be made available to them as generously as, for instance, to the Maudsley Hospital. In the past the Maudsley, like the independent clinics, has received nothing from the University Grants Committee, and research there has been financed largely by the Rockefeller Foundation. It seems desirable that independent clinics, unless violently heterodox, should also be fitted into the university system, with proper safeguards about the standard of teaching. We are faced once more with the old problem of how to plan in a free society—or how to provide for freedom in a planned society.

Smallpox Among the Vaccinated

THE clinical difficulties encountered by ILLINGWORTH and OLIVER in an outbreak of smallpox in the Middle East, mostly among military personnel, have a familiar ring. In the 100 cases discussed on another page they found that the general symptoms of the invasive stage resembled those in other diseases, backache not being the prominent symptom their textbooks and teachers had led them to believe. The duration of the pre-eruptive phase varied so widely that it became of doubtful diagnostic value in many cases. In consequence the diagnosis often turned on the rash, which in unmodified cases was characteristic by the time efflorescence was complete. In modified cases, however, no single criterion could be relied on, not even the distribution, which was sometimes indistinguishable from chickenpox. RICKETTS[1] in 1908 wrote: "In every epidemic cases arise in which the eruption is so highly modified and the character of the lesion is so anomalous that there is an inadequate basis for diagnosis." Nevertheless, relative distribution is the most dependable of all signs, and the DG EMS has recently reissued in pamphlet form a 1923 lecture by WANKLYN in which

1. Ricketts, T. F., Byles, J. B. Diagnosis of Smallpox, London, 1908.

this point receives special emphasis. ILLINGWORTH and OLIVER, stressing the occasional resemblance of severe smallpox to measles, describe a misleading stomatitis in some cases with early lesions which they call pseudo-Koplik's spots. In scrapings of these and the cutaneous lesions they found Paschen's elementary bodies, which enabled them to make an early diagnosis in 47 out of 50 cases. The test [2] is based on the large size and special arrangement of the elementary bodies of variola. A stained film of the scrapings, examined with a magnification of 1000, can be reported on within half an hour of the collection of the specimen. The results are positive as early as the first day of the rash, and for this reason especially the test promises to be of immense value. The old flocculation and complement-fixation tests,[3] besides requiring a high standard of serological technique and suitable controls, were positive only late in the disease, giving only a retrospective diagnosis; PAUL'S[4] rabbits' cornea test is said to be disappointing in its results. In the new test clumps of elementary bodies can be readily recognised, and if they are not present in large numbers the test is negative. Clusters of the extruded elementary bodies are found close to ruptured epithelial cells, from which rows of bodies may stretch across the film. They are demonstrated with ease in the papular and vesicular stages, but when pustulation and secondary infection set in they disappear. By contrast the elementary bodies of chickenpox are too small, too few and too feebly staining to be detected by this simple film technique. It remains to be seen how valuable the test will be in less expert hands.

A disturbing feature of this outbreak was that it occurred in a highly vaccinated military population—96% had been vaccinated at some time, a vaccinal state about three times as good as that of the non-military population of Great Britain. Is, then, vaccination less efficient than it was? If it is, does the fault lie with the lymph, the vaccinator or both? STEVENSON, in another paper in this issue, exonerates the lymph. He reminds us that for the last 60 years those conversant with the disease have recognised that vaccination and revaccination, however carefully performed, do not confer absolute immunity. There is indeed no sharp division between susceptibility and immunity, but all gradations of resistance to infection. As a clinical test vaccination provides a useful standard, but like all biological tests it is not to be regarded as absolute. The protection provided by all forms of active immunisation varies in degree and duration, and despite widely held views to the contrary this has always been so after vaccination. Thus occasionally the immunity conferred by vaccination is lost with astonishing rapidity. Among ILLINGWORTH and OLIVER'S cases such instances were common, if the records of successful vaccination can be relied on: 70% had been vaccinated successfully within two years and 16% within two months. But such records are not always reliable; a disturbing observation has been the significantly high number of Service men who successfully "take" when revaccinated after a short interval. The proportion of successful insertions varies with the experience of the vaccinator. In an excellent supplement recently revised,[5] the Army Medical Department emphasise three aspects of vaccination—the insertion, the interpretation, and the recording of reactions. Lymph should be used within a week of "manufacture," but if properly refrigerated can be kept for a fortnight. In preparing the arm disinfectants should be eschewed and reliance placed on cleansing with soap and water and drying carefully with a sterile swab. The insertion should be made through the lymph just deep enough to draw a little blood without causing free bleeding. The vaccination should be allowed to dry before applying a (non-disinfecting) dressing; since this takes several minutes and is likely to slow up long parades there is a tendency to hurry it. STEVENSON rightly questions the evidence for the widely held view that immunity increases with the number of insertions, but does not deny the possibility. Perhaps more insertions simply increase the chances of a take. The Army has now reverted to multiple insertions when there is special danger. In the absence of an epidemic a single insertion is to be made. When this does not take, two further attempts must be made at weekly intervals using three insertions. Vaccination is to be repeated every 5 years for troops on home service and every 3 years for troops overseas. In the presence of an epidemic all at risk must be revaccinated, using three insertions, unless they have been successfully vaccinated within the previous fortnight; if there is no take two further attempts must be made at intervals of 4 days. Few susceptibles will pass this sieve.

The most serious fault in current vaccination practice is the unsatisfactory inspection and recording of reactions. Vaccination may be followed by three different types of reaction according to the degree of immunity. A primary reaction is the ordinary "take" or vaccinia of susceptibles; it reaches its maximum intensity *after* the 7th day and is followed by a solid immunity of variable duration. Among MINNING'S[6] group of 717 men vaccinated by the multiple pressure (acupuncture) method, nearly 2% lost their immunity so quickly that when revaccinated 10–15 months later they reacted with a second vaccinia. The second type, the accelerated or vaccinoid reaction, reaches its maximum *within* 7 days and is regarded as an aborted vaccinia due to moderate immunity. The third type, the "immediate" reaction, which reaches its maximum within 72 hours, is regarded as evidence of a high degree of immunity, and is named "the reaction of immunity"; but in fact the type of response, the time of maximum intensity and the duration of the reaction bear a close resemblance to bacterial hypersensitive reactions. The pitfalls in reaching conclusions about immunity from tests of sensitivity are apparent to those who have had, for example, to interpret tuberculin tests in terms of immunity to tuberculosis. Inability to appreciate the significance of these early reactions is responsible for the spreading view that every vaccinated person must react in one of these three ways; a complete failure is not accepted. Yet failures to take due to

2. van Rooyen, C. E., Illingworth, R. S. *Brit. med. J.* 1944, ii, 526.
3. *Spec. Rep. Ser. med. Res. Coun., Lond.* no. 143, 1929 (Burgess, W. L., Craigie, J., Tulloch, W. J.). *Ibid*, no. 156, 1931. (Craigie, J., Tulloch, W. J.).
4. Paul, G. *Beitr. klin. InfektKr.* 1919, **7**, 267.
5. *Army med. Dep. Bull.* Suppl. no. 9, November, 1943. *Ibid*, Suppl. no. 18, October, 1944.
6. Minning, C. A. *Bull. US Army med. Dep.* August, 1944, p. 82.

immunity are common and are to be expected on a-priori grounds. The danger lies in interpreting all failures to take as evidence of immunity, when some arise from failure to vaccinate properly. Moreover, if immediate reactions are due to sensitivity the subject may still be susceptible, as was ILLINGWORTH and OLIVER'S patient who died of hæmorrhagic smallpox 2 months later. A further difficulty has arisen because some medical officers have assumed that an "immune" reaction occurred in all cases not having vaccinia or a vaccinoid reaction. They have entered an immune reaction in their records although they did not inspect the arms until a week or more after the vaccination, by which time immediate reactions would have passed off.[7] Clearly records of "immune" reactions are unreliable and the interpretations to be placed on them call for further investigation.

The limitations of vaccination must be clearly stated despite the mighty pens ready to exaggerate every failure. But we shall continue to regard it as the surest safeguard against a loathsome and fatal disease and seek "to fence off as many of the pitfalls and signpost as many of the right roads" as possible.

Sulphonamide-Resistant Gonorrhœa

THE sulphonamide drugs, valuable as they are in the treatment of gonorrhœa, have not survived the test of time as the universal remedy for that disease. Even the earlier reports described a proportion of failures, which seemed to increase with experience but decreased with the advent of more potent and less toxic derivatives. The most striking failures are those in which the causative organism does not disappear from the secretions and the disease takes its course without effect from large doses of normally potent remedies. It has been thought that some strains of the organism are naturally immune from the bacteriostatic effects of the drugs; others acquire immunity through under-dosage in the early stages of the disease. There has been laboratory evidence that strains which are thus resistant in the body are also resistant in the test-tube, and cases have been cited in which husbands and wives, or others known to be infected with the same organism, showed similar lack of response to treatment with adequate dosage. But some held this evidence unconvincing and believed that the root of the trouble was inability of the infected host to develop those immune bodies which alone can give the coup-de-grâce to an organism restricted in its power to reproduce itself. The recent work of HARKNESS[8] supports this view. He found that with gonococci cultivated from 21 clinically resistant and 12 susceptible cases there was no correlation between laboratory and clinical findings; indeed, 3 strains from clinically resistant patients were among the most susceptible in vitro. Moreover, of 87 couples in whom it could be assumed that man and woman had been infected by the same organism, in 13 one or other of the partners proved to be resistant to treatment, but in only 2 instances were both partners resistant. This problem has been investigated from another aspect by BOROFF,[9] whose observations suggest that the sera of certain people have an anti-sulphonamide action in vitro, and that this action bears a direct relation to their clinical resistance to sulphonamide therapy. All the sera of 13 patients with gonorrhœal urethritis clinically resistant to sulphonamide therapy inhibited the action of sulphathiazole on a susceptible strain of pneumococcus in vitro, and in some cases the inhibitory action persisted when the sera were diluted to 1 in 20. In 5 cases which showed clinical response to sulphonamides the inhibiting power of the sera diluted 1 in 2 was absent or far less, save in one case, in which smears and cultures of the prostatic secretion demonstrated the gonococcus five days after sulphonamide therapy was discontinued, although clinical cure had appeared to be complete. This work is as yet in its early stages, but it suggests that another laboratory test, apart from that of drug-susceptibility of the infective organism, may help us to forecast the probable value of sulphonamide therapy in the individual case.

Whatever the reason for the failure of treatment in sulphonamide-resistant cases, many clinicians have the firm impression that such cases are increasing in number and that the proportion of successes obtained with sulphonamides in gonorrhœa is progressively falling. The most disquieting of these reports comes from Italy, where the disease is particularly prevalent. CAMPBELL[10] reports that the results obtained with sulphathiazole and sulphapyridine in the treatment of Army patients in Algeria and Tunisia showed a close parallel with those in the United Kingdom. But during the campaigns in Sicily and Italy the experience from the first was very different. Short courses of treatment which had previously given as much as 70–75% of good results were successful in less than 25%, and many of the apparently cured cases relapsed. Dosage was therefore increased from 10 g. of sulphathiazole in two days to 25–30 g. of sulphathiazole or sulphapyridine in four or five days. Nevertheless second courses of treatment were necessary in 70–80% of cases and many patients continued to show gonococci in their secretions after long and heavy dosage. Some improvement resulted from better facilities and more expert supervision, but even so less than half the cases of acute gonorrhœa responded to the generous initial course of sulphathiazole, and relapses and local complications remained common. If this experience is repeated throughout the liberated countries of Europe the tax on man-power and on the medical facilities of the fighting services is likely to be severe. Certainly the high hopes that gonorrhœa would cease to be a serious problem to armies in the field must be tempered with misgivings.

Fortunately penicillin promises to reduce this gap in the therapeutic defences. Increasing supplies have permitted large-scale trials in the treatment of gonorrhœa, and the early results are very satisfactory indeed. Of 4439 sulphonamide-resistant cases treated in United States naval hospitals between July 1943 and March 1944, no less than 4258 (96%) were accepted as cures after one course of treatment.[11] Of the 181 failures, 141 were re-treated with penicillin and success was claimed in 139 of them; thus there were only 2 definite penicillin failures. In most of these patients the drug was injected intramuscularly

7. See *Ibid*, 1944, **79**, 2.
8. Harkness, A. H. *Brit. J. vener. Dis.* 1944, **20**, 2.
9. Boroff, D. A. *Bull. US Army med. Dep.* July, 1944, p. 111.
10. Campbell, D. J. *J. R. Army med. Cps*, 1944, **82**, 269.
11. Schwartz, W. H., Edge, C. O. *Nav. med. Bull., Wash.* 1944, **43**, 193.

or intravenously, but the intramuscular route was regarded as the one of choice. Intramuscular dosage varied from 71,000 to 125,000 Oxford units, with an average of 99,000 units per case; the tendency throughout the period of investigation was to reduce dosage. The intravenous method required more penicillin, and was no more effective. The optimum dosage was thought to be 20,000 units every three hours for 5 doses. Similar success is reported [12] in 1686 sulphonamide-resistant cases treated in fifteen US Army hospitals with total amounts of penicillin ranging from 40,000 to 160,000 units intramuscularly. There were 126 failures from the single course but all responded to a second or third. The results were as good when the whole course was completed within twelve hours as when it was spread over twenty-four. A dosage of 50,000 units seemed to be on the borderline of effectiveness, giving in one hospital only a 50% cure-rate; with this amount there was no margin to allow for loss of potency on storage, or inaccuracies of assay. Here again the optimum dosage seemed to be 100,000 units given 20,000 at a time three-hourly. No follow-up was possible in these cases and the maximum period of observation was 21 days. GREENBLATT and STREET [13] have obtained 100% recovery-rate with penicillin in 109 female patients ranging in age from 3 to 48 years, all but 8 of whom had had one or more courses of sulphonamides; they report cure in 104 cases with a single course of 60,000 to 150,000 units, and in the rest with a second course. They end their paper with a warning against undue optimism until it is certain that there will not be trouble from asymptomatic carriers or penicillin-resistant strains of gonococci. There is no lack of similar claims from other sources. Nevertheless, many of the early reports on the treatment of gonorrhœa with sulphonamides claimed successes which were not far short of these. It would be premature to conclude that as penicillin becomes generally available the problem will cease to exist. Other and well-tried remedies remain, and may keep their place.

In the early days of sulphonamide therapy it was noted that better results were obtained in acute gonorrhœa if the course of sulphanilamide was begun after time had been allowed for an antibody response to the infection to develop. This observation is recalled by HARKNESS's good results in sulphonamide-resistant cases when fever was induced by intravenous vaccine three weeks after the disease was contracted. During the intervening period he controlled the infection by low-pressure irrigations of the urethra. CRONIN [14] has suggested a method whereby the pyrexial effect of intravenous TAB vaccine may be prolonged by giving the vaccine in an intravenous drip. His aim was to maintain temperature at or above 103° F. for at least five hours and the treatment was effective in 14 cases of resistant gonorrhœa with courses of vaccine which ranged from 8000 to 27,000 million organisms. There were no major ill effects, but the procedure is probably more risky than CRONIN seems to suppose; deaths have been reported from the use of large doses of TAB intravenously, and even his initial dose of 500 million was larger than that which others have found necessary to stimulate an adequate reaction. NICOL,[15] for instance, using the "divided-dose" technique, found that two doses each of 25 million organisms provoked an excellent response in most cases. Treatment by hyperpyrexia produced by mechanical means, whether by Kettering hypertherm or inductotherm, fell into neglect when so much was expected from the sulphonamides, and looks like being eclipsed altogether by the new star, penicillin. The recent work of WALLACE and BUSHBY [16] has given proper emphasis to its hazards; and any treatment which requires such exacting standards should not be administered except under ideal conditions. But given these conditions it may remain an important therapeutic measure for the otherwise hopeless case.

12. Sternberg, T. H., Turner, T. B. *J. Amer. med. Ass.* 1944, **126**, 157.
13. Greenblatt, R. B., Street, A. R. *Ibid*, p. 161.
14. Cronin, E. *J. R. Army med. Cps*, 1944, **82**, 263.
15. Nicol, C. S. *Brit. J. vener. Dis.* 1942, **18**, 47.
16. Wallace, J., Bushby, S. R. M. *Lancet*, 1944, **ii**, 459.

Annotations

THE YEARS BEFORE SCHOOL AGE

CARE of the young child whose mother has to go out to work has been provided for many years by nursery schools. These offer him, "nurture" as Margaret McMillan conceived it—rest, fresh air, good food, active and stimulating play and an ordered social life with others of his own age. Nursery schools, however, are still relatively few, and all have waiting-lists. In some areas they are supplemented or replaced by nursery classes in the elementary schools, but these have not the same tradition, and are often poorly equipped for the management of small children. Moreover, before the war they rarely provided a midday dinner, which is regarded by the Nursery School Association as an essential part of the job. Both nursery schools and nursery classes cater for children between the ages of 2 and 5. During the war years it has been necessary to provide care for many more such children, and even for infants, whose mothers wished to supplement their income by working in industry, as well as for some of those whose homes had been destroyed by bombing. This led to the development of both day and residential war-nurseries. In their report for the year ending last March the Ministry of Health say that the total number of nurseries in operation was then over 1500, and the original programme had already been completed. There were also 750 war-time nursery classes in operation and 159 nurseries which kept open day and night so as to cater for the children of women on night-shift. About 400 residential nurseries, with about 13,000 places, have received babies and children under five. A few nurseries take "short-stay cases"—children whose mothers cannot look after them for a week or two because they are having another child, or for some other reason.

War-time nurseries have undoubtedly served a necessary purpose; but, despite some shining examples, they have not proved an unqualified success. Criticisms of them mostly derive from the plain fact that the very young child needs to spend a lot of time with his mother. The nursery school is different, for its shorter hours do not disrupt this close relationship: the children come after breakfast and are taken home at 3.30 or 4 PM. But when a child goes to a war-nursery so that its mother may spend long hours at work, it may be brought before breakfast and taken home to sleep, or more than ready for sleep, at night. If the mother is on night-shift she must be sleeping during some of the child's waking hours. The other main objection to war-nurseries applies in greater or less degree to aggregation of young children for any purpose. It is the risk of

infection. Helen Mackay told the Medical Women's Federation last year[1] that even in two good day-nurseries, taking 120 children, observed over a period of 6 months, the absence-rate through illness was 1 day in 4; and at the same meeting Marjorie Back noted that over 166 nursery months a group of nurseries had been closed for quarantime for a third of their working time. Finally, staffing problems have been serious, and those appointed have not always been fitted by training or temperament for the work.

Whatever provision is made for young children in the future, these are faults which no-one will wish to see perpetuated, and which are not offset by the benefits gained from a good diet. We should keep them in mind as things to be avoided, especially since the new Education Act lays on local authorities the duty of providing nursery schools wherever there is a demand for them. These should be established in the true nursery-school tradition, as places intended for the benefit of the child, not merely for the convenience of the mother or even for the advantage to society of any work she may do.

The Nursery School Association, which has just attained its 21st birthday, is thus faced with a dilemma. Unwilling that the new duties of the local authorities should rust, the 70 branches of the association are encouraging an outspoken demand for nursery schools up and down the country, knowing from experience that all such schools quickly acquire waiting-lists. On the other hand the association is well aware of the shortage of properly trained staff, and fears lest local authorities may appoint teachers with too little, or the wrong, experience. To meet this danger, the association is urging on the Ministry of Education the importance of training more staff as quickly as possible, and is doing what it can to encourage a high standard among local authorities. One method of setting the standard is by exhibitions, such as the one now in progress at 1, Park Crescent, London, W1. This shows equipment, home-made toys, learning materials, books, pictures, music, and design for buildings. Study of the exhibits, including those in the room called "days without toys," reveals how thought, skill and ingenuity can contribute to the nurture of the young child.

MECHANICAL RESPIRATORS

THE Both respirator, child of Drinker's "iron lung" and grandchild of Woillez's "spirophore" of 1876,[2] is now a familiar object in every large hospital in Britain, thanks to Lord Nuffield. At the time of his benefaction in 1937, the main thought was to tide over the grave respiratory crisis occasionally encountered in infantile paralysis. There must be few doctors, and none in fever practice, who have not seen or heard of such a case saved by the prompt use of one of these machines. The lessening of this menace of infantile paralysis alone has justified the distribution of what was judged the most suitable machine available at the time. Those who then called it "a wanton waste of private benevolence"[3] must mostly have changed their minds. The principles and mode of action of the respirator are now widely familiar and its ready availability has stimulated its use in divers other conditions in which respiratory activity is temporarily in abeyance. Thus Linton and Sarkar[4] kept a patient breathing during the acute stage of snakebite poisoning. Todesco[5] did the same in a case of diphtheritic paralysis of the diaphragm. Death was averted after the hitherto fatal mistake of administering paraldehyde in ounces instead of drachms.[6] The use of the respirator to combat respiratory depression of barbiturate poisoning may now be said to be routine. Novel uses are those described by Malkin[7] for treating scoliosis, by Marshall[8] in crush injury of the limbs, and by Macintosh[9] for reducing postoperative pulmonary complications after upper abdominal operations in poor-risk cases. This last suggestion has now been further investigated by Mushin and Faux, who report their results on another page. In little over five years the Both respirator, once described as a "white elephant," has produced persuasive reports of its use both as life-saver and as a valuable adjunct to physical medicine. The wide distribution has also made mechanical respirators less an object of dread to the public and the medical profession.

1. See *Lancet*, 1943, ii, 21.
2. Pratt, C. L. *Lancet*, 1939, i, 237.
3. Menzies, F. *Brit. med. J.* 1939, i, 35.
4. Linton, R., Sarkar, N. *Indian med. Gaz.* 1941, 76, 92.
5. Todesco, J. M. *Lancet*, 1942, ii, 261.
6. Macintosh, R. R. *Brit. med. J.* 1939, i, 827.

PSYCHIATRIC ADVICE IN INDUSTRY

PSYCHIATRIC advice, as Dr. Aubrey Lewis pointed out at the Royal Society of Medicine on Oct. 14, is not necessarily the same as advice from a psychiatrist. The occasion was a joint meeting of the section of psychiatry with the Association of Industrial Medical Officers, when the subject was thoroughly and practically discussed. The ordinary advisers in industry, he said, are the works doctor, the personnel manager and the welfare director; and the psychiatrist may well be kept in reserve for special cases. He suggested that the works doctor might interview workers when they leave school to enter the factory, when they show signs of maladjustment or neurotic symptoms, after illness, and when for medical reasons a change of job seems to be indicated. These interviews should be conducted with sympathy and detachment: there should be no hasty direct questioning, no "handout" advice. This opinion was shared by several other speakers. Dr. Ernest Capel regretted that the medical student in the past has not even been taught to take a psychological case-history properly; Dr. Russell Fraser protested against the stock question "Have you any worries?"—well calculated to tongue-tie anybody. It was felt that the medical officer must have the time and patience to find out the main attitudes of the worker, and to assess his value as well as his disabilities. Aptitude tests might be used to confirm a judgment. Dr. Capel recalled Culpin and Smith's experience that the dotting-machine is good for picking out obsessionals. The industrial doctor might, in his view, forget his midwifery and much of his therapeutics; but he must know his chemistry and physics and learn something about engineering, safety engineering, and factory management. His duties are mainly preventive, and he is responsible for the health of the group as a whole. The causes of breakdown are multiple, as Dr. Elizabeth Bunbury pointed out:

> "The girl who weeps speechlessly in the factory medical department may be crying because she has reached a stage of exasperated boredom through a monotonous job, or because she is exhausted through a long journey and much housework on top of long hours, or because she has had a quarrel with her boy friend, or because she has not got a boy friend to quarrel with, or because of a combination of these causes."

The strains of home and private life, in fact, are as pregnant of neurosis as those of the factory, and there is thus good reason, as Dr. Lewis noted, for ensuring that there shall be no sharp cleavage between intra- and extra-industrial advice.

Other factors influencing breakdown are frequent shift changes with the unsettling need to reverse sleep habits and meal-times, long hours (sometimes encouraged by the bonus system), boring and repetitive jobs, noise (in which Dr. Bunbury included Music While You Work), faulty ventilation, and supervision by those who are themselves neurotic. An occasion was mentioned when a reduction of hours was vigorously opposed by many workers because it meant loss of overtime pay.

7. Malkin, S. A. S. *Ibid*, 1939, ii, 702.
8. Marshall, D. V. *Lancet*, Oct. 28, 1944, p. 562.
9. Macintosh, R. R. *Ibid*, 1940, ii, 745.

Bonuses encourage output and seem to have come to stay; but they can be applied in such ways that they either split up the group, or integrate it into a coöperative unit. Needless to say the method chosen should foster community spirit, which is often very high. Dr. Bunbury recalled an unprepossessing mental defective who enjoyed the maternal care of a succession of women during six years. Boredom can be relieved by showing those who do the dull jobs what they are contributing to the finished article. Even a transfer to a machine which makes a slightly different small part gives a worker some relief. Noise and music do not disturb those doing routine jobs, but may irritate those who have to think—tool-makers, for example. Gratuitous noise is distressing: in one shop the foreman relieved his own irritation, and kept his workers jumpy and tense, by making the power system emit a loud shriek, at intervals as uncertain as his temper.

Foremen chosen only for technical ability and drive may not have the right qualities for supervising others. Dr. Capel felt that a neurotic should never be put in charge of his fellow-workers, and that obsessionals make particularly unsatisfactory foremen; being hard workers and over-conscientious themselves they are apt to expect too much of others. Anxious or hysterical men are almost as bad, he finds; and men free from neuroses are not necessarily going to make good supervisors. Fortunately the works doctor is not called upon to pick foremen—he need only point out those who will not do. The prevention of accident neurosis turns partly on early examination and clear prognosis, with emphasis on recovery, not disability, and partly on proper rehabilitation. Dr. R. S. F. Schilling spoke warmly of the results at Roffey Park, where injured workers are able to recover away from the stresses of both home and factory.

TEMPORARY HOUSES

THE new Town and Country Planning Act, so Mr. W. S. Morrison said in a recent broadcast, shows a green light to those who wish to get on with rebuilding our bombed towns and cities. As a step in this direction, the Ministries of Health and Works have issued a memorandum[1] to local authorities on the preparation and management of temporary housing schemes, in which the types of bungalow approved by the Government are illustrated. From the medical point of view there was always much to be said for the prefabricated house. Overcrowding inevitably means danger to health, especially from the tubercle bacillus. The provision of a great many separate dwellings is therefore welcome, and it would ill become us as doctors to look too closely at the æsthetic points of this gift horse, though as ordinary citizens we may experience a sinking feeling. It must also be borne in mind that no-one knows yet how prefabricated houses will stand up to the English climate—a point which may well have a bearing on health.

Four types of bungalow have been approved: the Portal, made of pressed steel, the Arcon Mark V, the Uni-Seco and the Tarran. Their outward appearance and the suggested types of layout recall some bad features of building by private enterprise before the war. Inside, however, they are as well equipped as has always been promised, though it seems a mistake, where all space is cramped, to make the kitchen the smallest of the four rooms. Local authorities may put up the bungalows on land acquired for permanent houses under the Housing Act, but they are warned to avoid using land which may be needed in the early stages of their permanent building programme, and to ensure that redevelopment is not obstructed by the presence of the bungalows, which are supposed to be going to last some ten years. As soon as the bungalows are ready local authorities must accept delivery at once: no plans are being made for storage. They are therefore advised to begin acquiring land now. Apart from sites which will ultimately be used for permanent houses, and land not intended for permanent buildings, authorities may put up bungalows on devastated sites and undeveloped land such as marginal strips of agricultural land. It is intended that priority shall be given to those living in insanitary or overcrowded houses, to ex-Service men and women, and particularly to those who have been disabled. Rents are to be fixed by the authorities at fairly high levels, the feeling being that if the rents are too low families will be unwilling to move into permanent houses when these are ready. It seems probable, however, that after ten years of caravan life with a growing family most people will be ready for a change.

1. Temporary Accommodation. HM Stat. Office. Pp. 31. 6d.

SUPPORT FOR VOLUNTARY HOSPITALS

PERHAPS the most striking fact to be found in the statistical summary of the King's Fund[1] is that in 1943, after some four years of war, only 27·3% of the total maintenance income of the London voluntary hospitals came from the EMS and public authorities. At £1,722,921 payments by patients and contributory schemes increased by £235,239. The figures, it is suggested, "should go a long way towards convincing those who fear that the voluntary hospitals are dying slowly but inevitably for lack of funds that their fears to date are groundless, at least so far as the hospitals in London are concerned. ... The Government is contributing towards the cost of beds reserved for casualties, but when all is said and done, the hospitals are still, as they were before the war, largely dependent on voluntary contributions for the maintenance of adequate provision for the civilian sick. Such contributions are providing adequate support for current needs, but they are leaving no adequate margin to meet the cost of capital works, which will be required after the war to restore the hospitals to their normal activities." In the Metropolitan Police District, covered by the King's Fund, there are 169 voluntary hospitals, of which 97 had surpluses and 48 deficits. With maintenance income at £5,413,200 and expenditure at £5,311,900, the surplus was rather lower than in 1942, but the Fund notes with pleasure that free legacies at £532,184 actually increased by over £54,000, though it was predicted that this source of income would be the first to suffer from economic difficulties. The number of beds open for patients rose from 16,245 to 17,679 during the year, and the average number occupied daily was 11,496 against 9945 in the previous year. The duration of the patient's stay was 16·7 days for the general hospitals and 28·1 for the special. Expenditure under salaries and wages rose by 20% through adoption of the Rushcliffe scales of salaries for nurses.

WE regret to announce the death on Nov. 16 of Sir ROBERT KELLY, emeritus professor of surgery in the University of Liverpool and consulting surgeon to the Liverpool Royal Infirmary. He was in his 66th year.

1. King Edward's Hospital Fund for London. Statistical Summary for the Year 1943. From 10, Old Jewry, EC2, 1s. (1s. 6d. post free).

EPSOM COLLEGE: *St. Anne's Scholarships.*—The council will shortly proceed to award scholarships to girls attending Church of England Schools. Candidates must be fully 9 and under 16 years of age, and must be orphan daughters of medical men who have been in independent practice in England or Wales for not less than five years.

France Pension.—The council will also in March award a pension of at least £30 per annum to a necessitous medical man, fully 55 years of age, who has been registered for five years.

Forms of application can be obtained from the secretary's office, Epsom College, Epsom, Surrey, and must be returned by Jan. 15.

Special Articles

VACCINATION AGAINST SMALLPOX

APPARENT ANOMALIES IN PROTECTION AFFORDED

W. D. H. STEVENSON, CIE, MD GLASG., FRFPS, DPH
DIRECTOR OF THE GOVERNMENT LYMPH ESTABLISHMENT, MINISTRY OF HEALTH

Blaxall in 1930 stated that "vaccination and revaccination afford a sure protection against smallpox and that by no other means at present known can this be obtained." This, most of us will agree, is true for the very great majority of people. The Royal Commission on Vaccination stated in 1896 that vaccination diminishes the liability to be attacked by smallpox and that this protection, at its greatest in the years immediately succeeding vaccination though not the same in all cases, might fairly be said to cover in general a period of nine or ten years. The German Commission of 1884 found that the protection varies within wide limits but on the average it lasted ten years. Both commissions were of opinion that more than one insertion of vaccine was more effective in the production of protection than a single insertion, the German Commission laying down at least two insertions and the British three or four with a total vaccinated area of at least half a square inch. They both agreed that revaccination renewed protection which the lapse of time had diminished. It would appear then that, if vaccination were carried out by multiple insertions, herd immunity could be secured by revaccination within a period of nine or ten years, although individual immunity in some instances would be lost before that period. In 1928 the Ministry of Health Committee on Vaccination, faced with a general decline of public vaccination because the prevailing smallpox was of the minor type, so as to render vaccination more acceptable considered it expedient to make a trial of vaccination by one insertion. They, however, considered that vaccination by multiple insertions should still be available for such persons as desired to ensure the greatest measure of protection available at one operation. They also advised that revaccination be offered to persons at the ages of 5–7 years, and again at the ages of 14–16 years.

Among other statistics, carefully compiled and dealing with such large numbers that errors associated with small figures were eliminated, the German Commission of 1884 considered the incidence of smallpox in the Prussian (or German) army and this matter is of particular interest from the point of view of this paper. It shows that, however carefully a group or community be vaccinated and revaccinated, some cases of smallpox and even some deaths from that disease will occur, especially if it is brought into contact with an unprotected population among whom smallpox is prevalent. My information is derived from a paper dealing with the findings of that commission written by E. J. Edwardes (1887). A considerable number of such cases and some deaths occurred in the German Army from 1867 to 1874. I reproduce table I from Edwardes's paper and have constructed table II from the information he gives.

TABLE I—PRUSSIAN (OR GERMAN) ARMY. SMALLPOX CASES AND DEATHS PER 100,000 MEN

	1867	1868	1869	1870 1st half	1870–1	1871 2nd half	1872	1873 1st qtr.	1873–.74	1874–75	1875–76	1876–77	1877–78	1878–79	1879–80	1880–81	1881–82	1882–83
Cases	74	38	43	30	565	684	161	36	7·3	8·3	6·4	6·3	4·8	4·5	2·1	6·9	4·5	2·2
Deaths	0·8	0·4	0·4	0·0	33	27	5·6	2·6	0·3	..	..	..	..	..	..	..	..	..

TABLE II—DEATHS FROM SMALLPOX PER 100,000 OF POPULATION IN PRUSSIA

1867	1868	1869	1870	1871	1872	1873	1874	1875	1876	1877	1878	1879	1880	1881	1882
43	18	19	17	243	262	35	9	3·6	3·1	0·3	0·7	1·2	2·9	3·6	3·6

The Imperial Board of Health, according to Edwardes (1887), remarked that "revaccination had already been practised in the army for several decades with a fair degree of carefulness." Compulsory vaccination began for the civil population in 1874. The Board of Health contrast the smallpox cases in the Army in 1867–69 with the fewer number occurring in the Army after 1874. They observe "No other explanation can be afforded for this, than that just as during the war smallpox in the German army considerably increased, in consequence of its coming into contact with smallpox in France, so the same thing must have happened in Germany itself before the war, when there was more smallpox amongst the civil population than there has been of late years." They note that not a single death occurred in the Prussian army since 1874: it should be remarked however that some cases of smallpox continued to occur. The Franco-Prussian war occurred in 1870–71 and there was a severe epidemic of smallpox in 1870–72. Camus (1933) tells us that among the 600,000 mobilised by France in six months of the war of 1870–71, there were 125,000 cases of smallpox and 23,740 deaths. Grossheim, quoted by Edwardes, stated that the Prussian Field Army had hardly any smallpox when it first went to France. During the war 4991 cases occurred and 297 deaths. Of 1005 cases with 61 deaths the vaccinal state was known; 109 cases with 2 deaths occurred among the "successfully revaccinated" group; it is not stated when they were revaccinated. It is obvious that the German commission of 1884 was fully aware that vaccination and revaccination did not confer absolute immunity against attacks of smallpox.

VARIABLE DEGREE AND DURATION OF PROTECTION

While the value of vaccination and revaccination has been completely established by studies of outbreaks of smallpox, and the safeguard which the great majority of individuals acquire is certain, many medical men may not be aware of the fact that the degree and duration of the protection varies in individuals and that in exceptional cases it falls very short of the average. The occurrence of such cases has always been acknowledged by persons conversant with the subject and they do not in any way affect the validity of the general conclusions as to the protection afforded to the majority of vaccinated persons. Even an attack of smallpox itself, while giving a durable immunity in a very large proportion of cases, in a few exceptional instances fails to protect against a second attack. Edwardes mentions that Bousquet found 34 second attacks in over 16,000 cases of smallpox collected from thirty epidemics, and other authorities are quoted who report such occurrences. One instance of a third and fatal attack is given. In most of these cases there were long intervals between the two attacks, but one individual was infected twice during one epidemic, and in another case three months elapsed between the two attacks. It is not surprising therefore to find in a few instances that vaccination also fails to protect against smallpox even in years immediately succeeding vaccination.

Coupland (1897) reported in the Gloucester outbreak of 1895 a case of a child whose vaccination had been performed in three places 22 days before the attack of smallpox commenced. The eruption was profuse and yet there were "3 inflamed vaccinal sites covered by dark scabs." The child died. Here, at a time when protection against infection is in almost all cases complete, sufficient protection even to mitigate the severity of the disease had not developed. Cory (1898) recorded 3 cases of children who developed smallpox at the ages of two or three years. They had been successfully vaccinated as infants as evidenced by 1, 2, and 4 scars respectively. Hanna (1913) reported 7 modified smallpox infections in the age-group two to five years; they had been vaccinated as infants. Lemaire (1926), regarding an epidemic in Algiers of 693 cases of smallpox, reported that the intervals since the last successful vaccinations were 15–45 days in 4 cases (2 died); 3–6 months in 8 cases (6 died); 6–12 months

in 4 cases (3 died); and 1–2 years in 8 cases (5 died). Kenawy (1933), in the Alexandria epidemic of 1932–33, observed some cases of smallpox in persons recently vaccinated. He remarks "C'est-à-dire que 0·6% de la totalité seulement ont conservé l'immunité jusqu'à un an, 0·8% ont pu la conserver deux ans." For comparison it is to be noted that about 38·5% of those infected fell ill ten or more years after their primary vaccination. Boulnois (1936), from an experience of an epidemic in Southern India, quoted a case where several members of a family developed mild attacks of smallpox 47 days after being vaccinated. Le Huludut (1936), reporting an outbreak in Chandenager, French India, in 1935, recorded 10 cases of smallpox among those successfully vaccinated 12–30 days before the attack and 1 case vaccinated 60 days before the attack. It is particularly mentioned that the results of vaccination had been carefully observed in all its stages. Two cases of hæmorrhagic smallpox were observed in subjects successfully vaccinated 12–15 days before.

The Commission on Smallpox and Vaccination of the Office International d'Hygiène publique issued a questionary to various countries which included one on immunity after vaccination. The Mexican experience (1934) was that revaccination is necessary five years after primary vaccination and a reference to those exceptional cases of failure to protect within that period was made "... il s'est présenté des cas de variole chez des enfants agés de 2 ans, qui presentaient des cicatrices évidents de vaccination et qui, évidemment, avaient perdu l'immunité." In a résumé of late researches in the USSR, Morosov (1938), chief of the smallpox section in the central Epidemiological and Microbiological Institute of Moscow, reported that 24 cases of smallpox with 2 deaths (out of 283) occurred among those vaccinated successfully within 12 months, and 13, with 2 deaths, between 1 and 2 years (Ozol's experience); of 109 cases of smallpox among vaccinated persons, 3 occurred among those vaccinated 1–2 years before and 9 among those vaccinated 2–5 years before (Lipkine's experience). Both in Mexico and in the USSR the usual vaccination technique is by three insertions, according to replies to the general questionary addressed by the commission (1930). Leake (1927), of the US Public Health Service, says "It is astonishing how soon after smallpox or vaccination some exceptional individuals lose their immunity."

CAUSES OF FAILURE

That the protection acquired by recent vaccination or revaccination against infection by smallpox sometimes falls far short of the average is an established fact. It is to be noted that cases of this kind happened when more than one insertion was the practice in vaccination (as when Cory practised), or with a single insertion, as in some of the cases recorded by Kenawy. It would be worth knowing if they are more common in the latter as Ernest Hart (1899) believed. He held the view that, on account of inefficient vaccination (by which he denoted making only one or perhaps two insignificant insertions of lymph), cases of postvaccinal smallpox, modified though they might be by the vaccination, occurred in every epidemic. Belief in the greater efficacy of more than one insertion in the production of protection is still held in most countries, vide replies to the questionnaire of the Commission on Smallpox and Vaccination (1934). A second factor has been conjectured; for example in the Mexican reply referred to above. The potency, or virulence, as the Mexicans call it, of the lymph is thought by some to determine the degree and duration of the protection. This factor is given, in conjunction with the first, in the reply from Yugoslavia, and Kaiser and Runes (1936) gave this as one of several determining factors. In a résumé of the replies to the questionary, the Commission on Smallpox and Vaccination (1934) stated that not enough investigation had been made into this matter. It must, therefore, be regarded as unproved.

I question whether the antigenicity of a lymph depends on the potency provided the latter is sufficient to ensure a "take." Potency relates to the infectivity or "take" value. In the immunisation of a community, as in mass vaccination in face of existing variola, it is essential to issue as strongly potent lymphs as one can. The more people successfully vaccinated the greater the herd immunity. But this consideration does not apply to the immunisation of any particular individual. That the lymph "takes" and gives a vesicular development is all that counts for the individual: he is successfully vaccinated. There is no evidence, so far as I know, that the protection in an individual successfully vaccinated is affected by whether the lymph gives 90% or 100% "takes" in the vaccination of a large number of people. The potency of a lymph in this country, as in many, is governed by an internationally agreed minimum standard (League of Nations 1927); no maximum was fixed. Most of the German vaccine institutes (1931) and those in many other countries consider this standard too low and prefer to issue lymphs of higher potency to secure a better "take" value. The authorities who prescribed this standard could not, it seems obvious, have considered that antigenicity was linked in any degree with "take" value.

It has been stated by Kaiser and Runes (1936) that the development at vaccination of an imperfect vesicle may be due to the quality of the lymph. My opinion is that, for lymphs derived from the same strain of vaccine, the development of a perfect or imperfect vesicle depends mostly on host idiosyncrasy. This view is substantiated by experience in the Government Lymph Establishment. We vaccinate very numerous calves and rabbits in the course of a year with lymphs of varying potencies but all of the same strain of vaccinia and derived ultimately from the same source. The same lymph will produce vesicles or papules of varied character on different animals. This has been observed especially in the recurring use of the same control lymph on numerous rabbits, but the same thing is noted in the vaccination of numerous calves with the same lymph on the same day. Again, although much weight cannot be placed on this argument, whether the dilution of the lymph is 1 in 1000 or 1 in 10,000 on the same rabbit the lymph will produce identical reactions in time of onset and in development. No differences in the quality of the vaccinal reaction or in the time in which it appears are noted when a weakly potent or moderately potent lymph is placed on the same rabbit side by side with a strongly potent lymph. Only a difference in the degree or quantity of reaction is noted. Public vaccinators occasionally report that a lymph produces on one individual a vesicular reaction denoted as mild, small or retarded, while in the hands of the same operator on another individual the same lymph is stated to give a good or normal reaction.

Cases in which protection afforded by vaccination did not develop or was short-lived, especially in young children, have occurred in many countries and in recent as well as in remote epidemics. The special incidence among young children may have little significance as attention was focused on cases in which smallpox attacked persons recently vaccinated, and inevitably most of them would be young children. Other age-groups might well have been more severely affected. Such cases cannot be attributed to any defect in the antigenic quality of the lymphs employed; for they have followed the use of lymphs of varying origins in many countries and in remote as in recent epidemics. They have also occurred when the technique of vaccination was by numerous insertions or by one insertion. Whatever the influence of this difference in technique or of the extent of the area vaccinated I believe that lack of protection is in the main due to failure in the response of the individual to immunisation.

Great variation is shown by individual animals in susceptibility to vaccinia infection, and this well illustrates how wide can be differences of individual response. By international agreement it was decided to test the potency of lymphs by certain approved methods. The authoritative article on smallpox by Blaxall (1930) details these and describes the results on animals which must be produced by 1 in 1000 dilution of the tested lymph and mentions that it may be necessary to repeat an experiment because of the insusceptibility of the test rabbit. In 1932 the Medical Research Council referred to this matter in a "*Memorandum on a method of testing vaccine lymph*" and it was emphasised in a paper on "Host influence in the characterisation of response to papilloma protein and to vaccinia virus" by Bryan and Beard in 1940. Our experience is that a few calves are entirely insusceptible to infection by lymphs which give good results on other calves. We have occasionally met with rabbits totally insusceptible. On the other hand we have found some instances of well-marked hypersusceptibility, and between these

extremes all grades of diversity are obtained. The same specimen of diluted seed lymph may produce on one calf such a small efflorescence that only a few grammes (3 to 10) of vaccinal pulp may be collected, while from a second, from an area about the same size, a large collection of 30–50 grammes or more may be obtained. We have vaccinated many rabbits with 1 in 1000, 1 in 10,000 and 1 in 50,000 dilutions of the same control lymph, making ten insertions of approximately equal areas with each dilution. An end-point for each rabbit can be calculated where there is an equal chance of infection taking or not taking, employing a method used by Parker (1938). Table III shows the great variations in rabbits with regard to this 50% end-point for the same lymph. Three control lymphs are considered. Similar variations have been obtained by intradermal inoculations.

There are, of course, other factors concerned in the acquirement of infection—e.g., dosage—but in smallpox as in vaccinia I believe that that of individual susceptibility is of very great importance. Bryan and Beard (1940) wrote:

TABLE III—DILUTIONS OF THE LYMPHS PRODUCING AN EQUAL CHANCE OF INFECTION OR NON-INFECTION IN RABBITS. TEN INSERTIONS OF EACH DILUTION WERE MADE

Lymph no.	No. of rabbits used	Rabbits giving 50% end-points at varying dilutions						
		Under 1/1000	1/1000 to 1/10,000	1/10,000 to 1/20,000	1/20,000 to 1/30,000	1/30,000 to 1/40,000	1/40,000 to 1/50,000	Over 1/50,000
1943	29	..	20	6	1	..	..	2
1961	63	2	39	7	10	2	2	1
3600	44	..	29	11	2	1	1	..

"The factors underlying these variations" (they are referring to animal response to infection) "in many instances are little known, so that efforts to eliminate, ignore or account for the variation result in much confusion in the interpretation of findings involving animal response. In the field of pharmacology, rapid progress has been made in recent years in the development of methods for the biological assay of drug action in animals. In these procedures the existence of variation in animal response is fully recognised and accepted. ... Not enough work has been done with viruses to make possible more than the suggestion that the character of response to infection with these agents is determined in the main by variations in host resistance or susceptibility."

Among other factors to which they attributed the varieties of types of revaccination reactions, Kaiser and Runes (1936) mentioned variations in individual capacities for production of immunity. Since experiences of failure in protection are so widespread, and have occurred in the past as well as in the present, differences in the degree of protection afforded against smallpox may largely be determined by individual variations in response to immunisation.

VACCINATION AFTER EXPOSURE TO VARIOLA INFECTION

There has been a tendency to regard recent experience in Glasgow, Edinburgh and elsewhere concerning the occurrence of smallpox, however modified, in persons successfully vaccinated within a few days of first exposure to infection, as a new and unexpected phenomenon. In an annotation in the *British Medical Journal* of March 18, 1944, it was remarked that the fact that vaccination in the incubation period of variola need not give absolute protection against the infection was established "by recent Scottish experience." The Glasgow and Edinburgh experiences were entirely in line with what has occurred in the past. As Marsden (1943) said regarding the Glasgow experiences of 1942, after stating it was in keeping with the teaching of Ricketts and his successor, "it serves to emphasise the prophylactic limitations of vaccination performed after exposure to infection." Ricketts and Byles (1908) ruled that vaccination done within a day or two after exposure and followed by a normal reaction is a certain preventive, but to this rule, they said, there were occasional exceptions. "The fact is that the pertinent date is not when the subject is vaccinated but when the reaction begins." Delay of the reaction they attribute to a peculiarity either of the lymph or of the subject. They also remark, "Protection against smallpox can never be promised confidently if its acquisition be postponed until after exposure." Immermann of Basle (1902) writes as follows: During epidemics of smallpox it has been observed that vaccinated individuals not rarely become infected with variola during the course of their vaccinia. ... In such cases the outbreak of the *initial symptoms* (my italics) "is far more frequent in the first week of the vaccinia"; (he gives the incubation period of naturally acquired variola as 10–13 days) "they commence more rarely in the middle or end of the second week and have scarcely ever been observed in the course of the third week." Again, "If a vaccination is made early enough in the period of incubation of the variola, however, it is beyond question that the disease may not seldom be completely aborted." Leake (1927) states that "Successful vaccination performed on the day of exposure will almost always give complete protection."

Hanna (1913), in a statistical account of 1163 cases of smallpox admitted to the City and Port of Liverpool in the ten years preceding, gives details of 73 cases of concurrent variola and vaccinia. These people landed in Liverpool from ships and were incubating smallpox. In chart B ("Concurrent variola and vaccinia among cases unvaccinated before infection with smallpox") the details are as follows. There were 28 cases in all. Two vaccinated on what Hanna calls the second day of infection—he gave the interval between infection and rash as 15 days—developed modified smallpox. By the usual convention, taking this interval as 14 days, these cases would be regarded as being vaccinated on the first day. One vaccinated on the third day of incubation of the disease (or second) developed the disease: one vaccinated on the fourth day (or third) developed the disease. All these cases were mild smallpox. Two cases vaccinated on the fifth day (or fourth) developed the disease; one mild, one moderate. In another chart (C) he considered 45 cases which were revaccinated after infection. One case revaccinated on the third day of incubation (or second) developed mild smallpox. One on the fourth (or third) day developed mild smallpox. Two on the fifth (or fourth) day developed mild smallpox. Hanna also analyses 20 cases reported in 1878 by Birdwood of the Metropolitan Asylums Board's hospital. Two vaccinated on the third day (or second) of incubation developed discrete variola. All these cases reported by Hanna were successfully vaccinated.

Robertson (1913), of New South Wales, states that, in an epidemic of variola minor comprising 1037 cases, 56 occurred among those successfully vaccinated within the incubation period, some during the early days of incubation: he reports one case vaccinated 15 days before the eruption, one 14 days, four 13 days, and so on. It should be noted that he also states that "amongst a number of cases which were vaccinated successfully after one exposure, in none did the disease develop when the inoculation was performed before three days after that exposure." Perhaps they were not infected or got a small dosage of infection.

Kenawy (1933), of Alexandria, observed that 150 cases of variola major developed among those vaccinated during the incubation period. Of these, 31 had been vaccinated during the first 3 days after infection but only 3 or 4, I gather, successfully. He added that it was true that some persons so vaccinated escaped the disease but he concluded that vaccination during the period of incubation cannot with certainty protect. Note also Le Huludut's experience (1936), already quoted in the first section of this note.

Table IV is taken from Morosov's résumé of late USSR reports. It concerns the experiences of Ozol. Among these cases there were only 9 revaccinated persons. Only those persons are included who showed vaccination pustules. The author remarks,

"Le tableau montre qu'une vaccination ou revaccination réussie, faite pendant la période d'incubation de la variole, exerce peu d'influence sur la gravité de la maladie. Cette influence ne se fait sentir que si la vaccination réussie a eu lieu dans les 10 premiers jours de l'incubation."

It is to be noted that Morosov does not refer to the effect on the acquirement of smallpox but on the gravity of the disease, and that the table relates apparently to the date of onset of smallpox and not to the date of the appearance of the rash.

Very important in the consideration of this matter is the fact that medical officers of health have adopted the convention that the incubation period of smallpox is 12 days to the onset of the disease, or 14 days to the appearance of the rash. This can relate only to average periods. Actually these vary not only from one epidemic

TABLE IV—INTERVALS BETWEEN SUCCESSFUL VACCINATION AND THE APPEARANCE OF SMALLPOX

Days ..	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Cases of smallpox	21	11	19	17	12	7	11	4	4	4	4	6	4	..
Deaths ..	9	6	7	5	1	..	1	..	1	..	..	1	..	..
Course unknown	2	..	2	3	3	1	1	1	..	2	..	4	..	..

to another but in the same epidemic, if we are to believe the experience of some authorities—for example, Robertson (1913) writes, "It is evident that the latent period is extremely variable ranging from 6 to 16 days for the onset and 8 to 20 days for the eruption." MacCombie (1899) stated that the interval to onset varies in different individuals between 5 days and 20 or more—usually it is 12 days; but he adds "not infrequently 10, 11, 13 and sometimes 9." He himself saw one as short as 7. The eruption, he said, develops as a rule 48 hours after the onset of the initial symptoms, but he adds, "there are many exceptions to this rule." Immermann (1902) stated that the incubation period between infection and onset lasts generally 10–13 days, or even 15 days; more frequently it is less, 5–10 days. The twelfth day is the most frequent. The eruption, he states, appears as a rule towards the end of the third day of sickness. Variation in incubation periods of the disease in the same epidemic of either variola major or minor must be related to the idiosyncrasy of individuals or to dosage of infection as affected by close or casual contact. The shorter the incubation period of the disease the less likelihood will there be that vaccination will develop sufficient protection in time to prevent infection. The fact that occasionally an individual may react poorly as regards the production of protection must also be taken into account.

It is only reasonable therefore to expect that a person may not be fully protected even if vaccinated on the day of infection, and the statement that vaccination within the first three days will always protect against infection is without justification.

SUMMARY

Numerous observations show that individual animals (calves and rabbits) differ, sometimes widely, in their response to vaccination even with the same lymph. They vary in their susceptibility, and, if vaccinia develops, they may present differences in the character as well as in the number of vesicles or papules which develop. There is evidence that this is also true for man.

The protection afforded by vaccination against an attack of smallpox is subject to variation, both as to the time when it begins to be effective and the period over which it is effective. When vaccination is carried out successfully after exposure to smallpox the development of protection depends on two factors, each being variable—the response of the individual to vaccinia and the response to smallpox. There is no justification for the opinion that vaccination within the first three days of exposure to smallpox will invariably protect from infection; the evidence adduced shows that it has not done so in quite a number of cases. Epidemiological experience has shown that variations also exist as regards the period during which protection against an attack of smallpox is effective. Attention has been focused in this paper on the exceptional cases in which either protection has not developed or has been short-lived. These cases have been stressed in the published work because they have been unexpected; they differ from the strong and comparatively lasting protection usually experienced. They have occurred in various countries and in remote as well as in recent times, even when the technique of vaccination involved the making of three or more insertions of lymph, usually considered to be the most effective procedure. Differences in the protection afforded by vaccination must, I consider, be due in the main to variations in host response to immunisation, because of their widespread occurrence. When vaccination fails to protect against infection by smallpox, its influence in modifying the severity of the disease has not been considered.

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STUDENTS DISCUSS GOODENOUGH REPORT

THE British Medical Students' Association's preliminary discussion on the Goodenough report took place during the recent annual general meeting.

Several speakers were anxious lest there be too great a specialisation in science, and demanded culture as well as clinics. The extramural schools were vehement in their own defence, and denied many of the implications and statements in the report. Discussion on this point became so involved that it was decided to prepare a special statement on their views. Several members referred to the benefits of a tutorial system and were sorry that no mention had been made of its possibilities. There was strong agreement with the principle that teachers should be selected for their ability to teach and not only for their research ability. Staff-student committees were warmly recommended. Guy's dissenting, the association confirmed its repeated suggestion that all schools should be open equally to men and women, and pointed out that any fixed proportion amounted to discrimination and vitiated the principle. The selection of students must be solely on grounds of suitability. Many members considered that a competitive examination at the beginning of a student's course was not a satisfactory guide to his future ability as a doctor. This raised the question of financial help for suitable but poor students, and it was agreed that grants would have to be larger than had been suggested. Grants would have to be made also to hostels and for recreation; if these facilities had to be self-supporting their cost would be prohibitive to many students. A majority of speakers agreed that routine X-ray examination for tuberculosis should be compulsory, since spread in a community depends on infected members. It was pointed out that those who feared that they were infected were often those who objected to examination.

In the discussion on teaching, it was suggested that the best way to study pathology was in clinicopathological conferences, to avoid the subject being considered an end in itself. Members were insistent on the importance of social medicine and the implications of early diagnosis and the prevention of disease. Preregistration house appointments were thought to be necessary for every newly qualified doctor, but a salary of £80–100 was felt to be inadequate. Many speakers hoped that the standard of qualifying examinations would be unified and suggested that only universities should conduct them. The Royal Colleges, it was felt, should confine their attention to postgraduate diplomas and similar qualifications. Apprenticeship to a general practitioner working in a health centre was recommended by one delegate.

Reconstruction

A COMPREHENSIVE DENTAL SERVICE

TEVIOT COMMITTEE'S RECOMMENDATIONS

EARLY last year an interdepartmental committee with Lord Teviot as chairman was appointed to consider how the public can be provided with a satisfactory dental service, how enough dentists can be secured, and how research into dental disease can be promoted.[1] To help the Government in their preparations for a National Health Service, the committee has issued the interim report[2] here summarised. It is unanimous.

PRESENT STATE AND PROSPECTS OF THE DENTAL PROFESSION

Undergraduate education.—There are 5 dental schools in London, 7 in the provinces, 3 in Scotland, 1 in Northern Ireland and 4 in Eire. Before the war close on 400 students entered them annually, of whom about 10% were women. The length of the course for the licence (LDS) is usually about 5 years (including the year spent on premedical subjects), while the degree course (BDS) is rather longer, except in London. Most students take the LDS.

The total expense of training and qualification could nowhere be less than about £800 and it would usually be much higher. Since 1921, 1358 students have had grants or loans from the Dental Board, but these never covered the whole cost and they ceased at the beginning of the war. Very few grants from other sources are held by students.

Postgraduate education.—A limited number of house-appointments are available at the dental hospitals. For practitioners refresher courses have been assisted by the Dental Board since 1923, but in general the demand for them has not been large.

Dental man-power.—At the end of 1942 the Dental Register contained the names of 15,192 dentists, of whom it is estimated that 12,812 were engaged—at least part-time—in dentistry. But the "bona-fide practising dentists" admitted under the 1921 Act are now mostly over 45, and their number is such that a substantial proportion of the profession will be retiring in the next few years. During the war the number of new students has fallen below 300 a year, being about 150 less than the quota permitted by the Ministry of Labour. The Government Actuary calculates that if the number of students qualifying annually were to rise to 400 in the years 1948–52, and to 425 thereafter, it would still be about 30 years before the effective total of the profession would be higher than it was in 1942. "This is an alarming forecast and we have no reason to think it will be substantially falsified unless vigorous measures are taken."

Ancillary dental workers.—Under the Dentists Acts provision was made for unregistered persons to work in public services under the personal supervision of a dentist. No dental dressers of this kind seem to be employed in the civilian services, but the Royal Air Force employ 32 "dental hygienists" on the cleaning and polishing of teeth, and are training 12 more.

Most dentists have surgery assistants; these have seldom had any training except from their employer, and they are not allowed to do any work in the mouth.

Finally, the dental mechanic, who constructs dentures and other appliances, is an essential part of any dental service. There are about 8000 in this country, but arrangements for training are inadequate.

Dentistry as a career.—At present dentistry is unattractive to boys and girls in comparison with other professional careers, especially medicine.

> "We have been told that not a few who take it up do so because there is no room for them in the medical schools. The work itself is apt to appear unpleasant and of restricted scope until its scientific interest begins to be appreciated; and there is, of necessity, little scope for specialisation. Practising dentists feel that their work has not an important enough place in the mind of the public, and in the local authority dental services they complain in many cases of lack of access to the responsible committee of the authority. Many local authorities have no chief dental officer responsible for the organisation and working of their dental services. The opportunities which do exist in the career are not, it is generally felt, made as widely known as they might be, either to parents or to boys and girls when choosing their future vocation. Finally, the training is long and expensive and many parents cannot afford it for their children."

The profession, however, should have a great future if it is enabled and encouraged to progress on the right lines, and its expanded services must be fully utilised in any measures for the improvement of the national health.

EXISTING PUBLIC DENTAL SERVICES

School Dental Service.—Until the recent Education Act was passed, local education authorities were obliged to provide dental treatment for children in elementary schools but need not provide it for pupils attending secondary schools and other institutions for higher education. Not until after the commencement of this war did every local education authority have a school dental scheme.

In 1938 about 70% of the 5 million elementary-school children were inspected; 50% were recorded as requiring treatment, and 33% received it. The acceptance rate (i.e., the proportion of those requiring treatment who received it) was 65·5% and each dentist treated on average 2137 children. In Scotland the number of children inspected annually is believed to be under half the total, the treatment acceptance rate varying from less than 50% to over 90%. A keen education authority with an adequate staff can achieve a high acceptance rate without compulsion: thus at Cambridge, where all children are inspected each year, 75% require treatment and nearly all of these accept it.

Maternity and Child Welfare.—Public provision of dental care for expectant and nursing mothers and for children under school age is in most places extremely meagre. There are signs that the younger mothers are beginning to understand the value of conservative dentistry, but there is a very long way to go.

National Health Insurance.—Roughly two-thirds of the insured population—i.e., between 13 and 14 million people—are entitled to dental benefit, but less than 7% of these claim it each year. The qualification for dental benefit is a prescribed period of membership of an approved society—usually about 2½ years—which can be completed, at earliest, at the age of about 17. Thus the boy or girl who leaves school at 14 has usually no assistance in obtaining dental treatment for those three important years.

It is the common experience in insurance dentistry that people do not resort to treatment until a stage when the teeth are unsaveable and often there is gross oral sepsis.

The services in general.—Dental treatment is also given to hospital patients and the tuberculous, and three London boroughs have municipal dental clinics. "Broadly, then, the picture is of a number of public dental services not closely correlated and each with shortcomings, and of a public ill educated and apathetic in regard to the care of the teeth. This attitude springs we think mainly from a natural fear of pain and lack of any real understanding of the importance of dental health. Economic factors must also contribute, but we are inclined to think that they are of less effect in this connexion than lack of education."

STATE OF THE NATION'S TEETH

The dental health of the population is bad and its effect on their general health is bad.

On an average 90% of men and 86% of women entering the Army and ATS have needed dental treatment on enlistment; 13·4% of the men had essential artificial dentures and a further 10% required them.

1. The members of the committee are: Mr. L. C. ATTKINS, LDS; Mr. F. J. BALLARD, Mr. E. G. BEARN; Prof. R. V. BRADLAW, MRCS, LDS; Prof. R. J. BROCKLEHURST, DM; Dr. T. H. J. DOUGLAS, LDS; Mr. W. KELSEY FRY, MRCS, LDS; Major-General J. P. HELLIWELL, MRCS, LDS; Mr. J. F. HENDERSON; Mr. A. C. W. HUTCHINSON, DDS; Mr. H. T. A. MCKEAG, B DENT SC; Mr. THOMAS RANKIN, LDS: Alderman W. L. RAYNES; Mr. ANDREW SHEARER; Councillor JOHN STEWART; Dame GWENDOLINE TRUBSHAW; Dr. R. WEAVER, LDS; Mr. B. J. WOOD, LDS; and Sir CHAD WOODWARD, FRCS; with Mr. H. F. SUMMERS and Mr. S. G. GAME as secretary and assistant secretary.
2. Cmd. 6565. HM Stationery Office. Pp. 25. 6*d*.

In Cambridge in 1938 only 9·1% of the 5-year-old children examined had naturally sound teeth; on the average each child had over 4 decayed teeth. Of 10,000 Scottish 5-year-olds examined in 1941–43 only 1000 were found free from caries and on the average 7 out of each child's 20 teeth were decayed or missing, about 5 of these 7 being molars. Among 8700 Scottish children aged 6–13 examined in the same period the percentage of sound "first permanent molars" dropped steadily from 82% at age 6 to 20% at 13.

At three large Ordnance factories a sample of the workers was examined. Only about 1% were dentally fit without dentures.

Dental health is an integral part of general health, and dental disease contributes in no small measure to much general disease.

INTERIM RECOMMENDATIONS

A satisfactory service.—The ideal at which we must aim is that people should value the health of their mouths and should seek by every means to preserve it. One of those means will be regular inspection and the treatment of any incipient defects. This treatment should be conveniently and promptly available when demanded, with the minimum of formalities and the maximum of personal freedom; and it should be paid for by the people not as patients but as members of the community.

Progress must be made concurrently on two sides: (1) the stimulation of a *demand* more truly representative of the need for treatment, and (2) the *supply* of an ever more adequate service. It is stated that before the war there was no lack of dentists, over the country as a whole, to meet the actual demand for treatment; but if the demand rose in future to somewhere near equality with the real need then there would be a shortage of dentists unless their numbers had increased pari passu. If, for example, the annual demand rate rose rapidly to 40% or 50% and the numbers of the profession showed no rapid increase, the shortage would be very serious.

> "It may seem ironical that the too great success of one object of policy should be a matter of anxiety with regard to the other; but it is not really so, if viewed realistically. A man who drives two horses in a race must drive them approximately at the same rate if he is not to be upset; but subject to this, he must drive them both as fast as he can. That is our object—to keep demand and supply in a rough equality, but still to make the quickest possible progress in both. And the analogy will go a little further still; for just as one horse helps the other forward, so, we hope, will a greater demand for dental treatment encourage recruitment to the profession, and conversely a well staffed service will undoubtedly stimulate the demand."

A comprehensive service.—The greatest single step forward which could be made now is to accept the principle of a comprehensive service—a service which, while perhaps not yet wholly adequate, will be equally available to all who demand it, and which will be paid for by the community as a whole.

> Of the two factors depressing the public demand for regular dental care, "the greater is, in our view, lack of appreciation of the importance of dental health and the lesser is lack of means. It is idle to seek to remove the first until the second has been removed; therefore, as a beginning we want to 'divorce dental health care from questions of means' and thus begin to build up the demand: then can come the steadier and longer process of increasing public enlightenment about dental health."

Dentistry is not an adjunct but an organic part of health; so it is important to the success of the health service as a whole that dentistry should, if possible, form an integral part of it on a comprehensive basis.

> "A comprehensive scheme, if it is framed and administered in a satisfactory way, will offer to the dental profession itself the best opportunity of attaining its rightful place in the public estimation. This is not the justification of the proposal; but it is an important consideration because it involves the reasonable expectation, if true, that young men and women will adopt the career of dentistry in sufficient numbers to make the scheme a success. Plenty of work, adequate remuneration, good conditions of service and the knowledge that dentistry is making an essential contribution to national health, will be, in our view, the best ways of encouraging recruitment to the profession, and securing that ready coöperation which must be the foundation of any satisfactory dental service."

On the other side of the medal is the question, Can it be done? Will there be at any time such a demand for treatment that the service available at that time will be hopelessly inadequate, and the scheme be thus discredited?

> "On a careful review of the probabilities we recommend the institution of a comprehensive dental service from the outset. We confess that we cannot regard some temporary excess of demand over supply with any undue anxiety—for what would it mean? It would mean that demand was coming closer to an equality with the true need; it would mean that much more was being done for the dental health of the people than ever before; and it would, we believe, soon bring an expansion in supply."
>
> "We have already quoted the Government's words that health care should be divorced from questions of personal means; to this we subscribe, and we cannot see that if there were a certain shortage of dentists those words would become untrue. If there should be a shortage, let it be shared by all. We therefore recommend that when the National Health Service is inaugurated, a comprehensive dental service should form an essential part of it. The possibility of temporary and local shortages should be frankly accepted and stated; the position would, we think, be willingly accepted by the public for the sake of a scheme of comprehensive scope."

The committee is not yet in a position to give its conclusions on the important question whether any dental work should be delegated to ancillary workers.

Special classes.—There are certain classes of the community who stand particularly in need of dental care and who can benefit in a special way from it.

> "We have received a great deal of evidence in favour of a concentration of effort on the dental care of (*a*) expectant and nursing mothers, (*b*) children and (*c*) adolescents. There are already ... public services ... which go some way towards meeting the needs of these classes. ... Our concern is not to dispense with these services, nor to regard a general service as a substitute for them, but rather to strengthen and improve them by all practicable means: they must form as it were the sharpest point of attack of the dental force of the country upon dental disease."
>
> "We express as strongly as we can the hope that employers will give their workers, and particularly the adolescents, time off without loss of pay for dental treatment. ... The provisions of the Education Act will result we trust in more and more adolescents coming within part-time contact with education authorities. We would stress that in their case too, the authorities should take their responsibilities in respect of dental care very seriously, otherwise much previous expenditure of time and money may be thrown to the winds."

Position of dentist in public service.—It is of very great importance that dentists working in the public dental services should have cause for satisfaction and pride in their work. There should be no compulsion on any dentist to enter the public service; any dentist should be free to engage either whole-time or part-time in the service or any branch of it; and the patient must have free choice of dentist. The proposals are not intended to interfere with the free right of everybody to seek his dental advice and care through private arrangements. "Our object is a service equally available to all, but not compulsorily imposed upon any."

General dental practitioner service.—This is envisaged as broadly analogous to that of a general medical practitioner service. "We recognise of course that a great part of the population today have no such relation with a dental practitioner as is conveyed by the term 'family dentist'; but it must be an object of policy to encourage the development and growth of such a conception."

Health centres.—Dental health centres will undoubtedly provide facilities for teamwork, and it may well be that in certain localities they will effect economies in dental man-power and equipment. Such centres should be established experimentally in suitable areas.

"There should be local consultation with the profession not only as to the development, siting and size of these centres, but also as to their internal arrangement, design and equipment. They may be either separate or (preferably) a part of the general health centre where other kinds of care are received. We share the desire of the Incorporated Dental Society to see the services of dentists included wherever possible in health centres set up for the purpose of providing medical and surgical treatment. We see no reason why the dentists employed by local authorities should not operate in these centres; on the other hand we contemplate that they will mainly be staffed by those who elect to come into the 'general' service."

Specialist services.—The aim should be to make available all necessary facilities for special diagnosis and treatment.

Coöperation and coördination of services.—The comprehensive dental service will be made up of several elements—the general service and the service for special classes, the separate practice and the group practice in dental health centres—and it is important that these several elements should be a source of strength to one another. "Moreover it is in our view essential that full use should be made of the expert guidance of dentists in the planning and administration of the service, both centrally and locally. Further the body with whom practitioners in any general dental practitioner service are in contract should be a dental body."

Dental health education.—Short-term publicity methods are not likely to make the public appreciate the need for regular inspection and treatment of the teeth, let alone develop a more positive or preventive attitude to oral health. What is wanted is a steady policy rather than a campaign, and by far the most important item is the quality of treatment given to the public.

> "We do not wish to separate dental from general health education; the one is a sentence on the page of the other. But we are anxious that that sentence should not be crowded out; rather than that, we would have it given a page to itself."

Additional recommendations.—Every possible step should be taken to encourage suitable ex-Service men and women to take up the profession of dentistry. The further education and training scheme of the Ministry of Labour should be interpreted liberally in the case of intending dentists, so that, for instance, an ex-Service man or woman who had not begun a dental training or who had even pursued some other vocation before the war should, if he or she is a willing and suitable candidate for the profession, receive the maximum assistance.

It is imperative that dental teachers should be quickly restored to their peace-time callings. "The public dental services will demand a greatly increased entry to the profession, and our final report will contain our recommendations on this and kindred topics. The immediate point, however, is that the first need in order of time is for the adequate staffing of dental schools so as to cope with the anticipated postwar student-entry. The schools are understaffed at the present moment to a serious degree: if they remain so after the war, the situation as regards dental man-power will deteriorate progressively."

"ALL CAREFULLY PACKED."—When delicate instruments and drugs have to be sent overseas into hot countries their value on arrival depends largely on the skill and ingenuity of the firm which packs them. At the Anglo-American Services exhibition on preservation and packing for the tropics, at the Central Ordnance Depot, Feltham, Middlesex, a section devoted to medical and surgical materials and equipment shows some clever ways of defeating the attacks of damp and heat. Penicillin, for example, before transport abroad has to be almost completely dehydrated; in that state it is hygroscopic, so it has to be packed in bottles with rubber diaphragms through which distilled water can be injected when the time comes to prepare the solution. Each diaphragm is protected by an aluminium disc and two aluminium caps, and the bottles are packed in boxes, which in turn are packed in waterproof bags, and nailed up in wooden boxes. Similar thought has gone to the packing of plasma, serum, various kinds of tablets, plaster-of-paris bandages, and iodine swabs.

In England Now

A Running Commentary by Peripatetic Correspondents

OUR village is busy on work of national importance. Other places may make tanks, guns or aeroplanes, but this is total war and we are engaged on an even more vital occupation—the mass production of babies. Under an official Government arrangement the manor house is packed with expectant mothers patiently awaiting attention, our streets and places of entertainment are crowded with women showing that globular form so pleasing to accoucheurs, and every house of the district can show its samples of our finished product, billeted by instruction of the ministry and apparently wearing well. Raw material flows in by a frequent service of special buses from London and the whole life of the village centres round that house by the wayside where 24-hour production is maintained by shifts of midwives.

Our chief and his staff may shortly be giving evidence before the Royal Commission on Population and the results of our research will doubtless find a prominent place in his report. We can produce incontrovertible evidence that the number of illegitimate births in any district is in inverse proportion to the square of the distance from the nearest military establishment; that there is a perfect correlation between the birth-rate and the shortage of midwives, a reduction in the number of midwives being always accompanied by a rise in the birth-rate; and, perhaps most startling of all, that the elopement of a midwife will precipitate the immediate simultaneous delivery of every expectant mother in her area. The application of these discoveries in the national campaign for a bigger population will need consideration but the brilliant mind of our senior accoucheur has directed us to one solution. The other day a mother who had just been delivered of her third BBA in the heart of rural England wrote and told us that in future we need not bother to send a midwife as her husband, David, the cowman, "is such a good midwife because he is good with cows," and should we require a midwife she could recommend him with confidence. Now, my dear Watson, the birth-rate varies in inverse proportion to the number of midwives, therefore abolish midwives and appoint experienced cowmen in their place and the population will immediately increase. Think of the good old days of the eighteenth century when William Smellie was appointed "man midwife extraordinary"—the most prolific years in the history of the nation!

* * *

One of the most therapeutic agents that I know in cases of protracted or chronic illness is an aquarium. Caterpillars and mice in cages are good too, but the difficulty of obtaining food plants and their gentle aroma are drawbacks. "Just looking at them, you mean?" says Pooh-Bah. I used to be rather overawed by Pooh-Bahs and pretend that I was studying these lowly companions, but now that I am within measurable distance of the dust I am frank. "Yes, P. B." I say, "the number of man-hours—since these became differentiated from beast-hours—that have been spent in contemplating, brooding with or gloating over such is at least a million times more than those spent with the written word, and out of habit they bring balm to the soul." He goes away muttering, "Little things please ...." and tapping his head, and indeed that is where the trouble lies. I have been an habitual brooder all my life. A long series of pets in boyhood whetted an appetite which I found hard to assuage when I first became a student in "digs." I even had to resort to an earthworm taken from the lab, and feed it on mud from returning football boots. I was romantic in those days. "My dear Sir and Madam," I would say, "my hermaphroditic dear, it was I who rescued you from a formalined death!" Later the establishment grew to about thirty aquaria. Then when I went to sea the abstinence symptoms came on again and I kept cockroaches and bed-bugs. I was never seasick, but 16 years did not cure me of homesickness, and I used to have lone ecstasies of it in my cabin, contemplating seeds germinating in a pot of earth from the garden at home. No-one who has not communed with root-hairs can realise the vast neighbourly contact of the animate with the inanimate world, a penetrating intimacy that the brooder himself is seeking with less specialised forms of life. Came chains of

chameleons, gekkos, scorpions, fire-bellied toads, ant-lions, but I think the most soothing of all are the sub-aqueous brethren. There is something in the attitude of a fish or the aloof gliding of a planorbis snail that takes one back to prehuman times. I confess that considering the number of hours that I have brooded on these fellow creatures I am singularly ignorant about them. For this winter I have got as well as an aquarium a few White Admiral larvæ in their hibernacula and a large pot of earth on the surface of which about 50 little wild cyclamens are fattening up their baby corms. I shall drop in between surgeries and rounds for a brood with them in the same way as the religious slip into a cathedral or the less religious in for a quick one. Last summer I was brooding over a squirming mass of gentles, romping like playground children, when Pooh-Bah came and looked over my shoulder. He went quite pale. "Disgusting!" he hissed, and hurried away. Till then I had never spotted the inner motive of Pooh-Bahery. Some time ago a brother peripat recorded how his infant son lost his recently acquired control of bladder when contemplating the chickens. How well do we brooders know that feeling of wonderment and content and relaxation, but nowadays our libation is poured out in words. For in these small lives we do not first seek knowledge, though in them lie secrets beyond the knowledge of man, but as acolytes we glow with the content that comes from watching mysteries. The Pooh-Bahs may laugh and rage together, but in their mocking is a horror of their coming home. But they who wonder at these things, where shall they find fear?

* * *

Believe it or not; I found the following scribbled on an evening paper picked up in a railway carriage. It is what is called, I am told, a "Triolet" and was written apparently apropos a paragraph carrying a picture of Dr. Charles Hill, complete with pipe, and headed (the paragraph not Dr. Hill) "Three Children per Marriage are Necessity—says Radio Doctor":

TRIOLET

"Three kids? That's a lot
My dear Doctor Hill
Food and clothes to be got
Three kids: That's a lot:
And for each tiny tot
The Stork has a *bill*
Three kids? That's a lot
My dear Doctor Hill."

* * *

He's a good hand, and there was no doubt of the severity of his pain—it had flattened him out completely. I had just been woken up, and there was just enough motion to discourage clear thinking. The fear is sometimes father to the thought and the more I looked at him the more he looked like a perforation. The prospect of this filled me with acute terror. Admittedly, his abdomen was not absolutely board-like, but I had never seen a perforation fifteen minutes old, and it might develop any moment. I sat down and tried to be calm and dispassionate. Thirty-six hours to port—my God, I should have to sew it up. At this I all but perforated myself; I distinctly felt my acid curve climb off the chart. And I had used nearly all my ether for cleaning—no virgin ever felt so foolish. And what if I opened him and couldn't find the perforation? This was clearly the occasion for it to be round the back, or somewhere. Even the thought of a *Daily Mirror* write-up couldn't console me now. I prayed for a sign to guide me in my hour of trial and tribulation. Fearfully I looked again. My prayer was answered. He had done a thing I felt no self-respecting perforation would do. He had fallen asleep.

* * *

In the shed in which we store our all too meagre supply of corn there are unwelcome mice for which we set break-back traps. Yesterday we had a success—one thief lay dead in the trap and beside it lay another squatting apparently uninjured but no less dead. Do mice die of fright or was it just another case of coronary embolism? No post-mortem was done.

Mr. THOMAS STOWELL has been re-elected to the council of the Industrial Welfare Society of whose advisory medical committee he is chairman.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

THE House has adjourned for a week and the new session will open on Wednesday, Nov. 29, with the King's Speech. It is expected that there will be about a week's debate on the speech, in which any topic of general policy may be raised. This will leave some time free before Christmas in which progress may be made with social legislation. What will happen to the National Health Service proposals is not yet certain, but if the insurance proposals are to have a real meaning the National Health Service must also be put into legislative form before this Parliament ends. To leave the medical service proposals to the hazards of an election, now that they have got to the present stage by the process of inter-party agreement, would not assist their calm and judicial consideration.

Last week interest centred chiefly on the partial demobilisation that is to take place between the defeat of Germany and the final defeat of Japan. How long this period will be it would be hazardous to say. But recent Japanese successes of the mainland of China and the possible opening of a Japanese land route from north to south in China do not promise any quick ending of the struggle. We may go on all of 1946. In the interim, however, we shall be turning away from war production in this country to peace production, and more consumers' goods—pots and pans, clothing, furniture and household necessities—will gradually become available. A fortunate pointer to the greater availability and freedom of our shipping was given by the Prime Minister's announcement of a plan to give overseas Service-men in Italy, the Near East, the Far East and East Africa spells of leave in this country which they badly need.

As far as the doctors and dentists in the Services are concerned the demobilisation plans do not promise any early relief. They are based on the two factors of age and length of service, no consideration being given to foreign service. Although in the debate special consideration was suggested for men who have been wounded or suffered serious illness, no promise of this was given. The fact is we are in the grip of a problem of man-power which needs very careful handling. And medical man-power is one of the difficulties. The application of the general demobilisation rule of age and length of service means slow demobilisation for doctors. The situation may be eased when we know the composition of the forces which will be engaged in the war against Japan after the German defeat; that is, how far France will contribute, how far the Netherlands, and how far the United States. Australia and New Zealand are in any case in the Pacific war at present and will of course continue. But it may be necessary to devise special measures to relieve the pressure on British medical man-power if the needs of the civil population of this country, turning again to peace production, are to be met adequately.

An encouraging announcement in relation to the extent of our war preparation was given by the Secretary of State for Air. The Joint Air Training Scheme in Canada, which has been of such immense value to the whole Allied war effort, is to be discontinued from the end of March, 1945. There is to be also a reduction in the parallel scheme carried out in South Africa and in Southern Rhodesia. Skeleton staff arrangements will remain after March in case of any unexpected and unanticipated turn in the fortunes of war. But Allied air superiority is now so great that we have reserves of man-power in hand which are calculated to be enough to meet all contingencies to the end of both the German and the Japanese wars. The best side of this is the great reduction in the casualties of the RAF.

The Prime Minister's report on the terrorist assassination of Lord Moyne, the number arrested, the stern words used, are however a painful reminder that the postwar world will still be full of grave problems. The agony of Europe, of the Middle East and of the Far East will leave a trail of "rehabilitation" problems which will tax all the resources of civilised mankind. What our immediate contribution to these tests is to be will be revealed in the King's Speech.

FROM THE PRESS GALLERY

Demobilisation of Doctors

ON Nov. 5 in the debate in the House of Commons on the Government's plans for a reallocation of manpower between the armed forces and civilian employment at the end of the war with Germany, Lieut.-Colonel J. D. PROFUMO asked whether there would not when peace came be a growing need in this country for doctors and dentists. In his reply Mr. E. BEVIN said it was proposed to relieve doctors and dentists by age and length of service in accordance with the general scheme. But Dr. HADEN GUEST thought the Government should give special consideration to this problem. He did not know how they were going to release any large number of doctors. If the Government would look at the statistics, which Dr. Guest as a member of the Central Medical War Committee knew well, they would find that the numbers of doctors in the Services were large—larger than those of practically any other profession. The proportion of doctors in the Services, he went on to say, was higher than the proportion of miners or building workers. There were not enough doctors to make their release on the lines laid down in the white-paper possible. More doctors would have to be obtained, and unless plans were laid to bring forward new doctors more quickly and to obtain other doctors for the civilian population, it would be impossible to tackle this question. Dr. Guest said that he knew one district where there were three doctors now in civilian practice. Two of them were between 75 and 80 years of age, and the third was 80. He was sure that these doctors would go on working as well as they could, but their period of service was drawing to its close and clearly some relief would have to be given to them.

Dr. HADEN GUEST also asked whether due weight would be given to sending men home who had been exposed to tropical diseases in the Far East. Mr. M. S. MCCORQUODALE, in winding up the debate, said he was sure that the authorities would give proper attention to compassionate and medical cases. Thought and care had been devoted to this demobilisation plan, and he was confident it could be carried through to the satisfaction of our men and women in the Forces.

Social Insurance or National Insurance?

When the Ministry of Social Insurance Bill was considered in committee in the House of Commons on Nov. 14, an amendment moved by Mr. M. PETHERICK to change its title to Ministry of National Insurance Bill was carried by 170 votes to 89. The bill passed through committee and was read the third time, and on the following day passed through all its stages in the House of Lords.

QUESTION TIME

Welfare Food Schemes after the War

Major S. F. MARKHAM asked the Minister of Food whether, in connexion with social insurance, it was proposed to continue in the postwar years the arrangements by which pregnant women, nursing mothers and children up to school age could obtain essential supplies of milk and vitamins.—Mr. W. MABANE replied: No change is contemplated in the welfare foods schemes so long as food shortages continue and consumption of liquid milk by the general public is restricted. Consideration is being given to the best means of ensuring that the special needs of children and pregnant and nursing mothers will be met when liquid milk and other essential foods are again in ample supply.

Mediterranean Sick Camps

Mr. W. WINDSOR asked the Secretary of State for War whether his attention had been called to the conditions prevailing at wounded and sick camps in the Central Mediterranean area.—Sir JAMES GRIGG replied: A letter published in a Sunday newspaper related to one particular convalescent depot and investigations show that even at this depot the conditions described were by no means general. Its location was not entirely suitable for occupation during the winter, but for military reasons it could not be moved as had been intended. Steps were taken to prepare it for the winter, but before this could be done torrential rains set in much earlier than had been expected. The majority of tents are dry inside. Defective tents are being replaced as soon as possible. A tent has been erected to protect those waiting for meals. A drying shed is available and there is an ample reserve of spare blankets. The scale of beds normally available for a convalescent depot is being supplemented by the construction of bunks. Each individual not provided with a bed received a groundsheet. A complete issue of gas capes has now been made. No large buildings are available, and the area has been heavily bombed. There is apparently no suitable permanent accommodation which is being occupied by Italians.

Domestic Staff for Hospitals

Replying to a question Mr. ERNEST BEVIN said that during the period of the heavy "flying-bomb" attacks, the London hospitals evacuated many of their patients and their staff demands were much reduced. In the last two months these demands again became urgent. This coincided with the need to provide domestic staff for the hostels for building workers brought into London. Even during this difficult period the hospitals were not neglected and in the past two months 63 cooks, 756 full-time and 115 part-time domestic workers and 163 orderlies, porters, stokers and maintenance men were placed. Now that the staffing of the building workers' hostels is almost completed he hoped that it would be possible to make further progress in meeting the demands of hospitals which will enjoy first priority for the supply of domestic labour.—Mr. E. H. KEELING: Does not the Minister agree that it would be a great calamity if beds had to be closed owing to lack of staff, and does he hope that he will be able to avoid that?—Mr. BEVIN: I think so; I am pressing on with it, but I would make an urgent appeal to the voluntary hospitals in London to introduce a little more up-to-date personnel management. It would help me enormously if their staffing measures were not so antiquated.

Veterinary Education

Replying to a question Mr. T. WILLIAMS, parliamentary secretary to the Ministry of Agriculture, said that the Minister of Agriculture and the Secretary of State for Scotland had already set up a committee to inquire into the extent and effect of veterinary practice in Great Britain by persons who were not registered. Consultations with the Royal College of Veterinary Surgeons and the various institutions concerned with veterinary education were taking place, and Mr. Williams hoped that the recommendations of the Loveday Committee would be found to be generally acceptable, but pending the result of these deliberations he was not able to announce what further steps would be taken to implement the recommendations.

MEDICAL SUPPLIES FOR SLOVAKIA.—Mr. LAW announced that medical supplies have recently been despatched to Slovakia.

MILK USED FOR MANUFACTURE.—On Nov. 15 Colonel LLEWELLIN said that in the previous week 126,200 gallons of milk were manufactured in Great Britain. They were used for the production of priority foods only.

BLIND CHILDREN.—Mr. WILLINK gave the number of children under one year of age registered in England and Wales as blind on March 31, 1938 and 1943, as respectively 11 and 13.

REHABILITATION CENTRES FOR WOMEN.—Mr. BEVIN is ready to consider the provision of industrial rehabilitation facilities for women as soon as the need arises.

YELLOW FEVER INOCULATIONS.—Mr. A. V. ALEXANDER stated that the right of officers and men of the Royal Navy and Royal Air Force proceeding to Gibraltar or Africa to refuse inoculation against yellow fever had not been withdrawn.

A ROOF OVERHEAD.—In London the Cecil Houses, blitzed, restored, and blitzed again, continue an adventurous fight against the powers of darkness. Every night the houses at Boswell Street, Harrow Road and Waterloo Road are open to homeless women. The Wharfdale Road House, blast-shaken, had to close down just as Boswell Street reopened. Every night the three houses are filled. The guests arrive in the evening and leave in the morning after breakfast. Each pays 1*s.*, for which she gets a hot bath, a good bed, and facilities for washing her clothes and for cookery; if she brings a baby she can have a cot for an extra 3*d.* At each house the matron keeps what stock she can of shoes, stockings, underwear and warm clothing for those who need them; and the Christmas parties every year are famous. In normal times Cecil Houses, once established, are self-supporting, but nowadays expenses are many and unforeseen. Gifts of clothes, or donations, may be sent to Mr. S. T. T. James, 193, Gower Street, London, NW1.

Letters to the Editor

PENICILLIN IN ACUTE NEPHRITIS

SIR,—A recent experience prompts me to suggest that a valuable use of penicillin may be in the treatment of acute hæmorrhagic nephritis in children—and possibly in adults. It is well known that in children the disorder of the kidney frequently follows or is associated with an infective focus, especially in the upper respiratory tract, including the middle ear. The hæmolytic streptococcus is a common infecting organism in such cases, but the use of sulphonamides if and when the kidneys are inflamed is contra-indicated. Penicillin however has no such drawback and if the infective focus can be quickly brought under control by its use it seems reasonable to hope that the damage to the kidneys may be minimised. I am aware of the general good prognosis in this acute form of inflammation of the kidneys in children; but no-one can predict in the early stages whether or not the child is going to be in the fortunate class, and a minority do badly, passing on sooner or later to chronic and incurable forms of the disease. I am also aware that the primary focus of infection may have largely passed its acute inflammatory stage before the kidney involvement appears, and in such circumstances penicillin can hardly be expected to do as much as when the tonsillitis or otitis media, for example, is contemporaneous with the nephritis. But even in these cases the certain elimination of any smouldering sepsis should help to limit kidney damage. A single observer's experience with this disease is limited and I am anxious that the suggestion contained in this letter shall receive some extensive trial. Otherwise I would not have the temerity to "rush into print" with a single observation, and I have purposely refrained from giving any details of a solitary and successful case.

Middlesex Hospital, W1. ALAN MONCRIEFF.

BEDS FOR TUBERCULOSIS PATIENTS

SIR,—On Oct. 21 under this heading you summarised a debate in the House of Commons on a motion by Sir Waldron Smithers concerning the treatment of tuberculosis in Kent. In an account of the circumstances in which a certain patient was admitted to hospital, strong criticism of myself as administrator of the tuberculosis work in the county was implied. In order that this matter may be properly understood, I would like to comment briefly on this report. While criticism of my behaviour is of no interest to your readers, important principles are involved which concern all whose duty it is to carry out public health administration. The facts which I shall give are not in dispute.

A patient was sent by his doctor to hospital for radiography of his chest. The doctor was told that the appearances were suspicious and consequently referred him to a tuberculosis officer on my staff. Pulmonary tuberculosis was diagnosed and the patient was placed on domiciliary treatment, his name being put on the usual waiting-list for admission to a sanatorium. Unfortunately, at the present time, owing to the length of the waiting-list, a long delay is unavoidable. During this period neither the patient's wife nor the doctor asked the tuberculosis officer to call.

After about six weeks, Sir Waldron Smithers, in whose constituency the patient resides, asked me for information as to the position, since the patient's wife had complained to him. I gave Sir Waldron Smithers a very full report; but it transpired that after visiting the patient he had succeeded by direct telephone contact in getting the patient forthwith into a London voluntary hospital. Here it should be noted that the same hospital on three separate occasions previously had refused formal application from me for reception of tuberculous patients, and had placed their names on a waiting-list.

In addition to this interference with normal procedure, Sir Waldron Smithers took the unusual, and in my opinion regrettable, course of entering into correspondence with me and also (unknown to me) with one of my tuberculosis officers, at the same time, in regard to the same patient.

In the House of Commons Sir Waldron Smithers quoted from my letters one or two sentences out of their context, suggesting that I had little sympathy with the sufferings of the tuberculous and allowed officialdom to interfere with prompt treatment—because I had said that a tuberculosis officer dealing with one particular area would not be in a position to speak on the council's policy regarding tuberculosis in the county as a whole. In general, a more accurate and fairer statement of the facts of the case was given by Miss Horsbrugh in her reply to Sir Waldron Smithers.

The facts as regards tuberculosis in Kent have been frequently and fully reported to the public health committee. The Ministry of Health is aware of the position, and to the best of my belief everyone concerned has done everything possible to alleviate a situation which is everywhere recognised as deplorable. It is, however, a national problem, not in any way confined to this county; and until young women can be persuaded to come forward to be trained as tuberculosis nurses, long waiting-lists will continue, and, owing to delay in isolating the infectious, the circumstances will be likely to deteriorate.

Maidstone. CONSTANT PONDER, County Medical Officer.

CONGENITAL SYPHILIS WITH OBSCURE INITIAL SIGNS

SIR,—While Dr. Lapage does well to draw attention to the increase in the incidence of congenital syphilis, I feel that the symptoms described in his note of Oct. 14 ought to have awakened the suspicions of the practitioners who referred the cases to him. Cases 2 and 3 both had typical dermal histories. Cases 1, 4 and 6 showed Parrot's pseudoparesis, and radiography of the epiphyses of the joints concerned no doubt would have confirmed the diagnosis as effectively as the Wassermann reaction. In an infant a history of inability to move the limbs should always suggest three possible diagnoses: obstetric paralysis, the osteochondritis of congenital syphilis, or Barlow's disease. Enlargement of the liver is noted in some 20% of all cases of congenital syphilis, but depression of the bridge of the nose cannot be diagnosed with accuracy under the age of 6–12 months, and is almost always preceded by bloodstained snuffles.

The fact that the mothers of Dr. Lapage's cases "were apparently normal during pregnancy" is a strong plea for the routine elimination of the possibility of syphilis in the expectant mother. When one case of syphilis is detected, examination of the remaining members of the family is the only certain method of discovering asymptomatic cases. It is still not generally realised that the average infant, infected in utero, is apparently normal at birth: evidence of infection is seldom observed before the second week of life. The death-rate in the present series—3 out of 6—seems unusually high. In treated congenital syphilis it need not, as a rule, exceed 5%.

I would suggest that routine examination of the infant's cerebrospinal fluid is not usually necessary, and may even be dangerous. The blood Wassermann reaction, and X ray of long bones, usually give the answer. I would also suggest: (1) That the index of suspicion should be high, particularly in diseases of infants; (2) that a more adequate standard of undergraduate and postgraduate instruction in this subject should be universal; and (3) that the possibility of syphilis should be excluded in *all* expectant mothers—this should be a statutory obligation, not a matter for the individual medical conscience as at present.

Bristol. DONALD D. BROWN.

FATTY STOOLS AFTER DYSENTERY

SIR,—All will agree with the statement in your annotation of Nov. 11 that transient sprue-like symptoms fairly often follow infections of dysentery type; but it is rather problematical that the "explanation of the steatorrhœa seems to lie not so much in damage to the intestinal mucosa as in the rapid passage of the intestinal contents and consequent failure to absorb the vitamins and other substances necessary for the complete metabolism of fats." It is true that no definite damage of the intestinal mucosa has so far been found in sprue conditions; the occasional finding of thinning of the mucosa, or small scattered ulcers, is held to be a sequel. But flatulence, dyspepsia, loss of weight and energy, and

increased fat content of the stools are often present in sprue many months *before* the onset of diarrhœa. Furthermore the gravity of the steatorrhœa is by no means proportional to the number of daily motions. Other and more complicated factors seem to be responsible for the failure of the jejuno-ileal function, as is evident from my recent review of the implications of modern physiology and pathology in relation to this condition.[1]

The syndrome attributed to deficiency of the vitamin-B complex described (mainly in America [2 3]) as consisting in anorexia, flatulence, loss of weight, diarrhœa, nervous irritability, and a characteristic derangement of motility and mucosal pattern on X-ray examination, seems also to indicate that rapid passage of intestinal contents cannot alone be responsible for the steatorrhœa. The American authors have specially underlined that none of their cases showed steatorrhœa, and this coincides with my experience in similar cases. The frequency of this condition has been considerable in this country in recent years. The patients are mostly otherwise healthy people with a good medical history. On searching for a cause it is tempting to select such factors as overwork, anxiety, monotonous and vitamin-poor war-time diet, and overloading with starchy food. But these cases had become common in the United States during 1939–41, at a time when unemployment had disappeared, good food was available for everyone and anxieties were remote.

In view of the work mentioned in your annotation, on the possible conditioning of B-complex deficiencies after the use of sulphonamides, it may be worth considering the possible influence of injudicious use of sulphonamides (not only sulphaguanidine and sulphasuccidine) on similar abdominal conditions, and to follow up a certain number of cases more closely.

London, W1. Z. A. LEITNER.

MALIGNANT MELANOMA

SIR,—We feel that the paper by Dr. Margaret Tod in your issue of Oct. 21 under the sensational title "Tragedy of Malignant Melanoma" should not be allowed to pass without criticism. The fact that this article was quoted by the *Evening News* cannot of course be held against Dr. Tod, but the authority of the Holt Radium Institute for the statements, which is implied by the newspaper, may well lead to alarm and despondency on the part of the public. The unfortunate statement that "six patients died as a direct result of meddlesome and incompetent treatment," besides being discourteous to the profession to which Dr. Tod belongs, is more than likely to destroy the confidence which many of us find so helpful to our, not always unsuccessful, efforts to relieve the sufferings and discomforts of our patients.

While we sympathise with Dr. Tod's evident indignation at what she calls "inefficient," "careless," "incorrect" as well as "meddlesome and incompetent" treatment, we envy her certainty of the correctness of her own advice and methods. Perhaps the somewhat sheltered atmosphere of an institutional appointment has narrowed her outlook. She has, we think, omitted several important facts which might help to get a better perspective of the frequency of malignant melanoma, at least in respect to other conditions. She says that "during the last three years 74 such tumours (malignant melanomata) have been seen at the Holt Radium Institute," but she does not state the total number of cases, let alone those of other skin tumours, seen at the same institute over the same period. Needless to say, she does not even hint at the number of moles, usually called "cellular nævi," seen; as we all know so well, they would be as the sands of the sea, without number. She writes that "malignant melanoma is not a common tumour"; we would say that it is an exceedingly rare one, but figures such as we have indicated might have gone some way to prove her right.

We agreed with Dr. Tod's admission that "malignant melanoma may be very difficult to diagnose"; indeed we should have said that, before metastasis, it is impossible to diagnose the malignancy, with the necessary certainty, without histological study. How this study is to be made without excision she does not say. We have also been told, not once but many, many times, by patients, that discoloured moles were growing in size; and yet, on histological study, have found them to be cellular nævi without any evidence of malignancy.

Under Dr. Tod's heading "Possible Lines of Treatment" we are in entire agreement with her paragraphs 3 and 4. We also agree with her statement in paragraph 2 that "if there is no doubt that a lesion likely to be a melanoma is growing, treatment must be radical" and that "surgery is the first choice." In our view such surgical excision would be better done by diathermy, for this blocks the lymphatics and other vessels and so helps to prevent metastasis, if that has not already taken place.

We do not agree that "irradiation to the highest degree which can be tolerated offers a useful alternative" to surgery. It is generally accepted that malignant melanomata are not radiosensitive, and our limited experience of this rare tumour, over a period of more than 20 years, both in hospital and private practice, supports this view. It should not be forgotten that the appearance of an X-ray or radium atrophy is disfiguring and that radiodermatitis is potentially epitheliomatous.

Dr. Tod holds that even benign moles should not be removed or treated in any way; if the patients insist, they should be submitted to operation, and any question of cosmetic result "must not influence the surgeon in planning his excision." We do not agree. We would also challenge the statement in paragraph 1 that "it is never justifiable to remove, for cosmetic reasons, a pigmented lesion which shows no sign of active growth." In true malignant melanomata biopsies of excised lesions have revealed malignancy, however early the growing lesion has been seen, and it is unfortunate and not true to ascribe its malignancy to any therapeutic procedure. Surely a simple excision, or even one or two applications of carbon-dioxide snow, cannot be regarded as carcinogenic factors. The statement we have criticised is the implication that the malignancy of these tumours is in any way the result of injury or "injudicious treatment."

It is well known that consciousness of a physical deformity may seriously interfere with a patient's ability to earn her or his living, and may (often does) make them morbid and introspective—in fact may spoil the whole of their enjoyment of a normal life. This is a humane and practical outlook and should in our view be given at least serious consideration in moderating such drastic advice as is recommended.

J. E. M. WIGLEY.
London, W1. R. T. BRAIN.

PERINEAL EXCISION OF THE RECTUM

SIR,—It is well known that after excision of the rectum the large cavity necessarily left takes a considerable time to heal and a persistent sinus commonly remains. In my last case union was complete in ten days, and there was a striking difference in the patient's condition compared with previous cases.

After the usual Lockhart-Mummery excision the whole raw area was powdered with sulphanilamide and the usual oiled silk and gauze pack inserted, most of the skin incision being closed. At the end of three days, under gas anæsthesia, the pack was removed and the whole of the cavity found to be remarkably clean with no pus at all. The remainder of the incision was therefore closed and two small tubes were inserted to the depth of the wound; through these was instilled 5 c.cm. of penicillin solution containing 100 Oxford units per c.cm. twice daily. At the end of another four days the tubes were removed, the wound appearing soundly healed. At no time was there any pyrexia, local reaction or discharge of pus, and at the end of ten days the stitches were removed as for a primary healed wound. Throughout the whole of this time the patient was in extraordinarily good condition, taking full diet and behaving quite differently from patients normally subjected to this operation.

Halifax General Hospital. H. I. DEITCH.

1. Leitner, Z. A. *Trop. Dis. Bull.* 1942, **39**, 497.
2. Lepore, M. J., Golden, R. *J. Amer. med. Ass.* 1941, **117**, 918.
3. Mackie, T. T. *Ibid*, p. 910.

NATIONAL UNIVERSITY OF IRELAND.—Prof. Thomas Walsh, MD, has been coöpted to the university senate.

Obituary

WALTER MARTIN ASH

OBE, MB LOND., FRCSE, DPH

AFTER a long illness Dr. Ash, medical officer of health for Derbyshire, died on Nov. 9, aged 55. Born in Somersetshire, he was educated at Blundell's School, Tiverton, and began his medical career by entering the London Hospital, where he was captain of the rugby fifteen. After graduating in 1912, he held several house-appointments at the London and saw service from 1914 to 1919 as a temporary surgeon in the Royal Navy; at the Royal Naval Hospital, South Queensferry, he had under his care casualties from the battle of Jutland and later he served on board two ships of a cruiser squadron, and with the naval demobilisation board at Dundee. He then turned towards public health, obtaining the DPH in 1920 at Manchester; but his interest in surgery led him to take the fellowship of the Royal College of Surgeons of Edinburgh in 1923. His first appointment was that of assistant county MOH of Lancashire; in 1923 he became deputy MOH for Middlesex; and eventually, in 1925, at the early age of 36, he was appointed to Derbyshire. There his interest in clinical medicine prompted him to a study of "Derbyshire neck," which bore fruit in an important communication on goitre next year in the *Journal of State Medicine*. His administrative abilities had full scope in the county, and his extension of the midwifery services was an outstanding achievement. All those with whom he came in contact recognised him as an enthusiast whose wisdom carried his efforts along the right lines. He had the confidence of his subordinates and of his colleagues both lay and medical. In those affairs in which family practice and public health were associated, he was always a help to the profession in the area. At the beginning of the present war his abilities as an organiser were illustrated by his success in planning the Civil Defence casualty services, in a county with a scattered population and of varying geographical features. The service was accepted as a model and he was invited to describe it by broadcast. In 1943, in recognition of this work, he was created OBE. By his death the public have lost a valued servant and the profession a good friend.

Dr. Ash was at one time president of the Association of County Medical Officers of Health and also of the East Midlands branch of the Society of Medical Officers of Health, and he was a prominent Freemason. His wife, formerly Miss Pryce-Jones, survives him.

GREVILLE MATHESON MACDONALD

MD LOND.

SIXTY years ago children grew up with *The Princess and the Goblin*, *Phantastes* and *At the Back of the North Wind*. George Macdonald's stories, remote yet real, impossible but disturbingly likely, were apt to come to life in their dreams. His eldest son, who has died on Nov. 3 at the age of 88, told in his *Reminiscences of a Specialist* of a childhood packed with fairy-tales, including those of Lewis Carroll, who was a family friend. But the little boy seems to have been given a dreadful faith in his own dullness. From this he was delivered by no less a person than Octavia Hill, and in his teens he decided to become a doctor, despite early signs of chronic deafness which threatened to prove a handicap. At King's College, London, his student years passed successfully; he founded the *King's College Magazine*, was one of Lister's first dressers in London, and qualified in 1879. He came near to abandoning medicine, as hopeless for a deaf man; but he persevered, and took his MB with honours in 1880. After a tour round the world and two years' practice in Florence, he came back to demonstrate anatomy at King's. An appointment as house-surgeon at the Throat Hospital, Golden Square, was the beginning of specialism, and in due course he joined the staff of his old hospital. In 1904, however, he retired to Haslemere. He wrote some memoirs, several books on his specialty, more on religious and philosophic themes, several fairy-tales, and one or two romances.

Dr. W. H. PARRY and Dr. E. WYN JONES have been nominated as sheriffs for Caenarvonshire and Sir EDMUND SPRIGGS for Denbighshire.

Public Health

Schools of the Future

IT is no uncommon sight, in England, to see a village school in varnished Gothic, small and dark, standing in the corner of a meadow. The pleasant fancy that the children, if cramped in the classroom, at least have the run of a fine field is quickly ended by the discovery that a miserable backyard behind the school has been fenced off and paved with asphalt. That is the playground; the meadow is for sheep, or cows or horses. True, once the school door shuts, rustic children have the run of the countryside; whereas the town child, with the same allotment of playing space, has no such compensation. But in town and country alike the habit of mind that allowed a playground to recall a prison yard is as out of date as the old school buildings.

The draft building regulations just published by the Ministry of Education (HM Stationery Office, 6*d*.) promise something better. The buildings proposed are far beyond the standard found in most schools today: classrooms are to be larger and airier, with good provision for practical work; assembly halls are to be wired for broadcasting, equipped for film projection, and fitted with a good stage for acting. Proper dining-rooms and kitchens will make school feeding easier. One or two points, however, are less satisfactory. Thus the proposed area, to include playground, for a one-class school is only ½ acre, and for a five-class school 2 acres. Playing fields will of course be additional to this space, and these are more generously conceived, running from ½ to 14 acres.

A question that may trouble school medical officers is the space allotted to beds in dormitories. Only 3 feet is to be allowed between beds, which means that the heads of the occupants may be only about 5 feet apart, unless the beds are arranged head-to-foot. In small boarding schools two sickrooms, each capable of being isolated, are to be provided and in larger schools a separate sanatorium.

The standards set out in the draft will become statutory unless Parliament decides to annul them within six weeks. As they will establish the pattern of our schools, probably for the coming century, they need serious study.

Infectious Disease in England and Wales

WEEK ENDED NOV. 11

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 2132; whooping-cough, 1297; diphtheria, 642; paratyphoid, 3; typhoid, 4; measles (excluding rubella), 5752; pneumonia (primary or influenzal), 583; puerperal pyrexia, 161; cerebrospinal fever, 37; poliomyelitis, 13; polio-encephalitis, 2; encephalitis lethargica, 1; dysentery, 320; ophthalmia neonatorum, 66. 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 Nov. 8 was 744. During the previous week the following cases were admitted: scarlet fever, 41; diphtheria, 17; measles, 15; whooping-cough, 18.

Deaths.—In 126 great towns there were 2 (0) deaths from enteric fevers, 6 (0) from measles, 1 (0) from scarlet fever, 2 (0) from whooping-cough, 12 (0) from diphtheria, 41 (3) from diarrhœa and enteritis under two years, and 25 (2) from influenza. The figures in parentheses are those for London itself.

Sunderland and Newport, Mon, each reported a fatal case of enteric fever. There were 7 deaths from diarrhœa at Birmingham.

The number of stillbirths notified during the week was 209 (corresponding to a rate of 31 per thousand total births), including 15 in London.

CARDS FROM LABRADOR AGAIN.—The Grenfell Association, about this time of year, have happy ideas for Christmas cards, which they sell in aid of the needy and hardworking people of Labrador and Newfoundland. This year's batch are well up to standard—polar bears, huskies and penguins do honour to the festival and remind us of regions where the deep-sea fishermen and their families know the full meaning of a white Christmas. Those who wish to buy cards or calendars should write to the hon. secretary, Grenfell Association, 66, Victoria Street, London, SW1.

On Active Service

CASUALTIES

KILLED

Lieutenant DAVID M. DE R. WINSER, MC, BM OXFD, RAMC

DIED OF WOUNDS

Captain JOHN HUNTLY TARRING LAWTON, MRCS, RAMC
Captain PHILIP AUGUSTUS ROBINSON, MRCS, RAMC

DIED

Captain IAN WILLIAM BARCLAY, MB GLASG., RAMC

WOUNDED

Lieutenant A. E. WEBSTER, RCAMC

AWARDS

DSC

Surgeon Commander C. P. COLLINS, MB LOND., RN

MC

Captain SUBRAMANIAIN GOPALKRISHNAN, IAMC
Captain C. J. PINTO, MB, IAMC
Captain C. S. RAO, IAMC
Captain L. J. CALVERT, RCAMC
Captain D. G. CAMERON, RCAMC
Captain C. B. CASWELL, RCAMC
Captain R. C. MELLOW, RCAMC
Flight Lieutenant R. N. RYCROFT, MRCS, RAFVR

Rycroft was the only medical officer on one of the beaches of Normandy on D day. Owing to the intense bombardment, it was not possible for him or any member of his unit to move off the beach for 6 hours. He worked for 48 hours tending casualties among the personnel of his unit and also aided some 75 American wounded. He was himself slightly wounded but his efforts on behalf of others were untiring.

Major R. W. JONES, MB EDIN., RAMC

Major Jones commanded a company of a field ambulance which landed with an infantry brigade on the first day of the invasion. During the attack by the brigade on its objectives in the area east of Bayeux on June 6, he constantly attended wounded whilst under heavy fire. In addition to leading his own assault section he visited the other sections of his company, moving under constant fire of snipers, and controlled their work in addition. As a result of his exertions all casualties of the brigade were successfully evacuated.

Captain J. A. PETRIE, MB ST. AND., RAMC

Captain Petrie was RMO with a battalion which made three attacks on the Gustav line during one week last May. Throughout this time he always had his RAP well up with the battalion despite almost continuous heavy enemy shell fire. During one period of 24-hours he treated some 300 casualties. The ready treatment of wounded at his hands (of his own men and those of other units) was invaluable in maintaining the morale of the battalion in battle.

MENTION IN DESPATCHES

Surgeon Commander R. D. BRADSHAW, MB EDIN., RNVR
Surgeon Lieut.-Commander D. W BURNFORD, MRCS, RNVR
Surgeon Lieut.-Commander G. D. CHANNELL, MB LOND., RNVR
Surgeon Lieutenant R. G. G. EVANS, MRCS, RNVR
Surgeon Lieutenant G. C. HAYWOOD, MB, RNVR
Surgeon Lieutenant D. A. MACIVER, MB EDIN., RNVR

MEMOIR

Captain J. T. DOYLE was killed in action in September, four days after landing in the Arnhem area with an airborne division. He was born in 1920, the son of Mr. Norman Doyle of Cheam, and educated at Caterham School and Guy's Hospital. His family had a long-standing connexion with Guy's, for in 1822 his greatgrandmother had been married from the hospital where her father was then apothecary. Doyle qualified MRCS in 1942 and graduated MB Lond. the following year. He was appointed to Guy's (USA) Hospital at Seal, where he quickly showed his capacity to handle the varied problems which face a house-officer, and where by his charm of manner and ability he won the affection and respect of his medical and nursing colleagues, and of his patients. While still a student he served with the AFS at Purley, and later with the fire squad at Guy's which saved the hospital when it was encircled by fire and most of the surrounding buildings were razed to the ground. Doyle was commissioned in the RAMC in 1943 and later transferred to a landing-field hospital.

B. Berrys Studios

Notes and News

MEDICAL SCIENCE AND PHYSICAL EDUCATION

ON Nov. 15 Brigadier F. D. HOWITT, FRCP, presided at the second annual meeting of the Research Board for the Correlation of Medical Science and Physical Education. Members of the board, he said, had worked in four main groups: Mr. Victor Lack, FRCOG, had taken charge of maternity and child welfare; Mr. Walton of education and recreation; Surgeon Captain Digby Bell of the Services; and Brigadier F. A. E. Crew, MD, FRS, of industry. A scientific advisory committee had been formed with Sir Farquhar Buzzard, FRCP, as chairman and Prof. Lancelot Hogben, FRS, as assessor.

Mr. H. U. WILLINK, Minister of Health, said that we ought to know more of "how to measure fitness for daily occupations, whether sedentary or manual, and how fitness for such ordinary work can best be secured and maintained." Not only productive efficiency must be considered but also the happiness of the worker in his job. In the Services, under the special circumstances of war, there had been a big change in the physique of young men and women as a result of carefully graded training: "the laboratory experiment has been successful, but the step from the laboratory to commercial production is often a long one. We have still to discover how these results can be successfully applied in ordinary civilian life."

Sir ALFRED WEBB-JOHNSON, FRCS, congratulated the Ling Association on launching this movement, and was glad it had the personal interest of the Ministers of Health and Labour. Never before had it been so important for the doctor and statesman to be closely allied. But medical advice to Ministers must be sound, and based on scientific inquiry. Little, for example, was known about the effect of physical exercise on fitness for childbearing. Two urgent needs were that, in planning towns and schools, adequate provision should be made for recreation, with playing-fields and swimming-baths, and that good use should be made of the many men and women specially trained in physical education and rehabilitation who would be released from the Services.

Brigadier CREW said that Professor Hogben and Lieut.-Colonel W. S. Tegner, MRCP, had drawn up a programme of research. The board could be the means of bringing together people who, living and working among them, could recognise and define the problems of social medicine, and those in university departments of social medicine who had the technique and facilities for investigation.

EXHIBITION OF HEALTH CENTRES

LAST week Mr. Somerville Hastings, FRCS, chairman of the London County Council, opened an exhibition of posters at the Housing Centre, 13, Suffolk Street, Haymarket, London, SW1. These posters, which have been made by Mr. Erno Goldfinger and Miss Ursula Blackwell, are designed to show the advantages that might accrue from the building of health centres and a possible form the health centre might take.

The first posters emphasise by photographs the effects of bad environment on health and the improvement in health that is gained in good surroundings. Then come some charts showing the proportion of the population in different age-groups now cared for through National Health Insurance, and the distribution of doctors in England and Wales. This is followed by a contrast, pictorially illustrated, between the complicated and overlapping services of today and the comprehensive service which might be obtained by proper coördination of the work of hospital and health centres. Some photographs are shown of existing health centres before passing on to detailed drawings and plans of the type of health centre Mr. Goldfinger thinks would be appropriate to provide the services promised in the white-paper.

The exhibition, though primarily intended for a lay audience, should yet prove of interest to doctors. They will find in Mr. Goldfinger's plans a wealth of ideas deserving detailed study. It is unlikely that every health centre would include all that is here shown provided. Local provision will obviously vary with local need. But what this exhibition does show is how easily the health centre could grow into something much more, both in structure and in spirit, than the conception of a "communal surgery."

The exhibition remains open until Nov. 30.

Lord NUFFIELD has been elected president of Guy's Hospital in succession to Lord Goschen, who has resigned.

EVERYBODY'S BUSINESS

CURIOSITY about health and interest in preserving it is almost universal. Two examples of health-education campaigns have lately come to our notice which show how lively it can be. In a "health forum" held at Cardiff last year each question from the audience was answered by one of a group of experts who included the regional blood-transfusion officer, the medical superintendents of a city isolation and a municipal general hospital, the chief sanitary inspector, the deputy city engineer, a general practitioner, the principal medical officer of the Welsh National Memorial Association for the Prevention and Treatment of Tuberculosis, two representatives of the education authority, the medical officer of health and a factory inspector. A report, obtainable from the MOH, shows that the answers were as creditable as the questions.

A second adventure in health education is a weekly course of lectures, on The Health Centre in Action, now in progress at Glasgow. The topics include the man in the street and public health, pneumonia, clinical pathology, prevention of blindness, artificial limbs, stomach ulcer, rehabilitation, diabetes, teeth, midwifery and tuberculosis. Straightforward lectures are interspersed with less formal entertainments, including a comedy talkie, *How to Spread Disease Quickly*, a brains-trust, a practical demonstration of food-testing and a social evening. The programme, arranged by Dr. T. Simpson Crawford, will repay study by those who might do something of the same kind.

TYPHOID ABSCESS

REFERRING to the notes in our issues of Sept. 9 and 23 Dr. I. Friedmann recalls the case of a young butcher admitted to hospital with vague periumbilical pains of 3–4 weeks' duration and a loss of 18 lb. in weight. A mass the size of a child's head was felt in the right mesogastrium, and on laparotomy this proved to be an enlarged mesenteric gland. Needling produced thick pus from which *Bact. typhosum* was grown in pure culture. He points out that "Purulent mesenteric glands due to typhoid—but often apparently unrelated to the disease—may be the cause of peritonitis (localised or diffuse), abdominal hæmorrhage, intestinal obstruction, or abdominal tumours of unknown origin." In the case he mentions, published with J. Cervenansky (in *Čas. čes. Lék.* 1936, **75**, 247), no history of typhoid or symptoms suggesting it could be elicited.

Society of Apothecaries of London

The court of assistants recently met under the chairmanship of Dr. J. P. Hedley, master of the society. An illuminated address was presented to Sir Stanley Woodwark on the completion of three years as master. Brigadier R. Ogier Ward took his seat as a member of the court; and a past master's medal was bestowed upon Mr. T. B. Layton. Dr. Hedley was re-elected as the society's representative on the General Medical Council, and Dr. W. D. Kirkwood on the Central Council for District Nursing in London. J. C. N. Wakeley was bound apprentice to C. P. G. Wakeley for four years. The following were admitted to the freedom of the society: by redemption, J. Bernstien, T. R. Hill, A. W. Kendall; and by servitude, A. W. Banks.

The following diplomas were granted upon examination:—

LMSSA.—M. J. Blunt, D. A. Cox, D. I. T. Edwards, E. D. C. Jones, R. A. Leeming, I. A. Nazroo, D. T. H. Paine, E. F. Roberts.

Master of Midwifery.—J. N. I. Emblin, A. Rothbaum, J. W. H. Simpson.

Surgeon Rear-Admiral C. P. G. Wakeley delivered a lecture in the hall on War Surgery in 1944, in place of Colonel Elliott Cutler, whose military duties prevented him from lecturing.

Nutrition Society

The conference on the nutritional rôle of the microflora in the alimentary tract, which the English group of the society was to have held last July, will now take place on Saturday, Dec. 30, beginning at 11 AM, at the London School of Hygiene, Keppel Street, WC1.

Electron Micrography

The scientific and technical group of the Royal Photographic Society and of the Association for Scientific Photography will meet at 3 PM today, Saturday, Nov. 25, at 16, Prince's Gate, London, SW7, to discuss this subject. The speakers are Mr. G. Parr, AMIEE, Mr. E. M. Crook, PH D, Miss F. M. L. Sheffield, D SC, Mr. L. V. Chilton, FRSP and Mr. D. G. Drummond, PH D.

Royal College of Physicians of Edinburgh

At a meeting held on Nov. 7, with Dr. A. Fergus Hewat the president, in the chair, Dr. W. F. T. Haultain (Edinburgh) was elected to the fellowship.

Army Blood Transfusion Service

Brigadier L. E. H. Whitby will give a lecture on this subject at the Royal Society of Arts, John Adam Street, London, WC2, on Wednesday, Nov. 29, at 1.45 PM. Surgeon Rear-Admiral G. Gordon-Taylor will be in the chair.

Course on Mental Deficiency

The University of London extension and tutorial classes council, in coöperation with the Provisional National Council for Mental Health, will hold a course on mental deficiency and allied condition, provided sufficient applications are received, at the London School of Hygiene, Keppel Street, WC1, from March 12 to 23. Further information from Miss Evelyn Fox, c/o the University Extension Department, 39, Queen Anne Street, W1.

Royal Society of Medicine

At the section of odontology, on Monday, Nov. 27, at 4.30 PM, Dr. G. J. Parfitt will speak on bone pathology. At the section of medicine, on Nov. 28, at 4.30 PM, Prof. H. P. Himsworth will open a discussion on nutritional factors in liver disease. At the section of otology, on Dec. 1, at 10.30 AM, Mr. E. D. D. Davis, Mr. F. W. Watkyn-Thomas and Mr. T. E. Cawthorne will open a discussion on endocranial complications of otitic origin. At 2.30 PM, on the same day, the section of anæsthetics is holding a discussion on anæsthesia in the dental chair, when the speakers will be Dr. K. B. Pinson, Dr. F. W. Roberts and Dr. A. D. Marston. At the same hour, at the section of laryngology, Mr. Bedford Russell will speak on chronic frontal sinusitis, and Colonel Norton Canfield, USAMC, and Major Cane, USAMC, on the use of tantalum in plastic operations on the frontal bone.

British Orthopædic Association

A meeting of the association will be held in London on Dec. 15 and 16. On Friday, the 15th, at the Royal College of Surgeons, Lincoln's Inn Fields, WC2, at 9.15 AM, Mr. E. A. Nicoll will show the British Council film *Accident Service*. Afterwards Prof. W. E. Le Gros Clark will speak on the efficiency of intramuscular anastomosis and regeneration of devascularised muscles, and Dr. Ruth Bowden on changes in voluntary muscle after denervation and during re-innervation. Short papers will be read during the afternoon session, which begins at 2 PM. On Saturday, the 16th, the meeting will be continued at 10 AM at Queen Mary's Hospital, Roehampton, where Dr. A. J. Craft will demonstrate the standard limbs supplied by the Ministry of Pensions. Mr. F. G. St. Clair Strange will also speak on amputations and Colonel Rex Diveley, USAMC, will show a film entitled *Meet Mr. McConachie*.

The vitamin D in Cow and Gate Milk Food is being increased to 320 units per oz. Each ounce of the reconstituted milk will therefore contain 40 units of vitamin D.

THE *Deutsche medizinische Wochenschrift* is now suspended, and its place is being taken by a *Medizinische Zeitschrift*, which will also include *Medizinische Klinik*, *Medizinische Welt*, *Münchener medizinische Wochenschrift* and *Wiener medizinische Wochenschrift*.

Births, Marriages and Deaths

BIRTHS

EVANS.—On Nov. 17, at Hitchin, the wife of Squadron-Leader Byron Evans, MD, RAFVR—a son.

PORTER.—On Nov. 13, at Burnham-on-Crouch, the wife of Surgeon Lieut. D. S. Porter, RNVR—a daughter.

MARRIAGES

HOUSE—SHAW.—On Nov. 11, at Seal, Roger Allan House, MRCS, flight-lieutenant, RAFVR, to Jessie Mary Shaw, section-officer, WAAF.

DEATHS

KELLY.—On Nov. 16, at Liverpool, Sir Robert Kelly, CB, MD LPOOL, FRCS.

SEARS.—On Nov. 12, at Colyton, Devon, Charles Newton Sears, MD LOND., of Mullion, Cornwall, and late of London, SE12, aged 64.

SUCKLING.—On Nov. 16, Ernest Victor Suckling, MB, DPH, FRIC, FR SAN I., aged 51.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

CONTROL OF VENEREAL DISEASES

AN EPIDEMIOLOGICAL APPROACH*

JOHN E. GORDON, MD, FRCP, COLONEL MC, USA

Division of Preventive Medicine, Office of the Chief Surgeon, ETO, United States Army

IT is a military dictum that the most effective force must be concentrated where the greatest progress can be attained within the shortest time. It is an epidemiological principle that successful control of a communicable disease depends on recognition and elimination of the sources of infection. The venereal diseases have been too much set apart from other acute communicable processes; too much consideration has been given to their moral aspects to the neglect of the social and economic; and attention has been focused on the infected individual rather than the afflicted community—on the illness of Mary Jones instead of the venereal disease of London. I shall choose to look upon the venereal diseases as communicable diseases, to consider them as one would measles, scarlet fever or pneumonia, and to integrate what is known of them—what is practised in their control and prevention—with the accepted epidemiological principles which govern the control of all communicable diseases.

The first requirement of the epidemiological method is an adequate knowledge of cause. The causes of communicable diseases are of two kinds—the active infectious agent, and the predisposing factors. In respect of the venereal diseases we are well informed about the infectious agents—the gonococcus in gonorrhœa, *Treponema pallidum* in syphilis, and specific bacteria or viruses in the less common of the group. The principal lack of information in respect of cause is not in the field of microbiology but in those factors which predispose to infection, those host factors which depend on psychological, physiological, sociological and economic influences. Generalities have been drawn, theories have been elaborated and speculations are common, but far too little in evidence are the precise statistical facts on which to base constructive measures. There is need for field study by epidemiological methods. The study of disease in its natural environment brings out facts which cannot be heard through a stethoscope nor drawn from a test-tube. This sort of knowledge is as important to improved control of the venereal diseases as was knowledge about the louse in the limitation of typhus fever.

CLINICAL DIAGNOSIS

Having knowledge of the communicable nature of a disease and of the agent which causes it, the next feature of the epidemiological approach is to establish criteria for its recognition in its natural environment. In contrast to many other communicable diseases, the technical methods for recognising the two important venereal diseases are simple and readily available. Furthermore, the venereal diseases are spread in only one way—by direct (usually sexual) contact, which is in general widely spaced and readily remembered, in contrast to the repeated and ephemeral exposures which characterise diseases contracted through the upper respiratory tract. This adds greatly to the value of a carefully taken history. In the male particularly the clinical symptoms and the physical signs of gonorrhœa are well-defined. For many years, and principally because of local requirements and moral implications, diagnosis of this disease has required demonstration of the causative agent by laboratory means. From a purely professional standpoint this is unnecessary and gonorrhœa can be diagnosed on the basis of history, clinical symptoms and physical signs. The United States Army in the European theatre of operations has recognised this principle by prescribing that demonstration of the organism, while desirable, is not essential for the diagnosis of gonorrhœa, and contrariwise a diagnosis other than gonorrhœa (non-specific urethritis and similar terms) is not permitted in patients with an urethral discharge until gonorrhœa has been convincingly excluded. The error introduced by the application of these admittedly rigid criteria represents less than a fraction of that in the other direction through the present common practice of evading a diagnosis of gonorrhœa when possible.

On the other hand, laboratory confirmation of the diagnosis of syphilis is essential, but when properly used the available methods are simple, efficient and reliable. In the presence of typical clinical manifestations, a diagnosis of syphilis may be made on the basis of positive reactions to standard serological tests or by demonstration of motile *T. pallidum* from appropriate lesions. The occurrence of spirochætes other than *T. pallidum* on the surface of oral and anal lesions renders material from these sources unreliable. In the absence of typical clinical manifestations a diagnosis of syphilis must not be made on the basis of serological tests in the presence of fever, in patients recently vaccinated against smallpox, or in those with or suspected to have various infectious diseases such as malaria, infectious mononucleosis, lymphogranuloma venereum, or other conditions recognised or suspected to produce false positive reactions. Furthermore, a diagnosis of syphilis must not be made in the absence of clinical manifestations until a positive serological test has been confirmed and found to remain persistently positive at intervals of two to four weeks over a minimum period of three months. Tests of the "presumptive" or "exclusion" variety should not be used in the diagnosis of syphilis.

The less common venereal diseases—chancroid, lymphogranuloma venereum and granuloma inguinale—are equally well-defined clinical entities, and adequate criteria for their diagnosis are available.

DETECTION OF FOCI OF INFECTION

The primary practical application of the epidemiological method lies in the recognition of existing foci of infection from which new infections may originate. For many diseases foci of infection are multiple in kind, widely distributed and often difficult to identify. In contrast the human host is the sole reservoir for the venereal diseases; none exists in nature. The problem is thereby simplified and becomes merely a matter of identifying human beings suffering from these diseases. A variety of field methods are available, of varying applicability, largely governed by the nature of the disease under consideration. That of individual case-finding is the most productive and in general the most readily accomplished.

Case-finding by contact investigation.—This standard epidemiological procedure as applied to the venereal diseases involves five separate procedures. The start is made with the properly confirmed diagnosis of a venereal disease in any patient. A history of all recent sexual contacts is obtained from the patient. This roster of contacts serves to determine all possible links in the continued chain of infection—not only from whom the patient may have acquired his infection but also to whom he may have transmitted it. It permits working both backward and forward from the established case.

The next procedure is to visit each contact to tell him that he may have a venereal infection and needs a medical examination. Any implication of accusation must be avoided. The method of approach should reflect solely a desire to be helpful; it must be that of the professional health worker interested in curbing the spread of disease and not that of the moralist or the law-enforcement officer. The technique is personal public-health education at its best. The aim is to bring the person to proper facilities for examination and for treatment if necessary. The necessary medical care may be secured through reference to a private physician or to a clinic, at the patient's choice. Something more than advice is usually necessary, and the good contact worker will not only recommend the patient to consult medical facilities but will also help in the often difficult situation of registration and explanation of the reasons for the visit.

The final feature of case-finding is to make sure that if venereal disease be found treatment is followed to completion. This is known as case-holding. Lapse in treatment is common among patients with venereal disease and repeated follow-up visits are often necessary.

The principal accomplishment of this method of case-finding is the removal of a focus of infection from the community. Among measures which contribute to the decrease of the venereal diseases none is more important.

* Read before the Medical Society for the Study of Venereal Diseases, London, Feb. 26, 1944.

In addition the individual concerned has benefited from the recognition and elimination of his infection, and the epidemiological facts arising from accumulated case-studies form the basis for improved methods of administrative control.

The technique is by no means complicated; but much depends on the proper selection of investigators. Experience has led to the belief that the public-health nurse is best qualified. It is obviously impracticable to employ trained epidemiologists, but the nurse, because of the nature of the problem, should have public-health training. She has an approach better suited to female contacts than has a male investigator and is under no disadvantage when the person is a man. Most important of all, she can bring to the task ample time, a personal interest, and a broad social outlook, any or all of which the busy physician may lack. In respect to case-holding—the investigation of defaulters in treatment—some hold the opinion that a trained social worker has an advantage over the public-health nurse. On the other hand, experience shows that the person responsible for bringing a case under treatment has established a personal relationship which is lost when a second worker takes over case-holding.

Contact investigation is distinctly a public-health procedure, to be administered by a public-health authority. By choice, however, the case-finding team should have its headquarters within and be a part of the clinic where patients are treated. This is particularly true if case-holding and case-finding are a combined responsibility.

The effectiveness of case-finding is demonstrated by the experience of United States Army nurses assigned to case-finding work in the venereal diseases in the United Kingdom this past year. The patients were all American soldiers. None of the contacts were Americans. Anonymity was lost to the investigators through the necessity of being always in uniform. There was the added difficulty that in their approach to the contacts they were foreigners and so suspect, and also to a degree unfamiliar with social habits and customs and the intimate understanding of a people which can be so helpful. Nevertheless their results obtained have been good. In all, some 1718 soldiers with a venereal disease have been interviewed. Again because the patients were in a foreign country and many of the contacts were transitory, it was not always possible to obtain identifying information. However, sufficient information to attempt identification was obtained for 782, or about 46% of the sexual contacts involved. Completely identifying information was rare. Sometimes only the first name was known, sometimes there was only a description of the person and the fact that a certain public house was frequented. With such pieces of information it was possible to locate 457 contacts or 58% of those actually sought. The success of the method is shown in the fact that 223 of these girls were registered in clinics by the nurse, 109 were referred to clinics for treatment, and 17 were registered with or referred to private physicians. Thus a total of 349 or 76% were acquainted with the potential dangers they were experiencing and given the advantage of treatment. In addition 61 contacts were already under observation at clinics when found; 10 were under the care of private physicians and 18 were in jail or other institutions; a total of 89. Only 19 contacts (4%) proved uncoöperative. It is to be noted that under existing public-health procedures, and with the benefit of the broad education in venereal disease now practised, less than a sixth (71, excluding the 18 in institutions) of this relatively large group had sought medical care, and only a fifth were receiving it by any means; and yet the vast majority of the remainder were willing to do so when the need was explained. The necessity of contact investigation would seem to be surely demonstrated and the results show how direct and efficient it can be.

Quarantine of known contacts is a time-honoured procedure in the control of communicable diseases. Having knowledge of the exposure of a person to a disease, his movements can be restricted and he can be observed for early evidence of developing infection. With such diseases as smallpox, and others, this is an essential and productive method for early recognition of new cases and for limiting the spread of infection. It is not generally applicable to the venereal diseases. Wh applied, it usually is voluntary through education in risks of infection and involves early report to a physic for examination. Under certain circumstances howe the use of enforced quarantine does have practi application. In a number of American cities kno contacts to venereal disease can, if it is deemed necessa be kept in quarantine until freedom from infection established. This is a practical method of dealing wi the infectious prostitute.

House-to-house canvass is an effective way of det mining the incidence and prevalence of a sudden explos outbreak of disease, of which food-poisoning is a excellent example. It has no place in the routi attack on the venereal diseases, but in a modified for is frequently used in selected groups. The serologic survey (for syphilis) of groups of persons is nothing mo nor less than a special application of the technique house-to-house canvass. It may be applied to th inmates of institutions, to various industrial groups an as a prerequisite to marriage. Its commonest applicatio in recent years is in the routine testing of all patient admitted to hospital. This increasing practice i productive of greater returns than the examination of a like number of healthy people, because patients admitted to hospital are ill, and the illness may be syphilis. Aside from this last application, the serological survey of groups of people conforms to the general rule in being expensive and time-consuming, out of all proportion to the results achieved. One especially glaring illustration is the practice, fortunately becoming outmoded, of routine serological testing of food-handlers. Rarely if ever are the venereal diseases transmitted through the usual occupation of these workers.

Periodical physical examination is another recognised method for identifying foci of infection, best exemplified in tuberculosis practice where members of families in which the disease has occurred are examined at intervals to detect further new cases in incipiency. In addition, periodical general health examinations are increasingly emphasised as fundamental to good preventive medicine practice. A serological test for syphilis, and inquiry for a history suggesting gonorrhœa, should be a part of any examination of this type, or of any general medical examination for whatever cause.

A special case is to be made for including serological tests for syphilis in the routine prenatal care to which every pregnant woman is entitled. It has become general practice in most civilised countries to examine the blood of expectant mothers for syphilis early in gestation and to repeat the examination at least once before delivery. As a measure for reducing congenital syphilis this practice is to be wholly recommended. It might well be required by law.

Notification by physicians to health agencies is a recognised part of the control programme of most communicable diseases. It is the point of departure for the epidemiological method and fundamental to a well-organised case-finding programme. There is no scientific reason why the venereal diseases, since they are communicable diseases, should not be treated as are the others. Lack of a system of reporting is largely dependent on the peculiar features involved in transmission, on moral taboos, and on the presumed rights of the individual. This last concept disregards the obvious fact that the sum of the rights of the individuals who make up the community transcend the privileges of any one of the group, and demand the elimination of venereal disease as they warrant protection against other health hazards.

Some form of notification is a legal requirement of the public-health programme of almost all countries. The usual practice is a confidential report, the patient's name becoming known only when his own antisocial act brings that about, usually through refusal of treatment for the protection of others. Ordinarily no communicable disease is completely reported—some are reported better than others—but if the venereal diseases could be notified at a level of frequency even corresponding to that of whooping-cough, the possibility of eradicating foci of infection would be greatly enhanced. In the United States Army the venereal diseases are reported as a matter of course in the same way as are other communicable diseases, thus permitting distribution of

effort in dealing with the problem according to need. This is in contrast to civilian practice in Great Britain where effort to control the spread of the venereal diseases is dependent on such information as is obtained through voluntary reporting by an infected person.

DISTRIBUTIONS OF THE VENEREAL DISEASES

A tendency towards grouping of cases is a recognised characteristic of a communicable disease. The size of these aggregates, the rapidity with which they develop and their distribution may depend on one of a number of factors, more commonly on a combination of several. Particular and varying distributions in respect of time, of space, of individual and herd capacity to resist infection, of psychological differences and of social and economic relationships, can be identified and evaluated.

Adequate case-finding has been stressed as the first step in the epidemiological method. The individual profits from this; the community also to the extent that accumulated experience is periodically subjected to analysis in order to determine the nature, extent and significance of these aggregations or distributions of disease. The venereal diseases have such distributions. They are less well defined than are those of most communicable diseases, largely because of the attitude which has so long set them apart from other infectious processes. The application of accepted epidemiological methods would bring into play the full force of a programme of control based on orderly directed scientific attack in place of the present approach, which, while many times energetically pursued, gives no assurance that efforts are directed to the maximum benefit.

Geographical distribution.—Some communicable diseases—yellow fever for example—are limited in their geographical distribution to restricted endemic areas. Others of more universal distribution show well-marked variations from place to place. Before the war Sweden had the lowest rate for syphilis of any civilised country. The incidence of syphilis in Italy and in France was recognisably high, although definite data were lacking. A close approximation about the frequency of syphilis in the United States can be made on the basis of routine reporting and large-scale sampling of its efficiency. The information in Great Britain is fragmentary and indefinite since it is based only on infected persons reporting voluntarily to clinics. At any rate there are certain countries in which the venereal diseases are decidedly more of a problem than in others. The same situation holds within countries. In the United States one southern city has over a period of years maintained an incidence of syphilis more than twice as great as that in any other city of like size. Similar examples can be cited in Great Britain—a city in Lancashire of about 120,000 population provides as many fresh infections with syphilis to the United States Army as do the much larger urban communities of Birmingham and Liverpool. Similar differences become apparent when the incidence of syphilis is studied within cities. Comparing two Negro districts of similar size in a large seaport in the United States, the incidence of syphilis is significantly greater among the population of one than the other.

Shifting populations.—That important differences exist in different parts of a fixed population is not always completely appreciated, but the tendency of moving populations to have a greater incidence of communicable disease generally and of the venereal diseases particularly is more widely known. Epidemiologists have thus come to anticipate an increased frequency of these conditions among refugees and immigrants, in those concerned with military activities, especially in wartime, and among those who travel in the pursuit of their occupations. The need for special measures of venereal-disease control for these groups is evident. Where the mass movements are of soldiers under full military control it is relatively easy to develop methods which effectively prevent them from becoming vectors for the transmission of a venereal disease. With civilian populations, sailors and migrant labourers the problem is much more difficult.

Racial differences may be material. Coloured populations of the United States commonly have a frequency of new infections with a venereal disease five times that of white populations. This is more than the effect of local environment, for when coloured troops are transferred to a foreign country the difference is still maintained.

Clinical ratios.—It is common practice to speak of "the venereal diseases" as a group, since epidemiologically they are assumed to have so much in common. Nevertheless, full appreciation of the problem requires not only frequent examination of populations for total incidence, but also for the relative distribution of the several diseases. Ordinarily gonorrhœa is about five times as common as syphilis, the incidence of chancroid being negligible. Under certain conditions however these ratios become altered, so that in some communities of the United Kingdom the relative proportion of syphilis and gonorrhœa becomes as great as 1 : 1 instead of 1 : 5. In the armies of other theatres of war chancroid has changed from an unimportant consideration to a condition accounting for half or more of all venereal infections.

Industrial groups.—Some occupations are associated with high rates for venereal diseases. The most apparent are those which involve wide contact and much travel, with none perhaps more outstanding than that of sailors.

Time variations.—Long-term variations definitely occur over the course of years, related in general to major sociological and economic changes. Whether or not seasonal variations of any magnitude occur is not well known. The essential need is for simple determination of incidence to discover trends in the venereal disease experience of a given community.

Recognition of epidemics.—Centuries have passed since the venereal diseases, and particularly syphilis, appeared in outspoken epidemics, but it is too little appreciated that even in these times actual epidemics do occur. A village in East Anglia had been free from syphilis for a long time. In that locality six soldiers and a group of girls had had indiscriminate sexual relations with no untoward results. Then one of the soldiers visited London, contracted syphilis from a prostitute and returning to the village was ultimately responsible for three girls and at least five additional men developing the disease.

METHODS OF CONTROL

Three general principles guide the epidemiologist in the attack on a communicable disease. Where feasible the most satisfactory method is the destruction or elimination of the reservoirs of infection. The second general method is to break the chain of infection at the point of transfer. Theoretically this action can be developed either against the infectious agent itself or against the vector of that agent—for example, against the mosquito in malaria. Finally, measures may be directed towards increasing the resistance of the individual and thereby the resistance of the herd. The choice of which to employ, or what portion of effort to devoté to each, must be based on an analysis of the epidemiological features of the disease concerned.

Attack on reservoirs of infection.—Application of this principle so far as it concerns the venereal diseases is simple. The only reservoir of infection is man and the method is treatment of existing infection. Because of progress in improving methods of treatment, persons with gonorrhœa or syphilis can be promptly rendered non-infectious. The provision of adequate treatment facilities is an integral part of a control programme, and the developing tendency to incorporate treatment facilities within the clinics of general hospitals is to be endorsed, as contributing to higher medical standards and toward bringing these diseases within the full scope of good medical care. Treatment, however, must not be stressed to the neglect of preventive measures.

The second general method for eliminating reservoirs of infection is a full-scale effort toward the repression of prostitution. No better instance of the necessity for focal attack based on variations in likelihood of infection could be brought out. An analysis of the sources of all venereal infections would show that perhaps four-fifths arise from contacts who are not prostitutes. However, if the basis for calculation be the likelihood of contracting a venereal disease from a given number of sexual exposures, the risk of infection from intercourse with a prostitute is many times that of the risk from the much maligned "enthusiastic amateur." There are three

simple reasons why this is true; first, because almost every prostitute has or sooner or later contracts one or more of the venereal diseases; second, because the number of her exposures is so many times greater than the girl of limited activities, and finally, much uninformed opinion to the contrary, the prostitute does not "know how to take care of herself." The epidemiological method with which this discussion is concerned ends its application with the discovery of the prostitute. The necessary treatment to eliminate infection and the improved social and legal effort to limit her activities is not within the province of this discussion. Its importance must not be minimised.

Interrupting the spread of the virus.—Of the three general methods for the control of a communicable disease, those directed toward interrupting the spread of the infectious agent are, with few exceptions, most promising. The technical methods vary with the disease concerned, but fall into general groups. The first includes those measures which must be applied by the individual, while the second group are more general and by their nature are the responsibility of the community. The methods of individual personal hygiene or preventive medicine are thus distinguished from those of public health.

Personal prophylaxis.—The only absolute personal preventive measure is continence. But it is not commonly recognised that through education of the individual about sources of infection this same principle can be applied relatively as well as absolutely. There are certain available sexual partners who present a much greater risk of venereal infection than do others. If sexual contact cannot or will not be eliminated by the individual, it is still within his power to exercise selective discrimination; to limit his contacts to sources of lesser hazard. The problem of promiscuity in contradistinction to selected extramarital sexual relations is in point. The danger of the cheap prostitute is to be emphasised in contradistinction to the partner who is only occasionally exposed.

Actual specific prevention is available under chosen conditions and finds its most ready application in military practice. The specific preventive agents are mechanical, chemical and chemotherapeutic. Mechanical protection, in the form of a properly used condom, is highly efficient. Chemical methods of local disinfection have long been used, especially by armies in stations or centres set up for the purpose. Effective materials have more recently been developed for individual use, some of which are still in the experimental stage. In the future these individual methods may have some application in the civilian population, granted that the level of education in their proper use can be brought to that attained under military conditions.

Chemotherapeutic prophylaxis is at the moment in its infancy, and is limited to the use of a sulphonamide compound by mouth for the prevention of gonorrhœa and chancroid. With the rapid development of new therapeutic agents of both chemical and biological origin, the potentialities in this field are decidedly encouraging.

Public-health measures.—Most public-health programmes for the control of the venereal diseases combine treatment facilities for the infected with a preventive programme. As emphasis on prevention increases, administrative organisation must undergo the same change that has occurred in other fields of medical practice, where prevention has attained equal importance with treatment. With the acute communicable diseases, with tuberculosis, with cancer, the course of development has conformed to a pattern. The care of the ill was the first responsibility recognised by the community. As medicine progressed, the simple preventive measure of isolation of acute communicable diseases in a fever hospital was elaborated to include other measures for the protection of the community. Prevention outgrew the bounds of the fever hospital, the tuberculosis sanatorium or the surgical ward and was accepted as a general responsibility of the community and therefore to be administered by the public-health authority. It seems logical that this must be the eventual future of the venereal diseases. Indeed, this division of responsibility has been incorporated into the practice of the United States Army in the European theatre, where the prevention of the venereal diseases is delegated to the Division of Preventive Medicine and the treatment of these conditions to the Division of Professional Service.

The scope of a programme of prevention for the venereal diseases falls into three divisions. The usefulness of the epidemiological method and its prime importance in defining the places for emphasis and the points of attack have been discussed. Dependent on the information brought out by epidemiological studies, a programme of education promises most in limiting incidence. The methods are in some instances general: in others specific. The stress given to each depends on the demonstrated behaviour of the several diseases in a given set of circumstances. The general educational approach should endeavour to elicit public support for the preventive methods which apply both to the individual and to the community; and for special education of particular groups on the value of such methods as notification and provision of proper treatment.

As in general public-health education, posters, moving pictures and lectures are all useful. Newspaper publicity is perhaps most valuable of all the tried methods of mass appeal but the wireless is almost undeveloped. In a wide experience the most valuable general educational method has proved to be the informal discussion in small groups. Each person in such a group becomes a public-health educator, and while the method is time-consuming and expensive at the outset, the eventual results are excellent.

Specific methods of public-health education in the venereal diseases are directed essentially towards two groups—the medical profession and public-health authorities. Here again a modification of the small group method has proved invaluable. A coördinator, well versed in the general programme which has been agreed on, visits local health authorities, outlines the principles of a satisfactory programme and makes specific suggestions in view of local conditions. This method has proved so valuable in civilian practice that it forms the basis for the programme of the United States Army. Qualified medical officers are specifically assigned to major commands as venereal-disease control officers.

The practice of preventive medicine has gone far beyond the epidemiological study and the education of populations in good health measures. The extent to which social and economic factors contribute to the prevalence of disease is becoming increasingly evident. Thus in an attack on the venereal diseases all the community's resources must be brought into play. The interest and activity of public-health authorities must be directed by public opinion towards increased activity in the repression of prostitution. Military authorities perhaps more than civilian communities have recognised and utilised substitutive activities as an important factor in the prevention of venereal disease. Almost every army has become convinced of the futility of punishment as a preventive measure. The same point of view should be adopted by civilian populations, but this will require a change in public opinion, changes of economic circumstances to permit earlier marriage, and correction of innumerable social problems which in the past have often required centuries. There is, however, no need to wait. Much can be done now. In Canada, for example, health authorities have acted through strictly voluntary methods. Epidemiological studies showed that an undue proportion of venereal infections came from certain dance halls, beer parlours, rooming houses and cheap hotels. Health officers visited the proprietors of these establishments and through their coöperation arranged for stricter supervision and self-imposed regulations prohibiting entrance of unescorted women; a division of facilities with separate rooms for unaccompanied men; and improvement of conditions in rooming houses and hotels through enlisting the interest of property owners and real-estate agents. Where pressure was needed the interests of the brewery industry were enlisted or the threat of cancelling licences was employed. An awakened and energetic public opinion does not require compulsory legal backing.

SUMMARY AND CONCLUSIONS

Public interest is being increasingly aroused to the importance of the venereal diseases, both to the Armed Forces and the civilian population. This gives promise

of permanency and already has provided an impetus to the improvement of methods, procedures and attitudes. The danger of dissipation of effort through misdirected and unequal emphasis makes necessary a critical review of existing programmes of control, that balance and effectiveness be assured.

It is an epidemiological principle that successful control of a communicable disease depends on the recognition and elimination of the sources of infection. The venereal diseases are communicable diseases. An adequate programme for medical care of persons suffering from either of the two most common would effectively eliminate them, providing such facilities were known to all persons, that those who needed them were aware of the need, and that they would voluntarily use them. Experience has shown however that provision of medical care is not enough. Equally essential is an effective programme of prevention utilising all the forces of public health. This is logically based on an understanding of the nature of the disease involved, both as a clinical phenomenon and as a biological entity; on evaluation and definition of methods for diagnosis; on appreciation of the distribution of the disease in time and space; the means by which it is transmitted; and development of methods for interrupting its spread.

The community as a whole must accept the responsibility for educating the individual in the venereal diseases; for epidemiological studies necessary to define the extent of the problem and to expose the vulnerable points for attack; and for providing those control measures which can only function as a community responsibility. On the other hand, the individual is obliged, through enlightened appreciation, to give support to the community programme, and to practise the control methods which are based on individual initiative.

GRAMICIDIN S

ORIGIN AND MODE OF ACTION

PROF. G. F. GAUSE
CHIEF OF THE MICROBIOLOGICAL DEPARTMENT

M. G. BRAZHNIKOVA
RESEARCH FELLOW

From the Institute of Tropical Medicine, Moscow, USSR

IN the summer of 1942 we undertook a systematic investigation of various strains of antagonistic sporulating bacilli from Russian soils. Although antagonistic action upon agar plates was often recorded, the broth cultures of the antagonistic strains of aerobic sporulating bacteria were usually ineffective or only slightly effective in killing staphylococci. Among several hundreds of isolated strains only one culture, isolated from a garden soil, was remarkably effective in doing so. In subsequent work it was designated as the Gause-Brazhnikova strain, and served as a source for isolation and large-scale production of a new bactericidal polypeptide which was given the name of "Soviet gramicidin" or gramicidin S.

The organism we have isolated belongs to the *Bacillus brevis* type as described by Stokes and Woodward (1942). It produces alkali in sucrose broth and H_2S in peptone broth. We compared it with the strain of Dubos (1941), which we had at hand, and found it somewhat similar though by no means identical in growth properties. The Gause-Brazhnikova strain is thermophilic and grows at temperatures up to 60° C, though the best production of gramicidin S is observed at 40–41° C.

PRODUCTION AND CHARACTERISTICS

The bacteria are grown on 10% yeast autolysate with 0·5% of glucose in large vessels with a depth of liquid not exceeding 5–6 cm.

After 6 days' incubation at 40–41° C the culture fluid is acidified by HCl to pH 4·7, the supernatant liquid is discarded and the sediment is somewhat concentrated with the aid of a supercentrifuge. The concentrated sediment is then spread on large dishes and dried overnight at 50–60° C. The dry mass is ground to a fine powder in a ball-mill. To each kilogramme of the powder 4 litres of alcohol is added, and about 5% alcoholic solution of gramicidin S is obtained. It is then diluted with alcohol to 4% concentration, passed through a Seitz filter, sealed in ampoules and used in clinical practice at this stage of purity. The extraction of bacterial mass with alcohol is repeated three or more times. The yield of dry gramicidin S is about 400–500 mg. per l. of bacterial culture, but it rises to about 750 mg. when peptones are added to the nutritive medium.

Preparation of pure crystalline gramicidin S.—We early recognised that the active antibacterial principle elaborated by our strain of bacteria is fundamentally different from that described by Dubos (1941). When alcoholic extract of the acid precipitate of our bacterial culture is simply poured on a watch-glass and left for a few minutes at room temperature, the active principle readily crystallises from it in the form of thin colourless needles. This is the best reaction for identification of the specific substance produced by our strain: it never occurs with the tyrothricin of Dubos, which is an amorphous body and can be fractionated into individual crystalline substances only by chemical treatment.

The following method is used to obtain the active principle elaborated by our strain of bacteria in the pure crystalline form.

1 vol. of the crude alcoholic extract of gramicidin S is mixed with 3 vol. of water, and repeatedly extracted with ether to eliminate lipoid substances. The lipoid-free solution is evaporated to dryness at 37–40° C. The dry residue is dissolved in a small amount of warm alcohol on a water-bath at 40–45° C. Charcoal is added, the warm solution is rapidly filtered from it and placed on ice. The active principle rapidly crystallises. The crystalline mass is filtered from the mother liquor and washed several times by cold acetone upon the filter. The active substance is further recrystallised twice or more from the acetone-water solutions with the charcoal and is each time washed with pure cold acetone.

The crystalline body thus obtained shows the following characteristics which are here compared with those of gramicidin Dubos, and tyrocidine hydrochloride, derived from tyrothricin:

	Melting-point	N% (Kjeldahl)	Biuret reaction
Gramicidin S	268–270°	13·0	+
Gramicidin Dubos	228–230°	14·8	+
Tyrocidine hydrochloride	240°	14·3	+

Hence it is clear that gramicidin S is a new substance different from the other known crystalline polypeptides produced by aerobic sporulating bacilli. A. N. Belozersky and T. S. Passhina have demonstrated that it has some unique chemical characteristics (see next paper).

ANTIBACTERIAL ACTION

The 4% alcoholic solution of pure crystalline gramicidin S was first diluted with water, and then mixed with equal volumes of the nutritive broth, which in many of the experiments contained 10% of human serum. One drop of bacterial culture was put into each tube, and the latter were incubated overnight at 37° C. The bacteriostatic action was judged from the absence of growth of the bacteria. The contents of each tube were then plated upon the nutrient agar, and the bactericidal action was concluded from the absence of growth in the plating. The bactericidal concentrations in most instances approached bacteriostatic ones. The results with some gram-positive bacteria are given in table I.

TABLE I—ACTION OF GRAMICIDIN S ON GRAM-POSITIVE ORGANISMS

Bacteria	*Bacteriostatic concentration in nutritive medium μg. per c.cm.*
Staph. aureus (18 different strains)	10
Streptococcus (10 strains)	10
Diplococcus pneumoniæ	10
Clostridium welchii	7
Cl. histolyticum	7

A comparison with tyrothricin (Lederle) showed gramicidin S to be somewhat more efficient in killing staphylococci, whereas tyrothricin is more active in killing streptococci and pneumococci. Gramicidin S is less selective than tyrothricin in its antibacterial action. The latter point becomes clearer when we compare the action of gramicidin S and tyrothricin upon various gram-negative bacteria (table II).

TABLE II—ACTION OF GRAMICIDIN S COMPARED WITH THAT OF TYROTHRICIN ON GRAM-NEGATIVE ORGANISMS.

Organism	Concentrations in nutritive broth														
	Gramicidin S (μg. per c.cm.)							Tyrothricin (μg. per c.cm.)							
	400	200	100	50	25	12	6	C	400	200	100	50	25	12	6	C
Salmonella abdominalis	−	−	−	−	+	+	+	+	+	+	+	+	+	+	+	+
S. paratyphi A	−	−	−	−	+	+	+	+	+	+	+	+	+	+	+	+
B. dysenteriæ	−	−	−	−	−	−	+	+	+	+	+	+	+	+	+	+
Vibrio choleræ	−	−	−	−	−	+	+	+	..	..	..	..	..	..	..	..
B. proteus vulgaris	−	−	−	+	+	+	+	+	+	+	+	+	+	+	+	+
Bact. coli	−	−	−	−	−	+	+	+	+	+	+	+	+	+	+	+

+ = growth present. − = growth absent. C = control.

Whereas tyrothricin is ineffective against all gram-negative bacteria studied (this accords with the findings of other workers), gramicidin S prevents the growth and kills many varieties of gram-negative bacteria suspended in nutritive broth. Among these, *B. proteus vulgaris* and *Bact. coli* are noteworthy because of their wide distribution in infected wounds.

TOXICITY AND STABILITY

The greater range of activity of gramicidin S, as compared with tyrothricin, is not associated with any greater toxicity. Numerous tests have shown that, for white rats, LD 50 (that is, the dose causing a 50% mortality) of gramicidin S, given intraperitoneally, is 17 mg. per kg. of body-weight—thus almost coinciding with LD 50 for tyrothricin as established by Robinson and Molitor (1942). Moreover, solutions containing 400–800 μg. of gramicidin S per c.cm., as used in clinical practice, do not interfere with the activity of leucocytes in human wounds when applied locally or in cavities. This was determined by cytological observations made according to the method of Dr. M. Pokrovsky, which entails microscopic examination of a series of imprints made on glass slides from the surface of a wound. Dr. E. Kost and Dr. M. Stenko in the Botkin Hospital at Moscow have shown that in wounds regularly and abundantly irrigated with a watery solution of gramicidin S the growth of fibroblasts and macrophages is very active. Dr. L. Levinson of the histological laboratory of the University of Moscow recorded the favourable action of gramicidin S on regenerating tissues of the wound, and particularly the high nucleic acid content of the cells.

A peculiar feature of gramicidin S is its great stability. In the dry crystalline form it loses none of its antibacterial activity on being heated to 160° C; nor does autoclaving at 120° C for 30 min. reduce the activity of watery solutions. When tyrothricin to which 1% of hydrochloric acid has been added is heated for an hour, flocculation is visible and activity reduced. Neither reduction of activity nor flocculation are observed when gramicidin S is treated in the same way. After hydrolysis into constituent amino-acids, however, as described in the next paper, any antibacterial activity of gramicidin S disappears.

The addition of 4% of lipoid substances to weak watery solutions of gramicidin S does not reduce its activity against gram-positive bacteria, although it reduces somewhat the strength of its killing action on the gram-negative bacteria studied.

PROPHYLACTIC POWERS AGAINST ANAEROBIC INFECTION

Lacerated wounds of muscles in guineapigs were infected with *Cl. welchii*, treated either with watery solution of gramicidin S containing 400 μg. of this substance per c.cm. (experimental animals) or with physiological saline (controls); the wounds were then sutured. The mortality in animals treated by gramicidin S was 5%, whereas in control animals it attained 53%. Similar experiments were made on 48 white rats, where the experimental wounds were infected with a fixed quantity of garden soil. The mortality of controls was 100%, whereas in the rats treated by gramicidin S it was only 40%. Hence it is clear that gramicidin S possesses some capacity to prevent anaerobic infection in animals.

SUMMARY

A new strain of aerobic sporulating bacteria has been isolated which produces a new and hitherto unknown crystalline polypeptide with the melting-point 268–270° C. This substance has been named Soviet gramicidin or gramicidin S.

It kills not only gram-positive but also gram-negative bacteria suspended in nutritive broth.

Its toxicity is no greater than that of tyrothricin, and it is harmless when applied locally or in cavities in concentrations of 400–800 μg. per c.cm. of solution.

Gramicidin S is stable and its antibacterial activity is not destroyed by autoclaving.

It has been shown to protect against anaerobic infection in animals.

Methods for its production on a large scale are described.

CHEMISTRY OF GRAMICIDIN S

A. N. BELOZERSKY T. S. PASSHINA

From the Institute of Tropical Medicine

Gramicidin and tyrocidine hydrochloride discovered by Dubos (1941) have already been subjected to detailed chemical study by Hotchkiss (1941), Christensen et al. (1941), and Gordon et al. (1943). Gramicidin S (Gause and Brazhnikova 1943) differs sharply from them in melting-point and biological behaviour.

Insoluble in water, acids and alkalis, gramicidin S is easily soluble in alcohol, and with more difficulty in acetone. It can be hydrolysed with difficulty. When heated with 22% hydrochloric acid, it goes into solution only after 18–20 hours' heating, and complete hydrolysis is observed only after 35–36 hours.

Crystalline gramicidin S melts at 268–270° C, and contains 13% of nitrogen (Kjeldahl). It gives a positive biuret reaction, but the xanthoproteic reaction, Millon reaction, Pauly reaction with diazobenzol-sulphonic acid, Voisenet reaction for tryptophan, and Sakagushi reaction for arginine were all negative. Unlike the gramicidin of Dubos, gramicidin S acquires a deep blue colour when treated with ninhydrin, and this colour immediately passes into amyl alcohol. The positive reaction with ninhydrin demonstrates the presence in gramicidin S of free amino-groups in the α-position. The same is also confirmed by the capacity of gramicidin S to react with nitrous acid. Free carboxylic groups are also present in gramicidin S, in so far as it can be titrated by the method of Willstätter and Waldschmidt-Leitz.

The determination of amino-N by Van Slyke's method with HNO_2 yields the following figures: after 5 min. 1·64%; after 30 min. 1·87%. The coincidence of these figures demonstrates that amino-groups are present in gramicidin S in the α-position alone. The titration by Willstätter's method gives for amino-N 1·97%. The presence of free α-amino groups in gramicidin S shows that it is not a cyclopeptide, and hence fundamentally differs from gramicidin of Dubos.

A further study of the products of hydrolysis of gramicidin S has also shown a number of important differences between this substance and those discovered by Dubos and Hotchkiss. Complete hydrolysis in 22% hydrochloric acid was reached in 36 hours. The completeness of hydrolysis was controlled by cessation of increase in amino-N. The hydrolysate contained 97% of nitrogen in the crystalline gramicidin S used for hydrolysis. The following reactions were all negative in the hydrolysate: Millon reaction, Voisenet reaction for trytophan, Sakagushi reaction for arginine, Pauly reaction for histidine and xanthoproteic reaction. The negative results obtained both with gramicidin itself and with the products of its hydrolysis demonstrate that gramicidin S does not contain tryptophan, tyrosine, phenylalanine, arginine and histidine; nor were aspartic and glutamic acids discovered in the hydrolysate (Foreman method). The distribution of nitrogen in the hydrolysate was:

Nitrogen	%	*Nitrogen as* NH_2
Huminic	0·30	90·1%
Amidic	0·72	
Basic	27·02	
Mono-amino-acid	71·96	

Study of the basic fraction of the hydrolysate has shown that it does not contain arginine and histidine, and that not all amino groups are in the α-position, although the whole N of this fraction is amino-N. The picrate obtained did not explode at 252° C as that of lysine does, and its melting-point coincided with that of the picrate of ornithine. The amount of ornithine contained in gramicidin S was 18%.

It is remarkable that in the hydrolysate of gramicidin S some amino-N is not in the α-position (i.e., it is revealed after reaction with HNO_2 for 30 min.) whereas in the crystalline gramicidin S the whole amino-N was α-amino-N. Probably in the molecule of gramicidin S the δ-amino group of ornithine is bound, and only freed in the process of hydrolysis. These structural relations are very suggestive.

Among mono-amino-acids present in the hydrolysate we have so far discovered 10–15% of proline and have isolated about 70% of pure crystalline leucine. This investigation will be continued.

The results of our investigation are here summarised:

RESULTS OF INVESTIGATIONS

	Gramicidin Dubos	Tyrocidine hydrochloride	Gramicidin S
Melting-point	228–230° C	240° C	268–270° C
Molecular weight (Rast)	1250–1550	1260	1060–1340
Free NH_2	−	+	+
Free COOH	−	+	+
Time of dissolution on hydrolysis (hours)	18	2	18–20
Total N (Kjeldahl)	14·8%	14·3%	13·0%
Tryptophan	+	+	−
Tyrosine	−	+	−
Dicarbonic acids	−	+	−
Phenyl-alanine	−	+	−
Proline	−	+	+
Ornithine	−	+	+
Leucine	+	+	+

It is clear that gramicidin S represents a new and hitherto unknown crystalline polypeptide, which differs from both gramicidin of Dubos and tyrocidine hydrochloride.

CLINICAL USE OF GRAMICIDIN S

PROF. P. G. SERGIEV
VICE-PRESIDENT OF MEDICAL RESEARCH COUNCIL OF USSR

Although the discovery and wide application of sulphonamides was an important step in the advance of modern medicine, some of their weak points became evident as soon as they were used in war surgery. The first is their feeble action against the staphylococcus, which is such a common invader of war wounds; the second is that their local application somewhat desiccates the wound and retards regeneration. Hence the search for new antiseptics, of biological origin, free from these disadvantages.

Gramicidin S is a new substance of this kind, capable of killing many pathogenic bacteria. Its antibacterial action is more universal than that of tyrothricin, and applied locally to wounds or cavities in the specified concentrations, not only is it harmless but it even stimulates healing. The Medical Research Council of the USSR released it for wide medical trial in July, 1943, and this paper is based on the results of its use in 1500 cases in ten leading Soviet hospitals.

APPLICATION

Gramicidin S is distributed in ampoules containing 4% alcoholic solution of the dry substance. In this form it has proved to be stable for at least two years, perhaps indefinitely. When required for use it is diluted 100 times with water, so that each c.cm. of solution contains 400 μg. of gramicidin S. It is also employed in an ointment, the original 4% solution being diluted 50 times with castor oil. It is soluble and stable in this and some other oils, and it readily passes from them into water. For treatment of skin infections the initial solution is diluted 100 times with 70% alcohol. A characteristic feature of gramicidin S, not recorded for tyrothricin, is its power of alleviating pain.

RESULTS

Suppuration of soft tissues.—The 300 cases in this group comprise gunshot wounds of soft tissues at the stage of necrosis, severe burns, abscesses of the abdominal wall, and anaerobic infections. The watery solutions of gramicidin S were abundantly applied daily for 4–5 days, at which time the bacteria usually disappeared from the infected wound. Thenceforward gramicidin ointment was used sometimes every 2–3 days. Many cases of long-standing suppuration (6–8 months' duration) responded well to gramicidin treatment and were healed in 20–30 days. Most of the clinical observations were accompanied by repeated bacteriological examinations, and with studies of phagocytosis in the wound and measurements of the phagocytic activity of leucocytes in the peripheral blood. The disappearance of necrotic tissue and the appearance of granulations and epithelialisation were very rapid. The following are examples.

CASE 1.—A man of 28. Severe burns of abdomen, of both hips and round the knee-joints. Treatment by usual methods for two months was unsuccessful. Temperature 39° C; much suppuration of burned tissues with *Staph. aureus* in the pus. Gramicidin therapy started June 8, 1943, and continued daily. On June 12 the temperature was normal, the state of the patient had improved remarkably, and only a few bacteria were found in the wound exudate (mainly intracellular). On June 22 all the burned surface was covered with fresh granulation tissue and a third of it was epithelialised.

CASE 2.—A man of 22, with numerous severe wounds of hands, legs, face and head caused by a mine. Loss of the left eye. Temp. 38–39° C; *Staph. aureus* and *B. proteus* in the pus. After two days' treatment with gramicidin S the appearance of the wounds was much improved, suppuration was reduced and the swelling of the face and right eyelid had decreased so much that the patient could use his right eye. After 9 days' treatment his state was entirely satisfactory.

Preparation for skin-grafting.—The wound surface was freely irrigated with the watery solution of gramicidin S before and after transplantation of skin-grafts, and the results were always favourable.

Osteomyelitis.—The following is an example.

CASE 3.—A man of 48 had an open fracture of the tibia and fibula in the lower third and a fracture of the astragalus. These were complicated by traumatic osteitis with extensive suppuration and partial necrosis of soft tissues. The general condition was poor; temperature up to 40° C. Daily application of watery solutions of gramicidin S was begun on April 30, 1943. In 3 days suppuration was arrested and the general state improved. Temp. 37–37·4° C. After sequestrectomy the patient rapidly recovered.

In cases of chronic osteomyelitis the solution was applied on the operating table, immediately after sequestrectomy.

CASE 4.—A man of 26. Admitted to hospital on April 8 with osteomyelitis of the os calcis. All dead bone was removed on April 24. A tampon was inserted saturated in watery solution of gramicidin S, 800 μg. per c.cm. After 3 days the tampon was changed; no pus was found. Recovery without suppuration.

Empyema and peritonitis.—In this group also the application of watery solution of gramicidin S was valuable, as in the following example.

CASE 5.—A man of 38, admitted to hospital on June 10, 1943, with a diagnosis of abscess of the right lung and right-sided empyema. Felt ill, temperature 37·8° C. *Diplococcus pneumoniæ* found in the exudate. First aspiration on June 10: 250 c.cm. of viscous stinking pus sucked out of pleural cavity and 100 c.cm. of watery solution of gramicidin S introduced into it. On June 12, 50 c.cm. of liquid pus was aspirated and 50 c.cm. of the watery solution of gramicidin S introduced. On June 14 the exudate was sterile. Radiogram on June 15 showed that the pleura contained no fluid and that traces of the abscess cavity were insignificant. Rapid recovery.

Skin infections.—This group includes 267 cases. The best results were obtained with diluted alcoholic solutions of gramicidin S containing 400 μg. per c.cm. of alcohol, and also with ointments. In 117 patients with contagious impetigo treated with alcoholic solution of gramidicin S the time of recovery was on the average 4·1 days. In 23 patients with more deeply seated injuries of the skin of the ecthymic type, the time of recovery was on the average 6·8 days; 70% of chronic suppurations of the skin that had lasted from 3 months to 3 years were completely healed in 16–31 days.

Prophylactic use.—The number of cases studied prophylactically is insufficient for definite conclusions to be drawn, but all wounds treated prophylactically with gramicidin S healed by first intention.

This article is based on observations of Dr. K. Zirkunenko, Dr. E. Kost, Dr. M. Stenko, Dr. N. Gulaeva and Prof. A. Prokoptchuk.

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AMŒBIC DYSENTERY

FACTS AND FALLACIES IN RADICAL TREATMENT

SIR PHILIP MANSON-BAHR, CMG, DSO, MD CAMB., FRCP

THOSE who have specialised in tropical medicine believe that they possess an array of specific drugs, unrivalled in their potency in all other branches of medicine. It is therefore somewhat disturbing to find that now, when effective treatment of many tropical diseases contracted on war service is so necessary, our cherished and apparently well-founded views are being called in question by medical officers whose experience of these conditions is somewhat limited—witness the depressing account of the treatment of amœbiasis in India by Leishman and Kelsall.[12] The treatment of this disease is the case in point, for it is essentially a chronic infection and it should be realised that it may persist unchecked for 30–40 *years* or even longer; that clinical relapses are the rule and that silent periods may ensue lasting sometimes several years. We hoped, with some reason, that of all the ills which afflict mankind this was one over which, in the words of Dobell, we possess the most complete mastery, and that this is mainly due to the sane therapeutic use of emetine introduced by Sir Leonard Rogers[24] in 1912. The immediate effects of injections of this, the chief alkaloid of ipecacuanha, on the acute stage of amœbic dysentery, with active forms of *Entamœba histolytica* in the fæces, exceeded anything seen previously in the accepted ipecacuanha treatment as practised by Sir Patrick Manson. But, as with all new methods of treatment, preliminary reports were unduly optimistic; it was not sufficiently realised that a long "follow-up" is neoessary in order to pronounce absolute cure, and indeed success is still claimed after an observation period of six weeks or two months.

It was some time before the four-nucleated cysts were generally recognised as the cystic stage of *E. histolytica*. Precystic forms and cysts of *E. histolytica* were studied by Huber[9] in 1903, though the cysts had been previously seen and figured by Quincke and Roos[22] in 1893. They were again seen by Viereck[25] in 1907 and by Hartmann[8] in 1908, but because some confusion in nomenclature reigned it was not till 1912, as the result of studies by Wenyon,[27] that the typical cysts were generally recognised as distinct from those of *E. coli*.

Soon afterwards it became apparent that in chronic amœbic dysentery (with cysts in the fæces) injections of emetine hydrochloride, however large in amount and however prolonged, exerted no recognisable effect on this stage of the parasite, so that symptoms persisted in spite of this specific treatment. These important and basic facts do not appear to have been appreciated by many physicians now treating amœbiasis. From the studies of a number of eminent protozoologists, notably Wenyon, it has been shown that the cyst stages of *E. histolytica* are derived from precystic forms; that these are not usually found in amœbic ulcers but congregate on the mucous surface of the bowel, where they lie embedded in mucous to be swept into the lumen by the onward rush of fæces, by which means they leave the body as mature cysts in order to complete the evolution of the organism and aid in its dispersal.

LIMITATIONS OF EBI AND QUINOXYL ALONE

Emetine, when injected, and presumably distributed by the blood-stream, is not to any extent excreted in the fæces, and therefore does not come directly into contact with the precystic forms; so to extirpate these the drug must be introduced directly into the alimentary tract. This was achieved by the elaboration of the double iodide of emetine and bismuth by Dumez[6] in 1915. This is a compound from which emetine is liberated in the intestinal contents by decomposition in an alkaline medium into emetine and bismuth sulphide. The therapeutic effect of EBI (as it came to be called) on chronic amœbic dysentery with cysts in the fæces was subjected to stringent clinical tests by Dale,[4] Carmichael Low[14] and Dobell[5] from 1916 to 1918. They found by daily microscopic observations on the fæces in a series of cases that cysts disappeared directly the patient came under the influence of this drug, and these observations were supported by many others about this time.[5]

At the termination of the 1914–18 war, especially during the years 1920–24, a large number of war pensioners were definitely and permanently cured by emetine bismuth iodide. Nevertheless, a certain proportion (about 12%), as shown by Rennie[23] on a series under my care, subsequently relapsed, and the most refractory were those who had been previously subjected to a *long series of hypodermic emetine injections.* At that time I was able to agree with J. G. Willmore that it was quite useless in these resistant cases to continue with intensive EBI treatment. One case, in particular under my care, relapsed after nine separate and exhausting courses of EBI.

However, during the last 25 years I have been continuously engaged in the treatment of chronic amœbic dysentery and have been able to keep accurate follow-up records for 10–15 years. From these records I can state that amœbiasis, both in the acute and chronic stage, is a curable disease for which we possess specific drugs. 'Quinoxol' or 'Yatren' (now known as 'Anayodin' or chiniofon *BP*), a combination of iodine with oxyquinoline-sulphonic acid, was found by Mühlens and Menk[12] in 1921 to cure chronic amœbic dysentery which had previously proved refractory to EBI. This somewhat startling claim was soon confirmed by a whole array[1 4 10 11 13 17] of workers in the Dutch East Indies and China, while Vogel[26] was able to show that chiniofon was almost as toxic as emetine to *E. histolytica* in culture. It soon became apparent that, when introduced into the rectum in the form of retention enema (in 2·5% solution) it was more effective than when taken by mouth. In 1925 I showed in 15 cases treated simultaneously by the mouth and rectum that it could not be relied on to cure every case, for a quarter subsequently relapsed. (Some, like Lichtenstein,[13] claimed to have secured better permanent results by increasing the strength of the solution to 10%, but this is probably incorrect since the maximum solubility of the compound is about 4%.) Rectal therapy was controlled by sigmoidoscopy, by which means I was able at this time to observe directly the healing of amœbic ulcers in the rectum. It therefore became apparent that some better mode of treatment would have to be devised to cure refractory war infections.

In the meantime other compounds of emetine—emetine periodide and 'Auremetine' (Martindale,[18] Willmore,[26] Gordon[7])—were subjected to therapeutic trials, but neither of these, though sometimes better tolerated, appeared to possess any more strikingly potent therapeutic qualities than EBI.

COMBINED TREATMENT

Acting on these considerations from 1926[15] onwards I adopted a method of combined treatment with the

two most specific antiamœbic drugs—emetine bismuth iodide and chiniofon. This method has been described in detail in recent editions of *Tropical Diseases* (11th ed., p. 544) and in *Dysenteric Disorders* (1943, p. 188). From 1920 onwards I have compiled records of over 1000 cases of chronic amœbiasis, and in the Lumleian lectures[1] for 1941 a critical study of 535 specially selected cases was published.

Before treatment by the combined method nearly half of these cases had received protracted hypodermic emetine therapy, and ample evidence was obtained that the common practice (then as now) of periodic courses of emetine injections tends to produce an emetine-fast strain of *E. histolytica*. Moreover, numerous instances of emetine intoxication were described; some of these cases had received as much as gr. 70–120 of this drug spread over a period of 2–3 months. In several partial paresis of the legs had thereby been produced. (These clinical observations are supported by the experimental evidence of Bonnin and Aretas,[2] who by exposing *E. histolytica* in cultures to increasing concentrations of emetine found it was possible to produce strains resistant to this drug.)

This combined, or synergic, treatment consists of giving EBI at night in doses of gr. 2–3 for 10 nights; gr. 30 should be the maximum, but usually a total of gr. 20 suffices. Certain essential precautions must be taken—

EBI.—The patient must be confined to bed for the whole period. No solid food should be taken for four hours before the administration of EBI and some sedative, like phenobarbitone gr. 1, or tinct. opii min. 10, given at 9.30 PM, half an hour beforehand to prevent vomiting. In sensitive patients all saliva should be wiped from the mouth and the patient induced to go to sleep.

Chiniofon retention enemata should be given concurrently with EBI during the daytime. After a light breakfast at 8 AM a 2% sodium bicarbonate enema of a pint is administered by a Higginson syringe to cleanse out the lower bowel. The chiniofon retention enema (2½ % solution in 7 oz. warm water) should be slowly run into the rectum with a no. 10 rubber catheter with the patient lying on his *left* side; when the solution has entered the rectum he should turn on his back for half an hour, and then on his right side, so as to facilitate percolation throughout the large intestine. The abdomen should be massaged anticlockwise. The foot of the bed should be raised about a foot on blocks. (This precaution is too often omitted.) Most patients can retain the solution for 8 hours. Chiniofon is to some extent absorbed from the bowel and can be recognised in the urine by the ferric chloride test. Ten consecutive treatments can be given daily in combination with the EBI.

This treatment is not exhausting to the patient, and if it is properly conducted the EBI is usually tolerated without inconvenience. It is not claimed that this combined therapy invariably cures every case, or that relapses do not occur. In a series of 361 so treated there was a relapse-rate of 3·7% within a year; but this residuum was finally cleared of infection by a further course of the same treatment combined with protein shock therapy. It is suggested that this reaction in some way reinforces the action of the antiamœbic drugs.

We have the testimony of Willmore,[29] to whom fell the responsibility of treating last-war pensioners for the Ministry of Pensions, that a similar favourable result was obtained in a series of 200 of his cases.

COMMON FAILINGS IN TREATMENT

It is now necessary to attempt to explain why many apparently incurable amœbic dysenteries are being encountered in soldiers returning mainly from India and Burma, and how it is that this well-tried method of treatment appears to be so little practised or appreciated.

First, as regards EBI: it is obvious that to produce its effects the drug must be properly absorbed, and this is not invariably so. EBI is best dispensed in gelatin capsules, and when it is encased in stearin or salol, or sugar-coated in tablet form, the coating may become insoluble so that the tablets pass through the intestinal canal unchanged. Sometimes, too, after storage in a hot climate the gelatin becomes so indurated that the capsules fail to explode, as they should, in the duodenum, and are passed out in the stools unchanged; this has actually been found to be the case at present. It is therefore good practice to prick them with a pin to aid their solution. Sugar-coated tablets are now in vogue. On the whole they are satisfactory, but this coating may also be so hardened that it is advisable to scrape away a portion before administration. When EBI is being adequately absorbed the recipient should experience a sense of nausea within about two hours. The fæces should be liquid and dark in colour (due to liberated bismuth). If these signs do not appear the drug is not being absorbed. As a further check, the stools must be searched daily to see that tablets are not being passed whole.

Other fallacies centre round the chiniofon retention enema. On questioning patients referred with so-called incurable war-time amœbic dysentery it is sometimes found that the principles of a *retention* enema are not sufficiently appreciated. Occasionally the enema is given as a bowel wash; much too large quantities are employed, with the result that it is voided immediately instead of being retained for a long period. The essential point is that the amount should not exceed 7 oz. and it should be injected into the rectum very slowly. The ritual of the technique must be carefully observed.

It is not proposed to weary the reader with the examples of cure in long-standing and refractory cases which are recorded in *Dysenteric Disorders* (2nd ed., p. 194), but to support my contentions it appears advisable to quote the following remarkable example of a story which is common just now.

A regular soldier had originally contracted the infection in India and had spent the greater part of his 15 years' service in hospital or under ambulatory treatment for chronic amœbiasis. After being subjected to the usual array of antiamœbic drugs, including Kurchi bark and its derivatives, for 6 years, he was finally invalided to England. The story for the next 7 years is much the same. Amœbic hepatitis was followed by liver abscess, but according to some accounts the material evacuated at operation resembled hydatid fluid. This could not be confirmed, but the intradermal Casoni test was subsequently positive. In December, 1942, he began to cough up liver pus once more and was admitted to a London hospital, where *E. histolytica* cysts were found in large numbers in the fæces. In spite of emetine, EBI and chiniofon retention enemas the cysts persisted. In May, 1943, he was referred to me. At this time he was complaining of hepatic pain and nausea and the fæces still contained many *E. histolytica* cysts. After a period on a strict milk diet he was given two protein-shock treatments; then the combined EBI and chiniofon treatment was begun, which did not differ materially from previous courses except that precautions were taken to see that the drugs were absorbed. The *E. histolytica* cysts disappeared after the second day of treatment. The patient has been followed-up for the subsequent 1½ years and he has remained in good health. He is now employed in a munition factory.

OTHER REMEDIES

Space does not permit critical discussion on the merits of other antiamœbic drugs now in use. There are the arsenicals, acetarsol and carbarsone, which enjoy a great vogue in chronic amœbiasis. Their claims to extirpate this infection have never been satisfactorily proved, nor have any controlled clinical observations with a long follow-up been published. Other preparations allied to chiniofon—'Enterovioform' and 'Diodoquin'—are commonly used in the United States; but it is questionable whether permanent cures are always obtained by their use, or whether they are really more effective than the original chiniofon. There is therefore ample room for the introduction of still more efficient antiamœbic preparations. The common practice of giving all these various drugs in wearisome succession should be discouraged, because it never leads to any satisfactory evidence of their efficiency.

CONCLUSION

Hypodermic injections of emetine do not cure chronic amœbic dysentery. So widespread is this erroneous belief that to the average practitioner the mere suggestion of amœbiasis serves as an indication for uncontrolled emetine injections.

The common practice of periodic courses of emetine injections is injurious and should be discouraged as

liable to produce emetine-resistant strains of *E. histolytica*.

The combined treatment with emetine bismuth iodide and chiniofon now offers the best hope of a permanent cure, but the details of administration must be observed.

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RODENT ULCER
TREATED BY APPLICATION OF SODIUM BICARBONATE

DUNCAN CAMERON, M D GLASG., F R F P S

HON. PHYSICIAN TO THE CUMBERLAND INFIRMARY, CARLISLE

IN November, 1934, a patient with a doubtful rodent ulcer was sent to me for an opinion. The lesion was thought to be a basal-celled carcinoma, but what struck me particularly about it was the amount of sebaceous material presenting at the patulous mouth of the ulcer. I wondered what would happen were this greasy matter removed, so I gave the patient a lotion of bicarbonate of soda, with a little glycerin added to prevent drying, and instructed him to apply this twice or thrice a day on white lint. In a month the ulcer had disappeared leaving a fine scar.

It happened that at this time an old woman was awaiting admission to one of my beds for radium treatment of a typical rodent ulcer. I treated the lesion with a similar lotion and it disappeared in 9 days.

No further cases were treated with sodium bicarbonate until March, 1938, when this old woman returned to see me. She had a new lesion behind and below the site of the previous one and separated from it by an interval of healthy tissue. The report on a piece of tissue from this ulcer was "rodent ulcer." The previous treatment was repeated and the growth disappeared within a month.

Since then, bicarbonate of soda has been used in the treatment of the comparatively few cases of rodent ulcer that have come to me. In all, 24 patients with, among them, 28 malignant growths of face or neck have presented themselves.

Of the 28 lesions 24 were submitted to histological examination and the histological findings and results of treatment in these cases are summarised in the table.

Of the 16 verified "simple" rodent ulcers (typical and atypical) 4 have been healed for over five years, 1 for over three years, and 3 for about a year. The time taken for cure, when treatment was carried out conscientiously, varied from 10 days to 10 months, but one of the unconfirmed lesions had 2½ years' treatment before cure.

The first 2 lesions in the whole series were not submitted to biopsy, for no serious experiment in treatment was then contemplated. Nor was biopsy considered necessary for the other 2 ulcers in the series, since the patient in whom they occurred was referred to me by the radio-consultant for the area. The first 2 of the unconfirmed lesions have beeen healed for over ten years. One of the last 2 has been healed for three years, while the other is healed but shows two pinheads of crust. Treatment in these cases varied in duration from nine days to over a year.

APPLICATION AND EFFECTS

The sodium bicarbonate has been applied on white lint as a simple saturated solution in water, as a water-saturated solution with glycerin added to prevent drying, or as water-glycerin lotions or pastes of various strengths. It has also been used as ointments of 15% or 30% in lanolin, eucerin or soft paraffin. The solutions or pastes are more effective than the ointments.

Where solution alone has been employed, there has been little or no obvious reaction. Where a strong paste has been used the area round the ulcer has become red, and purulent material has come away from the base, followed by separation of a slough and exudation of serum. The rolled edge has been ulcerated. Application of solution at this stage should result in healing.

It will be noted that, since the salt used is bland, the results obtained are not due to any caustic action. The fact that healing takes place shows that only the malignant tissue is adversely affected by the solution. The action of the sodium bicarbonate may be either direct or indirect.

If the action is direct, it may be physical or chemical. Physically, the sodium bicarbonate may increase the osmotic pressure of the lymph in which the cancer cells are bathed and thus damage them. Chemically, it may act by heightening the alkalinity of the lymph. By altering the pH it may inhibit the action of some enzyme such as the proteolytic one which constitutes the "diffusion factor."

If the action is indirect, the salt may, by virtue of its solvent properties, remove a local stimulating substance which has set up carcinogenesis. With removal of the irritant, the malignant bias might be gradually reversed. Muir [1] has shown that the onset of malignancy is a gradual process, so a return to normal by degrees seems a rational conception.

Whatever the action of sodium bicarbonate, it seems to be different from that of radium. It does not impair the effect of radium and is not prejudiced by the previous use of radium. Case 7 failed to respond to treatment by the sodium salt and was cured by application of interstitial radium. Case 8 was cured by sodium bicarbonate after interstitial radium had been unsuccessful. The salt may fail because interposition of fibrous tissue or healthy epithelium prevents its access to the malignant cells or their immediate surroundings. Case 2 (*B*) suggests this.

ILLUSTRATIVE CASES

1.—Miss A., aged 74, seen on March 10, 1938, had a small ulcer on the right cheek, first noticed in the previous July. Biopsy: "rodent ulcer." A lotion of 8% sod. bicarb. in water with an equal quantity of glycerin was used as a dressing. Slight erythema appeared after some days, but without other obvious change the ulcer had healed by March 30. The scar is now flat, smooth and sound.

2 (*a*).—Mr. B., aged 67, seen on May 21, 1938, had an ulcer (of which he was unaware) on the right side of the face

RESULTS OF TREATMENT OF 23 LESIONS EXAMINED HISTOLOGICALLY

Lesion	Died before treatment complete	Discontinued treatment	Healed	Growth arrested for 6 years or more	Failed	Totals
Typical rodent ulcers	1	2	4	3	2	12
Atypical rodent ulcers	..	..	4	..	..	4
Large rodents with epithelioma at edges or involving deep structures ..	..	..	...	..	3	3
Squamous carcinoma	..	..	1	..	..	1
Fibrosed epithelioma	1	..	..	..	..	1
Unconfirmed ..	..	..	2	..	..	2
Equivocal	..	..	1	..	..	1

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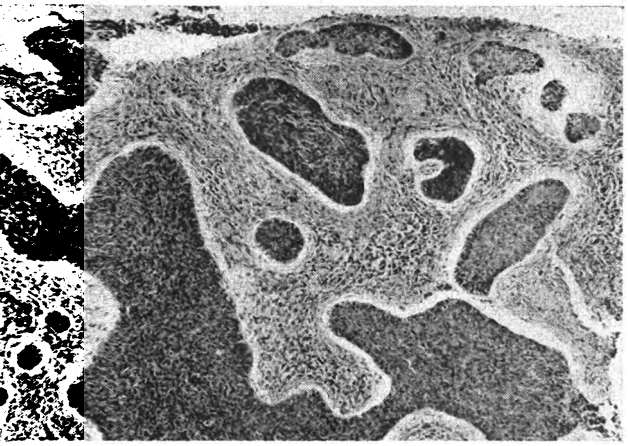


Fig. 1—Case 3: typical rodent ulcer

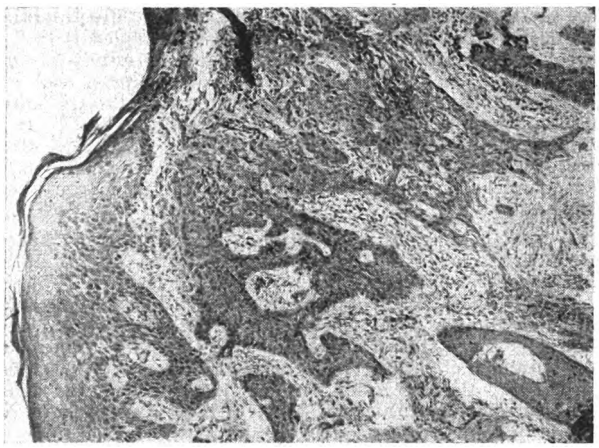
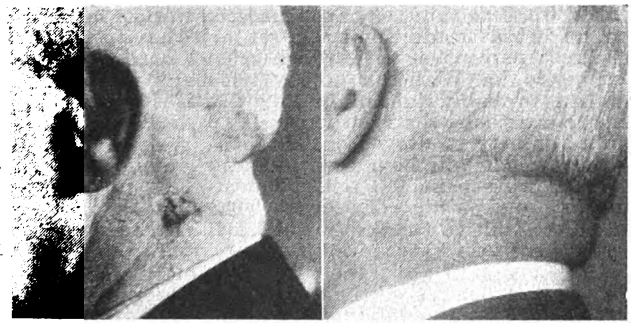


Fig. 3—Case 4: rodent ulcer

near the bridge of the nose. Biopsy: "mixture of rodent ulcer and cystic epithelioma." Dressings of bicarbonate solution with glycerin were applied. There was no visible reaction but the ulcer had disappeared by February, 1939, the site being represented by a thickening of the skin. A flexible sound scar remains.

2 (*b*).—He also had a sore on the right side of the nose at the junction of the ala and cheek, first noticed about two years previously. It consisted of two small deep holes connected by an irregular undermined gutter and surrounded by a waxy margin. It had had three courses (three doses each)



(*a*) (*b*)

Fig. 2—Case 4: (*a*) before treatment; (*b*) after treatment

of X rays and there was considerable fibrous tissue reaction. Biopsy: "rodent ulcer." After 22 months' treatment with bicarbonate, water and glycerin lotion, the lesion healed. Three months later it broke down and for 2 years it remained as a callous ulcer. It was then curetted and scrapings contained necrotic-looking rodent cells. Dressings of the lotion were applied, and 10 days later the ulcer seemed firmly healed. A small superficial ulcer developed on the scar, but curettage revealed no malignant cells. This ulcer has since broken down but has not spread.

3.—On July 19, 1938, Mrs. C., aged 79, was found to have a small ulcer ($\frac{1}{4} \times \frac{1}{8}$ in.) with a pearly surround, horizontally just below the left eye. Biopsy: "typical rodent ulcer" (fig. 1). A lotion of equal parts of saturated solution of sod. bicarb. and glycerin produced a little erythema, but the ulcer was healed on July 29. Slight redness persisted till August 19. The scar can be found only on close examination.

4.—Mr. D., aged 62, was seen on Jan. 17, 1939. Two years previously a sore had developed in the left posterior triangle of the neck (fig. 2). At first it was pustular, and several times it broke down and then healed. Examination showed a shallow ulcerated area ($1\frac{1}{8} \times \frac{5}{8}$ in.) with a waxy edge (fig. 2*a*) The skin in the centre showed scarring and several small crusted points. Biopsy: "rodent ulcer" (fig. 3). Dressings with a solution of sod. bicarb. with glycerin continued till June, 1939, when healing had taken place. Subsequently sebaceous exudate occurred, but a little lotion applied at intervals removed this. In August, 1942, the patient was admitted to the ward so that simple watery solution might be applied regularly to get rid of the exudate completely. This was successful (fig. 2*b*), but a small ulcer with sebaceous exudate has since appeared at the bottom of the scar.

5.—Mrs. F., aged 73, seen on Feb. 16, 1939, had a rodent ulcer on the tip of the nose just left of the mid-line ($\frac{3}{8} \times \frac{1}{4}$ in.). It had been present for 18 months and had broken down and crusted over several times. Biopsy: "rodent ulcer." Under treatment with equal parts of saturated solution of sod. bicarb. and glycerin the lesion had healed by March 14. The patient was confined to the house for the month of May and on first going out was exposed to hot sunlight. The site of the ulcer blistered and broke down. Dressings with paste and lotion were resumed and healing finally took place on Dec. 12, 1939. The site has remained firm since.

6.—Mrs. G., aged 43, was seen on July 16, 1940, with a slightly itchy circinate raised tumour of $\frac{3}{8}$ in. diameter, with a pearly edge and some central scarring on the nose close to the inner canthus of the right eye. It had started as a papule three years previously and had at one time been cauterised with silver nitrate. Biopsy: "early basal-celled carcinoma. This is not a typical rodent ulcer but is midway between rodent and epithelioma" (fig. 4). A paste of gr. 240 sod. bicarb. in $\frac{1}{2}$ oz. each of glycerin and water produced some erythema. An ointment of 30% sod. bicarb. in lanolin was then used but had no obvious effect, so a lotion of equal parts of saturated solution of the sodium salt and glycerin was applied. The lesion had healed on May 20, 1941, and a smooth, flexible scar remains.

7.—Miss H., aged 72, seen on Jan. 3, 1941, had a circinate scaly ulcer of $\frac{3}{8}$ in. diameter with an unbroken surface. It had been present for about two years. Biopsy: "rodent ulcer." It was treated with a 30% bicarbonate in soft paraffin and later with lotion. A rolled edge was evident in September, so the patient was sent for radium treatment. On Oct. 31 four 1 mg. needles were inserted under local anæsthesia. She was discharged from hospital on Nov. 7 and healing was uneventful.

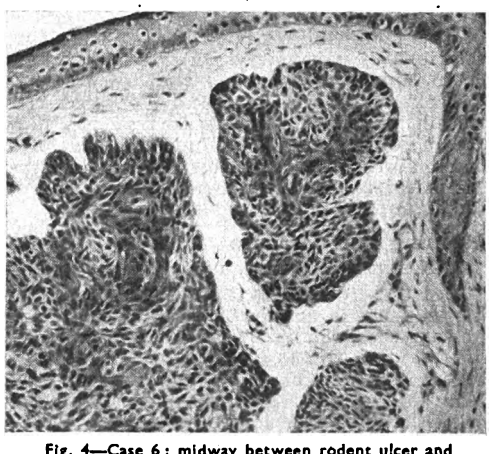


Fig. 4—Case 6: midway between rodent ulcer and epithelioma

8.—Mr. I., aged 74, seen by me on Dec. 20, 1941, had a rodent ulcer (2·6 × 1·7 cm.) on the right temple. It had been present about two years. The postero-inferior part

showed the typical rolled edge while over the surface there were small shallow ulcers with yellow sloughs. Five months previously, radium needles had been inserted and left in for a week. As healing had not taken place the advice of the radiotherapy consultant for the area was sought, and he referred the case to me. I admitted the patient to the ward so that a simple saturated solution of sodium bicarbonate in water could be applied often enough to keep the dressing moist. There was no visible or subjective reaction. Healing was complete on Feb. 1, 1942, and a firm smooth scar remains.

9.—Miss J., aged 81, seen on Oct. 20, 1942, had an ulcer on the right cheek of 3½ years' duration. Biopsy: "ulcer has the general appearance of a rodent but there is a differentiation of the epithelium with the production of early epithelial whorls. I think it should be considered as epithelioma." Except that on two occasions the skin around the ulcer became irritated by the bicarbonate lotion and had to be soothed by calamine lotion, progress was uneventful. The lesion was soundly healed on Jan. 18, 1944—one pinhead of crust only being present. In July she showed only a smooth scar.

10. Mr. K., aged 47, noticed a papule on the right side of the nose near the inner canthus of the right eye about a year before he was seen on April 5, 1943. Examination showed a circular bossed lesion of ½ in. diameter with a central crust. Biopsy: "rodent ulcer." A lotion of two parts of saturated solution of sod. bicarb. and one part of glycerin was prescribed. The ulcer was healed on Dec. 14, 1943.

11. Mrs. L., aged 65, first attended on Oct. 16, 1943. For two months she had had an ulcer on the right malar region. Nine years previously there had been a boil at the same place and later a burn from fat. The lesion measured 1 × ¾ in. Biopsy: "carcinoma of squamous origin, though it may have arisen as a rodent." Under the usual bicarbonate lotion the ulcer became cleaner, shallower and smaller, but the skin around became reddened and thickened. I asked Mr. C. J. L. Thurgar, the radiotherapy consultant, to see the patient on Jan. 12, 1943, and he advised a soothing application—2% ichthyol in Lassar's paste was used. The thickening and redness settled in a week and the ulcer had healed without further bicarbonate treatment by Jan. 27, 1944.

SUMMARY

The treatment of rodent ulcer by local application of sodium bicarbonate is described.

Under this treatment the lesion disappeared in 8 out of 16 uncomplicated rodent ulcers which were verified histologically.

I gratefully acknowledge the help of Dr. J. Steven Faulds, pathologist to the Cumberland Infirmary. He has made all the biopsies and photomicrographs for me and also took photographs of patients My thanks for photographs are also due to Surgeon Lieut. R. Kilgour, a former house-physician, and to Sgt. J. Kerman of the Carlisle city police.

Reviews of Books

A Textbook of Psychiatry

For Students and Practitioners. (6th ed.) D. K. HENDERSON, MD EDIN, FRCPE, R. D. GILLESPIE, MD GLASG., FRCP. (Humphrey Milford. Pp. 719. 25*s*.)

EACH new edition of this textbook testifies to its success and to the care the authors take to include in it the results of recent work. Besides numerous passages added for the latter reason, there are in this sixth edition some major rearrangements and a special chapter on methods of physical treatment. The section on paranoid states has been moved from the schizophrenic reaction types because in the authors' experience the personality of paranoid patients is not in keeping with this attribution, and complete final disintegration of the personality is almost consistently absent. (For so bold a statement detailed evidence would be desirable: many psychiatrists would say their experience led them to a contrary conclusion.) The chapter on psychiatry in the last war—always an odd excrescence in an otherwise systematic presentation—has been amplified by data from the present struggle: it would probably be an advantage if in the next edition the authors could distribute this material in the appropriate sections, in accordance with their general scheme. It would also enhance the value of this compendious book if the interesting chapter on relations of psychiatry and law could be made fuller: such important work as that of Norwood East, the Gluecks, Ashaffenburg, and Vervaeck, covers ground that it would be valuable to traverse, however briefly. Room could perhaps be found for it by pruning some of the material, up and down the book, that is now of historical rather than current interest ("antedating," for example).

Meaning and Purpose

KENNETH WALKER, FRCS. (Cape. Pp. 170. 7*s*. 6*d*.)

LULLED by the rhythm of Mr. Walker's smooth pen, his reader is in danger of acquiescing in almost anything he says: especially a reader who has enjoyed his *Circle of Life* and *Diagnosis of Man*. All the same, after a chapter or two of this book, he may become uneasy. Mr. Walker says in his preface that he has examined critically "those scientific theories of the last hundred years which have exerted a strong influence on our thinking, not so much for the purpose of assessing their worth as for discovering the effect which they have had on our philosophy of life." In fact, he has gone farther, for besides reviewing the influence of Darwin, Bergson, Freud, and others, he has added chapters on "the religious account of reality," "the worship of race" and "the religion of communism." He is anxious to show us where the materialists have gone wrong, and since this is a short book he has to hurry through their positive contributions to knowledge in order to attack their weaknesses. The result is unfair to Mr. Walker, for it gives an impression of bias which may rouse the *old* Adam in his more aggressive readers. Like Mottram in *The Physical Basis of Personality*, he makes the point that science has set itself to study, by means of the senses, what we think of as the material world: and he, too, holds that in addition to the senses we have a faculty of direct perception with which science naturally has nothing to do. With this proposition many will agree; but he is probably right in thinking that it is less acceptable to the young than to the more experienced. In his kindly anxiety to draw from his own development the morals which will help contemporary young through their growing pains he tends, however, to forget the meaning and purpose of growth. The mind cannot be fully accessible to the forces which will move it twenty years hence, or which moved it twenty years ago. Just as the skeleton in which the epiphyses unite before their time is pathological, so the mind in which opinions are formed early and maintained for life has suffered arrest.

If Mr. Walker is content to have stimulated new lines of thought in his reader and revived the vigour of old ones, he has written a successful book. If, like the young clergyman, he wanted to preach a sermon which would put us all right he has failed. Perhaps he worries too much. Among men belief and practice seldom go hand in hand; the medieval church combined a positive and practical belief in mercy and charity with the burning of heretics. The young who believe "that science is capable of providing all they need, and even a metaphysic" are often incurably altruistic.

A Life of Travels

C. S. RAFINESQUE. (Waltham, Mass: Chronica Botanica Co. London: Wm. Dawson and Sons. Pp. 57. $2.50.)

THESE autobiographical notes, which were published in 1836, have been reprinted as a number of *Chronica Botanica*, with a foreword by Elmer D. Merrell, and make interesting reading. The son of a French father and a Greek mother resident in Turkey, Rafinesque spent a wandering childhood and adolescence in various parts of Europe, and was attracted early by the study of botany and zoology. After three years in America he settled in Sicily for ten years, combining commerce with biological research, founding the squill industry, and publishing many scientific papers. In 1815 he migrated to America with a vast collection of specimens which were lost by shipwreck. From then until his death in 1840 he travelled extensively in that country, and for some years was professor of natural history at Lexington. This work is an epitome of his journal and contains no technical matter; it is of interest as a record of travel and of a varied and somewhat tempestuous career.

THE LANCET
LONDON: SATURDAY, DECEMBER 2, 1944

The Example of New Zealand

As the time draws closer for formal negotiation between the medical profession and the Government, each feasible alternative to the white-paper plan is brought into the open. Some, poorly rooted, wither at once in the noonday glare, but others survive and flourish—at any rate temporarily. What at present looks like the hardiest plant comes from New Zealand. More and more is being heard about the social security schemes enacted in that Dominion, and opinions differ as to whether we are to take New Zealand as an example or as a warning. Unfortunately, much of the current discussion has been based on old facts, and in the hope that fresh data may be helpful we are publishing, this week and next, an article based upon the most recent information to reach this country.

Like our own National Health Insurance Act, the New Zealand Social Security Act gives doctors the choice of several methods of remuneration. But whereas over here payment by item of service never found much support, in New Zealand it is now used more than any other. In Britain only two areas (Manchester and Salford) elected to pay panel doctors on this system, and they both abandoned it after years of uneasy trial—years in which they vainly sought means to keep it free from abuse and fair both to patient and doctor. When it failed, Manchester and Salford turned instead to payment by capitation fees, which was already adopted by every other area. It is all the more surprising therefore to find that in New Zealand the capitation system has relatively few advocates, and that more than nine-tenths of the payments to doctors are made through payment-for-service or refund systems. For basically the refund system is a system of payment by item of service, even though some claim that the fact that the doctor usually charges the patient a small fee, above and beyond that allowed by the State, is a deterrent to abuse, preventing frivolous demands by the patient and over-attendance by the doctor. This extra fee is, however, an optional addition, and apparently, being unpopular with the patient and incapable of legal enforcement, it is often waived; so there is a tendency for the State-allowed fee to become the standard payment. If New Zealand abides by this system, she will some day have to find a solution for problems which we failed to solve here—how to reward the able and conscientious doctor who may make fewer but more useful attendances than his less efficient or less scrupulous colleague, and how to ensure that the social security funds are not threatened with bankruptcy by claims for an ever-increasing number of items of service. At present, in New Zealand, these funds are able to meet all calls on them, with relatively little subsidy from general taxation; but this is only so because of war-time prosperity, which ensures a high yield from the wages tax by which the fund is raised, and a minimal call on the fund for the relief of unemployment. There is also in New Zealand today, as here, a great shortage of civilian doctors. Most doctors are working to capacity to do the minimum essential work, and there is little temptation to excessive attendance, or even opportunity for it. This fact is reflected in the comment in the annual report of the New Zealand Director-General of Health, which has just reached us, in which he says, "The shortage of civilian doctors and the long hours they are working in many cases makes it unlikely that the cost of general medical services will increase further under present conditions."

This comment also suggests that the New Zealand government are uneasily aware of the magnitude of the potential commitments they have undertaken, and supports the view, expressed in our article, that not very long after the war they may have to press for alteration in the methods or scales of payment. Time alone can show with what success our New Zealand colleagues would be able to resist such a demand. But, theoretically, it does not seem that they have placed themselves in a strong position vis-à-vis their government. Instead of taking the attitude, now likely to be adopted by doctors in this country, that first and foremost, in any negotiations for a new medical service, must be placed the achievement of a sound administrative structure giving the profession its proper share of influence and responsibility, the New Zealand profession has allowed itself to undertake piecemeal, and without coördination or safeguard, the provision of all those parts of a national health service for which the Government could be induced to offer immediately satisfactory terms. Doctors in the Dominion now have little or no say in the planning or administration of the service. The few advisory committees allowed for by the Social Security Act are appointed by the minister of health himself, and have functions similar to committees familiar to us through National Health Insurance, such as the allocation and medical-services sub-committees; they exist, in other words, to facilitate the day-to-day working of the Act, and not to influence future policy. The New Zealand minister may also, if he chooses, recognise "any committee or other representative body for the time being constituted to promote or safeguard the interests of the members of any profession affected by the operation of the Act" as a suitable body with which to discuss terms and conditions of service. Apart from this, the only professional voices he hears are those of the permanent salaried doctors employed in the department of health.

We cannot help feeling that, in the shaping of the New Zealand scheme, opportunities have been missed that might have resulted in a really comprehensive plan, offering, to doctor and patient alike, a fuller, a better, and a more progressive service. All that has so far been secured is a State subsidy of private practice, and this by an extravagant and easily abused system, which, experience has shown, fails to encourage or reward the highest standard. As such, it is unlikely to give lasting satisfaction either to the profession or to the people of New Zealand. We venture to hope that, when the time comes for its revision, we may have raised a structure here, in our own new service, that will provide a worthy and acceptable pattern for New Zealand to copy, or to adapt to her own local needs.

Protection from Hepatitis

THE widespread increase of jaundice in the past few years has stimulated research; but in discovering new facts we have, as usual, discovered new problems. Three varieties of hepatitis with jaundice are now recognised: infective hepatitis (formerly called catarrhal jaundice), postarsphenamine hepatitis, and homologous-serum hepatitis. It is virtually certain that infective hepatitis is due to an infective agent, but this has not yet been identified and we do not know how it is ordinarily conveyed. The relationship between the three types of hepatitis is likewise obscure, though suggestive facts are accumulating. The evidence for their unity is about as strong as the evidence for their separate identity; but DIBLE, MCMICHAEL and SHERLOCK [1] have at least made it clear that all three have essentially the same pathological background—namely, a variable degree of cytolytic change in the liver with cellular infiltration of the portal tracts. The old conception of duodenal or biliary catarrh, with inflammatory blockage of the bile-ducts, has been abandoned, and attention is focused on the liver cell as the principal point of attack. Hence it is natural that attempts should be made to detect weaknesses in the defences of the liver against toxic agents and to find means of protecting it.

DAVIS and WHIPPLE [2] in 1919 showed that feeding with carbohydrate protected the liver against chloroform injury. MESSINGER and HAWKINS [3] in 1940 indicated that a diet of high fat content lowered the tolerance of the liver cell to arsphenamine, while protein was protective. Until recently it has been usual, in treating hepatic disorders, to ensure an adequate intake of readily available carbohydrate and a low intake of fat; but evidence of the positive importance of dietary protein has been increasing. Animal experiments (SHIFRIN,[4] GOLDSCHMIDT et al.,[5] MILLER and WHIPPLE [6]) have shown that protein feeding guards the liver against injury by arsphenamine and chloroform, and it appears that on diets low in protein the cytoplasm of the liver cells diminishes (KOSTERLITZ.)[7] It is noteworthy that ANDERSEN of Copenhagen,[8] when transmitting infective hepatitis to pigs and from pig to pig, found that the disease affected only the undernourished. The protective action of protein may be explained by the presence in the protein molecule of thiols—the sulphur-containing amino-acids methionine and cysteine—which combine with, and detoxicate, many organic arsenical compounds. This explanation is feasible in the case of arsphenamine hepatitis, if we assume that the liver is damaged when the stores of detoxicating amino-acids are exhausted. But in infective hepatitis one would not expect these amino-acids to confer much protection against the unknown infecting agent, unless methionine and cysteine play a larger part in guarding the liver cells against injury. It is now known that a variety of abnormal diets will give rise to cirrhosis of the liver in animals, and HIMSWORTH and GLYNN [9] have described a form of hepatitis produced in rats by a protein-deficient diet (trophopathic hepatitis), against which complete protection is given by adding methionine to the diet. GOODELL et al.[10] found that methionine prevents arsphenoxide injury in dogs on a diet deficient in protein. In man BEATTIE and MARSHALL[11] found that in syphilitics receiving neoarsphenamine, administration of amino-acids did not reduce the "overall" incidence of liver damage, but (methionine especially) shifted its peak incidence towards the end of the second course of antisyphilitic treatment and reduced its severity.

A carefully controlled investigation has been made by PETERS et al.[12] on the effect of casein, cysteine and methionine in the treatment of hepatitis arising in the course of arsphenamine therapy, and from the results they conclude "that both cysteine and methionine had a significant but not remarkable effect on the course of the jaundice," while casein had none. Their findings confirm the clinical impression that cysteine and methionine have a definite though not sensational effect on the disorder. It should be noted, however, that their criterion of improvement was reduction in bilirubinæmia; and jaundice is only one of several signs of disordered liver function. Further, it is a matter of common experience that subjective improvement precedes the disappearance of icterus by days or weeks; so it is possible that a beneficial action on the liver cell might not immediately lead to diminution of bilirubinæmia. In another series of experiments BEATTIE[13] has studied the effect of variation of protein intake on the progress of infective hepatitis and postarsphenamine jaundice, and has found that by increasing the daily ration of protein to as much as 150 grammes the average stay in hospital can be reduced by more than a third. He further states that "the average time spent in hospital in a large series of cases is roughly inversely proportional to the daily protein intake." In assessing the therapeutic value of methionine and cysteine, he emphasises the necessity of taking into account the protein content of the diet; for a diet poor in protein may annul or minimise the benefit from the amino-acids, and conversely a diet rich in protein tends to reinforce their action. If, however, methionine and cysteine act in a specific manner in hepatitis it would probably be more important and simpler, when the quality of the diet is in doubt, to increase the dose of these amino-acids so as to outbalance any effect of protein deprivation.

Further work on these lines, especially if it takes into account other functions of the liver, should be fruitful. The present stage of the investigation of hepatitis is fascinating and full of promise, but while attempts to assign specific rôles to individual amino-acids are necessary, it may be wise to keep in mind a principle of general dietetics—that a good mixed diet tends to meet the requirements of the average person. Remembering the intimate interrelationships of the

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amino-acids, and the importance of even simple members of the series like glycine in detoxicating mechanisms, one may look forward hopefully to influencing the liver cell by employing selected groups of these compounds.

VD

VENEREAL diseases are commonly called "scourges," and many people still think of them chiefly as a reward of sin. It is refreshing to find that in Colonel GORDON'S lecture, published in our present issue, the control of these diseases is discussed on stark epidemiological lines. No doubt it is still premature in this country to presume a state of public enlightenment that would permit the medical officer of health to control their spread in the same way as he controls the spread of diphtheria or typhoid fever; but a great deal has been done in the past two years by the Ministry of Health and its allies to break down the old attitude of "secrecy and hush-hush." This attitude, said Sir WILSON JAMESON in his recent broadcast, "has not been entirely overcome, but it has suffered a resounding defeat." He rightly added: "we must have the support of well-informed public opinion."

It is interesting to hear from GORDON that the US medical authorities in the European theatre of operations have decided that gonorrhœa can be diagnosed on the basis of history, clinical symptoms and physical signs, and that demonstration of the causative organ, while desirable, is not essential. We wonder what the clinic medical officers who examine reported contacts under regulation 33B would think of this. Reliance on symptoms and signs can only be satisfactory, surely, if the vast majority of cases of urethritis are caused by the gonococcus; and the experience of British Service venereologists suggests that they are not. Most specialists in the subject here have come to regard primary non-specific urethritis as a clinical entity, though it may be often venereal in origin. A substantial proportion of the cases of urethritis attending Service treatment centres show a longer incubation period than is usual for gonorrhœa and do not in general respond to sulphonamides or penicillin. In such cases a certainly causative organism is rarely isolated and some workers have thought that a virus may be the responsible agent. If this form of venereal disease is really non-gonococcal, it seems probably best to report it as such.

For the prevention of gonorrhœa chemotherapeutic prophylaxis—or post-prophylaxis—is undoubtedly effective: the disease is less likely to materialise if sulphonamides are taken a few hours after a risk of infection. If, however, the strain of gonococcus concerned happens to be sulphonamide-resistant this result cannot be expected, and the risk of actually manufacturing a resistant strain is not negligible. There is also a small risk of sensitising people by giving them little doses of sulphonamides. American investigators put the incidence of ill effects attributable to idiosyncrasy at less than 4% for cases treated with prophylactic sulphathiazole, but even this proportion cannot be ignored. Dizziness is the commonest subjective symptom, and it is obvious that incoördination of inappreciable degree might spell disaster to a pilot or driver. We must ask ourselves whether, when penicillin is available for treating gonorrhœa, it will still be justifiable to employ even a slightly hazardous means of prophylaxis.

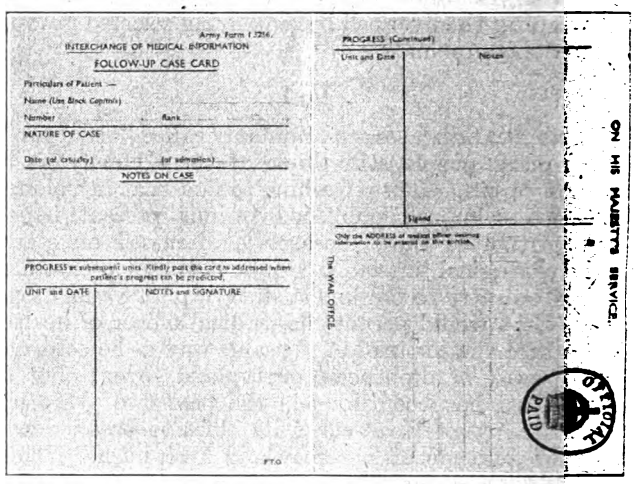
While we heartily agree with GORDON that the provision of adequate treatment facilities is an essential part of any control programme, and that these facilities should be integrated with those of a general hospital, it seems important that the responsible physician should be one who is making the subject his life's work and not one who is pot-boiling or waiting for something better to turn up. Patients are quick to recognise the specialist with divided interests and his clinic seldom prospers. The efficient treatment of venereal diseases will be one of the tasks of any National Health Service, and we may suppose that in each area or region an experienced consultant will hold a senior post. Wherever possible this consultant should be on the teaching staff of a medical school where he will direct his own clinic, teach students, and be in a position to pass on his knowledge to those in charge of smaller clinics in his region. He would also organise the training of clinical assistants, nurses, male orderlies and social workers at his central clinic, from which they would "graduate" to responsible posts. From this system a certain uniformity of standards should emerge which is the opposite of what obtains today in any half-dozen clinics in a given area. Demobilisation will release enough keen VD specialists to supplement those already available, and it will be a national loss if these are allowed to drift into the various walks of medical life where their special experience will be of little use.

Finally, when demobilisation comes, it should not be difficult, with adequate supplies of penicillin, to ensure that men and women are not discharged from the Services in an infectious state. Speaking of demobilisation in the United States, the Surgeon-General of the US Public Health Service said on Nov. 9 that it will create a sanitary oasis of 10–12 million men returning to their homes healthy or in a non-infectious stage of disease. But, in the British Forces at any rate, this must be arranged without any penalisation, for demobilisation cannot be deferred on account of a venereal infection. Such men and women as need further treatment or surveillance will, as happens now in invaliding from the Services, be directed to the civilian clinic nearest their homes and provided with a written account of their treatment to date for the information of the clinic doctor. It has been suggested that the name of the patient might be sent to the medical officer of health of the district to ensure that his case is followed up; but, tempting as this proposal may be, it would smell of discrimination against the Forces. The post-war reservoir of infection will not be among ex-Service men and women, whose disease has been systematically treated and among whom default has generally not been possible, but among the thousands of civilian sufferers, some of whom have never submitted themselves for examination and many of whom have not completed treatment.

Sir JOSEPH ARKWRIGHT, FRS, honorary bacteriologist to the Lister Institute, and till 1940 a member of the Agricultural Research Council, died on Nov. 22 in his 81st year.

An Appeal from the Field

NOT more than one of every hundred follow-up cards sent with their patients by surgeons of the British Liberation Army is getting back to the sender. The forward surgeon who wants to know whether his technique needs modification, or is collecting a series for publication, fills in his patient's particulars on the follow-up card here illustrated (Army Form I 3216), addresses it to himself, and encloses it with the man's case-notes before evacuation. Each unit through which the man passes makes a note under "Progress," until the time arrives when the outcome can be predicted with reasonable certainty; a final note is made by whoever is then in charge of the patient; and the card is posted back (at Government expense) to the forward surgeon. With the MEF and CMF this system worked well, but for some reason it is not working between the Army hospitals in France and Belgium and the hospitals in England. In his letter on another page General MONRO implies that large numbers of cards are put into circulation; this means that some get lost on the way, for many EMS surgeons have rarely or never seen one; others fail to make the change-over from Army to EMS dossier; sometimes the surgeons at the base may forget them at a busy time, for the casualty work has fallen heavily on relatively few. Moreover, the instructions may not point definitely enough to one man as the person to return the card; better results might come if the forward surgeon stipulated the date for return, varying the length of time with the case—3 weeks for an abdomen, 3 months for a fracture, and so on.


Army Form I 3216.
INTERCHANGE OF MEDICAL INFORMATION
FOLLOW-UP CASE CARD
Particulars of Patient —
Name (Use Block Capitals)
Number Rank
NATURE OF CASE
Date (of casualty) (of admission)
NOTES ON CASE
PROGRESS (Continued)
Unit and Date Notes
Signed
Only the ADDRESS of medical officer receiving information to be entered on this portion.
THE WAR OFFICE,
PROGRESS of subsequent units. Kindly post this card to addressed when patient's progress can be predicted.
UNIT and DATE NOTES and SIGNATURE
FTO
ON HIS MAJESTY'S SERVICE.
PAID

Follow-up Card.

This is not "just another Army Form"; it is a personal request from a colleague, who cannot see the result of his work, for news of his patient. It should have a high claim on the surgeon's time.

Annotations

DIFFUSION OF SULPHONAMIDES INTO WOUNDS

WHEN sulphonamides are inserted into a wound they may be distributed around the cavity by currents in the fluids of the wound, but it is doubtful whether these are sufficient to carry them into the deeper crevices; they may penetrate dead tissue slowly by diffusion, but their action does not penetrate far into living tissues, owing to the equalising influence of the circulation in the capillaries.[1] Accordingly it is useful to consider what concentrations may be obtained in the wound by giving the compounds by mouth. Cope[2] compared the level of sulphadiazine in the blood and vesicle fluid of patients with burns. In one patient, treated within 2 hours of the injury, the concentration in the vesicle fluid was the same as in the blood—4·3 mg. per 100 c.cm. In another patient, who had not been treated until 60 hours after the burn, the concentration was 3·3 mg. in the vesicle fluid and 8 mg. in the blood. Much depends in such observations on whether the concentration in the blood is rising or falling at the time the sample is taken, for the amount of sulphonamide in the wound fluid (or tissue) requires time to come into equilibrium with that of the blood, and a considerable lag may occur. Lately Sager and Pudenz[3] have made experimental wounds in guinea-pigs, treated the animals by mouth with sulphonamides for 48 hours, and compared the concentration in the blood and wound exudate. In guineapigs treated with sulphadiazine or sulphanilamide the concentration in the exudate was on the average 1½ to 2 times as high as that in the blood—e.g., with sulphanilamide 2·6 mg. per 100 c.cm. in the blood and 5·0 mg. in the fluid; with sulphadiazine the average figures were 5·7 mg. per 100 c.cm. in the blood and 8·7 in the fluid. With sulphathiazole, on the average, the concentration in the exudate was only about three-quarters that of the blood. An examination of their figures however shows that there were great variations in the individual cases. Sometimes the concentration in the fluid was much greater than in the blood, occasionally it was lower. The differences in the concentrations in the exudate and in the blood may be partly due to the complex nature of blood. The sulphonamides are distributed unequally between the corpuscles and the plasma, and it is only the sulphonamide in the plasma which is in relation to that of the exudate. Moreover, in both fluids much of the sulphonamide is not free to diffuse but is bound to the plasma.[4] The concentration will also be influenced by the relative acidity or alkalinity of the two fluids, for this greatly influences the solubility of the compounds. For practical purposes, small variations in concentration, whether in exudate or blood, are probably unimportant. If an organism is not controlled by 5 mg. of sulphadiazine per 100 c.cm. it is not likely to give much response at 8·7 mg. It is enough to say that the concentration in the exudate is about the same as that in the blood. This agrees with the results of earlier workers on other body fluids, who found that after oral administration the concentration in peritoneal, pleural and joint effusions tends to be somewhat lower than that of the plasma when equilibrium is reached, which takes 2–3 hours.[5] Similarly the concentration of sulphathiazole in the fluid of the knee-joint is about the same as in the blood.[6]

All this indicates that the concentration of sulphonamides in wound fluids after oral administration is not negligible; but it is much lower than that which can be produced by inserting the compound directly into the wound. Each method of administration has advantages and disadvantages; the logical procedure is to combine them so as to summate the advantages and minimise the disadvantages.

1. Hawking, F. *Lancet*, 1941, i, 786.
2. Cope, O. *Ann. Surg.* 1943, **117**, 885.
3. Sager, W. W., Pudenz, R. H. *Nav. med. Bull., Wash.* 1944, **42**, 1275.
4. Davis, B. D. *J. clin. Invest.* 1943, **22**, 753.
5. Canterow, A., Cubberley, C. L., Ratcliff, A. E. *Arch. intern. Med.* 1942, **69**, 456.
6. Heyl, J. T. *Proc. R. Soc. Med.* 1941, **34**, 782.

ROLE OF THE MOH

How can the medical officer of health best employ his knowledge to promote health? Prof. R. M. F. Picken, in his presidential address to the Society of Medical Officers of Health on Nov. 17, asked and answered this question. He recalled that when he joined the society in 1912 many MOH's were in general practice, their public work being part-time; and he was then impressed by the range of their observations, and by their excursions into what is now called social medicine. These doctors "were among the few who had ready access to the facts bearing on communal health and they had time to study them." It was not long, however, before the growth of the personal health services changed the duties of the MOH and laid on him a great burden of administrative work. It is well, Picken thinks, that local authorities should place the management of professional and technical departments in the hands of professionals; but if a medical man allows himself to be engrossed in administrative detail, he loses touch with the medical thought that ought to mould the growth of his department. If he has to depend on others for medical advice, then he strengthens the case of those who believe that the head of a health department need not be a doctor at all. No MOH, in Picken's view, should be expected to fill his every working hour with routine duties: even while a junior, he should have time to get to medical meetings and time for reading. Nor should he have to set a limit to the field of medicine he surveys in relation to the people he serves.

Already the MOH has a claim to be regarded by his colleagues as a specialist: he holds a higher qualification and he has special opportunities for studying, for example, nutrition and infectious diseases. To make the best use of these opportunities he will be wise, in Professor Picken's opinion, to concentrate on the statistical material at his command, which often enables him to throw light on the relations between health and environment. The earlier medical officers of health did well in this field, but nowadays professional statisticians have scared many a good man from figures. This is a pity, for the MOH with an eye for the information to be gained from numerical data—both local and national—can make contributions at least as valuable as those of any other specialist.

REVIVING THE DEAD

DEATH is a relative term. To the doctor, it means the cessation of respiration and circulation. To the biological purist it means a complete cessation of function of all the organs of the body. A considerable time interval usually separates these two states. As far as we know, biological death is irrevocable, but clinical death is by no means always so, if the precipitating cause of death is transitory. We have learnt from animal and human observations however that the higher functions of the brain are irretrievably lost if their oxygen supply is stopped for more than a few minutes. For recovery therefore oxygenation and circulation of the blood must be restored within this period. It may be possible to restore pulmonary ventilation by artificial respiration or intratracheal insufflation; and cardiac massage, which directly stimulates the heart to contract, also mimics the pump effect of the heart in forcing oxygenated blood into the coronary and carotid arteries. Intravenous blood-transfusion alone is valueless when the heart has stopped, since it cannot develop enough pressure to push the fluid through the lungs and heart and into the arterial tree. Enthusiastic reports now come from Russia of a simple but theoretically well-founded technique of resuscitation. Transfusion of blood into an artery is started as soon as possible after the heart has stopped, certainly within five minutes. If the injected blood is introduced at a pressure of 160–200 mm. Hg the aortic semilunar valves close and the blood is forced into the coronary arteries and the peripheral arterial tree. Artificial respiration is carried out simultaneously by intratracheal inflation of the lungs with bellows. An ordinary intravenous blood-transfusion is begun directly after the heart has started pumping normally. As would be expected, success has been attained only in otherwise healthy subjects who have "died" as a result of trauma—usually from hæmorrhage. The brief reports so far available[1] give no details of the successes, but of the 51 men revived, 12 recovered completely and were evacuated to base hospitals.

HOME AND FOSTER-HOME

NEGLECT of children is not a pleasant subject, and this is one reason why it gets little attention. Dr. A. E. Martin,[2] senior assistant MOH for Leicestershire, believes that, so far as the neglected child is concerned, evacuation, whole-time work in factories by mothers, separation of parents, and similar circumstances, have more than counterbalanced the decrease in poverty during the war. The bodies mainly dealing with the problem are the National Society for the Prevention of Cruelty to Children and the health and education departments of the local authorities; but few authorities have any unified scheme of administration and no public body has a statutory duty either to seek out or to alleviate cases. Martin contends that almost every case should be discovered by either the health or education services, but lack of any coördinated plan has meant that many children needing help have not had it. He recommends that some member of the central staff of the health authority should be available to receive reports, to give advice, and to devote part of his time to the administration and supervision of a definite scheme. Probably this task would be undertaken by an administrative medical officer, and much of the success of the scheme would depend upon the energy and enthusiasm of him and his colleagues.

Neglect may be due to the parents being ignorant and incompetent, or wilful or thoughtless. In the less serious cases much can be done by the visits of health visitors or trained social workers, but where neglect springs from graver causes a different line of approach is called for, and coöperation with the NSPCC may prove valuable. Prosecution is rarely desirable unless it becomes evident that the only way to protect the child is to remove him from the care of his parents. Even bad cases of neglect are found among parents just as affectionate as the average but lacking the mental ability to keep up a reasonable standard of living. It may be necessary to remove the children in their own interest, but such parents should not be penalised as if they were deliberately cruel, and the disposal of the child should be carefully considered beforehand. Nothing is gained by lodging him, even temporarily, in an environment which the parents have grounds, whether real or fancied, for thinking worse than his own home. The recent case where a child was placed for a short time in a remand home showed how strong feeling can be on this point.

In the same way, much thought should be given to choosing the right places for any other children brought up away from their homes. The Provisional National Council for Mental Health has published a pamphlet[3] setting out well the principles that should guide those responsible. The homeless child needs the same things as any other child—security, individual love, and a chance to develop his initiative. He may get all these

1. *Soviet War News*, 1944, no. 982, p. 3.
2. *Public Administration*, 1944.
3. "The Care of Children Brought Up Away from Their Own Homes." From 39, Queen Anne Street, London, W1.

things in the right foster-home, or in a home for a group of children provided he and the superintendent suit each other. When children are grouped together under the care of one person—or preferably two people, man and wife—the family pattern should be copied as closely as possible, children of varying ages being included. Such an arrangement gives the older ones practice in looking after the smaller children, and the smaller children a chance to learn from their elders. Repeated changes of home or foster-parent are bad for children, destroying all sense of security: for this reason the first choice of home must be made very carefully. As we noted in our article on Unwanted Children on Sept. 23, the idea of the regimented orphanage is fortunately disappearing. Its end might be hastened by the appointment of Commissioners in Child Welfare as suggested by Captain Daynes in our correspondence columns this week.

FULL EMPLOYMENT

FEW would dispute that unemployment is a major cause of physical and mental ill health, or that, in Britain at any rate, full employment might prevent more disease than any immunological procedure. The devices whereby this powerful prophylactic can be brought into action are social and economic rather than medical, but we make no apology for giving space this week in our Reconstruction column to a review of the second Beveridge report which discusses the foundations of national welfare. The sciences of economics and sociology are still in swaddling clothes; their techniques are such that most who run may still read; and their vocabulary is not beyond the understanding of the liberally educated. The doctor who, wittingly or otherwise, practises social medicine, may feel inclined to consider the means by which Sir William Beveridge believes we could improve the daily life of millions.

LONDON AND NEW YORK

IN the last few years the attitude of the profession towards infant mortality has become less fatalistic, and there has been a welcome tendency to make geographical comparisons as well as temporal ones. Before the war the practice of looking back at the high mortality of 40–50 years ago was apt to induce complacency. Certainly we need not be ashamed of the decline since those days, but we still do not know whether it is chiefly due to improvement in the care and surroundings of the newborn, or to an equally dramatic restriction in the size of families.

Sir Allen Daley's annual report for 1943 as medical officer to the London County Council shows that infant mortality in the county fell from 159 per 1000 live births in 1900 to 51 in the year under review; but it also makes some instructive comparisons with the corresponding rates for New York. Strictly, it would have been more appropriate to use the rates for Greater London, as Stocks did,[1] so as to bring in the suburbs, which offer a more favourable environment for health than London County; but their exclusion does not distort the general picture. In New York infant mortality declined from 135 in 1900 to 30 in 1943—a fall of 78% as compared with 68% for London. The decrease has therefore been much more pronounced in New York than in London, especially since 1935 when the two rates stood at 48 and 58. When the difference between the 1943 rates for the two cities is broken down it is seen that the bulk of the London excess occurs at 1–12 months, when a New York death-rate of 8·7 contrasts sharply with one of 27·3 for London. This difference is not by any means explained by the effect of war conditions on infant health; it was just as plainly apparent in the 1930's despite New York's more difficult climatic and racial problems. Two-thirds of the difference in the death-rates for the whole 12 months is accounted for by two groups of diseases—gastro-enteritic and respiratory. If London could equal the New York rates in these groups Daley would be able to report an infant mortality of 38 instead of 51. Gastro-enteritis registers by far the highest excess—a London rate of 9·4 against 1·7 for New York.

This unnecessarily high toll of deaths from gastro-enteritis is associated to some extent with war. The rate in London has risen steadily from 6·1 in 1940, and the rate for the whole of the country is also increasing. In Scotland, a rate that had been moving upwards during 1926–38 has lately registered a sharp increase. War conditions of life provide a partial explanation: bottle-feeding is commoner, and because of the call for woman-power more children are in institutions. Overcrowding in maternity homes and hospitals, and a deterioration in the quality of nursing staffs, may also be implicated. The most important factor, however, if we may judge from Scottish experience, is the housing situation: less houseroom means less hygiene. A study of infant mortality in Cincinnati[2] showed a positive correlation between the incidence of diarrhœal diseases and the percentage of private indoor toilets.

EXUDATIVE TONSILLITIS

SORE throat is in season again and practitioners may be puzzled about how best to deal with those troublesome cases with exudate on the throat. To many doctors confluent exudate on the tonsils or pharynx suggests diphtheria, while follicular exudate is usually regarded as streptococcal. In actual fact extensive exudate is a frequent accompaniment of streptococcal infection; and faucial diphtheria, particularly in the adult or immunised child, often appears as a follicular tonsillitis or pharyngitis. When in doubt give antitoxin, is the only safe advice. That the bacterial ætiology of exudative sore throat is difficult to determine on clinical grounds alone is obvious from Cruickshank's[3] analysis of 342 cases admitted to an isolation hospital during 1942 with a notification of diphtheria. Only 36·5% of these were confirmed on bacteriological evidence as diphtheritic infections; the final diagnoses of the remainder were tonsillitis or pharyngitis in 40·9%, hæmolytic streptococci being recovered from two-fifths of these; Vincent's angina in 5·8%; and glandular fever in 1·1%. Cases of glandular fever are often notified as diphtheria because of the throat exudate and the associated adenitis. But the absence of severe toxæmia in a patient, often a young adult, whose throat symptoms have been present for some days, should raise doubts in the doctor's mind and suggest the examination of a blood-film. A stained smear from the throat of such a patient may show numerous fusiform bacilli and spirilla, and mislead the inexperienced clinician, who relies too much on the laboratory, into a diagnosis of Vincent's angina.

The complexity of the problem of exudative sore throat is brought out by a detailed clinical and bacteriological study[4] of 116 cases among 900 American Servicemen admitted to hospital with respiratory infection. The criteria for inclusion in the group were a temperature over 100° F. and exudate on the throat at the time of examination. Three throat swabs were daily taken from each patient and examined for hæmolytic streptococci. Samples of the patient's serum, taken at onset and after 4 weeks, were examined for antistreptolysin, and a significant rise in titre was regarded as evidence of streptococcal infection. Hæmolytic streptococci

1. Stocks, P. *Brit. med. J.* 1941, ii, 96.

2. The National Health Survey, 1935–36. Preliminary Reports: Bulletin no. 5. National Institute of Health, US Public Health Service.
3. Cruickshank, R. *Publ. Hlth*, 1943, **57**, 17.
4. Respiratory Diseases Commission, *J. Amer. med. Ass.* 1944, **125**, 1163.

ere isolated from rather less than half the total, and significant increase of antistreptolysin occurred in alf of these positive cases. In other words, less than quarter of the total cases gave unequivocal evidence f infection with the hæmolytic streptococcus. However, many of the patients with streptococci in the hroat and an insignificant rise of antibody were probably lso suffering from streptococcal infection of milder egree. Clinically, this latter group resembled the larger eries from whose throats hæmolytic streptococci could ot be recovered; in these two groups the onset was ess acute and local signs and symptoms less severe, while cough and hoarseness were more frequent complaints. Leucocyte-counts in the group with streptococci and antibodies averaged 16,000 per c.mm. on the first or second day: in the other two groups the average initial count was 9000. Extensive or confluent exudate was usually associated with hæmolytic streptococci in large or predominant numbers, but streptococci and antibodies were found as often in patients without tonsillar tissue as in those with tonsils or tonsillar tags. Clinical diagnosis of "streptococcal sore throat" or not, without previous knowledge of laboratory results, was correct in five-sixths of the non-streptococcal cases and in two-thirds of the unequivocal streptococcal infections, but only 15% of the patients with streptococci in the throat without significant rise in antibody were regarded as streptococcal.

The large proportion of patients with follicular tonsillitis and no evidence of specific bacterial infection will not surprise the experienced physician, but calls for more investigation into ætiology. In this series hyperplastic lymph-follicles on the pharynx were more commonly seen in the non-streptococcal cases, and the same observation has been made in other undifferentiated respiratory infections and in atypical pneumonia. A virus ætiology therefore seems possible. On the other hand, failure to isolate hæmolytic streptococci from infected tonsils is not conclusive evidence of a non-streptococcal infection. The organisms may be present only in the tonsillar crypts—a much higher proportion of clinically infected tonsils yield hæmolytic streptococci on dissection after removal than on swabbing[5]—or the streptococcus may be missed because it does not produce hæmolysis on the blood-agar plate, or it may grow primarily only anaerobically or in an atmosphere with 5–10% CO_2. These causes combined probably explain the failures, reported in our correspondence columns,[6] to isolate hæmolytic streptococci in every case of scarlet fever, although other organisms—for example, *Staph. aureus*—sometimes produce the scarlatinal syndrome.[7]

TRAINING IN INDUSTRIAL MEDICINE

INDUSTRIAL health is a composite subject dealing with the health, safety and welfare of people in their working environment, and the services of various experts such as doctors, engineers, chemists and physicists are needed to elucidate many of the problems which arise. In the introduction to his chapter in the annual report of the Chief Inspector of Factories,[8] reviewed on another page, Dr. E. R. A. Merewether draws attention to the scarcity of people qualified to deal with industrial health and welfare. In Britain, as in America, the demand for such people has outstripped the supply—a state of affairs which might lead to the discredit and regression of an essential service. He therefore pleads for extended facilities for academic instruction and practical training of acceptable standards. He suggests[9] that such instruction should be given both to undergraduates and postgraduates. Apart from refresher courses for postgraduates he thinks there should be an extended course leading to a registrable diploma in industrial health. The course should not be stereotyped and might be devised by the various universities to emphasise the health risks in the main local industries, such as agriculture, potteries, steel, metallurgy, mining, wool and cotton. In this way each course, while providing instruction over the whole field, would acquire distinctive value by emphasising the health risks of one important industry.

Last year the Medical Research Council set up a department for research in industrial medicine at the London Hospital under the direction of Dr. Donald Hunter. This is staffed by one medical assistant, three chemists, a physicist and a lady almoner, as well as clerical staff and technicians, and costs about £7000 a year to run. It is at present carrying out two large-scale investigations, one in collaboration with Dr. A. I. G. McLaughlin, HM Medical Inspector of Factories, into pneumoconiosis in iron and steel foundries, and one with Dr. William Evans into the life and livelihood of the cardiac worker. It has also investigated several short-term problems, such as the effect of aluminium and alumina on the lungs of duralumin aeroplane propeller grinders,[10] toxic polyneuritis resulting from the manufacture of tricresyl phosphate,[11] and the toxic manifestations of benzene in workers with aeroplane dope and rubber solvents.[12] The similar departments to be inaugurated in Manchester, Durham and Glasgow by the Nuffield Trust will find no lack of subjects for investigation. The department at Manchester is likely to develop into an excellent sister to the one at the London Hospital. But the grant of £4000 a year to the other two universities will hardly pay for a department which must employ experts in so many branches of science, and carry out mass investigations. In Glasgow the department is to be a subdepartment of social medicine. Industrial medicine however is concerned with a much wider field than the sociological aspects of industry.

THE TIMES

ON Jan. 1, 1785, appeared the first copy of the *Daily Universal Register*, known from three years later as the *Times*. Last Saturday saw the 50,000th issue produced (like the 1st and all the others) from Printing House Square, London, EC. There have been periods when the *Times* was hot for reform, and others when it coolly reflected the opinion of the ruling classes. But however its political record is assessed, it has played a large part in forming the highest standards of journalism, and today it lives up to those standards. Those who understand the difficulties of newspaper production recognise the *Times* as one of the finest products of English life—indeed of Western civilisation. For our part we are particularly happy at the evidence that this influential journal is nowadays well informed on the achievements of medicine and is intent that everyone should have the benefit of these achievements.

On Nov. 22, Dr. HENRY BRIGGS, emeritus professor of midwifery and gynæcology at the University of Liverpool, died at his home at Hoylake, Cheshire. He was 88 years of age.

5. Rantz, L. A., Jacobs, A. H., Kirby, W. M. M. *J. clin. Investig.* 1943, **22**, 419.
6. *Lancet*, Sept. 16, 1944, p. 390; Oct. 7, p. 486.
7. *Ibid*, 1942. ii, 732.
8. Cmd. 6563. HMSO. 1944. 1s.
9. *Med. Pr.* Oct. 11, 1944, p. 233.
10. *Brit. J. indust. Med.* 1944, **1**, 159.
11. *Ibid*, p. 227.
12. *Ibid*, p. 238.

IN Russia newly qualified doctors at the front are to be given the opportunity for further study. Postgraduate courses in radiology and neuropathology have already been given on the First Ukrainian Front. The former lasts two months and the latter six weeks, with eight hours' study daily. Officers attending the courses are attached to two or three large military hospitals, and often visit civilian hospitals as well.

Reconstruction

FULL EMPLOYMENT

SOME MEDICAL IMPLICATIONS

(FROM A CORRESPONDENT)

SIR WILLIAM BEVERIDGE has called his new report *Full Employment in a Free Society*.[1] In so doing, he has straightway placed his finger on a vital point. Neither Russia nor Germany have found it impossible to produce full employment, but the loss of personal individual freedom involved has been great—in one case so great that few can seriously think it worth while. Democracies in war-time have also achieved full employment. The price has been conscription and direction of labour, allocation of raw material and control of industry, rationing and price control, and an unbalanced internal budget. Here, too, the loss of individual freedom has been heavy, particularly in the matter of choice and location of occupation. Can we achieve full employment without resorting to all these devices, or to the extreme measure of socialisation? Sir William Beveridge's answer is that we can.

The essential liberties which he believes must be preserved at all costs are freedom of worship, speech, writing, and teaching; freedom of assembly and of association for political and other purposes, including change of Government by peaceful means; and freedom in the choice of occupation and in the management of personal income. He excludes from the essential freedoms the liberty of a private citizen to own the means of production and to employ other citizens to work them for a wage. This liberty must justify itself as a device; but only if it fails to produce full employment is the expedient of socialisation worth trying.

ENDS AND MEANS

The target figure set is a maximum of 3% unemployed (about 500,000), with a greater number of jobs than workers as a continuous condition. The 3% would in fact be people out of work mainly when in process of changing a job, or as a result of industrial friction or seasonal fluctuations. To achieve this situation, the first need is psychological: a common aim generally agreed, and finance subordinated to that aim. The aim proposed is the deliberate abolition of want, ignorance, squalor, ugliness, and disease. The economic measures necessary are more complicated.

The first and by far the most important is that the total amount of money spent in the country should be enough to keep everyone busy. The determining factor in expenditure should no longer be the amount of money nominally available but the number of pairs of hands waiting to work. This proposal reflects the important discovery, put to practical test during the war, that national finance should not be treated as if it were an individual or business budget. National finance is not simply a matter of paying for government expenditure by taxation and borrowing; it is also a machine for injecting additional money into circulation to cover increases in national wealth. If the injection is made too fast, there is more money than goods available to be bought and the result is inflation; if too slow, the goods fail to sell, and the result is unemployment. Sir William Beveridge has aimed at devising machinery for making the speed of injection just right. He proposes a new type of national budget to lay down the total national spending for the year, this to be dealt with under five headings:—

(1) *Communal spending* on essential services which for social reasons should not be sold: Defence, order, free education, the National Health Service, roads, drains, and public works. This money to be spent by Government authorities, both national and local.

(2) *Public business spending*, on industries under Government control, or to be brought under Government control. This should include transport and all complete monopolies.

(3) *Private business investment*, which should be brought under government control, both to steady fluctuation and to promote socially desirable investing. The state agency would be a National Investment Board.

(4) *Spending by private people* on their personal needs—by far the biggest item. The Government can increase or steady this in two main ways: (*a*) through the social security scheme, by increasing benefits and decreasing contributions, or vice versa; or (*b*) through progressive taxation, which serves to redistribute personal wealth and to inculcate personal responsibility for governmentally supplied services.
Taxation is thus looked on more as a social surgical instrument than as a financial necessity.

(5) *State spending* on the necessities of life (food, fuel and so on) for selling back later to the public, at a price based not on their cost but on what people can afford. This "joint consumption outlay" is Sir William Beveridge's method of maintaining price control and subsidy of essential goods. It is an ingenious way of influencing private spending, while still leaving free choice to the public.

The basis of the new budget will be an estimate of the amount of money which needs to be spent so as to provide work for everyone. Its basis, then, will be available man-power and not yield of taxation. The estimated spending under the five headings given above will be worked out. If it falls short of the spending needed to produce full employment, it must be increased on a basis of social priorities. The extra spending may need to be very large, particularly at times when private spending and investment show signs of declining—that is, when there is a tendency towards a slump. The old idea of the state economising when times are bad is now recognised by all economists as the surest way to make things worse. It is during a depression that the state must spend most to keep up employment.

The part of the national budget spent by the state will be met by taxation and borrowing. There is no inherent harm in a permanently unbalanced budget; but taxation is preferable to borrowing, since borrowing increases the number of people to whom the state must pay interest for doing nothing. It must be part of the state's policy continually to lower interest rates until, as Keynes says, the rentier dies of inanition. But fear of borrowing, and borrowing heavily, must never be allowed to stop the spending necessary to give full employment.

The National Investment Board is to have three jobs. First, it must have the power to get full information about proposed new investments. Secondly, by giving a state guarantee, it must help socially desirable projects to borrow money from the banks. Thirdly, it must be able to stop socially undesirable projects from borrowing.

There are two other measures, besides keeping up total national spending, which are necessary for full employment. They are social and not economic. First, people must be prepared to change their work if necessary. Secondly, work must be brought to the people, and not people to the work; that is, the location of industry must be controlled. As Sir William Beveridge points out, difficulties arise not so much over change of job as over change of location of job. People are far more ready to alter their occupation than to move their homes.

International trade must take second place in a discussion on full employment. There can be work and money for all in the absence of any overseas trade. But there certainly cannot be even the necessities of life, on which to spend the money earned, without overseas trade. We must have imports to provide our food and to maintain our standards of living, without which full employment cannot yield its dividend of health and happiness. To maintain our imports, Sir William Beveridge says, we must balance our accounts with the

1. Geo. Allen and Unwin. 12*s*. 6*d*.

t of the world, and keep our foreign economic policy sonably stable, so that other countries know what we nt from them and what they can expect in return. e must try to get as many multilateral trade agreements possible; this means that if we supply country A th exports, A in return does not necessarily have to pply us, but can supply country B, which in turn ves us the imports we want. If we cannot have orld-wide agreements, then we must fall back on gional agreements or even agreements between rselves and individual foreign countries.

RESULTS OF FULL EMPLOYMENT

Apart from the obvious benefits in mental and physical ealth which full employment will bring, the situation f more jobs than workers will have important results n industrial relations. Workers in war-time no longer ear dismissal in the same way that they did before the ar. There will be, then, a tendency to absenteeism nd bad time-keeping. This is a problem for the ndustrial psychologist. If workers can be educated o realise the social value of the work they do, all but he psychopathic should treat their jobs seriously. But t will be hard for employers to keep their workers if heir product has no obvious social value, or is socially ndesirable. Furthermore, the bargaining strength of abour will be greatly increased by full employment. And if one section of workers secure an increase in wages, the result will be that the price of their product will be raised for everybody. The answer is that the Trade Union Congress must have a unified wage policy; and there should certainly be an increase in arbitration for settling wage disputes.

COMPARISON WITH THE WHITE-PAPER

Though Sir William Beveridge worked perforce independently from the Government experts, the conclusions of the Government white-paper on full employment[2] do not differ greatly from his, save in vigour. The white-paper is ready to unbalance the budget, but—presumably in deference to those who still think the state's accounts are in essence the same as personal banking accounts—it says there must be a long-term balance. Sir William aims at preventing slumps; the white-paper only tries to iron them out. Finally, the white-paper concentrates rather more on the immediate future, while Sir William suggests a recurring series of 20 year expenditure plans, each based on social priorities. The official and unofficial remedies are not then so greatly different. It is now up to the patient to decide which is finally chosen.

IMPLICATIONS FOR MEDICAL PLANNING

This new presentation of national economics must react on services planned or run by the state. If it is a good rather than a bad thing for the state to spend liberally on salaries and buildings—if the reason for doing things is to be social desirability rather than money to be made—there is no reason why the state should not be a fair and generous employer. The criterion must no longer be economy but efficiency. This should mean that the multitude of checks—for example on the issue of stores and apparatus—beloved of bureaucracy, can be swept away. It should also mean that, in discussions on rates of pay, the profession should exercise reasonable restraint in putting a fair price on the value of its services. If the state has no need to cheese-pare, we have no right to grasp. The nation wants a first-rate health service as a right; it can afford to have it; and the doctors want to provide it. The equation should not prove insoluble.

The other major implication of Sir William Beveridge's proposals, though not of the white-paper, is one for which doctors may well have to fight. His criteria of a free society certainly do not apply to the majority of doctors in state employ. They have neither the right to publish nor to associate freely for political ends. Safeguarding these rights will be comparatively easy for the clinicians. It will be more difficult, yet even more important, for the administrators to be able to speak their minds publicly, if stultifying bureaucracy is to be avoided.

2. Employment Policy. Cmd 6527. HMSO. 6d.

Special Articles

NATIONAL HEALTH SERVICES IN NEW ZEALAND

PAYMENT OF PRACTITIONERS

IN November, 1935, the Labour Party came to power for the first time in New Zealand. It commanded a large parliamentary majority, and one of its election promises had been the establishment of a national medical service.

In 1936 the government, with the declared purpose of introducing a system of health insurance, set up an investigation committee. This consisted wholly of MP's of the government party, and though it took evidence from interested bodies, including the British Medical Association, there is reason to doubt whether such evidence made much impression on its preconceived ideas. The only medical member of the committee was a junior practitioner who had just been elected to parliament.

The government wanted a free medical service for the whole population, including general-practitioner service, hospitals, laboratory work and specialists. The BMA wanted a free service for the indigent, and a contributory system of insurance for the less affluent, but wished to leave unchanged the existing system by which those who could afford to pay the general practitioner or the specialist did so, either privately or through friendly societies. Protracted discussions took place. In 1937 Sir Henry Brackenbury visited New Zealand and his advice was made available to the government as well as to the BMA. No satisfactory solution was found, and in 1938 the discussions ended in deadlock. In September of that year the government introduced its Social Security Act which shortly became law. This raised money by a tax of 1s. in the £ on all incomes, from which it proposed to finance a generous pensions scheme, and a comprehensive series of medical, hospital and related benefits. This Act was a major issue in the election of November, 1938, in which the Labour government was again returned to power.

The benefits under the Act were intended to begin in April, 1939, and negotiations were reopened to arrange for their implementation. It was not, however, found possible to reach agreement on the immediate provision of all services, and the history of the progress of the new service since then has been the piecemeal provision of one benefit after another to build up a service which still remains far from comprehensive. In 1939 treatment in all mental hospitals (which are government institutions) was made free, and a maternity benefit scheme was introduced, which after modification was accepted by the profession. Under this scheme the general practitioner reports to the local MOH the fact that he has attended a confinement or a miscarriage, and he receives a payment from the Social Security Fund. The fee for attending a miscarriage is £3, for a confinement £5 5s. This includes the usual antenatal attendances, but certain extra payments are allowed in respect of complications and of mileage. The doctor may not charge the patient any fee. A recognised obstetric specialist, if called in, may charge the patient what fee he likes. In this same year the government introduced a payment of 6s. (since increased to 9s.) per day per occupied bed to all hospitals, both public and private. This was accepted by the public hospitals as the sole contribution expected from the patient, any expenses in excess of this being made up from the local rates. In the private hospitals, the payment counts as a grant-in-aid towards the normal charges of the hospital or nursing home. Where the staffs of the public hospitals had previously been honorary, they now began to receive part-time salaries ranging from £250 to £600 per annum.

The form of the general-practitioner service had not been decided when war broke out. A considerable

number of medical men joined the Forces and went overseas. It was the expectation of the medical profession that the establishment of any further public services would await their return. But in 1941 the government decided to establish a general-practitioner service. It was to be a capitation system, available to all, remuneration to the doctor to be at the rate of 15*s.* per annum for every man, woman and child on his list, with extras for mileage. The members of the public were invited to enrol on the lists of doctors of their choice. The public made little effort to avail itself of this invitation, and fewer than 50 doctors coöperated out of a possible 700 or 800 in the country. The scheme failed. In November, 1941, the government introduced a new system of payment for general-practitioner services, based on the principle of payment per item of service. A fee of 7*s.* 6*d.* was allowed as the basic fee for seeing a patient in the doctor's consulting-room or the patient's home. This was increased to 12*s.* 6*d.* for attention provided between the hours of 9 PM and 7 AM or at any time on Sundays. The doctor could claim this fee from the government on presenting the patient's signature to a statement that he had been seen and treated; or alternatively he could charge the patient 7*s.* 6*d.* or any higher fee and empower the patient to recover from the post-office a rebate of 7*s.* 6*d.* on every fee paid. Under the latter alternative, however, the doctor could not sue an unwilling patient for more than 7*s.* 6*d.* per service. Both these methods of payment have proved popular and continue today. They are used with approximately equal frequency. They are not, however, the only methods of payment. In fact there are in coexistence five methods by which the government pays for general-practitioner services.

The following are comments just received from our New Zealand correspondent on these different methods and on the general-practitioner service as a whole.

FIVE WAYS OF PAYING THE DOCTOR

1. *Salaried appointments.*—Payment by salary is limited to a few remote and scattered rural areas and ones with a large proportion of natives. On the whole the salaries and conditions are satisfactory to good, and the step represents an advance, because previously most of these areas had no medical service at all, or only a very indifferent service.

2. *Capitation fees.*—Payment by capitation fees has never developed beyond the relatively small number of doctors who undertook it in the first place. Most of these men lived in one- and two-men country districts, a few in towns. When the fee-per-service schemes became universal, these men mostly wanted to remain in capitation, and did so. The other methods became applicable, of course, to persons who had not enrolled, or to newcomers to the district. How serious the confusion and overlapping between the two may be is hard to say—probably it is not serious at all. It may result in some loss of money to the government, but that would not be much. Those doctors using capitation like it for its simplicity and its removal of all financial aspects from their relations to patients.

3. *The fee for service.*—Under this system the practitioner receives 7*s.* 6*d.* for each item of service rendered, with extras for night attendance and the like. The patient certifies on a form that the service was given, and on another part of the form the doctor claims the money from the health department. He sends in his heap of forms every month and receives a cheque in payment.

This system was intended by the government to be the standard method, the difference between 7*s.* 6*d.* and the usual fee of 10*s.* 6*d.* being reckoned to be more than made up by absence of bad debts, and unwillingness to charge for subsequent perhaps brief attendances. The British Medical Association here officially opposed it, and called on its members not to adopt it. Despite this it has gradually gained common acceptance, even high BMA officials openly admitting that more than half—perhaps much more—of their members have come to use it.

The advantage of this system is that it is the simplest of all—except perhaps capitation—for both patient and doctor; it eliminates accounts, bad debts, and standing in queues at post-offices to obtain refunds. To the doctor the fee is more than satisfactory, for there are no bad debts. To the patient there is no financial barrier.

The disadvantage is that the system may be abused: abuse by the doctor involves over-attendance—e.g., putting a poor patient into a private hospital and over-visiting in order to work up a sizeable fee, say for an appendix operation; and counting all trivial follow-up attendances as valid for the fee. Abuse by the patient includes frivolous calls and attendances, and demand for unnecessary medicines. As it must meet an unknown number of calls, the Social Security Fund has to be literally "bottomless." Some obvious abuses can be detected and stopped by the local officers of the health department, but many must get by. No worth-while details of the costs are made public by the government; but it is known that it is comparatively easy for a young doctor, or a moderately competent doctor, to earn £3000–£4000 a year, while the more efficient, by dint of organisation, are alleged to reach £10,000.

4. *The refund system: use of token fee.*—On this plan the doctor collects a token fee in cash—usually 5*s.*—and asks the patient to fill up the form (as in 3) as well, with which the doctor claims direct for 7*s.* 6*d.* This system is allowed by the government but disapproved by the BMA. It lends itself to concealment of income, and the patient is inclined to resent being asked for the 5*s.* On the other hand it is held by some to be a barrier to frivolous calls.

5. *The refund system proper.*—Here the patient receives an account as formerly—usual fees are at the rate of 10*s.* 6*d.* per attendance—and on payment is given a detailed statement as to dates and number of services rendered. Each of these constitutes a claim for 7*s.* 6*d.* for which he goes to the post-office.

The BMA favours this scheme, as perpetuating former relations with patients and making it hard to conceal income. For the doctor, however, it means all the old business of keeping accounts, sending them out repeatedly, and bad debts. Increasingly the patients become disinclined to play the game; they feel that Social Security should pay their doctor's bills, they resent being asked for a "surcharge," and they object to have to go to the post-office to collect their dues. Actually in practice this scheme is rapidly disappearing under its own inconvenience, in spite of BMA support.

THE GP SERVICE UNDER SOCIAL SECURITY

It is remarkable how readily the people and the doctors have come to accept these schemes. They represent of course nothing new in medical practice, but only altered modes of payment. Indeed the complacency of all concerned—people, doctors, government—towards past modes of practice is disturbing. If even a small proportion of the huge sums now reaching practitioners had been set aside in favour of research, a postgraduate teaching school, and the provision of refresher courses, they would have been far more productive.

No attempt has been made, or even suggested, to coördinate the work of general practitioner and hospitals. Money is poured out on the completely unorganised individual GP service. The work—as tended to happen under the British National Health Insurance scheme—is partly pushed on to the hospitals, which have neither money, staff, nor room for it. The people get poor value for the money paid to the GP.

It is hard to be certain of the effect of Social Security on general practice, because in war-time decreased personnel and increased demands have masked it. My impression is that standards have fallen, and that the economic motive in general practice has become even more predominant than before. The younger men and women are tempted into general practice by the high and easy rewards. As the effect of high taxation begins to be felt they tend to go easy or to give up general practice altogether. The younger men just qualifying are confused and sceptical about the whole position. It is certain that neither preventive medicine nor education for health has received any real impetus from Social Security legislation. Strangely also it has not facilitated that spontaneous grouping of medical men into coöperative teams which was the hope of a government spokesmen. The profession—while with some justification boasting victory over the government—is uneasy in spite of its undreamt-of rewards.

(To be concluded)

GENERAL MEDICAL COUNCIL

PRESIDENT'S ADDRESS

THE 162nd session opened last Tuesday with an address from the President, Sir HERBERT EASON. He began with a tribute to three former members of the Council who had died since the last meeting, Sir Humphry Rolleston, Mr. Hey Groves and Sir Robert Kelly. He recorded with regret the retirement from the Council of Sir Henry Tidy, whose modesty and integrity made him one of its most influential members; of Mr. E. L. Sheridan, chairman of the Dental Board, "a most charming colleague and one who represented the highest traditions of the dental profession," and of Prof. J. H. Burn, whose profound knowledge of pharmacology was of value to the pharmacopœia committee. He welcomed Lord Moran as representative of the Royal College of Physicians of London, Prof. W. J. Dilling as representative of the University of Liverpool, and Mr. James Lyons as an additional member under the Dentists Act, and he congratulated Dr. E. W. Fish on his appointment by the Privy Council as the new chairman of the Dental Board.

REVISION OF THE CURRICULUM

On Sept. 18, the President said, a letter was received from the Minister of Health referring to the report of the Interdepartmental Committee on Medical Schools (the Goodenough Committee) and saying that it would greatly assist him to know whether early action would be taken by the Council with regard to the revision of the medical curriculum, and if so what was likely to be the general nature of such action. "In view of this communication from the Minister I called a joint meeting of the education and examination committees on Oct. 4, and the Council have resolved that in view of the report of the Interdepartmental Committee, the Council are prepared to take the initiative forthwith in the matter of the revision of the medical curriculum. In order to give effect to this resolution a revision will be undertaken forthwith of

(1) The recommendations in regard to the registration of medical students, incorporating resolutions in regard to general education and preliminary scientific subjects, adopted by the Council on May 28, 1937.
(2) The resolutions in regard to professional education adopted by the Council on May 29, 1936.
(3) The recommendations in regard to professional examinations adopted by the Council on May 25, 1933.

Four committees have been appointed to consider and report jointly to the education and examination committees on the various stages of the curriculum."

EDUCATION IN THE COLONIES

Since Sir Richard Needham's visit to the schools of medicine in Uganda and Nigeria made in 1939–40, the Secretary of State for the Colonies has appointed a commission under the chairmanship of Sir Cyril Asquith to consider the principles which should guide the promotion of higher education, learning, and research and the development of universities in the Colonies; and to explore means whereby universities and other appropriate bodies in the United Kingdom may be able to coöperate with institutions of higher education in the Colonies. The President reported that on July 27 he gave evidence before the commission.

THE FACTORY DEPARTMENT IN 1943

THE annual report of the Chief Inspector of Factories for 1943 [1] reflects the quickening of interest in the health, safety and welfare of factory workers. The story of the year's work is one of achievement carried out in a breathless tempo with a depleted staff. For the first time since 1938 there have been fewer accidents, and the reduction in fatalities noted in 1942 has been maintained. The number of accidents to women has risen, but more women were working in factories, and the accident-rate to women in the munition industries—the main source of such accidents—has fallen by about 3 per 1000 Nevertheless the total of 309,924 non-fatal and 1220 fatal accidents shows that there is still need for improved methods of accident prevention.

1. Cmd. 6563. HMSO. 1944. 1s.

The reduction in accidents took place during the later months of the year and coincided with a widespread shortening of working hours. Sir Wilfrid Garrett quotes the experience of a large factory where three-quarters of the accidents happened between 4.30 PM and 6.45 PM, a fact which reinforces the argument for a shorter working day. The general tendency is to reduce hours of employment, but long hours are still being worked in some factories vital to the war. Experience in 1943 has again shown that production is not in direct ratio to the hours worked. A recent report by the Industrial Health Research Board stresses the difficulty of isolating reduction of hours from other factors affecting output, but Sir Wilfrid says that inspectors all agree, and many in management concur, that reasonable hours have a great effect on the well-being and efficiency of all concerned. As regards accident prevention, Sir Wilfrid Garrett thinks it a misdirection of energy for safety organisations to try to make the worker accident-conscious by methods akin to high-pressure salesmanship. "Education in method has its place but general exhortations to workers to be careful are of little value unless it is abundantly clear that the management has done everything possible from its end."

The special investigations carried out by the department include the effects of radioactive substances and X rays; the danger of fire and explosion when grinding magnesium and aluminium, and of petrol fires in testing aircraft engines; the health risks inherent in handling leaded petrol, in patent fuel and flax factories, in steel founding, boiler-scaling and welding. The ventilation and conditions of work in electrical power stations and drop-forging establishments also received attention. An agreement on improved conditions in boiler-scaling and the cleaning of oil-fuel tanks and bilges on board ship was made during 1943 with representatives of employers' and workers' organisations. The report discusses the difficulty of harmonising the demands of the fuel economy campaign with adequate heating. Ventilating engineers and others too often regard general ventilation by fans as an acceptable method for removing dust or fumes. The department makes a clear distinction between general ventilation and local exhaust ventilation, the latter being required by law to take dust and fumes away from the workrooms. Great improvements in factory lighting were made during the year.

DISEASES OF INDUSTRY

Dr. E. R. A. Merewether, in his chapter on industrial health, discusses the effect of war-time processes on the incidence of notifiable industrial diseases. The number of cases of lead poisoning notified during the year (46 with 5 deaths) is the lowest ever recorded. No cases occurred in people engaged in shipbreaking and vitreous enamelling, and only 2 were found in potteries and 4 in the painting of buildings. All these processes have been restricted during war-time. On the other hand there have been more cases of poisoning concurrent with greater activity in the smelting of metals and the manufacture of paints and colours. Two cases of phosphorus necrosis of the jaw were observed in men working at a phosphorus filling factory. Poisoning by phosphorus is now never seen in peace-time. Cases of chrome ulceration rose from 89 in 1942 to 226 in 1943, largely because 131 people were affected in a new process of handling sodium chromate; the nasal septum was the site of the lesion in all except 2 of these cases. There were 16 cases, with 4 deaths, of toxic jaundice; 14 of these (3 fatal) were caused by TNT and the other 2 by dinitrotoluene and chlornaphthalene. Of 19 cases notified as toxic anæmia, 7 had an occupational cause; 6 were due to TNT and 4 of these were fatal. Only 79 cases were notified as aniline poisoning, compared with 204 in 1942; TNT was responsible for 62 of them. Poisoning by TNT can thus be notified as toxic jaundice, toxic anæmia or aniline poisoning (cyanosis) according to the predominant signs and symptoms. The single case of chronic benzene poisoning notified was in a man of 40 who had been employed for about 19 years on spreading cloth with a celluloid rubber solution containing benzene; he died from aplastic anæmia ending in acute leukæmia.

Only 2 cases of arsenical poisoning were notified, but one of these, a maker of sheep-dip containing sodium

arsenite, had carcinoma of the lung. Three similar cases in sheep-dip workers have been notified since 1939. A connexion between arsenic dust and malignant disease of the lungs has been suspected for many years and the problem is now being examined by a committee under the chairmanship of Prof. M. J. Stewart. There were 4 fatal cases of anthrax and 1 non-fatal case of mercurial poisoning. Of the 160 cases (15 fatal) of epitheliomatous ulceration recorded, 111 were due to pitch or tar, 48 to mineral oil and 1 to shale oil. A substantial number of the cases, especially those due to pitch or tar, were notified in an early stage and the warts or keratotic new growths were treated with radium. In many such cases no pathological examination is made and no doubt some of them were in the pre-malignant stage. The case of manganese poisoning notified was only the second since the condition was made notifiable in 1936. A man of 49 who had been crushing ferro-manganese for 2 years developed the typical mask-like expression, monotonous voice, slow articulation and hesitant gait. A fatal case of manganese poisoning, not reportable under the Factories Act, occurred in a man who had been engaged in welding tram-lines, using an electrode containing 14% manganese under poor conditions of ventilation. One case of compressed-air illness was notified, making 16 cases in the 4 years since notification became compulsory.

All workers engaged in handling radioactive luminous paints had blood-examinations and were closely observed. No severe disturbances of the blood-picture were observed; leucopenia was present in 5% of the cases, but nearly 40% showed a relative lymphocytosis. Some of the workers had slight chronic dermatitis of the fingers and one had an acute radium burn apparently due to direct contact with the luminous paint. Estimations of the radon content of the exhaled air after removal from exposure for 48 hours were carried out by Professor Russ in about 100 luminisers; 9 gave positive results, but in 7 of these Dr. E. C. Gray found no permanent retention of radioactive material in the body.

Analysis of the 695 gassing accidents, with 27 deaths, shows the effect of war-time conditions, the main gases responsible being carbon monoxide, chlorine, nitrous fumes, trichlorethylene, sulphur dioxide and carbon tetrachloride; 9 cases of gassing by phosgene were also reported. In the section on the health hazards of handling leaded petrol it is pointed out that tetraethyl lead mainly affects the nervous system, in sharp contrast with poisoning by inorganic lead compounds.

MEDICINE AND THE LAW

Borrowed Qualifications

FREQUENTERS of our criminal courts will have noticed how very different are the pictures of the same man painted by the prosecution and by the defence. Not long ago, for instance, before the magistrates at Burnham (Somerset), William Hugh Rankin, aged 55, of 72, Lavernock Road, Bexley Heath, pleaded guilty to charges of having falsely taken the title of bachelor of medicine and bachelor of surgery. He had prescribed sleeping tablets containing drugs on the Poisons List, adding after his signature the letters "MB, ChB" and the address "8, Harley Street." There was evidence that he had told people that he was practising as a surgeon in London and that his visit to the West Country was his first holiday after an uncomfortable time in the blitz. He had claimed acquaintance with a practitioner in the district ("do you remember me? We were at St. Thomas's Hospital together,"—or words to that effect). Not recognising him as a contemporary, the doctor consulted the hospital list and subsequently took the Medical Register to the hotel where Rankin was staying, in order to compare its entries with the signature in the hotel books. His suspicions being aroused, the doctor then informed the police, identifying Rankin's face from records which an inspector brought him for the purpose. Proceedings were then taken by the Medical Defence Union.

The advocate for the accused, who spoke of him as Dr. Rankin, said his client was a doctor of medicine at Columbia University in California who had devoted most of his life to medical research; he came to this country in the last war and served as a ship's doctor in the Merchant Navy. Dr. Rankin, he explained, could not be present in court because he was taking a medical course at the Bristol postgraduate medical school and was studying for an examination to be held in January. On the other hand the advocate for the prosecution stated that the accused had not put his name down for the examination, and the course of study he was taking was not the slightest use for the examination for which he was proposing to sit; "I don't know how it came about that he was admitted to this course." The defendant's advocate conceded that his client had been a very foolish man but contended that he had suffered for past delinquencies—a reference perhaps to the police records which, if the accused had not pleaded guilty, could not have been mentioned. The chairman of the bench put it a little higher than mere foolishness. "This man," he said, "is a dangerous individual possessed of amazing impudence and cool, calculating effrontery; it is vitally important that the public should be protected from charlatans." The punishment he proceeded to impose was a fine of £10 on each of two charges together with the payment of certain costs.

Alleged False Pretence by Unregistered Practitioner

In another recent case, at the Old Bailey, an unregistered practitioner was found not guilty on a charge of false pretences. She was Mrs. Astrid Hill; being fully qualified to practise in Norway, she obtained admission to the Medical Register with permission to practise here subject to conditions; her name was later taken off the Register. The principal witness for the prosecution was a Downham practitioner who said that Mrs. Hill applied to him for the post of locum tenens when he was about to take a holiday. She gave him to understand that her name was on the Register and she told him her Norwegian qualifications; she asked for an advance of £10, which he gave her. This payment was the subject of the indictment, the false pretence being her statement that her name was on the Register. Had he known that the statement was not true, he would, he said, never have given her any money at all. Mrs. Hill said she had practised in Oslo for 20 years without the slightest suggestion against her. She married an Englishman in 1935. Her name was placed on the Medical Register in 1942, but was erased later because letters sent by the medical authorities did not arrive and she therefore had no chance to reply to their questions. She had applied for reinstatement without success. She intended to apply again. It was because she thought her application would succeed that she offered herself for the post of locum tenens. She denied having said anything to lead the prosecutor to believe that she was on the Register. Mrs. Hill was found not guilty and was discharged.

PRINCESS TSAHAI MEMORIAL FUND

THE task of building a hospital in Addis Ababa, to the memory of the young Princess Tsahai, is going forward. Readers will remember[1] that this daughter of the Emperor Haile Selassie, who trained as a nurse in England during the Italian occupation of her country, was moved by a great wish to benefit the health of the Ethiopian people. Her death soon after her return home was a tragedy for her country as well as for her friends. Her father had created a trust fund for her amounting to £13,704 in British war loan, and this, in accordance with a wish expressed before her death, the Emperor has now placed at the disposal of the memorial council for the use of the hospital. A part of this sum has already been despatched to roof the hospital, but further funds are needed to equip and endow it. Three wards are to be named after British friends of Ethiopia: Major-General Orde Wingate, who led the Emperor's Army to victory in 1940; Dr. John Melly, who raised and led the British Ambulance Service in Ethiopia during the Italian invasion of 1935; and Lord Davies, the late chairman of the memorial council. Lord Horder, the present chairman, will be glad to acknowledge donations and annual subscriptions, which should be addressed to him c/o Messrs. H. Reynolds & Co., hon. chartered accountants, 1, Bloomsbury Square, High Holborn, WC1.

1. See *Lancet*, 1944, i, 795.

Major-General Sir ERNEST BRADFIELD has been granted the local rank of lieut.-general while holding his present appointment at the India Office.

In England Now

A Running Commentary by Peripatetic Correspondents

I AM horrified to see the suggestion, discussed in the Goodenough report, that the University of Oxford should in future have a small undergraduate medical school of carefully picked young Herrenvolk who are going "to become teachers, investigators and consultants rather than general practitioners." I hate to think that, whenever we get a first-class lad in our medical school at Mudport, Oxford may come along with (no doubt) a golden spoon, and leave us with the skim-milk. The Goodenough Committee nicely sets forth the pros and cons of this proposal, but does not comment on what is surely its most serious drawback—the effects upon the young heroes themselves. I can think of nothing more unkind, more misconceived, than to pick a boy out of the sane community of the average medical school, in order to train him for a messianic rôle in a Fuehrerschule. To rub shoulders, in the course of his work, with all sorts and conditions of men and fellow students is a cardinal part of his medical education; he needs this experience all the more if he has that in him which will make him "become a teacher, investigator or consultant."

* * *

The special smell of Stockholm this winter greets you even as you step out of the plane—fresh-cut wood and burning charcoal. With the stopping of coal shipments from Germany, enormous stocks of three-foot logs, mostly silver-birch and pine, have been piled everywhere. One result is that Stockholm, always clean and tidy, is now absolutely spotless with the absence of coal smoke. Imagine going about all day in London and finishing up with clean hands! The smell of burnt charcoal comes from the conversion of nearly all the cars to a most efficient system of wood-burning propulsion, the result of experiments by the Swedish Army before the war. Indeed the whole of Swedish life is conditioned by the plentifulness of wood and its products, such as paper: even the schnapps is made from wood.

Looking north over the water from the southern heights of Södermalm, on a sunny morning—the only sunny day in my three weeks' stay—Stockholm's colours are a warm beige, Venetian red, black and verdigris. The sparkling water is everywhere and the great mass of the King's Palace would be the predominant feature but for the red-brick, green and gold of the finest modern building in Europe—Österberg's not over-praised Town Hall. The girls are like the city, neat, clean and fresh, and at their best under twenty. For the older generation, who like 'em well-tubbed and without cosmetics, Sweden would be a paradise. The men, particularly the Army, showed, I thought, a tendency to pallor and spottiness. I had many arguments about this and came to the conclusion that it might be due to a combination of lack of fresh vegetables from the diet, lack of sleep—the Swedes never go to bed—and alcohol. Alcoholism is Sweden's no. 1 social and public health problem. It is said to have improved since the introduction of spirit rationing, but I saw more drunks in three weeks in neutral Sweden than in three years of Britain at war. At 4 o'clock in the afternoon I saw a young mechanic lurching down a main street, knocking down a woman and a row of bicycles and finally pitching on to the cobbles in the road on his head. Sailors drink the spirit out of the torpedo-tubes and some have gone blind, and soldiers ask you for your ration in the streets. The only advantage of schnapps which was put to me was that it ruined your stomach long before you could get DTs.

* *

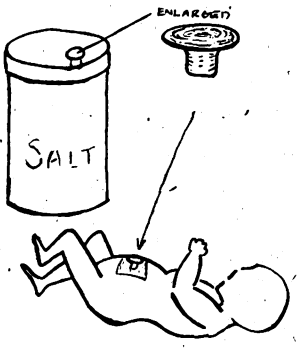
The thoughts of a Briton arriving in a neutral country naturally turn to food; and he is not disappointed in Sweden. Plentiful fish, particularly the delicious little Baltic herring in many forms, and smoked eel; reindeer and elk (the latter come into the suburbs of Stockholm and thousands are shot every year); capercailzie; roe deer and cranberry sauce; bilberries; sweet pickled cucumber. (Sorry, chaps!) Meat, bread and fats are rationed but on a generous scale. Of the drinks I chiefly remember mead drunk out of the ox-horn used by Gustavus Adolphus, at Uppsala; the sweet and insidious Swedish punch; and some 50-year-old whisky in Visby. Wines are reasonably plentiful but very dear. Indeed the prices for everything in Stockholm are somewhat above London ones, though of course quality is better and choice much more varied.

* *

Going to the cinema in Stockholm is a serious affair. Seats are numbered and reserved, and it is best to book in advance. Two performances nightly, at 7.15 and 9 PM, and you are lucky if you get anything more than the news with the big picture. Smoking is not allowed, and you must shuffle to your seat facing the other people in the row—to turn one's back is a social gaffe of the worst order. As for cuddling one's girl, the opera or church would be a more propitious atmosphere. Only one German film was showing when I was in Stockholm, as against large numbers of American, Swedish and British: indeed German influence was at a very low ebb and their propaganda jejune in the extreme. As for the doctors, while the older generation still looks almost exclusively to Germany, the younger ones have begun to read British and American medical literature in the last ten years, and the British Council has done much to keep up and increase their interest during the war years. Certainly the eagerness to hear about British medical and social developments, as well as the kindness and hospitality I received from everyone, shows the failure of the Germans to poison the minds of the Swedes against us.

* * *

If you do not mind your household salt being a little damp for three weeks, may I recommend the saline plug treatment of infantile umbilical hernia? I usually avoid prescribing patent remedies, but the small rubber bung (pat. 4390) provided by the manufacturers for keeping salt in, is just as effective for keeping a navel from popping out. Plug the opening with the hump, fixing the flat surface with sticking plaster. After three weeks clean it and replace it in the salt box; also clean the baby and replace it in its pram.



* * *

Time was—I say it in no boastful spirit but merely to record a relevant fact—when we had a housemaid. Rather a comely lass was Vera and left us only to better herself by marrying Albert, a handsome and entirely satisfactory young man now in the Army. Vera brought Albert to see us when he got his embarcation "leaf" and the conversation turned on how they proposed to spend those few delirious days. "We're going up to stop with Mum and Dad," said Albert, referring to his in-laws. "Dad and Albert gets on a treat," interjected Vera. "That's a fact we do," said Albert. "He's a proper chap is Dad." There was a pause while we all thought of Dad in warm terms. Albert broke the silence. "Last time I was on leaf," he went on, "him and me and a few others all goes into Braunton to have a few beers. I was all right all the time I was inside but when it come closing time the cold air struck me legs and I couldn't hardly stand up." "I know how it is," I murmured sympathetically. "It happened to me more than once in the last war—Funny stuff cold air." "You're tellin' me," said Albert. "Well, Dad, he takes me arm but 'tweren't a bit of use and I keeps falling down." "Too bad," I said. "Too right," said Albert, "but it didn't worry Dad." "All right, lad," he says, "let's get a hold of you." "Well, doctor, I weighs all of 160 pound but old Dad picks me up fireman fashion like I was a child and carries me 'ome a mile and a half." "And Dad's seventy, you know, doctor," added Vera proudly.

Letters to the Editor

CHRISTMAS

SIR,—A month ago you kindly published my appeal on behalf of the Christmas gifts fund of the Royal Medical Benevolent Fund. I am very grateful to those who have already forwarded their contributions, but may I ask those of your readers who are in sympathy with our work and who have not yet sent their donations to forward them as soon as possible to the hon. treasurer, RMBF, 1, Balliol House, Manor Fields, Putney, London, SW15, marked "Christmas gifts."

This appeal is urgent, for we have not yet received the sum required to meet the distribution of gifts.

THOS. BARLOW,
President, RMBF.

INTERCHANGE OF INFORMATION BETWEEN ARMY AND E M S

SIR,—The surgeons with the British Liberation Armies are bitterly disappointed that so few of the Follow-up Postcards (AF I 3216) which they have enclosed in the envelope containing the field documents of wounded men evacuated to the United Kingdom have so far been returned to them by EMS surgeons treating these patients subsequently. The consulting surgeon to this group (Brigadier A. E. Porritt) has written (October, 1944):

> "If only the EMS would realise how eagerly these cards are awaited over here, I am sure they would make a greater effort to return them. Not more than 1% have been returned since D-day."

Quite apart from the natural interest and eagerness of individual surgeons to hear how their cases have progressed, this information, together with comments and constructive criticism, are a valuable factor in improving the standard of surgery in the field. Instructions on the employment of the follow-up postcard issued by the Army and EMS are almost identical and quite explicit. Naturally enough, the Army surgeons cannot understand why a system which worked between the forward and base hospitals in MEF and CMF should not work equally well between the Army hospitals in France and Belgium and the EMS hospitals in the UK. It is scarcely surprising, therefore, that our surgeons are inclined to blame the EMS for its failure in this instance. It would be a great pity if this mutually beneficial liaison between two large groups of the profession cannot be improved, particularly as both are doing such splendid work on the same job.

It is not easy to discover why these cards are not returned. I suspect that the different systems of documentation are mainly responsible. I believe the plan tends to break down at the point where the essential clinical information which should be written off the field card is first transferred to the EMS case-sheet. The follow-up card is either missed or returned to the Army envelope to be dealt with later—and thereafter forgotten, because to the surgeon who has to plan the patient's treatment it is of little clinical importance.

Whatever the cause, I am quite sure that most EMS surgeons are unaware that there has ever been any complaint. I am equally convinced that as soon as their attention is directed to this a remedy will be found and this valuable system of interchange of information will work smoothly.

D. C. MONRO,
Major-General; Consulting Surgeon to the Army.

War Office, SW1.

DIRECT INTUBATION

SIR,—Major Freda Bannister and Mr. Macbeth lay down the principles of direct intubation clearly and convincingly (Nov. 18, p. 651). The truth of their contention can be readily demonstrated in practice by having the assistant move the neck from a position of extension to one of flexion while the laryngoscope is in position in the anæsthetised patient. A small point which I find useful in practice is to have the ward pillow or pillows replaced by a pillow of double thickness and firmer consistency when the patient is brought to the anæsthetic room. This simplifies procedure when the time comes to introduce the laryngoscope.

While I have not had an opportunity of using the laryngoscope designed by Major Bannister and Mr. Macbeth, I should have thought that the angle and deviation of the handle make it less efficient mechanically than one in which the handle is at right-angles to the blade. Macintosh's laryngoscope seems to me to have two great advantages not possessed by others: the ease with which the tongue is moved and kept out of the way; and the automatic tilting of the epiglottis. This instrument, used with the head and neck in correct position, has made direct intubation a simple and atraumatic procedure, even for those who, like myself, belong to that much maligned but singularly passive body, the occasional anæsthetists.

Rush Green Emergency Hospital, Romford. E. JAMES.

COMMISSIONERS IN CHILD WELFARE

SIR,—Recent correspondence in the *Times*, initiated by Lady Allen of Hurtwood and summarised in your issue of Sept. 23, has shown that the need for adequate supervision of children's homes is now recognised. The general public, and indeed many of our own profession, have not realised, however, that this need applies to institutions caring for *sick* children just as much as to institutions caring for unwanted children. Bad accommodation and inadequate nursing facilities, resulting in frequent cross-infection, are to be found just as often in children's hospitals, children's wards in general or cottage hospitals, and nursing-homes, as in orphanages.

It is more than a hundred years since Parliament first appointed the Commissioners in Lunacy, charged with ensuring that any institution which professes to treat mental cases—whether it be a rate-aided mental hospital or a private mental home—shall maintain at least a minimum standard of care. The case of the infant or young child is very similar to that of the mental patient inasmuch as they are equally inarticulate and have little effective say in arrangements made on their behalf. I suggest therefore that Parliament should make no less provision for safeguarding the interests of the young child than have been made for the insane person and the mental defective. We as a profession should make every effort to secure the establishment of a body which should:

(*a*) Lay down basic requirements for approved hospitals, or other places catering for infants and young children.
(*b*) Maintain a register of such institutions in which these requirements are fulfilled.
(*c*) Establish efficient supervision of these institutions so that up-to-date ideas on the welfare of the children shall be widely disseminated.

It is to be hoped that the committee which is to be formed by Parliament to inquire into orphanages will extend its deliberations to include all establishments where children are deprived temporarily or permanently of direct parental care.

London, S.W. GUY DAYNES.

BEDS FOR TUBERCULOUS PATIENTS

SIR,—Much has been said already about shortage of accommodation for tuberculous patients. The great difficulties in staffing adequately even the available beds, and the impossibility of increasing accommodation by allocating more beds for these cases, are well known, though the Ministry of Labour is doing as much as possible under wartime conditions to alleviate the situation. The danger of spread of infection by people who cannot find institutional accommodation has become a national problem.

In a previous letter (*Lancet*, 1943, i, 817) I suggested that a clear-cut classification of cases of pulmonary tuberculosis would help to economise the use of the beds available. I pointed out that advanced and chronic cases, unlikely to benefit from sanatorium treatment, needed hospital accommodation of a simpler kind. May I now draw your attention to an emergency measure which is working satisfactorily in Doncaster?

The public-assistance institution here, which not only serves the borough but also the rural district and the adjacent West Riding area round and near Doncaster, has set apart two small isolation wards for cases of advanced open tuberculosis, beyond the stage of sanatorium or surgical treatment. Thanks to the coöperation of the borough health authorities and the public-assistance board, I am, as clinical tuberculosis officer, in

control of these beds. The institution is run by the public-assistance board, but the cost of the beds is met by the tuberculosis authorities, either Doncaster or West Riding as the case may be. Thanks to this arrangement I have never had to admit hopeless chronic cases to our borough sanatorium, which is strictly reserved for pulmonary cases suitable for treatment. This, by the way, enables me to accommodate a fair proportion of West Riding cases, in addition to our borough cases, in the sanatorium, and thus alleviate somewhat the tense situation in the West Riding.

Overlapping between different departments, so often an obstacle in tackling this major problem of public health, can, as Doncaster has shown, be overcome by goodwill and understanding among the parties concerned.

Doncaster. E. G. W. HOFFSTAEDT.

PAYMENT OF PRACTITIONERS

SIR,—We suggest that in any revision of National Health Insurance the procedure for payment of civilian medical practitioners attending Service personnel sick on leave, by the submission of Army Form O.1667, would solve the problem of remuneration of the panel doctor. The forms he returned would show how much work he had done and he would be paid accordingly.

Persons above a certain salary (e.g., £500 a year), if included in the scheme, should pay an additional charge themselves. This would encourage them to respect their medical attendant and their times for summoning his aid. A visit dragged out to more than half an hour should count as two visits. Entirely free medical attention tends to be grossly abused by the upper classes, as may be confirmed by questioning any Service doctor who has to care for a large number of officers.

This system would raise all persons to the level of the "private patient" and would be simple to operate. Further, it would avoid the creation of a central controlling body for the medical profession, to which we are all, at this sick quarters, wholeheartedly opposed.

P. E. G. BURNETT, Squadron-Leader. JOAN MILLETT, Flight-Lieutenant.
A. A. HILL, Flight-Lieutenant. ELSPETH MCKECHNIE, Flying Officer.

*** The similar systems now on trial in New Zealand are discussed in a leading article.—ED. L.

QUININE AND MEPACRINE IN MALARIA

SIR,—Recent correspondence in medical journals has referred to the giving of quinine by intramuscular injection. The principal objection to this method has been pain. However in an ill man with failing peripheral circulation the problem of rate of absorption must also arise.

In the past twelve months at a general hospital we have treated over 5000 cases of malaria: during the height of the season last year it was a daily experience to admit unconscious or semiconscious men with malignant tertian infection. The invariable practice has been to give quinine by intravenous injection, and the results are among the most dramatic and satisfying that fall to the lot of the physician. It is a life-saving measure. We have given scores of such injections without mishap and this has been the general experience of hospitals in the MEF and CMF. The method is simple, safe, certain and painless.

The injection (gr. 10) rarely has to be repeated more than once and very rarely more than twice; after that the drugs can be given by mouth. If an intravenous drip has to be put up a second dose can of course be added to that. In Service personnel veins can always be found. The quinine should be well diluted (to 20 c.cm., or more if practicable) and given extremely slowly, at least 5 minutes being taken over the injection. In an emergency, if no sterile diluting fluid is available, the plunger of the syringe should be drawn back, after inserting the needle into the vein, so that the quinine is diluted with the patient's blood, and the injection should then be made very slowly as usual.

A letter is not the place in which to discuss the treatment of malaria; but another useful fact which should be widely known is that a large single dose of mepacrine can be given when rapid absorption is important. In malignant tertian infection, in some parts of the world It least, quinine by mouth is less effective than mepacrine. at has been our practice to give the daily amount of mepacrine (0·6 g. and in the last few months 0·8 g.) to all patients in one dose anyway. This is partly for administrative reasons and partly because it seemed to work better. Mepacrine has been given in this way to over 2000 individuals, and in no instance has there been any upset. True idiosyncrasy to mepacrine is very rare and the patient is likely to be aware of it. Sensitisation to mepacrine taken prophylactically was reported from one part of the Mediterranean, but this was due to small doses being taken over a number of days and is a different matter.

CMF. R. W. D. TURNER.

FEES FOR CIVILIAN MEDICAL ATTENDANCE ON MEMBERS OF THE FORCES

SIR,—In response to a request from a Parliamentary constituent of mine I asked the Prime Minister on Nov. 17 if his attention had been drawn to the inadequate fees payable on behalf of members of the Forces for professional attendance by civilian doctors, and whether he would take action to remedy this position. The Prime Minister replied that the present scales were fixed by agreement with the British Medical Association and he could not agree that they are inadequate. I may explain that it is a Parliamentary convention that when a question concerns all three of the fighting services it must be addressed to the Prime Minister.

My correspondent, who holds the medical degree of London University, forwarded me a copy of the official document in which the charges payable by the Government are set out. For a "visit and medicine" at the doctor's surgery the fee is 3*s.*; for similar service involving a journey of under two miles during the day, 4*s.* 6*d.*; during the night, 6*s.* My correspondent cites two actual instances:

(1) "An airman comes to my surgery with acute otitis media. He is given, besides advice, sulphanilamide tablets and an ointment to protect the skin from the discharge." Fee 3*s.*

(2) "I travel a mile to see an ATS at home on leave. She has asthma; she is examined and is given an injection of adrenaline, a mixture and some tablets of ephedrine." Fee 4*s.* 6*d.*

The extravagant scale on which services other than medical are rewarded by the Government brings into glaring contrast the contemptuous attitude of our rulers to the medical profession.

House of Commons. E. GRAHAM-LITTLE.

HEARING AIDS

SIR,—As president of the Hearing Aid Manufacturers Association I would like to confirm the statement (*Lancet*, Nov. 4, p. 610) that a specification has been evolved by our technical committee for a British standard deaf-aid. This information has been passed to the Duke of Montrose, as chairman of the National Institute for the Deaf, as well as to the Electro-acoustic Committee of the Medical Research Council. It is necessary for a supply of special parts to be released by the Board of Trade before production can be commenced.

50, Wigmore St., London, W1. O. C. LEADBITTER.

VITAMIN K AS A PROPHYLACTIC

SIR,—I wish to supplement the data given in my paper of April 15 (p. 493) to answer some of the criticisms in your leader on p. 506. (It should be noted that the figures in the last column of my table II should be per thousand instead of per cent.)

Your first point concerns the fact that my material only includes the mortality from hæmorrhage and not the frequency of non-fatal hæmorrhages. The reason for this is that my material represents observations in the nine years 1934–43. During this time many different doctors were appointed to the women's clinic in Gothenburg and a different degree of attention must have been paid to hæmorrhages, especially the minor ones. Therefore, the published incidences of hæmorrhages cannot be assumed to give a homogeneous picture of the frequency of bleeding. However, the babies who have died during this period have been examined post mortem by the same prosector and with the same technique. Thus, there is a greater possibility of getting comparable results if they are based on mortality than on morbidity.

A precise record of hæmorrhages not leading to death would admittedly have been a valuable contribution to the question of the usefulness of vitamin K as a prophylactic, but the absence of such a record seems to me not to diminish the value of the mortality figures.

Your second remark is that I have not investigated the effect of obstetric factors such as instrumental labour. Naturally, this is a factor of importance and I therefore wish to give some complementary data. In the following table different obstetric factors during the control period and the vitamin period are registered.

INCIDENCE OF OBSTETRIC FACTORS POSSIBLY CONTRIBUTING TO THE FREQUENCY OF DEATH FROM HÆMORRHAGE IN THE NEWBORN (PER 1000 BIRTHS)

Obstetric factors	Control periods		Vitamin period
	1934–37	1937–40	1940–43
Forceps (high and low)* ..	24·9	27·9	40·5
Abnormal presentations † ..	56·9	61·9	73·8
Albuminuria and nephropathia gravidarum ..	70·8	104·1	95·1
Eclampsism and eclampsia ..	10·0	12·7	7·9
Placenta prævia and prem. separation of placenta ..	6·1	8·0	5·1
Contracted pelvis	3·5	5·1	6·1
Hæmorrhagia in graviditate	..	6·6	7·5
Cæsarean section	3·5	3·9	4·1

* The maximum frequency of high forceps in these groups was 3%.
† Breech, transverse, brow and face presentations.

It will be seen that there is a certain increase instead of a decrease in the frequency of instrumental factors (forceps) and of abnormal presentations in the vitamin period. No significant change is seen in the frequency of the other obstetric factors investigated.

Thirdly, you discuss my inclusion of intracranial and some visceral bleedings in the conception of "hæmorrhagic disease of the newborn" and seem to be of the opinion that I should have adopted the view of many pædiatricians—that traumatic and asphyxial bleedings do not belong to this disease. If I had done so, the most interesting result of my paper—namely, the remarkable reduction in deaths from intracerebral bleeding during the vitamin period—would not have been observed. As pointed out above, this cannot be explained by a lower incidence of obstetric factors in the vitamin period. A beneficial effect of vitamin K seems to me to be the most probable explanation of this phenomenon. Further, the work of Rydberg (*Acta path. microbiol. scand.* 1932, suppl. 10) indicates a high frequency of injury to the intracranial vessels in the newborn. In view of the fact that up to 42% of all newborn babies during the first week of life for a shorter or longer time show a prothrombin index below 20 (= 5% prothrombin) and thus are disposed to bleeding from hypoprothrombinæmia, it is not astonishing to find that prophylactic treatment with vitamin K led to a remarkable reduction in deaths just in the intracranial group of bleedings. Salomonsen (*Acta pædiat.* 1939, **22**, suppl. 1) stated that about 20% of all clinical cerebral hæmorrhages in the newborn are late and coincide with the physiological hypoprothrombinæmia of the newborn. He therefore concludes (p. 74) that "morbus hæmorrhagicus must in these cases be held responsible for the development of the cerebral hæmorrhage." Our greater understanding of the mechanism of these bleedings points to hypoprothrombinæmia plus a lesion of the vessels, traumatic or inflammatory (Salomonsen pp. 9 and 10). Concerning visceral bleedings, most of these are perhaps of asphyxial origin. However, I see no reason why a hypoprothrombinæmia should not be as dangerous a factor in asphyxial bleeding as in any other bleeding. Therefore, your suggestion that the intracranial and most of the visceral bleedings should be excluded from my material seems to me not justified.

"Hæmorrhagic disease of the newborn" has hitherto included many forms of bleedings with different ætiologies (hypoprothrombinæmia, thrombopenia, fibrinogenopenia, real ulcers, &c.). The determination of prothrombin and the effect of vitamin K have made possible to distinguish the hypoprothrombinæmic group. Since this group seems to be responsible for the major of bleedings in the newborn, Salomonsen has characterised his "morbus hæmorrhagicus neonatorum" by the subtitle "hypoprothrombinæmia neonatorum." As seen from my paper, I have followed his definition, and in consequence all those groups of bleedings in which a reduction in mortality was found after the administration of vitamin K have been considered as belonging to the disease.

Gothenburg, Sweden. JÖRGEN LEHMANN.

VENOUS SPASM PREVENTING BLOOD TRANSFUSION

SIR,—Dr. Humble and Dr. Belyavin in your issue of Oct. 21 indicate that the generalised peripheral venous spasm encountered during transfusion might be due to "a pathological central nervous reaction." A pathway for conduction of constrictor impulses to the peripheral veins has been demonstrated by Donegan (*J. Physiol.* 1921, **55**, 226), who showed that stimulation of the abdominal sympathetics caused contraction of the veins of the leg. His experiments extended previous observations that peripheral stimulation of the sciatic nerve effected contraction of the saphenous vein. Since the generalised spasm is consistent with the mechanism of the central vascular reflex, either a pathological reaction or a normal vasomotor response, it may be presumed that efferent impulses are conducted by the demonstrated sympathetic pathway. If this conclusion is valid, it may be possible to impede the constrictor impulses, in a manner similar to that used for relieving arterial spasm, by a sympathetic block. This would avoid the dangers which arise from a sudden cessation of the spasm when a transfusion is being given under pressure.

Salisbury, Wilts. A. MACHALE HARMAN.

TEMPORARY HOUSES AND THE FAMILY

IN his presidential address to the National Conference on Maternity and Child Welfare, held in London last week, Mr. Henry Willink, Minister of Health, said: "It has been suggested that a policy of building two-bedroomed bungalows is an attack on the birth-rate. The criticism is that since these bungalows are to have a life of ten years, then for ten years the families occupying them will be restricted to a two-bedroom size. With all respect I think this criticism is without foundation. The sole reason why the Government has decided upon a programme of temporary housing is that it is calculated that by using labour and materials which cannot be used for permanent housing, the number of new homes which can be built in the two vital and most difficult years after the defeat of Germany will be doubled. That is the sole reason for the temporary scheme. These houses are intended for young couples, in order to provide as many as possible of them with a separate home, as quickly as possible. Which offers better conditions for starting a family—a home of your own, however small—or lodgings or a home with mother-in-law? I have asked local authorities to make arrangements by which families which outgrow the bungalows may transfer to the permanent houses—of good standards and modern design—many of which will be going up simultaneously. Other young couples will take over the bungalows. May it not be that not one, but two or even three families may be started in a bungalow during its ten years' life?"

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE.—Brigadier George Macdonald, MD, DPH, has been appointed director of the Ross Institute of Tropical Hygiene.

Dr. Macdonald, who was born in 1903, is the son of the late J. S. Macdonald, FRS, emeritus professor of physiology in the University of Liverpool. He was educated at King Edward VII School, Sheffield, Liverpool Institute and the University of Liverpool, where he graduated MB in 1924. He took his DTM & H the same year and became a research assistant at Sierra Leone (1925–29). Afterwards he worked on the research staff of the Malaria Survey of India (1929–31), was medical officer to the Mariani Medical Association, Assam (1932–37) and the CEPA malaria control scheme, Ceylon (1938), and was appointed assistant director of the Ross Institute in 1939. Dr. Macdonald will take up his new appointment on his release from the Services.

Obituary

JAMES DUNDAS-GRANT

KBE, M D EDIN., F R C S, F R C S E

WITH his friendly Scots voice, his store of learning, and his interest in everything and everybody, Sir James Dundas-Grant was one of the personalities of London medicine. Dying at 90, he had run and enjoyed his race, and he leaves his fellow laryngologists many an ingenious device and innovation by which to remember him.

Press Portrait Bureau

His father, who was an Edinburgh advocate, sent him to school first at the Edinburgh Academy and then at Dunkirk. When he had taken his MA at Edinburgh he went to Wurzburg University in Bavaria before becoming a student at St. Bartholomew's and other London hospitals. After qualifying in 1876 he held a house appointment at the Edinburgh Royal Maternity Hospital and then settled in general practice in London, where he joined the honorary staff of the Poplar Hospital and the Shadwell Lying-in Home. After a few years, however, he decided to be an aurist and laryngologist. Taking his Edinburgh fellowship in 1884, he abandoned general practice two years later and became FRCS in 1890. At the Central London Throat and Ear Hospital he was successively registrar, pathologist, and surgeon, which he remained until 1913, when he retired to the consulting staff under the age limit. His other principal appointments were to the Brompton Hospital, the West End Hospital for Nervous Diseases, the Freemasons' Hospital, and the Sussex Throat and Ear Hospital. Laryngeal tuberculosis and asthma were two of the subjects to which he paid close attention; but these were in fact so numerous that over a long period there is hardly a volume of *The Lancet* that does not contain fruits from his fertile mind. As a notable amateur of music, whose recreation of choice was to conduct an orchestra he had gathered together, he was well suited to be hon. surgeon to the Royal Academy of Music and the Royal Society of Musicians. His other recreation, fencing, found its professional equivalent in long association with the Volunteers, especially as surgeon-major to the Post Office Rifles. When war broke out in 1914 Dundas-Grant was already over 60, and his war work was done in London. But it was none the less active, and in 1920, when he was appointed a senior consultant to the Ministry of Pensions, he was created KBE.

He belonged to a great number of medical bodies, both at home and abroad. In London he was president of the Hunterian Society, the British Laryngological Association, and the laryngological and otological sections of the Royal Society of Medicine. Whether in the chair or out of it he was a valuable member of any society, being always ready with some relevant suggestion or recollection. Abroad he was rightly regarded as one of the leaders of his specialty and held honorary membership of societies in the United States, France, Germany, Belgium, and Hungary. His knowledge of languages helped him to play a useful part in promoting international medical comradeship.

Outside medicine he was vice-president, and at one time manager, of the Royal Institution, and as a Freemason he attained the rank of grand officer.

"Perhaps the most vivid recollection one has of Sir James Dundas-Grant," writes a former associate, "was his great knowledge of the literature of ear, nose and throat disease. Nothing seemed to escape his notice and he was always anxious to explore and try new methods in diagnosis and treatment. He was immensely interested in instruments and acquired a large collection. He himself contributed to this department of the specialty, and his laryngeal forceps for the removal of simple tumours of the vocal cord (now largely out of date owing to the development of direct laryngoscopy), his aural probe and his cold air-douche for labyrinth testing were among his inventions. Although he had been in retirement for some time his colleagues will miss his occasional appearances among them and his desire to lend a helping hand in times of emergency. His love for the Central London Throat, Nose and Ear Hospital (now amalgamated with Golden Square Hospital to form the Royal National Throat, Nose and Ear Hospital) was shown by the way he volunteered to serve not only in the last war but even in this one. He always took a keen interest in all the institutions with which he had been connected, and his loss will be sincerely felt by all."

Lady Dundas-Grant, a daughter of Edward Frith, died in May, and Sir James on Nov. 13. They leave two sons. A memorial service was held in the chapel at Brompton Hospital last Monday.

ERNEST VICTOR SUCKLING

M B LOND., D P H, F R I C

Dr. Suckling made a life study of water purification. In the last war, before he became a doctor, he was given a commission in the RAMC and placed in charge of a mobile laboratory engaged in examining and purifying water-supplies for our troops in France and Belgium. He studied medicine at the London Hospital and qualified in 1924. After a period as assistant in the clinical laboratory at the London he became assistant, and later partner, to Dr. J. F. Beale and Dr. J. C. Thresh, who had established themselves among the leading consultants on the purity of water. The death of Dr. Thresh and the retirement of Dr. Beale threw the whole weight of the practice on Suckling's shoulders. In the Croydon typhoid epidemic of 1937 he was called in to advise the corporation, and the influence of his recommendations is seen today in the precautions taken at waterworks. During the blitz on London his laboratory was wrecked and many of his papers lost, but despite many other calls on his time this did not prevent his compiling a fifth edition of the standard work, *Examination of Water and Water-supplies*, by Thresh, Beale and Suckling, in which he rewrote many chapters and brought the whole up to date. As one of few men who have specialised in this subject his place will be hard to fill. He died on Nov. 16, aged 51.

DAVID MICHAEL WINSER

M C, B M OXFD, LIEUTENANT RAMC

David Winser has been killed in Holland at the age of 29. To few men have the gods given more talent, and in a short life he used his gifts to the full. Son of Commander Winser, RN, he was born at Plymouth. As a scholar at Winchester he won prizes in classics and the King's gold medal for English verse, he rowed in the school IV and shot in the VIII. While in Canada as a cadet he set up a record for the Dominion Rifle Association by scoring a possible at all ranges.

He went to Oxford in 1933 as a scholar of Corpus Christi College, and spent four supremely happy years there, making a multitude of friends and reading Greats. He rowed in the university boat in 1935, 1936 and 1937, shot for the university, and won the Newdigate prize with a poem called "Rain" in 1936, the year he stroked the boat. He wrote two novels while an undergraduate. After rowing at Bad Emms against various German crews in 1936, he made an adventurous journey single-handed in a canoe down the Danube to Bucharest, and made his way to Salonika. From there on the Ægean he crossed the open sea in his canoe to Athens, which he was determined to explore. Largely as a result of a description of this trip he was given a Commonwealth Fund fellowship at Yale. It was then he began his medicine, reading some physiology and becoming interested in child psychology; and on getting back to England he went to St. Thomas's

Hospital as a student. After a few months there he gained a scholarship at Charing Cross Hospital, and he did the rest of his training there. He had supplemented his scholarship in America by odd jobs, so it did not seem strange to work as a night porter in the West End for a few months of his time at hospital, and he got immense fun out of receiving tips from his old Oxford friends who failed to recognise him in his uniform.

On the outbreak of war Winser volunteered at once as a pilot in the RAF, but found to his great disappointment that he was partly colour-blind. So he returned to Charing Cross, qualifying in May, 1943. While there he inquired into the effects of blitz conditions on the incidence of perforated peptic ulcer in London hospitals, and with D. N. Stewart published his findings in *The Lancet* of Feb. 28, 1942. Later they, with Dr. C. C. Spicer, added a sequel (*Lancet*, 1944, i, 14) which Winser summarised as showing that on hearing the sirens middle-aged men with peptic ulcers should take a glass of milk and retire to bed. There too he published two novels under the name of John Stuart Airey. *Night Work* was an account of the reactions of patients, nurses, students and staff in a big hospital during a severe air-raid. His last book, *There was No Yesterday*, describing an outbreak of typhoid in a small Welsh town, had a vivid charm which brought it wide popularity. He also found time, in spite of the labour of hospital work in air-raid periods, to edit the *Charing Cross Gazette* and write a large proportion of the unsigned articles himself. He began during his house-appointments to contribute to *In England Now*, and continued to write for our columns intermittently until a few weeks ago.

While his friends and contemporaries were fighting at sea, in the air and in the Middle East, Winser as a medical student was continually chafing against what he felt to be a life too safe and settled. After six months as house-physician at his own hospital he joined the RAMC, and volunteered for service with a Royal Marines commando. To his great joy his beloved green berets formed part of the first assault troops on D-day. With them he landed in Normandy, and with them he worked throughout the desperate fighting on the British left flank in June and July. For his gallantry and devotion to duty he received the Military Cross in the field. Next came a short spell in hospital—"I tried to smoke out some bees with a phosphorus grenade," he wrote in his peripatetic column of Oct. 7, "and got too close." He spent a week's hilarious leave in Paris, rejoining his men just in time to take part in the landing on Walcheren Island. While looking after some wounded men he was killed instantly by machine-gun fire.

Winser had wit and charm and good looks above the average. He had an immense zest for living, and loved every minute of his full life. "He did the things the rest of us dream of doing." As scholar and author, poet, oarsman and doctor he had many successes, yet he was the most modest of men, and therein lay the secret of his charm. Writing recently as a peripatetic correspondent he said, "one likes offering things to men one has known for some time." Words could not express more modestly the devotion through which he came to die. "I believe," writes a friend, "that he would have few regrets."

JAMES CROCKET

MD EDIN., FRCPE, DPH

Dr. Crocket, who died at his home in Glasgow on Nov. 6, was a man of ability and character. He left school at 11 and was apprenticed to a business concern, becoming manager by the time he was 21. But he had already determined to be a medical missionary, and gave up his job to study at the universities of Glasgow and Edinburgh. He took his Edinburgh MB in 1909, afterwards going to China, to a mission station of the Church of Scotland at Ichang. His health, however, broke down and he had to come home. On his recovery he took his MD with honours, in 1913, and in the same year became medical superintendent to the Consumption Sanatoria of Scotland and the Colony of Mercy for Epileptics, Bridge of Weir—a post which he held for 15 years. His consultant services to the sanatorium, and to the Orphan Homes of Scotland, were retained until 1935. He became expert in tuberculosis, on which he contributed many papers to the medical press and he lectured on the subject at Glasgow University. Strong-minded, full of common sense, and a hard worker, he read widely and visited clinics abroad. His enthusiasm roused his patients to fight for the recovery of health, and his insight taught him their difficulties.

He died at Glasgow at the age of 66. His wife survives him with two sons and two daughters, three of whom follow their father in the medical profession.

ROBERT ERNEST KELLY

KT, CB, M D LPOOL, B SC VICT., F R C S

Sir Robert Kelly, emeritus professor of surgery in the University of Liverpool and consulting surgeon to the Liverpool Royal Infirmary, who died on Nov. 16, was one of the ablest all-round surgeons of his generation and an outstanding figure in Liverpool medicine.

Born in 1879, the son of Robert Kelly of Liverpool, he was educated at the Liverpool Institute and the University, where he soon showed the quality of his mind by winning scholarships and medals in pathology, surgery and forensic medicine. He took his B Sc at the age of 20, and graduated MB at 22. Four years later he took his MD and FRCS. After house-appointments and a registrarship at the Royal Infirmary, the 1914 war found him at the height of his surgical powers—imperturbable and with a technique combining beauty with speed. He went out to the Middle East and became consulting surgeon to the British forces in Salonika, with the rank of colonel. His services in that theatre were recognised by the award of the CB and medaille d'honneur des épidémies. After the war Kelly served on the Army Council's medical advisory board. He became a member of council of the Royal College of Surgeons in 1928, gave the Bradshaw lecture in 1938, and attained the dignity of vice-president of the College. He also represented his university on the General Medical Council. In the later years of his hospital and university work innumerable committee duties exacted far more of his time and energy than was fair to expect of a man already fully occupied with the calls of patients and doctors. His faithful attendance at these meetings, often tedious and not necessarily of first importance, was impressive.

He was an interesting speaker, with a gift for homely and illuminating illustration which brought him success both as a teacher and in the meetings of the Liverpool Medical Institution, of which he was twice president, an honour unique in its modern history. The same regard for the man and his work made him the natural choice for president at the annual meeting of the BMA in Liverpool in 1937. To his hospital colleagues, of his own age or of the younger generation, his enthusiasm and endless perseverance were an inspiration, and it was those who knew him best who spoke most highly of him. To the profession outside this inner circle it was his willingness at all times to place his skill and judgment at their service which made the greatest appeal. In university counsels he carried weight as a wise mentor and far-sighted guide. Though his profession was always his main interest he found time to be an ardent musician, a keen golfer, and something of a pioneer in colour photography. His nature was permeated by a kindliness which disarmed criticism; it harboured neither jealousy nor meanness of spirit. He was an optimist, but his optimism was tempered with sound common sense. His many qualities and services were recognised in 1939 when he was knighted.

"As a student," writes R. C., "I was one of Kelly's dressers, and later I became one of his colleagues. My main impressions of him are his generosity, his humility and his likeableness. Becoming one of the 'great ones' did not alter his natural geniality and courtesy. He gave you the feeling that he enjoyed talking with you, whether it was about some clinical problem, or whether it was the sharing of one of his interests or enthusiasms. Although he did not write much, and did not consciously try to gather a school of younger men around him, his

wide influence will long continue. To large numbers of men who passed through his hands as students and house-surgeons he was 'a father of his people.' They could not help but gather from him high standards of surgery, of craftsmanship, of thoughtfulness, of readiness to learn from experience."

He married Averill Edith Irma, daughter of Dr. J. Edlington M'Dougall, and she survives him with one daughter.

DUNCAN MacCALLUM BLAIR

M B GLASG., D SC LOND., F R F P S

Professor Blair died suddenly at his home in the University of Glasgow on Nov. 10 after a short illness from which he was believed to be making a good recovery. He was a comparatively young man but had won a high reputation in anatomy.

Born in 1896, he was a son of Dr. Alexander Blair of Ashington, Northumberland, and Crinan, Argyll. He was educated at Woodside School, Glasgow, and Glasgow University, and after serving as a surgeon sub-lieutenant RNVR in 1915–17 he graduated MB with honours in 1919. As soon as he was qualified he joined the staff of the anatomy department at Glasgow. At first he was inclined towards a surgical career, but under Professor Bryce's stimulation he became fascinated by anatomical research, and decided to make anatomy his life work. In 1922 he was appointed lecturer in regional anatomy at Glasgow; in 1927, at the early age of 31, he became professor of anatomy in King's College, London; and in 1935 he succeeded his former chief, T. H. Bryce in the regius chair at Glasgow. While in London he was mainly responsible for the planning of the new Hambleden department at King's College; for a time he was dean of the medical faculty at King's, and from 1931 to 1935 he was John Hunter lecturer in applied anatomy at St. George's.

Blair was a distinguished student and gained among other awards the Asher-Asher gold medal and the Symington prize of the Anatomical Society. To anatomical science he made important contributions, the chief of which concern the conducting system of the heart, the diaphragm, the knee-joint, the submandibular salivary gland and the nerve-supply of capillaries in striate muscle. To the teaching of anatomy he contributed the section on arthrology in Cunningham's textbook. He was an attractive lecturer and had not only the faculty of impromptu illustration, but also the gift of making most things seem simple. Moreover, his active interest in general medicine brought vitality to his lectures, which wherever possible illustrated the application of his subject to clinical work. Many students will long remember his teaching, and many will recall his kindliness and understanding as an examiner, not only in London and Glasgow, but at Aberdeen, St. Andrews, Sheffield and Edinburgh. He had a profound affection for his fellow men, and also a strong sense of public duty. He gave valuable service on the board of management of the Royal Maternity Hospital, the Western and Victoria Infirmaries, and the Royal Mental Hospital: he was a prominent layman in the Free Church of Scotland, chairman of the Glasgow Youth Organisations Council, and vice-president of the Inter-University Fellowship of Evangelical Unions; and in 1942 he organised a Glasgow University Naval Division and became its first commanding officer

HEALTH OF THE SUDAN.—The news value of the annual report of the Sudan Medical Service is reduced by the time-lag in its appearance, which in this instance is two years, but much of its information cannot be found anywhere else. The public health was on the whole satisfactory throughout 1942, despite adverse conditions due to the war; but relapsing fever became especially prevalent along the pilgrim routes in Darfar and Khordofan, particularly in the Gezira area of the Blue Nile Province. Heavy abnormal rains resulting in high Nile floods produced favourable conditions for mosquito breeding and consequently a high malarial incidence in Northern Sudan was encountered during the last half of the year. As in 1941 there are reports of that dangerous insect, *Anopheles gambiæ*, in the Wadi Halfa area in June. A considerable increase in bilharziasis—fortunately *B. hæmatobium* infection, which is relatively mild—was noted in 1942. A much more serious development is the evidence that *B. mansoni* is becoming endemic in the northern Gezira.

Notes and News

LCC MEDICINE IN 1943

Sir ALLEN DALEY, county medical officer of health and school medical officer, in an interim report[1] says that in 1943 the ebb of population from London almost ceased and a substantial return flow was evident. "There was little resort to shelters, but the blackout and consequent lack of adequate ventilation continued. The food situation, however, remained good." During the year 11 LCC hospitals were damaged by the enemy, and the total number of incidents in them, from the beginning of the war, rose to 476, with a total death-roll of 141 patients, 86 hospital staff and 12 ambulance staff.

The incidence of tuberculosis, as measured by notifications, is steadily rising, but the only epidemic disease that caused serious anxiety was influenza, which reached its highest mortality since 1937. The number of new cases of syphilis in women rose from 709 in 1940 to 1107 in 1943. Under Regulation 33B, 654 notifications of the source of venereal infection were received (34 men, 620 women) and in the case of 60 women named more than once the prescribed action was taken. Of the 37 who were found, 3 refused examination and were prosecuted.

Admissions to LCC hospitals continue to increase, and at times, owing to war damage, there was pressure on accommodation, especially for the chronic sick and for minor infectious diseases. At the end of the year patients in hospital numbered 53,222 (11,065 in general, 34,107 in mental, and 8050 in other special hospitals). Those in mental hospitals included 2975 EMS patients and 320 in a military mental unit. The population of mental hospitals and institutions for the mentally defective again declined slightly, but there was a disquieting increase in tuberculosis among them. Outpatient attendances numbered 1,251,701 compared with 1,105,659 in 1942. Confinements in the Council's general hospitals rose from 12,230 to 13,666.

The school medical service reports, compared with 1938, a lower incidence of verminous infestation, scabies, enlarged tonsils and adenoids, and otorrhœa. There was some evidence that the condition of children's teeth "is not quite so bad." An investigation by Lady Mellanby, D SC, showed that in a sample of school-children aged 5–6, the number "caries-free" (according to the standards used) was 22% compared with about 5% in 1929.

Sir Allen Daley's comparison of infant mortality in London and New York is annotated on p. 728.

ADVICE ON NURSING EDUCATION

A NEW advisory board has been set up by the Royal College of Nursing, under the chairmanship of Sir Cyril Norwood, to ensure that nursing education, including postgraduate training, benefits by advances in educational method. Miss E. E. P. MacManus, matron of Guy's, and Lord Horder are vice-chairmen, and the board includes educationists representing not only the medical and nursing professions but the schools and universities. Since the introduction of state registration in 1925, nursing education has developed in many directions. Post-certificate qualifications have been introduced for sister-tutors, midwives, health visitors, nurse administrators, ward sisters, and industrial nurses. Since July, 1939, the schools have begun to prepare girls for the first part of the preliminary nursing examination. The entry of girls for nursing training before the war was between 12,000 and 15,000 annually, and this number has now increased. Every year between 6000 and 7000 qualify for the state register. It is to be hoped that the advisory committee will contribute its share to reducing the high wastage figure.

ON GROWING UP

IN three talks published in separate booklets[2] Dr. Griffith discusses the physical and emotional changes accompanying adolescence in both sexes. He explains to his young audience that whereas sex-feelings are perfectly healthy and natural the sex-impulse, so potent a force for good or evil, has like a spirited horse to be properly managed and controlled. His style throughout is marked by sympathy, clarity, candour and absence of sentimentality.

1. Interim Report for 1943. From P. S. King and Staples Ltd., 14, Great Smith Street, London, SW1. Post free 7d.
2. Facts in Development; Emotional Development; and Towards Maturity. Edward F. Griffith, MRCS. (Lewis. Pp. 36, pp. 32, pp. 30. 1s. 6d. each.)

"DR. PHILLIGO"

Mr. C. E. Vulliamy has a painless way of presenting recent history. *Dr. Philligo*[1] follows *The Montagu-Puffins* and *The Polderoy Papers* with vigour and grace. This journal, fictitious like the others, covers the authentic events of the years 1887 to 1902. A man of character, the doctor is in many ways in advance of his time and can be counted on to appraise sardonically any form of superstition, cant or ordinary silliness. Poor brother Harry's mixed theology, Kewkett's collection of buttons, and the phantom nun seen by the sensitive lady who lived near Upwash, all get biting notice. His shrewd common-sense cannot, of course, deliver him entirely from the practices of his day. Poor Dolly, his ward, is sacrificed for some 30-odd years to contemporary estimates of the needs and purposes of women; and though he is scientifically aware of her growing frustration he often reinforces it ("Dolly begs for a bicycle. Dear Dolly must wait for a while"), and resents her late erratic escape very much indeed. On political issues he is mainly just, though naturally with some imperialistic bias. His medicine is up to date; he read his *Lancet* regularly, and quotes some of our stranger passages. Informative as he is about the events of the day, his most memorable records are domestic: Joey, the monkey lamp-stand, his niece Sophia's images of saints (she ran away with a bohemian gentleman and was not forgiven), and the incursions of old Mr. Polderoy into his neighbour's journal are the sort of things that get into a reader's mind and hang about for years.

University of Cambridge

On Nov. 24 the degree of MB was conferred on A. B. MacGregor, G. W. Harris and I. R. S. Gordon.

Society of Apothecaries of London

Brigadier L. E. H. Whitby will deliver a lecture, on blood-transfusion in peace and war, at Apothecaries' Hall, Blackfriars Lane, Queen Victoria Street, London, EC4, on Tuesday, Dec. 19, at 2.30 PM.

Medical Society of London

On Monday, Dec. 11, at 5 PM, at 11, Chandos Street, W1, Dr. C. P. Pinckney will speak on vomiting in infancy, Mr. N. M. Matheson on diseases of the female urinary bladder, and Dr. C. G. Barnes on hypoglycæmia following gastrectomy.

Royal Society of Medicine

There will be a meeting of fellows at 4 PM on Tuesday, Dec. 5. On the same day, at 4.30 PM, at the section of orthopædics, Captain George Blum will speak on the use of plastics in bone surgery and Mr. Rainsford Mowlem on cancellous chip grafts for the restoration of bone defect. On Dec. 6, at 2.30 PM, the section of history of medicine is holding a joint meeting with the British Archæological Association, when Mr. Wilfrid Bonser, PH D, will read a paper on epidemics during the Anglo-Saxon period.

Sampling Foodstuffs

The Society of Public Analysts is to hold a joint meeting with the food group of the Society of Chemical Industry at 2.30 PM, on Wednesday, Dec. 6, at the Chemical Society's rooms, Burlington House, Piccadilly, London, W1, when J. King, FRIC, C. A. Mawson, PH D, and E. M. Widdowson, PH D, will speak on methods of sampling foodstuffs for analysis.

Anglo-Soviet Medical Council

The annual general meeting of the council will be held on Friday, Dec. 8, at 4.30 PM, at 1, Wimpole Street, London, W1. It is hoped that Professor Priorov, the Russian orthopædic surgeon, who, with Professor Kotov, has lately arrived in this country, will speak at the meeting.

Dr. ARTHUR DAVIES, director of the Devonport pathological laboratory, is to act as consultant to the Ministry of War Transport, on questions affecting seamen's health, while Dr. M. T. Morgan is seconded to UNRRA.

CORRIGENDUM: *Myxœdema and Psychosis.*—Prof. H. Zondek points out that a statement in his paper in *The Lancet* of Sept. 30 may be misinterpreted. It runs "In cases of melancholia I found during the melancholic phases more or less complete retention of sodium chloride (Zondek 1935)." It would be more correct to say "In a number of cases of melancholia (though not in all) I found," &c.

1. London: Michael Joseph. Pp. 248. 12*s.* 6*d.*

Infectious Disease in England and Wales

WEEK ENDED NOV. 18

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 2335; whooping-cough, 1410; diphtheria, 619; paratyphoid, 18; typhoid, 7; measles (excluding rubella), 6001; pneumonia (primary or influenzal), 626; puerperal pyrexia, 127; cerebrospinal fever, 45; poliomyelitis, 12; polio-encephalitis, 2; encephalitis lethargica, 2; dysentery, 217; ophthalmia neonatorum, 62. No case of cholera, plague or typhus fever was notified during the week.

Deaths.—In 126 great towns there were no deaths from enteric fever, 5 (0) from measles, 2 (0) from scarlet fever, 3 (1) from whooping-cough, 15 (0) from diphtheria, 55 (3) from diarrhœa and enteritis under two years, and 33 (1) from influenza. The figures in parentheses are those for London itself.

Liverpool reported 6 deaths from influenza.

The number of stillbirths notified during the week was 228 (corresponding to a rate of 34 per thousand total births), including 18 in London.

Appointments

CRAIG, A. C., MB EDIN.: acting medical superintendent of the Royal National Sanatorium, Bournemouth.
GROSS, WILHELM, MD VIENNA: RSO, Scarborough Hospital.
LONG, MARY, MRCS, DRCOG: temp. asst. MOH for East Ham.
ROTHWELL, T. W., MB MANC.: examining factory surgeon for Coniston, Lancs.
SUTHERLAND, D. S. MD GLASG.: temp. medical superintendent, City Hospital for Infectious Diseases, Newcastle-on-Tyne.
TEMPLE, BARBARA, MB LOND., DMR: Harker Smith registrar in the department of radiotherapy, University College Hospital.
WATTS, W. P. T., MS DURH., FRCSE: medical referee for the county-court districts of Consett, Gateshead, Hexham, Morpeth, Blyth, Newcastle-on-Tyne, North Shields and South Shields (circuit No. 1).

Births, Marriages and Deaths

BIRTHS

BIRKETT.—On Nov. 21, at St. Albans, the wife of Dr. N. L. Birkett, RAFVR—a daughter.
BUCKLAND.—On Nov. 18, at Woking, the wife of Major F. E. Buckland, RAMC—a son.
KENNEDY.—On Nov. 20, in Edinburgh, the wife of Surgeon Lieutenant Hugh Kennedy, RNVR—a son.
MACLURE.—On Nov. 16, at Freetown, Sierra Leone, the wife of Dr. Hugh Maclure, Colonial Medical Service—a son.
NICHOLSON.—On June 20, at Hitchin, the wife of Squadron-Leader B. Clive Nicholson, MD, RAFVR—a son.
PAYNE.—On Nov. 20, at Windsor, the wife of Mr. R. Vaughan Payne, M CHIR, FRCS—a son.
SEYMOUR-PRICE.—On Nov. 23, in London, the wife of Major D. B. Seymour-Price, RAMC—a son.
TIBBITS.—On Nov. 22, the wife of Dr. Stephen Tibbits, of Warwick—a son.
WYNN-WILLIAMS.—On Nov. 24, in London, the wife of Mr. George Wynn-Williams, FRCS—a daughter.

MARRIAGES

BORG—CORBETT-THOMPSON.—On Nov. 16, in London, Charles Borg, captain RAMC, to Sheila Mary Corbett-Thompson.
PRIOR—BARTHOLOMEW.—On Nov. 10, at Epsom, Allen Percival Prior, major RAMC, to Dorothy Mary Bartholomew.
WILSON—PRICE.—On Nov. 21, at Rhyl, Kenneth Lennox Wilson, surgeon lieutenant RNVR, to Christine Doria Price.

DEATHS

ANDERSON.—On Nov. 19, John Binnie McKenzie Anderson, MB GLASG., FRFPS, of Lynedoch Street, Glasgow.
ARNOTT.—On Nov. 16, at Southall, Middlesex, Maurice James Arnott, MB DURH.
ARKWRIGHT.—On Nov. 22, Sir Joseph Arkwright, MD CAMB., FRCP, FRS, aged 80.
BRIGGS.—On Nov. 22, at Hoylake, Henry Briggs, MB EDIN., LL D LPOOL, FRCS, aged 88.
MURRAY.—On Nov. 19, at Worksop, Charles Graham Murray, MD EDIN., aged 75.
ORR-EWING.—On Nov. 17, at Oxford, Jean Orr-Ewing, BM OXFD.
SHERSTON-BAKER.—On Nov. 18, at Bournemouth, Sir Dodington Sherston-Baker, BT., MRCS, lieut.-colonel IMS retd.

Dr. A. G. SANDERS, who is to spend a year in China as medical adviser to the British Council, has reached Chungking.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

THE VOLUNTARY HOSPITAL WITH AN UNDERGRADUATE SCHOOL *

T. B. LAYTON, MS LOND., FRCS

SURGEON IN CHARGE OF THE THROAT AND EAR DEPT, GUY'S HOSPITAL; OTOLOGIST TO THE FEVER HOSPITALS OF THE LCC

THIS is a time when we must all think not only of the daily task before us but also of how we may fit that task into the general ordering of things and of how we may bear a part in that ordering.

The white-paper on a National Health Service is nothing new: it is a spring, or rather a leap, in a process that has been going on for 35 years. For the beginning of it all we have to go back to May 4, 1911, when Mr. Lloyd George asked leave of the House of Commons to introduce a bill to provide for insurance, among other things, for the prevention and cure of sickness. At the end of his speech he made it clear that the scheme then to be introduced was not a complete remedy for sickness. It was a foundation upon which a complete superstructure could be built later. You are to build the superstructure.

I am appalled at the want of appreciation of the meaning of the impending change shown by the majority of my colleagues in the consulting and specialist branch of the profession. They seem to think that it arose with the publication of the white-paper. It did not. Not even with the Beveridge report. It arose on May 4, 1911.

And yet they are all—all honourable men. It seems a serious matter for the future of our social life that a large number of men in any profession, trade or occupation—and those supposed to be the leaders and reputedly the ablest—should have gone quietly doing their daily task with their eyes so shut to everything around them that they were totally ignorant of changes impending that would alter entirely the lives of all of them.

Unfortunately, on the publication of the Beveridge report, certain well-meaning persons plumped for the whole medical profession being put on a salaried basis and paid by the State. This had a most unhappy effect. It centred discussion on one single point, and that relatively a small one, instead of stimulating a wide outlook upon the whole subject with its thousand facets. It threw into extreme opposition members of the profession, constitutionally conservative, who had had no notion of the possibility of a change that had, ever since the last war, been looked forward to by all working under the NHI Acts. This had a further reaction. It gave support to the criticisms that are in existence today against the medical profession.

CRITICISM OF THE PROFESSION

You are entering on or ending your studies during a revolution in the conduct of medical practice. You are no more going to conduct your practice in the way that your fathers did before you, than you are going to practise medicine in the way they were taught, when the stethoscope was the only appliance the doctor used, and the blood-pressure apparatus had just been introduced. In this new practice you have to raise again the medical profession to the position it held of old. It would be wrong to withhold from you that there are grave criticisms against our profession today. "This that I speak here to our own faces is but what others do utter abroad behind our backs. I am far from reflecting on any." And, if I may speak my conscience without reflecting upon any, it is idle to pretend that we of the medical profession have not fallen in the estimation of the people during recent years. It is idle to pretend that the nation has not put down the doctor from the seat on which it had set him up.

The criticism is of two kinds. The first is common to the whole profession except those who serve upon a salaried basis. It is that we have "clutching fingers." The second is special to the consultant and specialist branch, again excepting that small number that are on whole-time salaries. It is depicted in Vicky's cartoon in the *News Chronicle* of May 18 last. This represents us defending Harley Street with our money bags and an old gun called "the human element." We are clothed in the mental garb of the Tudors or before, and our apparent enemy is the youth of England who modestly comes with a demand for "health for all" to those whom he has been led to believe can best give it him.

PAYMENT OF HOSPITAL STAFFS

Except for a few part-time salaried posts and a limited amount of work on a sessional basis, the staffs of voluntary hospitals, who represent almost the whole of the consultant and specialist branch of the profession, have been paid on an over-the-counter basis for work done; but this has had a special factor. We were entitled to charge—and it was thought ethical for us so to do—some 50% over what would have otherwise been a proper charge because for a third of our time we worked out of charity for nothing. This was the last relic of the voluntary hospital system of the last century. In the meantime ideals and ideas have changed. Charity in that form is no longer a guide to conduct, whether you take as your mentor the late Archbishop of Canterbury or whether you follow Mazzini when he wrote in 1858 "*Charity* is not the watchword of the future faith. The watchword of the future faith is *association*, fraternal coöperation towards a common aim." To give is still better than to receive; but that giving no longer means working for nothing for someone who resents your doing so. It means putting in more skill, more kindness, and more conscience than you take out in cash.

There is also the problem of responsibility for money. When, under the old system, anyone pays me a fee, he does so direct, and he alone is responsible for that money. When one of you succeeds to my place, your patients will still pay you, but they will do so by weekly payment that will go through other persons' hands before it reaches you. And those persons will be responsible for your patients' money. One may, within reason, do what one likes with one's own; but one must be meticulously careful with other persons' money; so it is quite certain that the guardians of the people's purses will not pay you 50% more than they otherwise should because you voluntarily work for nothing for a third of your time. Therefore the consultant and specialist branch of the profession will not be able to earn a living unless they are paid for their work all the time.

From this it follows that each hospital must pay the members of its staff, adequately but not extravagantly, if it wishes to continue to do worthy work. Let us think this out. Some private practice will remain for a time from elderly people. This will keep going the limited number of consultants around the age of 60; but the vast majority of the population will turn with relief to the new method of paying for that doctoring which is outside the province of the general practitioner, the cost of which has been lying like a load upon the minds of most between the wars.

Therefore there will be no "private" practice for those who come back from the war to start again, or for those who come back to start afresh, or for you that go out into the world to make your first start. Whether you are paid upon a capitation basis or upon a sessional one or by a salary, it will not be in the old over-the-counter business which is called "private" practice.

PUBLIC AND PRIVATE PAYMENT INCOMPATIBLE

The white-paper does not seem to be clear as to whether a consultant and specialist doing work under the National Health Service should also do "private" practice. I am quite certain he should not. We do not want this branch of the profession to fall into the bog of "private" and "panel" practice from which we are striving to free the general practitioner. This is a sad story, the more so that it was no-one's fault; but it needs to be told to make things clear.

The essential difference in the doctor-patient relationship is whether the patient, within available limits, chooses the doctor himself, or whether the doctor is allotted to him. The distinction between "private" and "panel" patients has nothing to do with this principle of free choice of doctor; it relates merely to the method whereby the doctor is paid. On the inception of NHI the word "private" was given to those

* Address delivered on becoming first president of the Guy's Hospital Students' Union.

that paid "ad hoc," the word "panel" to those that paid on a contractual basis—through the Government to their approved society, back to the Government, thence to the local insurance committee, and so to the doctor.

As only the foundations of a health service have been built, doctors have been compelled to practise under both methods of finance; otherwise the wives and children of insured persons could have had no attention. This has given rise to many difficulties and sources of complaint. In the first place clauses have had to be inserted in the terms of service, and the medical benefit regulations to indicate where the "panel" service ended and the "private" practice began. Then innumerable discussions have taken place to decide whether a particular payment of a shilling or so came within them. Not infrequently good doctors, hopeless at rules and regulations, have inadvertently made mistakes. But even these leave a nasty taste in the mouth, which is accentuated by inquiries about the activities of a group of practitioners who may be called the Dodsons and Foggs of our profession. "Sharp practice theirs—capital men of business." They know the regulations from cover to cover, at least so far as these touch their own pockets. They never let a single sixpence slip, even though it may involve a hardship to the patient. Perfectly legal, but no giving beyond what they receive, and affording a basis for the accusation made against our profession today that we have "clutching fingers."

Can the doctor take a fee from a panel patient who is not on his list? On most occasions he cannot. If the patient meets with an accident away from home he is entitled to service from a near-by practitioner; if he is taken ill as an emergency and cannot at once get hold of his own doctor, or if he is on holiday or away from home on business he can claim attention from any doctor on the panel. Such doctors can take nothing; they get a fee out of the common fund. But within the area of his own insurance committee a doctor can charge a patient on the panel of another doctor for ordinary routine work. This is totally contrary to all the rules of medical etiquette that have been slowly built up for the benefit of the patient so that he should not go running from one doctor to another getting a different treatment from each. The patient can sign on the panel of a Dr. A. and then go round the corner consistently or occasionally and be treated as a "private" case by Dr. B.

Now there are certain people who will always believe that they obtain a better article by paying more for it in an elaborate shop than by buying it in a simpler establishment for a smaller sum. And there are always persons who will play up to this. Thereby there has arisen the idea that to be treated as a "private" patient gives the sick person something better than what he gets on the "panel." Everyone who has to deal with the NHI has steadily set his face against this and is determined that it shall stop. The only way in which it can be stopped is that any doctor that enters the National Health Service shall be excluded from "private" practice. This will then be reserved for those who take no service under it. They will not be many, and with the passing of those now nearing retirement they will have to show cause why they should take more money than their fellows who will form the great majority of the profession. We do not want in our medical schools men that will look forward to success based on show or pretence—on luxurious consulting-rooms, on new untested remedies, or on old remedies expensively sold. We do not want the type of teachers that will encourage such men, and whom they will encourage.

PAYMENT BY HOSPITALS

Payments to the staff must be absolute and not conditional upon the hospital taking a certain sum of money from a particular service or managing to collect enough from all sources. It is better to give than to receive, but you cannot be a giver if at any moment the bottom may tumble out of a third of your income. Payments to the staff should be on the same basis as any other—to the rate-collector, the baker, or the porter. It is only thus that the voluntary hospital can remain independent. If any one group of its personnel depend for their living upon any particular source of income the whole institution becomes dependent on that source and loses at once its independence.

I am one who believes in competition of the spirit rather than for cash. I believe that in any branch of mental activity two groups of persons or institutions working side by side towards the same end in friendly rivalry will best give that competition of the spirit. And that is why I want the voluntary hospitals to remain as independent units. But this independence must be independence not only of control but also of want and of indecent methods of collecting cash. I have often wondered why the voluntary hospitals and we who serve them have so fallen from the high estate in which the nation had once set us. I believe it is because we have lost our independence and have become dependent upon want. It is better to give than to receive, but it is impossible to be a giver when your belt won't meet. Your hands are tied. The key to the solution is to be found in the teaching of that great theoretical economist Wilkins Micawber, who observed that if a man had £20 a year for his income, and spent £19 19*s.* 6*d.* he would be happy, but that if he spent £20 1*s.* 0*d.* he would be miserable. It is the same for an institution as for an individual, but it is more than happiness. It is the cause, it is the cause. If the sixpence be again you you cannot be a giver and your code begins to fall. You cannot run high ideals on a falling code. And so the blossom of the young specialist is blighted, the leaf of the aged institution is withered.

Fortunately we are at a time when all that struggle to get the Micawber sixpence on the right side should be at an end. As I read the white-paper the Government will hand over to the voluntary hospitals sums that they have collected from the people and which can be represented as contributions paid by potential patients. Also the Goodenough report has recommended special grants to those hospitals which take part in medical education. Then there are the service payments to which we shall be entitled for work done. Today for the first time for 60 years voluntary hospitals should be able to make an estimate of income and compile a balanced budget. They should therefore be able to cut their coat according to their cloth, and know what they can do and what they should leave alone. People will not subscribe to things for which the Government has become responsible or for which they think it should be responsible; but they still want to give. I believe we shall always be able to collect money for capital expenditure both great and small. Balance the budget for current expenditure and we shall be independent.

THREE TYPES OF HOSPITAL

Having got an independent hospital with an independent staff how should we use it in the combined interest of the sick and of education? Here I must call your attention to a change in our hospital world entirely outside medicine. Domestic life is having as great an influence on this as are any of the advances in medicine. No-one today can be nursed at home for more than three days. If the illness is one that will lay them up longer they must go into hospital. Doctors can no longer say "This patient needs admission to hospital. this does not." The patient says "I am ill, I beg you to admit me." It is for this change in domestic life that I have suggested[1] the classification of hospitals into those of the first, of the second, and of the third instance. Under this classification those of the first instance are for persons that are ill, most of whom recover quickly. Those of the second admit patients who need investigation or an operation other than one of urgency. Those of the third instance should deal with matters that demand very special knowledge and where a team of many professions and occupations is needed. where each person of that team should already have experience but join it on probation and stay for a material length of time till it is found whether he or she is fit for the work.

With which of these cases should a hospital with an undergraduate medical school deal? Nearly all our work at Guy's for many years has been that of a hospital of the second instance. Patients requiring investigation and operation must ever be an important part of our teaching material. But for the great majority of the

1. An Industry of Health. London. 1944. Pp. 93, 94.

students that go through our schools work of this nature will not be the occupation of their lives. It will be their function to sort out those patients needing special investigation, to care for them when they have had it, to continue in their homes the treatment that has been started. Their life's work will be with those that come into the hospital of the first instance. They must have some education in these primary cases, and it is here that the newly qualified doctor is wanting to-day. Either we must take such cases into those hospitals that have medical schools attached, or else we must send our students out into the ones that take them. I believe we should do both.

We should not, I think, attempt to be a hospital of the third instance. The whole of our organisation is unfitted for it. It is wrong that an unqualified student should assist in an excision of the lung; he may need to see one such operation in his career, and if he has had the patient under his care he should do so; but he can do that as well 20 miles away as in the mother hospital. If the surgeon can travel that distance, why not the student? So also it is wrong that a probationer, allotted to the theatres for six weeks, should take any part in that teamwork; she will be fit for the junior post in the team when she has had two years' experience as a staff nurse.

Outside my classification there come many institutions of special types, the only one warranting the title of hospital being that for acute fevers. I do not think any of them should form a part of a parent hospital with medical school attached. We should concentrate upon being a hospital of the first and second instance and no more.

LONDON

Finally I want to say something about the special position of the hospitals and medical schools of London.

London has a triple function. It is the capital of the Empire, and it is the metropolis of England and Wales; but it is also the home town of the largest concentration of human beings the world has ever known. At present the municipal hospitals are concerned only with the third function, but the voluntary hospitals with all three. In so far as we are the capital of the Empire we have to send out doctors, and nurses, and other trained personnel in the industry of health, to all those outposts that are not yet self-supporting; and from all the Empire we need to attract people to tell us what they are doing and to see whether they can take anything back from us. It is as the metropolis of this country that we specially function as the hospital of the second instance and this has become closer with the home counties as the result of the diaspora that has occurred during the war.

There is, however, I fear, a danger that this closer union has held up the needed liaison with the other hospital system of London. We cannot remain in London without caring for London's people. We cannot care for London's people without working in close touch with those upon whom a statutory responsibility has been placed for the same purpose. Perhaps the most difficult factor in the whole hospital problem in London is the emotional relationship between the municipal and voluntary hospitals therein. I will not try to name it or to detail causes, but it is not one that leads to harmonious working. I who have worked equally in both for a quarter of a century am acutely sensitive to this. I see what is good in each; I see things in both that should be amended and where the one might learn from the other; but whenever I try to draw them closer, either among those with influence or among those in lesser positions, I feel a stiffening and a withdrawal. I believe that a very little goodwill among a limited number of persons should be able to break this down and enable the two systems to work in double harness in the interests of the people.

I speak feelingly as a Londoner, back to the Great Fire. We are an easy-going race, willing to let outsiders come in and rule us. We absorb them and make them like ourselves. But every now and then we rise in our enthusiasm and things happen. In the 17th century the trained bands marched to Bristol. In the 18th the cry was "Wilkes and Liberty."

And now I feel another stirring all about me prefigured by the London Plan with which the Hospital Plan of London must be incorporated. It will be a matter of grave responsibility for all to build this up for the benefit of the people without fear or favour. It is you who have to do this, with those now away; and in this I feel that age, not yet crabbed, may be a better guide to youth than those nearer to you with immediate cares that may be magnified by the changes that are to come about.

I will end with words amended from those of the philosopher I have already quoted. There have been periods in England's life when she needed to pause until certain expected events should turn up—when she has had to fall back before making a spring. The present is one of those momentous stages in the life of this nation. You find her, fallen back, for a spring; and I have every reason to believe that a vigorous leap will shortly be the result.

ARTERIOGRAPHY OF PERIPHERAL VESSELS

TECHNICAL DETAILS

J. R. LEARMONTH, CHM GLASG., FRCSE
PROFESSOR OF SURGERY, UNIVERSITY OF EDINBURGH

THE purposes of outlining the peripheral arterial tree by an opaque medium include the demonstration (1) of its anatomical arrangement, whether normal or abnormal; (2) of the presence of local irregularities in calibre, in arteriosclerosis or Buerger's disease; (3) of thrombotic blockage of main trunks in obliterative vascular disease; (4) of the extent of collateral circulation; (5) of the site and extent of arterial aneurysms; and (6) of the site of arteriovenous fistulæ. At present its use is attracting attention for the last three of these purposes, and it is to them that this note is directed.

Arteriography should not be used as a routine procedure in the investigation of the complications of arterial wounds. Clinical examination often gives the information required; and when final details remain undetermined, usually they are to be obtained only by careful dissection in a field so arranged that it is possible to carry out the dissection bloodlessly, and yet to identify the site of the lesion by permitting blood temporarily to flow through the suspected artery, by the release either of a pneumatic cuff or of a temporary ligature.

The experience of a vascular centre has emphasised the importance of the unhurried display of the structures in the vicinity of an arterial lesion, in order to conserve collateral vessels, and to avoid injury to adjacent structures (e.g., nerves) the direction and plane of which have often been distorted by the lesion, even to the extent of their inclusion in the wall of an aneurysmal sac. There is nothing new in this attitude—it is the teaching of Makins (1919), and familiarity with his monograph will in most cases make an arteriogram unnecessary—but it may be useful in determining the surgical approach in lesions involving the profunda femoris, the popliteal artery, and the beginning of the anterior and posterior tibial arteries. Thus the opaque medium is introduced into the common or superficial femoral artery, according to the clinical indications.

TECHNIQUE

Anæsthesia.—Spinal anæsthesia has been used in order that the vessels shall be freed from vasoconstrictor control, 120 mg. procaine being given ½ hour before operation.

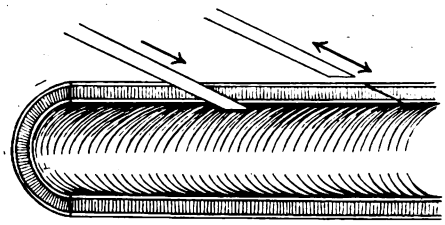
Position of patient.—When the lesion involves the femoral or profunda artery, the patient lies with his leg straight and rotated slightly laterally. When the popliteal is involved, the thigh is slightly flexed, abducted and everted, and the knee bent 20°, its lateral aspect being supported on the table by a sandpillow.

Radiography.—The apparatus used has been a mobile ward set (Watson), 90 kV, 30 mA, fitted with a Machlett grid tube; focus-film distance 30 in.; 12 × 10 film; double intensifying screens without grid. With 60 kV and 50 mA for femoral and 55 kV and 50 mA for popliteal arteriography, the exposure is 0·3–0·4 sec., according to the thickness of the limb.

Exposure of artery.—It is easiest to make the injection when the incision has been made in the line of the vessel, either in Scarpa's triangle (for femoral-profunda) or in Hunter's canal (for popliteal). The artery is disturbed as little as possible, and is *not* raised from its

sheath on a tape. Minimal disturbance helps to avoid the local spasm which appears occasionally even under spinal analgesia.

Arteriogram.—Diodone ('Per-Abrodil,' Bayer) 50% has been used, warmed to body temperature. The syringe is a 10 c.cm. Record with an eccentric nozzle, carrying a no. 19 needle. Before the injection is made, all instruments and towel clips are removed so they will not appear on the plate. The tube is brought into correct position. The needle is then passed into the artery, bevel downwards and parallel to its wall, to prevent leakage of blood during its passage and provide a long valvular tunnel which will be rapidly closed by intra-arterial pressure when the needle is withdrawn (see figure). When blood appears in, or is aspirated into, the syringe, the injection is rapidly completed (less than 5 sec.), the syringe being firmly steadied with the left forefinger and thumb to prevent displacement of the needle's point, and the exposure is made when the injection is almost complete. The needle is then withdrawn, and a moist gauze swab pressed on the vessel at the site of puncture. Pressure is maintained until the film has been developed; by this time oozing from the puncture has stopped.



Method of inserting needle so as to prevent leakage of blood and leave valvular track on its withdrawal.

Closure.—If the plate gives the required information, the small wound is closed by silkworm sutures. If the lesion has not been demonstrated, a film may be placed more distally and the arteriogram repeated.

Complications.—Hæmatoma has not been encountered. On one occasion, as a consequence of inaccurate placement of the needle, the medium was injected into the soft tissues, where its position was verified by X ray; there was no untoward reaction and all radiographic trace of the diodone had disappeared in 24 hours. On one occasion the artery went into spasm at the site of puncture, but the injection was made successfully. According to Wagner (1944), a clot may form in the artery at the site of puncture, but this has not been suspected clinically in our series. Systemic reactions have also been recorded by Wagner, such as "flushing of the skin with a feeling of warmth, erythematous eruptions, nausea, vomiting, cyanosis, respiratory distress and fall in blood-pressure"; none such has occurred in this centre.

Convalescence.—If there is no other contra-indication, the patient may be out of bed in 48 hours.

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CANCELLOUS CHIP BONE-GRAFTS
REPORT ON 75 CASES

RAINSFORD MOWLEM, MB NZ, FRCS
SURGEON IN CHARGE, PLASTIC DEPT., MIDDLESEX HOSPITAL, AND HILL END EMS HOSPITAL, ST. ALBANS

EARLY in 1941 it became necessary to make good the loss of part of the frontal bone in a child aged 11 years. At that time a considerable experience in the use of massive cancellous grafts from the ilium pointed to the probability that this type of bone survives from the beginning. The two most important facts underlying this belief are first, the rapidity with which structural adaptation occurs, so that a new cortex is well marked on radiographic investigation in 8–12 weeks, and second, the very high tolerance to infection which these grafts possess as compared with that of the more usual compact graft from the tibia. Both of these characteristics appear to argue an early vascularisation of the graft, followed by cellular activity of the transplant. At the same time, it had been found that in children, even if the difficulty of obtaining sufficient iliac bone before fusion of the secondary epiphysis is not insurmountable, that part of the graft which had been nearest to the epiphyseal line tends to be absorbed. This is thought to be due to an insufficient blood-supply being immediately available to ensure the survival of this recently laid down bone, which presumably has greater metabolic requirements than its more adult counterpart.

On biological grounds, therefore, it was thought that fragmentation of the graft might be expected to provide a much greater surface area through which the transplanted bone cells would become accessible, first to serum and secondly to the ingress of newly formed capillaries, and that the chances of their survival would thereby be enhanced. Once survival is ensured, fusion of the fragments can be expected to be rapid.

Accordingly, a section of cancellous tissue from the ilium was cut into fragments and inserted through a small incision in the frontal region to fill the cranial defect. The bone chips were applied so that they overlapped both the exposed bony margins of the defect and each other. No endeavour was made to produce a continuous surface; rather were spaces of some millimetres left between adjoining fragments to permit the permeation of blood, though care was taken to create a smooth general contour. The chips were arranged in at least two layers, and defects between those in the outer layer did not correspond with gaps between those beneath them. The wound was closed without drainage, and in 10 days the whole mass was clinically sound and firmly united with the cranium. Over a period of months no absorption was seen; in fact, the condition now is indistinguishable from that seen at the time of discharge over 3 years ago.

This experience appeared to confirm expectations, and completely altered one's outlook on the whole technique and rationale of bone-grafting, so from that time the principle of fragmentation of cancellous bone has been applied in other areas. Seventy-five consecutive cases are here reported.

SOURCE OF BONE

In all cases the graft is derived from the ilium. This bone is chosen for its relatively high cellular content and for its porosity. The fragmentation is designed to increase the surface area of the transplant and thus to create optimal conditions for survival of the greatest number of bone cells. The advantage of increased simplicity of operative technique, although important, is secondary.

The ilium is exposed by an incision about 3 in. long, and its crest and outer plate are freed from their muscular and aponeurotic attachments. Occasionally this process is continued on to the inner aspect. A block of bone of sufficient bulk is then removed with an osteotome, and its cortical covering is discarded. The remaining cancellous mass is divided into chips of various sizes, usually about $1 \times 0{\cdot}5 \times 0{\cdot}2$ cm. Irregular shapes are often useful, but it is undesirable to make the chips too small or excessive condensation is likely to occur.

GRAFTS FOR THE RESTORATION OF CONTOUR

Cancellous chips have been used in thirty-four cases for the restoration of contour in the frontal, supra-orbital, malar, zygomatic and mental regions. Cranial defects are included in this group, partly because they are often associated with loss of prominence of the eyebrow region, and partly because their margins are static, so that no problems of fixation arise.

The basic technique is always much the same. A small skin incision is deepened to the appropriate level, and undermining is carried out to expose the area to be grafted. In cranial defects the margins of the gap are denuded of periosteum with a raspatory to provide a strip of bare bone to which the chips may adhere, but no other shaping or freshening is carried out. In losses of, say, the superior maxilla, a complete bony foundation is probably not available, and in these cases the exposure of two or three bony areas to act as fixation points is sufficient because the graft depends for its survival on blood-supply and not on contact with existing bone. The correct contour is obtained by simply building up chips to the requisite levels. Fixation by pressure bandage for four to six days completes the process.

There have been no untoward sequelæ, and consequently the appearance of these grafts after varying intervals has not been seen. In one case, however, a

scar excision in the neighbourhood of a grafted frontal defect, which included the supraorbital ridge and an area of about 6 sq. in. above it, enabled the bone to be exposed after six months. The line of fusion between the original and the grafted area was not distinguishable, though the now smooth surface of the graft was a little more porous than the normal frontal bone.

If the outer surface becomes so smooth merely by the tension of the scalp over it, there appears to be little reason why the deep aspect, subjected as it must be to transmitted intracranial pressure, should not be equally regular. One would not therefore expect dural irritation, and the lack of operative interference with the epidural scar, either in the centre or at the margins of the defect, makes irritation still less likely.

In all these cases operative technique has been much simplified, in that wide exposures, bevelling of cranial margins, accurate templates, tedious shaping of one-piece grafts and difficult fixations have been eliminated. In their place is a restricted wound of access, and contour is regained by merely adding or subtracting the requisite number of bone chips.

GRAFTS FOR RESTORATION OF CONTINUITY

Thirty-six mandibular defects have been treated in which the loss has varied from ¼ in. to half the jaw, the average being 2 in. The bone ends are immobilised by dental cap splints or external bone pins, or both. Eburnated bone and scarred soft tissue is widely removed. The first step in the insertion of the graft consists in placing a "distance piece" of cancellous bone, about $\frac{1}{16}$ in. thick and ½ in. wide, into position on the deep aspect of the bone ends (fig. 1). This has a twofold function — it prevents soft tissues from bulging out through the mandibular defect, and it protects the chips from movement transmitted from the floor of the mouth. The chips are then laid into position overlying the distance piece and overlapping the mandibular ends, and are arranged to produce the necessary contour. No fixation other than suture of a layer of subcutaneous tissue is carried out, and it is sometimes desirable in the presence of free oozing to insert a drainage-tube for 48 hours. Three of these grafts have been carried out in the presence of a known opening into the mouth, and many within a few days of the cessation of discharge. None had been lost. The average time between operation and the removal of all splintage is 26¾ days, and it must be stressed that the chips themselves confer no initial stability whatever. X-ray control shows that fusion begins to be visible between the chips and with the mandibular ends in about 14 days, and continues until the bone is almost indistinguishable from the normal mandible. Clinical rigidity precedes complete radiographic fusion, so that careful examination and not X ray is used to determine the point at which fixation can be discarded.

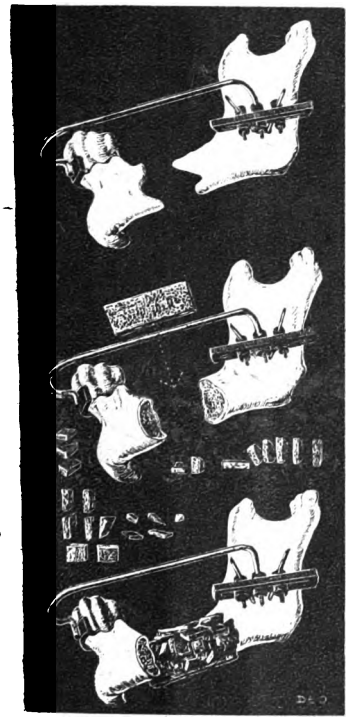

Fig. 1—To show the original defect, the removal of eburnated ends, and the insertion of the distance piece and chips (partially completed).

Five cases of extensive losses in long bones, each associated with overlying skin defect, have been treated on the same lines. Replacement of the skin defect has usually been the first step, though this may sometimes be combined with the bone-grafting operation. In the limbs treated to date, sufficient control of the bone ends has been conferred by previously applied plaster casts, leaving a window through which access is obtained and which is closed at the end of operation by a further application of plaster. This may not always be sufficient and actual skeletal fixation will then be needed. If this is so, either some form of skeletal splintage or a modified bony internal fixation may be used to confer stability. The chips can then be added to produce new bone. The technique so far applied is shown in fig. 2.

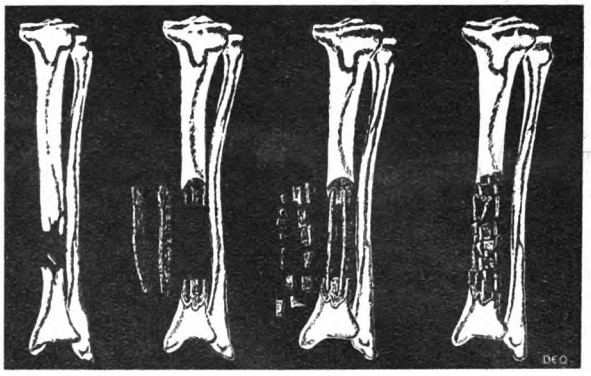

Fig. 2—To show the stages in the repair of an extensive tibial defect using two cancellous formers, and chips.

It must be pointed out that the distance pieces are cancellous strips less than ⅛ in. thick, and that they in no way correspond with the usual type of inlay graft. They are simply "formers" between and around which the contour of the bone is built up with chips. They do not even fit snugly into their slots in the bone ends and they are neither wired nor tied in position. It will be seen that the bone ends themselves are not only cut back to eliminate eburnated tissue, but also bevelled to provide the maximal bleeding surface for adhesion to and vascularisation of the grafts. It is unnecessary and undesirable to jeopardise the blood-supply to the bone ends by stripping back the periosteum through which nutrient vessels pass, and I do not think it justifiable to use power-driven saws or burrs because they may create sufficient heat to damage the vessels and the bone cells on whose immediate response the whole process depends.

In the tibial cases the initial plaster has been removed at the end of 5 weeks and replaced by a below-knee walking plaster. This is done in an endeavour to ensure an early return to vascular normality in the limb. The time of removal of all splintage seems to vary with the length of the defect, with the degree of vascularity obtained in the bed, and with the stresses to which the graft will finally be subjected. A case with a 1-in. defect in the tibia was rigid in 10 weeks, whilst two others with defects of over 4 in. are still slightly springy at 12 weeks. In a personal communication, Mr. L. P. Plewes, who has applied this principle to a number of cases of non-union of the tibia and radius and ulna, without gross loss of bone, reports that all splintage has been discarded in an average of a little less than 7 weeks from operation.

X-ray control in the tibial series here reported shows that the chips fuse with equal rapidity at the ends and in the middle of the defect, but that those chips lying immediately beneath the surface, where the blood-supply is indifferent, do not progress as fast as those in the depths of the wound which are in contact with vascular muscle bellies.

It will be appreciated, therefore, that in using cancellous chips we are reversing the accepted standards of bone-grafting. Instead of splinting the defect with a dense almost non-cellular transplant which may also act as a bridge for osteogenesis or as a poor source of new bone—and for neither of these purposes is it histologically suitable—we rely on other methods of fixation and fill the defect with a cellular mass, the survival of which will produce the requisite amount of new bone within a matter of weeks. The cases here reported appear to show that such a change of outlook is rewarded by increased operative simplicity, decreased postoperative recovery time, and added certainty of results.

SUMMARY

The immediate survival of a bone-graft probably depends on the establishment of a blood-supply to its contained cells sufficiently early to ensure their continued activity.

For mechanical reasons, this is unlikely to occur in cortical bone but is much more likely to do so in cancellous bone.

Fragmentation of the cancellous bone renders a greater proportion of its cells accessible to the blood-supply and expedites its survival.

Seventy-five cases of cancellous chip grafting for the restoration of contour and of continuity in fractures of facial and cranial bones, mandible and tibia are reported. All have been successful, in spite of potential infection in some of them.

The application of this principle may necessitate alternative methods of bone immobilisation, but it simplifies operation and ensures much more rapid regeneration than the accepted methods of bone-grafting.

I am indebted to my surgical and dental colleagues at the Plastic and Jaw Centre, Hill End EMS Hospital, for assistance in the care of these patients, and for the construction of such special splints as have been necessary.

PYLORIC STENOSIS

SELECTIVE MEDICAL AND SURGICAL TREATMENT

N. M. JACOBY, MD LOND., MRCP

PHYSICIAN EMS; REGISTRAR, CHILDREN'S DEPT, GUY'S HOSPITAL

THE general consensus of opinion at a meeting of the children's section of the Royal Society of Medicine (1941) was against the medical treatment of pyloric stenosis, on the grounds that surgery will cure every case, whereas atropine methylnitrate has failures. However Rammstedt's operation carries a definite risk, which varies with the skill of the surgeon and the chances of cross-infection in hospital. Thus while Levi (1936, 1941) had a mortality-rate below 5%, Dobbs (1941) estimates that for the country as a whole the rate is above 25%.

In spite of the unpopularity of medical treatment, Dobbs (1941) has shown that infants whose symptoms appear at the 4th week or later respond well to atropine methylnitrate ('Eumydrin'), often without admission to hospital at all, thus avoiding the risks of cross-infection. The home treatment of cases is probably the ideal at which medical treatment should aim, though this is still not possible in all cases since we have not yet investigated the potentialities of the method. It is well recognised, however, that where medical treatment is used exclusively, some cases do not respond sufficiently rapidly to warrant carrying on with the treatment, and that the mortality in these "failed medical" cases is very high. Dobbs series showed a 33% mortality-rate, and Williams and Pratt (1941) put it as high as 75%.

It thus becomes evident that exclusive medical or surgical treatment for all cases is not entirely satisfactory, and that if the type of treatment suitable for a given case could be selected beforehand the results would be better, the unnecessary or fatal operation, and the failed medical case being avoided. This selection however is not possible unless there are some criteria by which to decide the type of treatment to use.

Retrospective study of cases treated at one time exclusively surgically and at another time exclusively medically, aided by the work of Dobbs, already mentioned, has led me to formulate the following criteria which seem to give a fairly accurate guide.

1. *Indications for surgical treatment.*
   (*a*) Vomiting beginning in the 2nd week or earlier.
   (*b*) Severe dehydration.
   (*c*) High probability of cross-infection.
2. *Contra-indication to surgical treatment.*
   Evidence of infection anywhere in the infant. In these cases, owing to the high probability of postoperative diarrhœa, it is preferable to use medical treatment, even if surgery is otherwise indicated.
3. *Indications for medical treatment.*
   (*a*) Vomiting starting after the 4th week.
   (*b*) Vomiting continuous for 3 weeks or more before the infant is first seen, provided it is not severely dehydrated.
4. *Contra-indication to medical treatment.*
   Severe dehydration. Although the dehydration can be corrected by parenteral means, it is preferable to deal with these cases by the method described by Levi (1941).

In those cases where the vomiting begins in the 3rd and 4th weeks, personal judgment has to be used after the other factors have been taken into account. The size of the palpable tumour and the degree of visible peristalsis play no part in deciding the type of treatment to use.

TECHNIQUE

Nearly all the cases in this series were treated in a ward described by Jacoby (1944). The danger of cross-infection was minimal, and as most of the patients lived in rural areas far from the hospital or other medical care, the infants were kept in until they were completely cured and had gained at least 8 oz. above their weight on admission. All cases treated medically were followed up until the eumydrin had been withdrawn and it was obvious there was no relapse. The period of follow-up was at least 4 months.

Surgical treatment.—This followed closely the Levi technique—i.e., operation as soon as possible without previous parenteral hydration or stomach washouts. Post-operatively nothing was given by mouth for 4 hours. Feeding with 6% glucose in half-normal saline was then begun, working up fairly rapidly to a fluid intake of 2–2½ oz. per lb. body-weight in 18–24 hours. Milk was not introduced until 12 hours after operation, and then only by very gradual substitution. Full milk diet was not achieved until about the 5th day. Breast-milk was used when available, otherwise half-cream lactic-acid milk. A specimen feeding chart for a 7 lb. baby is shown in table I.

TABLE I—SPECIMEN FEEDING CHART FOR A 7 LB. BABY

Hours after operation	*Glucose-saline (drachms)*	*Milk (drachms)*
4	1	—
5	2	—
6	3	—
7	4	—
	Repeat (7) hourly until	
12	4	1
	Repeat (12) hourly until	
16	3	2
	Repeat (16) hourly until	
25½	3½	3½
	Repeat (25½) 1½ hourly until	
43	4½	4½
	Repeat (43) 2 hourly until	
57	4	5
	Repeat (57) 2 hourly until	
67	6	9
	Repeat (67) 3 hourly until	
79	6	10
	Repeat (79) 3 hourly until	
91	4	12
	Repeat (91) 3 hourly until	
103	..	16
	Repeat (103) 3 hourly until	
127	..	24

This regime is rather slower than that used by most authorities but it does largely avert the dreaded post-operative diarrhœa. As a matter of fact, when deaths after operation are attributed to gastro-enteritis, it is common to find no pathogenic bacteria in the stools, and the autopsy rarely reveals an inflamed alimentary canal. There are grounds for believing that many of these cases are really due to suddenly loading the gut with a quantity of food far in excess of what it has been used to during the period of vomiting.

Medical treatment.—The medical treatment used differs a good deal from that suggested by Svensgaard (1935) and other authorities who advise parenteral hydration and stomach washouts. In this series neither were used, because it was felt that they upset the infants and worsen the prognosis.

FEEDING.—Infants under 6½ lb. body-weight were given 1 oz. of full-strength milk 4-hourly. Those over 6½ lb. got 1½ oz. 4-hourly. The feed was increased by ½ oz. at the end of each 24-hour period, provided progress was satisfactory.

DRUGS.—Atropine methylnitrate, 0·6% in alcoholic solution, minims 4, before 4 feeds daily, until vomiting ceased. The dose was then reduced to minims 3, thrice daily, for the next 16 weeks.

On this regime the initial fluid intake is low, and as no parenteral hydration is employed, it is at once obvious why it is unsuitable for severely dehydrated cases. The great advantage of the method is the rapid cessation of vomiting and the decided clinical improvement.

In the medical, as in the surgical cases, it was emphasised that there could be no rigid routine. Each case was judged on its merits, and while basic principles remained the same details were varied according to progress.

RESULTS

With infants treated medically there may be some doubt as to the accuracy of the diagnosis; so no case was accepted unless a tumour was unmistakably palpated by at least two people.

Over a period of 2½ years 26 cases were treated, 23 being males and 3 females. Of these 26, 16 were treated medically with 1 death and 10 were treated surgically with 1 death.

The average length of stay in hospital for medical cases was 15·6 days, and for surgical cases 14·2 days. These figures are of little significance, for (as already pointed out) no attempt was made to discharge cases until they were completely cured and had gained at least 8 oz. More importance should be attached in the medical cases to time taken to cure the vomiting, and this averaged 3·6 days. It may therefore be assumed that in an urban hospital with an outpatient department the average stay would have been about 5 days.

Table II gives some additional particulars of the two series.

TABLE II—COMPARISON OF CASES TREATED MEDICALLY AND SURGICALLY

	Medical	*Surgical*
Average age on admission (weeks)	8·5	4·4
Average age at onset (weeks) ..	3·8	2·8
Average birth-weight (lb.) ..	7·4	7·1
Average weight on admission (lb.)	8	6·7
Number breast-fed	6	5

Deaths.—One medical case died, owing to an error of judgment. Because of war conditions the child could not be seen until 24 hours after admission, and its condition had to be described over the telephone. Though the general indications were in favour of medical treatment, it was not appreciated how severe the dehydration was, and when the infant was seen it was realised what an error had been made. The child was obviously moribund and died before any other treatment could be undertaken.

The surgical case continued to vomit after the operation, and as the condition was poor it was decided to wait before attempting further operation. The general condition deteriorated and in spite of palliative measures the child died. Autopsy revealed extensive collapse of the bases of both lungs.

DISCUSSION

As table II shows, the average age at the onset of symptoms in the surgical group was 2·8 weeks, and that of the medical group 3·8 weeks; but the age on admission to hospital averaged 4·4 weeks for surgical cases, and 8·5 for medical. Thus it seems that in the group treated surgically, the symptoms were severe enough to require medical opinion within 1·6 weeks, whereas in the medical group the period was lengthened to 4·7. Secondly, though the average birth-weight was roughly the same in both groups (7·1 and 7·4 lb.) the average weight on admission to hospital was 0·4 lb. below birth-weight in the surgical group, and 0·6 lb. above birth-weight in the medical group.

Both these facts indicate that in general it was the severe cases that were treated surgically, and the milder ones medically. It is however unwise to make a decision simply by a clinical impression of the severity of a case. For example, an infant seen a week after onset of vomiting, which started at the age of 2 weeks, might appear quite a mild case, but if he was given medical treatment and failed to respond, the case would look very severe a week later. If the criteria enumerated are followed, a much safer guide to treatment will be obtained.

Medical and surgical treatment both have a part to play in pyloric stenosis. In every case a decision should be made as soon as possible, especially when the patient is admitted to hospital by someone other than the doctor responsible for treatment. No temporary treatment of any sort should be allowed until the person on whom the responsibility for decision rests has given a verdict; only thus can a dangerous switch from one type of treatment to the other be avoided. In the past it is probable that a solitary attempt at medical treatment on an unsuitable case has convinced many people that surgery is the only line to adopt.

SUMMARY

Criteria for choosing between surgical and medical treatment of pyloric stenosis are suggested.

A scheme for postoperative feeding of these infants is proposed, and medical treatment is described.

Results in a series of 26 cases are analysed.

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LOCALISATION OF FOREIGN BODIES

JAMES F. BRAILSFORD, MD, PHD BIRM., FRCP
CONSULTING RADIOLOGIST, BIRMINGHAM CITY HOSPITALS

As a result of four years' experience in the RAMC in the war of 1914–18 I published the following statement.

"In the casualty clearing station of war emergency service, injuries call essentially for surgical treatment, and in the case of open wounds this is referred to as hygiene of the wound. Radiography for the localisation of foreign bodies at this stage can be beneficially avoided. Many foreign bodies will be encountered by the surgeon in cleansing and tidying up the wound, whereas those which have penetrated to a great depth may be situated in or near important structures, and after cleansing of the wound can await a more careful localisation than is possible with rapid screening methods. The mere detection of a foreign body does not necessarily warrant its surgical removal; even the size of the foreign body gives no surgical indication, for a large foreign body may be situated in a relatively harmless site, and a small fragment be against or in some important structure which it will ultimately damage" (Brailsford 1918).

The lessons we learnt in the last world war have not received the attention they deserve. Radiography has been responsible during this war for many unnecessary and often unsuccessful operations for the removal of foreign bodies. The spectacular X-ray demonstration of a bullet or metal fragment, because of its great density relative to the human tissues, has incited many surgeons to attempt removal, often, it would seem, without considering the necessity, the added risk to the patient and the damage to the tissues, and without seeking any help for its localisation, apparently deeming their knowledge of surface and deep anatomy sufficiently accurate to find it.

I have seen many patients who had been unsuccessfully operated on for the removal of foreign bodies, the only indication of the sites of which were given by the preliminary radiograms of the part and the position of the entrance wound. The size and position of the incision, relative to the wound and the accurately localised foreign body, showed how misleading the radiograms had been to the surgeon and how great was the unnecessary damage inflicted. This was the more instructive when the size and position of the foreign body and the condition of the wound suggested that the foreign body ought not to have been sought for at all.

I have been so deeply impressed by the frequency of these unnecessary failures and all they have meant to the patients, that I have formed the opinion that the patients would have been better off if there had been no X rays available. Trueta's experiences, as related to us in Birmingham in 1939, lend support to this opinion. A leading article in THE LANCET of Oct. 28, 1944 (p. 569), stated:

"In earlier campaigns in this war it was common for forward surgeons to have to operate without the assistance

of X rays, and it was surprising how often, particularly in men who reached the forward surgical unit late with suppuration established, the fragment could be felt and recovered. Without X rays, wounds near joints, of the buttock and of the abdomen were a great anxiety, though the resulting harm was more often to the surgeon's peace of mind than to the patient's wound. Today most field surgical units have X-ray facilities to produce those rough plates which are all the forward surgeon requires."

Are not these rough plates the cause of much trouble? Clinical judgment seems to be completely unbalanced by them, and as a result operations are performed which without X rays would either not be considered or considerably curtailed.

One has seen hundreds of foreign bodies left in the tissues of pensioners from the last war which had given no trouble in the long interval. The time taken over the unsuccessful searchings was sometimes appalling—up to 5 hours. In some cases much time had been wasted by ineffectual screenings or multiple radiographic exposures, hampered by the presence of surgical instruments and all the impedimenta necessary for sterility. Such failure to seek coöperation with the radiologist is deplorable, for with his aid the time of operation and the tissue destruction could have been reduced to the minimum.

In the last war the consulting surgeon to my Command never failed to consult me on every case he deemed important enough to explore. He insisted on accurate localisation and requested my presence in the theatre to place the patient in the proper position and give him the foreign body's skin markings, depth and anatomical relationship. He considered that any foreign body requiring removal demanded his skill, rather than that of the house-surgeon, if it was to be removed with the least possible damage to the patient. He never failed to extract the foreign body so sought for.

THE PRELIMINARY EXAMINATION

Radiography for the detection of foreign bodies is advisable for every wounded part, whatever its nature and appearance. The omission of radiography once resulted in the door-handle of a car being left in the chest after a motor accident, until the condition of the lungs demanded radiographic investigation.

A metal indicator, preferably a straightened safety-pin, is fixed to the skin so that its point indicates the wound. True anteroposterior and lateral radiograms of the part are taken with the beam centred over the point of the pin. Suitably exposed films should be "flat" enough to show the outlines of the soft tissues as well as the structure of the bones. In some cases, notably wounds involving the skull and the chest, it is advisable to supplement the examination by a further radiogram taken with the central ray directed at a tangent to the bony surface nearest to the foreign body. This will show whether the foreign body lies in the scalp or chest wall or if it has penetrated to the deeper structures. Any doubtful case of this type should be examined under the fluorescent screen.

Fluoroscopy ought not to be used in routine practice, but it is very useful for obtaining a rough guide to the positions of those foreign bodies whose removal is deemed by the surgeon advisable. Rapid screening may enable one to detect foreign bodies far distant from the entrance wound, which would be missed by a radiogram of the wound area. This procedure is indicated whenever there are clinical signs which cannot be explained by local trauma, or in gunshot injuries if there is a wound of entrance and no exit.

FOREIGN BODIES FOR REMOVAL

As a rule a thorough preliminary examination provides all the information required, for most surgeons make no special search for deep foreign bodies and do not remove them unless they are exposed during surgical toilet of the wound.

D'Abreu and his colleagues (1944) advise removal of all foreign bodies from the lungs that are over ½ inch in diameter. It is difficult to appreciate the basis on which this decision rests. I have seen many fragments and bullets over this size in the lungs of pensioners from the last war without any symptoms or radiographic indication for removal; I have also seen patients in this war with such foreign bodies who were symptom-free and showed no radiographic evidence of reaction around the foreign body, but who developed symptoms and radiographic signs after surgical removal. It is difficult to see how the sterile foreign body by remaining could cause more damage than the surgeon in extracting it; but if there is evidence, either clinical or radiological, that the foreign body is infected, removal may be reasonable. One has seen operations done for the removal of a single foreign body ½ inch or less in diameter, whereas in another case the surgeon has left a dozen or more of similar size. For these reasons I am forced to the conclusion that size alone is a difficult guide to removal; each case must be assessed on its own merits.

One sign of infection which has not been given the significance it deserves is the presence of a bubble of gas around or near the foreign body; a bubble of gas which persists or grows in size (not to be mistaken for a bubble of air which gets smaller) indicates the presence of anaerobic infection. Similar appearances may give a clue to the presence of non-opaque material such as bits of clothing, and it may be more important to secure accurate localisation and extraction of such infected material than of an opaque foreign body situated elsewhere.

ACCURATE LOCALISATION

Many methods of localisation have been devised. The claim for most is rapidity—i.e., a saving of time for the radiologist. Personally, after enduring for an hour or so the anxiety of watching the surgeon trying to remove a foreign body which had been expeditiously localised, I realised that the only criterion of a successful foreign-body localisation is the time taken by the surgeon to extract it. Even if the localisation in a difficult case took an hour, if the surgeon removed the foreign body in 5–10 minutes I felt the time was well spent.

When the surgeon has decided that there are clinical indications for the removal of a foreign body he should consult with the radiologist to decide the position of the patient most suitable for the operation. The patient is placed in this position and a metal marker is fixed on the skin directly over the approximate site of the foreign body. Two films are taken, one with the tube centred vertically and the other from the side with the tube horizontal; the tube being moved and not the patient. Care is taken to centre the central ray over the metal marker. The radiograms show the relative position of the metal markers, the foreign body and any bony element. If the localisation is not accurate the metal markers can be adjusted and further radiograms taken. The position of the centre of the foreign body, or any suitable point on the surface, can now be indelibly marked on the skin, preferably with a small + with a scalpel. The report should indicate not only the site of the foreign body but also the position which the patient must be in for the foreign body to be at that site.

A change in the position of a limb or a slight rotation of the body may make a surprising difference to the relative positions of the foreign body and the skin markings. An exercise in the adjustment of metal markers will soon teach the novice how easy it is to make mistakes unless one adheres rigidly to the rules.

I devised a metal marker for the skin which can be readily made from soft iron florist's wire; paper-clips will suffice but they are not easily bent into the desired shape. The shape gives four characteristic corners, which are not confusing when small films are being used. I make them ½ inch and ¾ inch square. They have the merit of being distinctive and are not likely to confuse or obscure the shadow of the foreign body.

The depth of the foreign body in relation to the marker and the part examined can be readily appreciated by examination of the film taken from the side or it may be estimated by rotating the patient under a fluorescent screen until the marker is seen end on. Precise measurements are not necessary.

THE OPERATION

To remove the foreign body, the patient must be placed on the theatre table in exactly the position in which the localisation was made, otherwise all markings

and measurements will be false and misleading. Surgeons will choose their own operative technique, but as a rule they make an incision through the skin at right angles to the long axis of the foreign body, the centre of the incision coinciding with the skin mark; they search for the foreign body by blunt dissection, no structure being cut unless it is clearly identified. If the conditions are carefully adhered to, the anatomical relationships of the foreign body having been taken into account throughout the localisation, the surgeon will extract the foreign body with minimum damage to the tissues and loss of time.

Operative measures during screening ought not to be allowed. I have witnessed the cutting of important vital structures during such proceedings. Since the screening is not stereoscopic it is impossible to judge the relative depths of foreign body and surgical instruments. The best method for localising the foreign body in the course of unsuccessful operative exploration is to clip and stabilise an artery forceps at the suspected site in the wound, and then take a true vertical and lateral radiogram with the tube centred over the point of the forceps, without the slightest movement of the patient between the exposures. If the foreign body is far from the point of the forceps and not readily detected, a further similar trial will probably be successful. The use of telephone or galvanometer probes is a waste of time. I often saw them used, but the only time they registered contact with the foreign body was when it had been exposed to view in the depths of the wound and the probe applied by sight. They failed to give even this evidence when the foreign body was non-metallic.

Though probably over 90% of war wounds are X-rayed, not one of the large number of members of the Medical Research Council War Wounds Committee is a radiologist conversant with modern work. Is it not because of this that the importance of radiography in the localisation of foreign bodies and the diagnosis of gas gangrene has been neglected?

SUMMARY

Localisation of foreign bodies should be so accurate that the time taken by the surgeon in removing them, and the operative damage done to the patient's tissues, are reduced to the minimum. The quick methods of localisation are liable to be very misleading, particularly when the essential need for operating in the localising position is overlooked. Moreover, they give little help in estimating the relative positions of the foreign body and anatomical features. Coöperation between the surgeon and radiologist is essential for success.

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DIPHTHERIA A P T

IMMUNITY RESPONSE AND INTERVAL BETWEEN INJECTIONS

GUY BOUSFIELD, M D LOND

As far as I am aware, no carefully controlled work has yet been reported which demonstrates the differences in immunity response that occur in the human subject as a result of variation of the interval between two injections of diphtheria alum-precipitated toxoid (APT). The importance of allowing an adequate interval is recognised in animal experimental work, but it seems desirable to demonstrate that the same rules apply in the human organism. I have attempted to stage an investigation which will bear critical scrutiny.

In 1943 I pointed out[1] that, when circumstances render it necessary, reasonably good results may be obtained by giving two injections of APT at only 14 days' interval, *provided that the dosage employed is generous.* Such a procedure however is not recommended when the monthly interval can be allowed, for its defects become obvious in the case of low dosage (vide infra). Also, when APT is insufficiently shaken before injection, or if the sample of APT has lost part of its antigenic value (as has been experienced in the past), the conversion-rate obtainable when using a 14-day interval may not be as good as when a longer spacing between injections is allowed.

1. *Brit. med. J.* 1943, ii, 706.

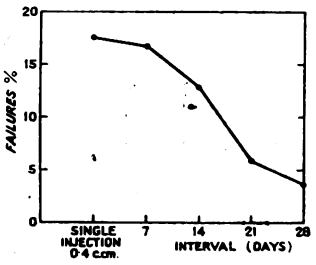
EFFECT OF ADMINISTRATION OF 0·4 C.CM. OF A P T BY DIFFERENT METHODS
(694 children, aged 1 year)

Dosage (c.cm.)	Interval (days)	Cases	Post-Schick positive	Failure to convert to Schick-negative (%)
0·4*	..	114	20	17·5
0·2, 0·2	7	132	22	16·7
0·2, 0·2	14	142	18	12·7
0·2, 0·2	21	142	8	5·6
0·2, 0·2	28	164	6	3·7

* Single injection.

The slight increase in the number of cases in the later groups is due to some failures to attend at the proper time, a difficulty which I could not surmount.

The groups shown below were arranged so as to be comparable in every way possible. A total of 0·4 c.cm. of London County Council APT was administered by five different methods, the results of which are shown in the table. A relatively small total dosage was adopted for the work as a result of past experience. I had noted that heavy dosage tends to produce fairly satisfactory results, whatever the method of administration. Thus, any differences in immunity response which are clear when low dosage is employed become less obvious when more potent injections are given. There is no suggestion here that a total of 0·4 c.cm. of APT of 50 Lf. per c.cm. value, given as two injections of 0·2 c.cm., is adequate for routine purposes. The results appear more striking when presented in graphic form (see figure).



Percentage of failure by the five methods.

As will be seen (and as would have been expected from previous work) the single injection of 0·4 c.cm. gives the poorest results, while two injections at only 7 days' interval do not yield appreciably better figures. Clearly no true secondary stimulus occurs as soon as the seventh day. Even at 14 days, the response with this particular sample of APT is far from satisfactory. The greatest jump in immunity response occurs at the 21-day interval; nevertheless a slight further improvement in the Schick-conversion rate appears at 28 days. Though the differences in these last two groups are not great enough to be statistically significant, there is a distinct suggestion that 28 days' interval is better than 21. This view is strengthened by the fact that a small number of cases which fell out of series in the above investigations, and were too few to be quoted here, might be taken to indicate that an interval of six weeks to two months is slightly better than that of one month. Administratively a very long spacing of dosage is rarely convenient, but my work suggests that at least a month is desirable when possible. If this cannot be arranged then 21 days is preferable to 14. One may also venture the view that it is quite sound to give a second injection of APT two months or even longer after the first dose, with expectation of good results; this is important, for many fear that if the patient fails to return in a month's time the effect of the first injection is nullified.

DETAILS OF INVESTIGATION

The conditions of work are now detailed for those who are interested in the design of investigation and in attempts to produce trustworthy figures. Failure to create really standard and comparable conditions has rendered a vast amount of the published work on diphtheria immunisation devoid of real significance.

All children were between their first and second birthday. Thus a reasonably constant weight of subject obtained throughout all the groups. Very few children of one year would have much previous experience of diphtheria, so the findings are not complicated by the presence of basal immunity.

The injections were given intramuscularly by each of the five methods in strict rotation, to exclude error resulting from

slight variations in the potency of any of the bottles of antigen. All subjects were demonstrated to be Schick-positive before inoculation, the toxin injection alone being given.

All toxin used in post-Schick testing was controlled for activity by parallel testing of primary cases. Post-Schick tests were performed 3 months after the final injection of APT. This interval was adopted because, in my experience, a negative Schick test obtained at this time after inoculation seems to indicate a sufficiently durable immunity to protect all children against fatal attacks of diphtheria. As I was dealing with infants, I had to be satisfied that they were successfully immunised. Any who were found positive at the post-Schick test of course received what further treatment was necessary.

The cases quoted would have been numerous but for interference with routine intervals, &c., due to enemy activity. Still, I think the evidence suffices to demonstrate my main points.

SUMMARY

The investigation reveals that, when using a sub-optimal amount of antigen, there is a steady increase in the Schick-conversion rate as the interval between two injections is increased from a week to a month. There are some grounds for the belief that an even longer interval produces slightly better results.

I wish to thank Dr. H. W. Barnes, MOH for Camberwell, and Dr. J. A. Scott, MOH for Fulham, for the facilities they have provided for me.

ANÆSTHESIA OF ANTERIOR ETHMOIDAL NERVE AFTER HEAD INJURY

ALAN WARDALE, MD LOND., MRCP, FRCS
SQUADRON-LEADER RAF

A MAN aged 40, with no previous history of ear, nose and throat disease, was involved in a collision while riding a bicycle on July 18, 1944. He was thrown to the ground and was unconscious for a few moments; his next recollection was of being propped up against a wall. There was no retrograde amnesia. After the accident he walked home with assistance.

He was seen the same day by his unit medical officer, who inserted two sutures into a laceration situated over the upper and outer side of the left eyebrow. Next day he complained of complete anæsthesia of the skin of the left side of his nose. His skull was X-rayed on July 20 and no bone injury was detected. On the 24th he was referred to me to eliminate any nasal injury, because his nose was still numb. There was considerable ecchymosis of the soft tissues round the left eye. No crepitus was detected anywhere around the orbit or the nose. The patient was quite definite that there had been no rhinorrhœa since his accident. There was no subconjunctival hæmorrhage and no clinical evidence of any fracture. The movements of the eye were full and the reactions of the pupil to light and accommodation were normal. Corneal sensation was unimpaired. The skin over the alar region on the left side of the nose was completely anæsthetic to touch and pin-prick. The left side of the nasal septum and lateral aspect of the inside of the nose anteriorly were also completely anæsthetic. Sensation was blunted in the skin of the upper lip and in the mucous membrane of the lip and gum (which was edentulous) over the sites of the incisor and canine teeth on the left side. The mucous membrane of the nose appeared normal both in colour and consistence. There was complete anosmia on the left side. X rays revealed no fracture of the nasal bones.

The patient suffered from slight headaches for some days after the injury. He was seen by a neurologist who advised a period of light duty and expectant treatment, since when his headaches have disappeared. When last examined on Sept. 16 his sense of smell was still absent, and, although he said that the anæsthesia seemed to be passing off, objectively there was no change.

The area of anæsthesia corresponds to the distribution of the anterior ethmoidal nerve, except the blunting of sensation over the small area of the upper lip and gum. This area is not usually described as being supplied by the anterior ethmoidal nerve, but possibly receives some fibres from that source in addition to branches from the infraorbital plexus, which would account for the blunting of sensation noted in this case.

The exact site of the injury is not clear; in the absence of X-ray evidence of fracture, one cannot say whether it was injured in the orbit or the anterior cranial fossa, although the associated anosmia suggests the latter, or an injury to the cribriform plate. References to the published work have failed to trace any similar recorded injury.

The patient tells me he suffered from an acute coryza in August. He was interested to find that rhinorrhœa and nasal obstruction were limited to the unaffected side of the nose.

My thanks are due to Air-Commodore E. D. D. Dickson, consultant in otorhinolaryngology to the Royal Air Force, for permission to publish this case.

Medical Societies

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE

AT a meeting on Nov. 16, with Sir HAROLD SCOTT in the chair, a discussion on

Amœbiasis

was opened by Dr. A. R. D. ADAMS (Liverpool School of Tropical Medicine). At present, he said, very large numbers of men overseas are being exposed to infection with *Entamœba histolytica* under conditions favourable to the establishment of the parasite in them. Some of those infected develop frank amœbic dysentery; others suffer little from the infection, which is discovered incidentally on routine stool examination. There are two views as to the nature of these quiescent cases; according to one, largely held by Continental workers, *E. histolytica* is normally a harmless commensal parasite in the bowel which, for some unexplained reason, may become pathogenic; according to the other view, the parasite is always pathogenic, the resistance of the host being adequate, in the clinically quiescent cases, to keep the lesions in check, unless debilitating influences lower it. In either case, latent infections should be cleared up if subsequent ill health is to be avoided. Diagnosis rests on recovery and recognition of parasites in the stools; and competent stool examination takes practice and skill.

For some years before this war Dr. Adams had found it simple to eradicate *E. histolytica* infestations by routine measures in all but a very small proportion of cases. He gave a few injections of emetine *only to arrest acute manifestations*; after that, an assault on the parasites with a variety of drugs over at least 3 weeks nearly always got rid of them. These drugs included some oral preparation of emetine such as 'Auremetin,' a pentavalent arsenical such as 'Stovarsol,' large doses of bismuth subnitrate, and retention enemata of an iodo-oxyquinoline compound such as 'Quinoxyl' (chiniofon). He did not attach much significance to the particular preparation used, believing that the combination of drugs given over at least 3 weeks produced the satisfactory result.

During the last year or so, he went on, many cases of chronic relapsing amœbiasis in a bad state have been reaching this country from the various war fronts, particularly from India and Burma, and these prove refractory to the treatment previously found so successful. Repeated long-continued and varying courses of treatment have now cleared many of them up, but others have resisted all remedies. These cases have usually received 50–300 emetine injections, and little other systematic treatment. He suggested that either the strains they harbour are abnormally virulent and resistant to treatment, or that excessive emetine dosage has permitted the parasites to become drug-resistant not only to emetine but to all other drugs known to act on them. He recalled that emetine alone will clear up only a minority of cases of intestinal amœbiasis; and that if one fails to sterilise a given case with emetine initially, to go on giving it is not only useless but hinders subsequent radical treatment. As few emetine injections should be given as are needed for the arrest of acute clinical manifestations: not 12 (which is a maximum not a routine number), but 3–6. The injections should not require repetition if combined treatment is begun at once and continued until sterilisation of the infection is achieved. In this way it should be possible to avoid the development of drug-resistance or gross destruction of bowel tissue. Unsuccessful treatment has produced a steadily growing number of cases of chronic amœbiasis and of postdysenteric colitis in the Ministry of Pensions

hospitals, adding to those already there from the last war. The time is opportune, with the material now available, for some fundamental research into the chemotherapy of amœbiasis.

Lieut.-Colonel W. H. HARGREAVES (Queen Alexandra's Military Hospital) thought it fantastic that emetine should still be the most potent drug available in the treatment of amœbiasis, and that there is still no single drug which is satisfactory when given alone. He considered it impracticable in war-time to hospitalise every carrier of *E. histolytica* until his stools are clear, and in his experience not all such cases are cleared of their infection by 3-weeks' combined treatment. Conditions in Burma have been difficult, and it has not always been possible to give any treatment other than injections of emetine. Some have had multiple treatments, yet have come home as chronic intractable cases. Some became ill during blunderbuss treatment, and, in desperation, emetine injections were given to relieve them. It seems advisable to invalid many of these cases earlier. General treatment consists in as full a diet as possible, patience, and a cheerful nursing staff. Men in hospital for months, under repeated courses of unsuccessful treatment, become depressed and lose hope. He had used the usual standard treatment: six 1-grain injections of emetine daily, followed by EBI together with chiniofon retention enemata for 12 days and then stovarsol or carbarsone, gr. 4 twice daily, for a further 12 days. He had also used the 3 weeks' course advocated by Dr. Adams, but did not find that one was definitely superior to the other. In addition, he had employed, without success, extract of kurchi bark, kurchi-bismuth-iodide, and stilbamidine. He had given sulphaguanidine and sulphasuccidine with relief of the symptoms in many cases but without effect on the amœbæ.

He described 2 critically ill cases; the first died of general peritonitis in spite of all treatment, and the second, in an equally critical condition, was given 100,000 units of penicillin intramuscularly, followed by 33,000 units 3-hourly to a total of just over 1 million units. The response within 12 hours was dramatic, the patient becoming free from pain and apyrexial, and within a couple of days passing a formed stool for the first time in two years. There was a rapid increase in weight, but the amœbic infection persisted, and on recurrence of diarrhœa with blood a second course of penicillin was given—this time 2 million units. This again produced a dramatic improvement and the patient was able to go on a month's convalescence; on return, amœbæ still being present, he was put on another course of 3 weeks' combined treatment, after which his stools became negative and he appeared cured.

There is no evidence, said Colonel Hargreaves, that penicillin has any effect on the *E. histolytica* parasite, but its action is apparently to combat secondarily infecting organisms which must play a large part in these severe refractory cases, gaining access to the bowel wall through the extensively ulcerated mucosa. To combat penicillin-resistant organisms, he is now giving sulphasuccidine in conjunction with penicillin, the total dosage being 60 grammes by mouth, the course consisting in sulphasuccidine by mouth and penicillin intramuscularly, followed by a standard anti-amœbic course lasting 3 weeks. When the patient is convalescent he is sent away for a month and then returns for sigmoidoscopy and examination of the stools. In one case a repetition of the second part of the course was necessary, but in general the attack on the secondary infection renders the severe refractory cases more amenable to treatment.

DISCUSSION

Sir HAROLD SCOTT traced the use of ipecacuanha in the treatment of dysentery during the last century. He mentioned the Chinese use of the seeds of *Brucea amarissima* in this disease and suggested that the drug might be further investigated.—Brigadier ROBERT PRIEST spoke of chronic intractable cases of amœbiasis in one of the Commands. All the drugs usually advocated are being used. The sulphonamides have no specific action on the parasitic infection, he said, but they helped to control concurrent bacillary infections, and so ameliorate the acute colitis.

Dr. E. M. LOURIE said that if cultures of *E. histolytica* are repeatedly exposed to emetine they develop resistance to the drug. But we know little, he added, of the possible dangers of combined treatment of amœbiasis. In trypanosomal infections the "interference phenomenon" occurs: arsphenamine by itself is curative, and parafuchsin alone is curative, but the two given together interfere with each other's action. Again, subcurative treatment of trypanosomal infections with antimony does not lead to antimony resistance, but subcurative treatment with an arsenical results not only in arsenic resistance, but also antimony resistance. He remarked that the experimental chemotherapist has not so far given much assistance to the clinician in the treatment of amœbiasis.

Sir PHILIP MANSON-BAHR emphasised that emetine injections must not be abused, and that treatment with EBI and with retention enemata of chiniofon must be carefully carried out with the aid of a thoroughly competent nursing staff. EBI tablets or capsules only too often pass through the gut unbroken and so have no opportunity of acting on the infection; and retention enemata, as often given, are suitable neither in quantity nor in distribution to the areas which they were intended to reach, being often voided before having an opportunity to do their work.

Dr. C. A. HOARE said that since *E. histolytica* has been incriminated as the causative organism of amœbiasis there have remained serious gaps in our knowledge of the ætiology of the disease. Variations in symptoms have been attributed to pathogenic and non-pathogenic races of the parasite. Differences in size of the cysts of alleged pathogenic and non-pathogenic strains have been demonstrated since 1917 and more recently Russian and American workers have shown the existence of two main races—a large one with cysts having a mean diameter of about 11 μ (37% of cases), a small race, the cysts measuring about 7 μ (56%). The remaining 7% are the mixed infections. In practice, a diameter of 10 μ can be taken as the dividing line between the races. The large race is the conventional *E. histolytica*, pathogenic to man and animals, while the smaller race differs in that the amœbæ do not ingest red cells and are not pathogenic to cats. Clinical manifestations of dysentery or liver abscess are generally agreed not to result from infestation with the small race. Nevertheless, the large race varies in its pathogenicity, probably owing to variations in the resistance of the host, though some believe that pathogenicity is due to association of the parasite with certain bacteria in the gut. Brumpt's non-pathogenic *Entamœba dispar* is now discredited as a species, but the position is far from clear. Until it has been elucidated, all infections should be regarded with suspicion and treated accordingly.

Dr. H. JOCELYN SMYLY noted that in North China some 30% of the population are infected with *E. histolytica*. He had examined and treated many cases with 'Vioform,' which, in doses of 0·25 g. thrice daily, he found to be as good as or better than chiniofon ('Yatren'). He had also used carbarsone in a dosage of 0·25 g. thrice daily with equal success. Neither drug caused toxic side-effects, and no diarrhœa resulted, as it does after full dosage with chiniofon. He mentioned the sudden death of a debilitated elderly man with low blood-pressure after a 7th injection of emetine given in treatment of an amœbic liver abscess. He discussed the treatment of intestinal amœbiasis with *Brucea amarissima* (or *javanica*) and mentioned successful results from various forms of this drug.

Dr. J. G. WILLMORE had used combined treatment since 1926. He, too, was encountering numbers of chronic intractable cases of amœbiasis now. Treatment of the concomitant bacterial infection often favourably influences the response to amœbicidal drugs, he finds; he has tried a number of drugs, including penicillin, with beneficial effect, though without action on the amœbæ. A course of conessine (the alkaloid from kurchi bark), given before other radical treatment, had given promising results.

Dr. ADAMS replying, agreed about the need for good nursing, maintenance of morale, and provision of a nourishing diet—not easy to secure for Service cases transferred to civil hospitals (and civil rations) after a long sojourn in military hospitals. The change after full Service hospital rations with "medical comforts" results in some hardship, and is a cause of justifiable discontent among the men.

Reviews of Books

The Hospital in Modern Society

Editors: ARTHUR C. BACHMEYER, MD, director, University of Chicago Clinics; GERARD HARTMAN, PH D, director, Newton Hospital, Mass. (Oxford University Press. Pp. 768. 28s.)

THIS compendium of material on hospital administration in the United States covers a wide field, dealing practically with hospital service and management, medical staff organisation and relationships, nursing education and service, special departments of the hospital (such as the operating room and outpatients) medical social service and records, financial control, plant maintenance, public relations, and group health insurance. To the British reader much in it will seem of academic interest only, since conditions in the two countries are widely different. There are, however, some common points. It quotes the opinion that "all privately supported hospitals are going to encounter more difficulty in the future than in the past to secure large funds," because of the probable decline in large fortunes. Of hospital employees, the same writer asks: "Do you assume that because they are incidentally engaged in the task of medical care they must accept as a part of their compensation the satisfaction of having participated in the performance of a delicate and merciful task?" This question has never, perhaps, been squarely faced in British hospital circles, where there is still some feeling that workers in hospitals ought not to expect as much remuneration as their counterparts in commerce. Developments in professional and trade organisations, however, during the past ten or twenty years, have tended to modify that opinion.

Functional Disorders of the Foot

(2nd ed.) F. D. DICKSON, MD, FACS; REX L. DIVELEY, MD, FACS. (Lippincott. Pp. 352. 30s.)

THE title of this book, now in its second edition, is perhaps a little misleading. The word functional is now often used to connote an absence of organic or structural change, but these authors use the word, in its truest sense, to include those disturbances in the working of the foot which are secondary to structural alterations whether due to disease or deformity. Great stress is laid on function, and especially on what they describe as "foot imbalance," considerable attention being paid to its effects on the growing foot of the child. In the earlier anatomical and physiological chapters the architectural, as opposed to the postural, nature of the arches is accepted by the authors, following the ideas expressed in the books of Morton and Lake. Footwear is fully considered. They advocate for normal children a shoe wedged on the inner side one eighth of an inch higher than the outer, the rigid shank being moulded to support the developing arch. A shoe of this type would in this country be regarded as purely corrective, to be used only for abnormalities. To many the idea of providing the developing foot with any kind of artificial support may seem contrary to biological principles, but as the authors point out "ideal natural conditions (for the development of the child's foot) do not exist in modern life, as most of the child's weight-bearing is on hard and non-resilient surfaces which, instead of providing a suitable medium for exercise and development, put an additional strain on the growing foot from which it must be protected by shoes providing sufficient support to make up for an insufficiency in the foot caused by restraint on development." And indeed there is nothing sacrosanct in the flat-bottomed shoe; it is merely a conventional form handed down from past times when the ability to manipulate materials was less than it is now.

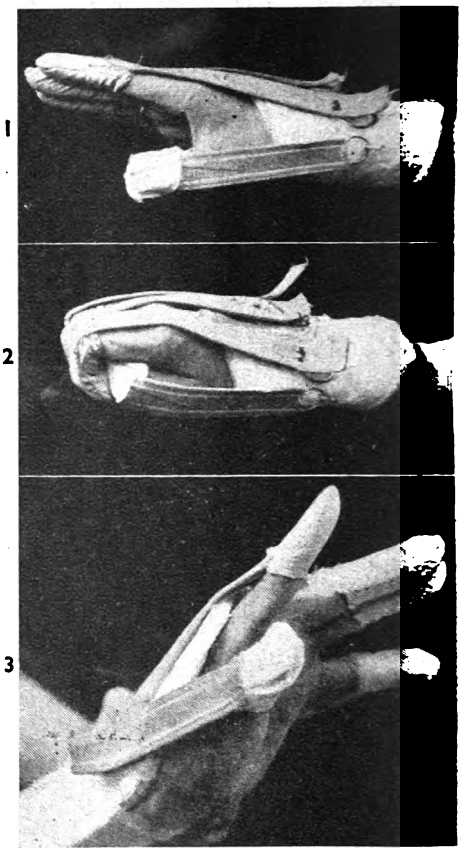
The new edition is a little larger than the first owing to the introduction of a few new operative procedures and of short chapters on disorders of the foot in industry and the Services. Reproduction of some of the radiograms has suffered a little from the inevitable falling off in quality of paper.

Miss FLORENCE UDELL, secretary of the Scottish board of the Royal College of Nursing, has been appointed head of the nursing section of the Health Division of UNRRA in the European Regional Office.

New Inventions

SPLINT FOR RADIAL NERVE PALSIES

THE splint to be described can be made at the hospital to fit the individual patient, and at short notice. It fulfils the requirements of the neurologist for support of the paralysed muscles, and those of the orthopaedic surgeon for free movement at all finger-joints.



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Two types of splint are most usually seen among the cases admitted here: one is of the cock-up type which supports the wrist but not the metacarpophalangeal joints; the other is a full hand splint which allows no finger movements. In a number of cases which arrived in shoulder spicas for fracture of humerus, the wrist and hand were quite unsupported. Much stiffness of the fingers had resulted and was often permanent. This seems all the more regrettable since often excellent treatment was given for the compound fracture or penetrating wound of elbow-joint. Yet, with good alignment of fracture and well-healed wounds, a useless limb resulted because of the claw-like stiffness of the fingers.

Materials used.—Elastic tape, as obtainable from artificial limb makers; curtain rings, picture-hooks ("X hooks"); finger-stalls, made from calico by the sewing-room staff; plaster bandages.

The finger-stalls are made to cover the two distal phalanges of the fingers, but only one phalanx of the thumb. The elastic is cut into lengths of about 7 in., and the finger-stall is sewn on to one end, a curtain ring on to the other. The picture-hooks are incorporated in a forearm plaster at a distance which allows the elastic to be just slack when the fingers are fully extended (figs. 1 and 2). Adjustments can readily be made by altering the position of the rings on the tapes. Usually the plaster is made so as to cover the lower half of the forearm. This allows access to the extensor origin for electrical treatment; alternately the plaster can be bivalved for the purpose.

In some cases with weak flexors we found that the elastic tended to produce hyperextension at the metacarpophalangeal joints before fully extending the phalanges. In these cases the dorsal plaster slab was carried well forward on to the proximal phalanges (fig. 3). In all other cases it did not extend beyond the wrist.

My thanks are due to Mr. F. W. Holdsworth, consultant orthopædic surgeon, and Dr. D. H. Collins, medical superintendent, for their encouragement and permission to publish this note.

E. G. HERZOG, MB LOND.

Wharncliffe Emergency Hospital, Sheffield.

THE LANCET

LONDON: SATURDAY, DECEMBER 9, 1944

Surgery on the Far Eastern Front

IN the past four years it has been difficult to look forward beyond the defeat of Germany. Yet the future holds for us not only a programme of reconstruction at home but also a struggle in the Far East that will certainly be bitter and may be long. Now that the end in Europe seems to be in sight we shall be able to give more thought to the needs of the Far Eastern campaign; and we may suitably begin by reviewing the problems of the surgeon. In some three years' experience of jungle fighting many of the obstacles that lie in the way of an efficient surgical organisation have become apparent. A few of them have been overcome, but many remain—some because they are insuperable and others because the Far Eastern theatres, as everyone knows, have had to accept a back seat where supplies and personnel were concerned. A time is coming when it will be possible to remove those obstacles that are removable, and adjust our methods to circumvent those that will persist.

Foremost among the problems of this campaign is the necessity of providing for casualties occurring at widely separate points connected only by tenuous communications. It has often been said that in warfare distances should be measured not by miles but by hours, and this is nowhere truer than on the Burma front. The difficulty extends far back, for the railways of Eastern India are not helped by the geography of Bengal, and evacuation troubles do not end when casualties leave the forward areas. It has become increasingly obvious that the mere provision of surgeons is not enough. The usefulness of a surgeon on the Burma front depends largely on the opportunities he is given by the units ahead of him, and the coöperation of those behind him. Surgical organisation will fail unless the forward officers are sufficiently well educated (in the surgical sense) to realise the importance of early and accurate sorting, to know when to spend time on resuscitation and when to hurry the casualty back to the surgeon, and to recognise cases, such as the small buttock wound with perforation of pelvic viscera, which conceal their urgency by an appearance of well-being. It will fail equally if cases on evacuation lines are not viewed and treated individually according to their needs. The general teaching given by the *Field Surgery Pocket Book*, issued to all RAMC officers, needs to be reinforced by personal instruction on the spot from men of high professional qualification and some teaching ability. Without such help in training non-specialist medical officers the surgeon's efforts will not achieve all they might, and it is good to know that the consultants appointed to the South-East Asia Command include experienced surgeons from teaching hospitals, whose principal responsibility, apart from the supervision of surgery, is educational.

India has had to feel her way with mobile surgical units. Such units now exist and have done magnificent work in circumstances that would have given them every excuse for discouragement. They have brought expert surgery as far forward as main dressing-stations and sometimes even further. But although they have largely obviated the necessity for long journeys back to the surgeon, long lateral journeys are still required because the front is both extensive and complicated and it is therefore impossible to make mobile units easily accessible to all casualties. For this reason, and because in times of battle mobile units can deal with only a small proportion of the wounded, it is urgent that medical officers in jungle areas should learn how best to use chemotherapy in delaying septic invasion in cases awaiting surgical treatment. CUTLER in his stimulating Linacre lecture[1] remarked that, though bacteriostatic agents are no panacea, "sepsis tends to be localised when they are in evidence, thus rendering a longer period between wounding and operation safer." In jungle warfare every forward medical officer should be in possession not only of this knowledge, but also perhaps of special instructions, differing from those appropriate for the casualty-clearing station or hospital.

A further difficulty in surgical organisation in the East is that of maintaining the interest and knowledge of surgical specialists who may feel themselves out of touch with recent developments in their profession. The distribution even of official publications such as the *Bulletin of War Medicine* and the *Army Medical Department Bulletin* has been unsatisfactory; and, though standard textbooks are provided for hospital units sent out from this country, units raised in India have had very few—generally because they were unobtainable. In the early years of the war India was in fact professionally isolated to an unnecessary degree, and the fear of losing touch with progress extended higher than the surgical specialists of forward hospitals. Still it is they, and the surgeons of mobile units, who most need an occasional period of the mental refreshment that can be provided only by the presence of one's professional equals and betters. A system of duty rotation between surgeons in forward areas and base areas was devised some time ago, and it is to be hoped that the fullest possible use will be made of the monsoon periods, when battle casualties are comparatively rare, to thin out the forward surgeons and give them a chance to refresh their knowledge in more favourable circumstances. On a larger question there may well be some speculation as to the period over which it is profitable to retain a highly qualified professional man out of touch with his equals in England or in the more fortunate theatres of war. There is no doubt that climate, surroundings, and the thousand and one frustrations and petty annoyances inseparable from an attempt to gear up an Eastern nation to modern war effort, all take their toll; and there is a period, shorter than might be imagined, after which individual efficiency begins to decrease. If surgeons are to perform their duties efficiently in isolated and unpromising surroundings, they ought to be withdrawn at regular and not too long intervals.

In a country where dysentery is endemic and as much as a third of the total force may be ill with malaria, every surgeon must also be a physician, and the time-honoured generalisation that no patient

1. *Lancet*, Sept. 30, p. 428.

suffers from two diseases becomes palpably untrue. To surgeons the high sickness-rate is a trouble in two ways: first, it is almost exceptional to treat a surgical lesion uncomplicated by a medical disease, and secondly the surgeon may find that harassed administrative officers disregard the sanctity of his department when faced with an influx of sick. This matters little of course, provided the surgical organisation remains intact and ready to function directly the need arises.

Finally a word must be said about accommodation and equipment. The existing buildings of Bengal and Assam do not lend themselves readily to conversion in accordance with recognised hospital standards, and neither the climate nor the insect fauna are kind to tented hospitals. That surgical wards and theatres should fall far short of desirable standards is often inevitable, and surgeons can only ask that such defects should be the result of honest failure rather than any complacency. Having said as much, they must proceed to adapt their technique to their surroundings by avoiding surgery of easily infected organs in forward areas and accepting the irreducible minimum of post-operative dressings. As to equipment, mass production of surgical instruments is not to be achieved in a day, and others besides bad workmen have sometimes had occasion to blame their tools. But shortages have been accepted with moderate cheerfulness so long as the needs of the European front were unfulfilled, and there is reason to hope that in the forthcoming campaign the excellent equipment of British general hospitals will be made available for surgeons working in India.

Influenza—Sporadic or Epidemic?

STRESS has hitherto been laid on the fact that the influenza virus, particularly of the type known as "A," is characteristically associated with epidemics rather than with sporadic cases of human influenza. Possibly this emphasis on the apparent rôle of virus A has been carried too far, for BEVERIDGE and WILLIAMS in Australia [1] incriminate both A and B virus as a cause of endemic infections of the respiratory tract in 1943. The period studied was the winter season in Victoria, between May and November, and though the incidence of respiratory tract infections in military camps rose with the advent of colder weather, it at no time exceeded 7·2 per thousand per week and no epidemic occurred. A correlation was observed between atmospheric temperature and the incidence of infection, and sudden falls of temperature were often followed by an increase. Five virus strains, four of A and one of B, were recovered from throat washings, and serological studies of 96 cases from many camps indicated virus A infection in 8 and virus B in 17 patients. No clinical differences were evident between the cases in which virus infection was proved and the others which comprised the majority of those studied. On the whole, the antibody responses, as measured by the agglutination-inhibition test with fowl red cells,[2] were smaller in amplitude in these sporadic A cases than in cases of influenza A observed in the Australian epidemic of 1942.[3] These findings led the Melbourne workers to suggest that sporadic cases of influenza A may be commoner than has been thought. Sporadic cases of influenza B have been noted in the Argentine [4] and Canada [5] although the virus has at times been associated with localised or spreading epidemics in the United States.[6]

Experience in Great Britain has suggested that the two viruses are much more often associated with outbreaks than with sporadic cases of influenza. Yet when virus B was active in an Army division in 1943 the infection-rate, including afebrile respiratory disorders, never rose above 2 per 1000 in any one week.[7] In 1941 a similar low incidence of respiratory infection was associated with virus A.[8] Last year too influenza A appeared in March, having been undetected even by serological tests for the previous two years. Two cases were found in an Army unit in March; then in April there was a small outbreak in a Royal Air Force establishment [9]; and in each of the three months, June, July, and September, sera sent to Hampstead for test gave evidence of virus A.[10] Finally, what appeared to be an explosive wave of the virus infection spread throughout the country, and the epidemic was obvious to everyone. In this year, therefore, every variation in epidemiological behaviour of virus A infection was encountered.

The present problem is clearly one of defining the whereabouts of the virus that initiates sporadic cases or epidemics, and of revealing the factors that determine whether the virus infection, when it has once appeared, remains localised or causes an epidemic. The remarkable sequence in 1943 of sporadic cases of influenza B and A, localised outbreaks of influenza A, and then a widespread A epidemic, was also experienced in Canada [5] and the USA [11] at almost the same time as in Britain. Clearly, this may mean that the virus steadily builds up its activity in any population from some hidden source. As methods of detection improve, the virus is being detected more and more often and is losing its apparent character of jack-in-the-box. So far, however, our tests are unable to detect the virus in normal persons, or for that matter in sick ones for months at a time during which sporadic infections of the respiratory tract continue to be experienced. If we could employ in man methods such as those used by SHOPE to detect latent swine-influenza virus in pigs,[12] we might succeed in unmasking the human virus from some latent form in which it lurks. Meanwhile, study of the biological behaviour of the strains of virus from different outbreaks shows a correlation between ease of adaptation to the ferret in the laboratory and ease of spread in man.[13] Is it too much to hope that one day it may be possible to predict, either from the character of the virus recovered or from the level of antibodies in the human population, that a human epidemic is likely or that the infection

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9. Donnelly, T. H., Hughes, H. P., Robertson, D., Philipp, E. *Ibid*, 1944, i, 42.
10. Andrewes, C. H., Glover, R. E. *Ibid*, 1944, ii, 104.
11. Salk, J. E., Menke, W. J., Francis, T. *J. Amer. med. Ass.* 1944, **124**, 93.
12. Shope, R. E. *J. exp. Med.* 1941, **74**, 41 and 49.
13. Andrewes, C. H. *Proc. R. Soc. Med.* 1942, **36**, 1.

will remain localised? This power of prediction will be needed if we are ever to apply with maximum benefit the newer methods of immunisation[14] which seem to hold such promise.

Limb Arteriography

EXCEPT in a few specialised vascular clinics, arteriography has not been much practised by British surgeons up to now. Visualisation of the arterial tree might satisfy the surgeon's morbid curiosity, but clinical observation and its simpler aids seemed to yield all the information needed for planning treatment. Above all, there was a danger that arteriography would precipitate or aggravate gangrene, and with some contrast media, such as thorotrast, there was even a risk to the patient's life. Deliberate puncture of an artery in itself seemed dangerous—the puncture wound might not seal off and might be the starting-point for a spreading thrombosis. With a thin needle the danger of bleeding is in fact slight, for light pressure will almost invariably seal the small hole. Thus DOS SANTOS,[15] whose son, also a surgeon, has recently published a book[16] on his vascular experiences, recorded in 1935 that in 1500 such punctures he had seen only one case of persistent bleeding, in an atheromatous femoral artery which required ligation, the limb recovering without gangrene. NELSON,[17] reporting on 76 cases of abdominal aortic puncture, found that there was no risk of "blow-out" leakage. Apart from such mechanical dangers, however, it proved difficult to find a non-toxic and non-irritating contrast medium.

In 1923 BERBERICH and HIRSCH[18] introduced 25% sodium iodide for the purpose, but besides the risk of iodism this tended to damage the endothelium of the blood-vessels, and some tragedies were recorded. The introduction of organic iodine compounds, such as iodoxyl ('Neo-iopax,' 'Pyelectan,' 'Uroselectan B,' &c.) raised hopes that a safe medium had been found. The iodine was firmly bound in this organic compound, and could therefore not be split off in the body, so no harmful effects from iodism followed. But the solution was irritating; spilling into the tissues during injection gave rise to local necrosis, and venous thrombosis sometimes followed its use in pyelography (the preparation is used in high concentration, 15 g. of the disodium salt dissolved in 20 c.cm. of water). In 6 out of 129 arteriographies DOS SANTOS thought that the gangrene had been definitely aggravated by the injection. LEVEUF[19] concluded that arteriolar spasm gives rise to anoxia and that this accounts for the œdema and subsequent gangrene. Most of the mishaps have occurred in children, which may support the view that too rapid injection, causing over-distension of the arterial tree, induces a vasoconstrictive response. WAGNER[20] depicts the scattered black patches of skin gangrene and the severely swollen limb in such cases. These skin patches are not unlike those that follow the accidental injection of 'Pentothal' into an artery, and it seems more reasonable to regard the gangrene and œdema as a direct necrotic effect of an irritant solution on the capillaries and venules. When thorium dioxide, known as thorotrast, was introduced 13 years ago FONTAINE[21] could report over 1300 injections given by LERICHE, MONIZ, and DOS SANTOS without incident or complication. But it was soon found that the thorotrast was taken up and held by the reticulo-endothelial cells of the liver and spleen and to a less extent the bone-marrow. BURROWS[22] showed that it remained without diminution in a rabbit's liver and spleen for as long as 4½ years; moreover, thorotrast is radioactive, and thus liable to cause malignant or other changes.[23] STEWART, EINHORN, and ILLICK[24] showed that in man the radiations from thorotrast stored in the spleen may be sufficient to throw an image of the organ on a photographic plate. No malignant growth has actually been proved to arise from thorotrast, but NORTHFIELD and RUSSELL,[25] working on human cerebral material, have demonstrated that thorotrast granules do block capillaries and venules. As JEFFERSON[26] says, these findings "make one feel that thorotrast should not be used except in cases of absolute necessity."

Since the beginning of this war diodone ('Perabrodil,' 'Pyelosil') has come to be used as a contrast medium in arteriography and appears at last to be a safe one. It is non-irritating and can be injected subcutaneously or intramuscularly without sloughing effects and has been safely used for outlining synovial cavities. LEARMONTH, who describes his technique for arteriography with this medium on another page, like most surgeons in this country prefers to expose the vessel, freeing it as little as possible, rather than do a blind puncture. He points out that the arterial blood does not spurt into the syringe—it even has to be aspirated—and with a yellowish injection fluid it may look much like venous blood. He uses no special apparatus for the injection, but delivers the solution with a hand syringe. It is important to see that the needle fits well. The arterial punctures are not as a rule painful, although some patients do complain of temporary discomfort towards the end of the injection. To remove all vasoconstrictor influences LEARMONTH recommends a spinal anæsthetic; and workers on the Continent, such as SCHRÖDER,[27] have been injecting papaverine intra-arterially at the same time, but this is unnecessary, and the injection can be well done under a local anæsthetic if preferred. LEARMONTH finds 10 c.cm. of diodone adequate, though others have used as much as 15–20 c.cm., but if the first picture is not satisfactory the injection can be repeated if the dose is kept well within the margin of safety. In the arm smaller quantities—5–8 c.cm.—are sufficient, and most surgeons[28] agree that temporary obliteration of the circulation with an inflated blood-pressure cuff is desirable during the injection.

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26. Jefferson, G. *Med. Ann.* 1938, p. 480.
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LEARMONTH [29] has found arteriography of special value in diagnosing and locating the local thrombotic blocks which are remarkably common in young patients. A usual site for such a block is the lower end of the femoral artery, where it pierces the adductor magnus muscle. In the patient with endarteritis obliterans or even the diabetic an arteriogram has been of great help in deciding whether it was worth while attempting a below-knee amputation. LEARMONTH has met with cases where after supposed ligature of a main vessel an arteriogram has shown that only a collateral branch has been ligated. PATERSON ROSS [30] has pointed out that the site of the main arterial stream blockage in arteriosclerotics is commonly in the popliteal artery at the level of the femoral condyles; prognosis here is poor. But if an arteriogram shows a block high in the popliteal artery, or in the femoral, there is a good chance of an adequate collateral circulation developing. ALLEN and CAMP [28] have suggested using arteriography for locating the level of embolic obstruction, often difficult to place. INCLAN [31] and SHALLOW and his colleagues [32] have explored the possibilities of arteriography in the early diagnosis of malignant bone tumours, especially osteogenic sarcoma. Biopsy in malignant cases carries a great risk of disseminating growth into the blood-stream, and it will be an important advance if this can be avoided. Arteriography is being more and more employed as a preliminary to operation on traumatic aneurysms, [27 33] where it gives the operator a reasonable picture of what he will find. It is a help in outlining the sac of the aneurysm, and by compressing the main artery immediately proximal to the sac before injection the collateral circulation may also be demonstrated. In the arteriovenous aneurysm it helps in locating the site of the fistula; the efferent vein of such a fistula needs to be compressed during the intra-arterial injection. These and many other uses are likely to be explored once arteriography is accepted as a safe procedure.

The Future of Medical Education

A SOUND curriculum must underlie all the expansion, both in numbers and in scope, expected in the medical profession after the war. The lines on which the curriculum could be improved have been indicated in the report of the Goodenough Committee. As Sir Herbert Eason, president of the General Medical Council, noted in his address on Nov. 28, the Minister of Health has asked the council to let him know as soon as possible whether they propose to take early action to revise the curriculum, and if so, what form their action is likely to take. Accordingly, the council have resolved to begin at once by revising their existing recommendations to licensing bodies concerning registration, premedical studies, and professional education and examination. They have appointed four committees to consider and report jointly to the education and examination committees on the various stages of the curriculum. Reform of the curriculum is not, of course, a task that can be completed overnight, but the council are doing what they can to satisfy quickly the hopes of the Minister and the community. Perhaps at the extra session which is to be held next February they will be able to give collective approval to a series of concrete proposals.

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30. Ross, J. P. *Ibid*, p. 632.
31. Inclan, A. *J. Bone Jt Surg.* 1942, **24**, 259.
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33. Fallon, M. *Lancet*, 1944, **ii**, 270.

Annotations

ADAPTATION TO EXPOSURE

THE ability to withstand the kind of climatic conditions which commandos and airborne troops must be prepared to meet can largely be cultivated. In a paper read to the section of physical medicine of the Royal Society of Medicine on Nov. 8, Surgeon Commander G. M. Levick, RN, explained that his first step in training such men was to explain to them, fully but simply, the scientific basis of the hardening process. This ensures their coöperation during training and enables them to make intelligent use of the means available to mitigate discomfort, especially during the hours of sleep. One of the greatest hazards is loss of heat by evaporation: a pint of water evaporated from wet clothing may cost the body 240 calories. This heat loss could be minimised by an outer covering impervious to water vapour, but the legs and feet offer a large surface for heat loss and are the greatest origin of discomfort from cold: Levick therefore insists that every man should keep one pair of socks dry to put on before trying to sleep—in wet boots but dry socks, he says, the feet keep surprisingly warm. Evaporation from the lungs and the warming of inspired air accounts for about 10% of the total heat loss, and this can be considerably reduced by the simple device of muffling the nose and mouth. From his own antarctic experience, Levick testifies to the warming effect of food, and advocates that some rations should be saved so as to provide a meal on which to sleep. The observation that blood from the liver gets hotter during digestion dates back to Claude Bernard, and the liver is doubtless the source of this warmth after meals.

The importance of teaching the soldier to think for himself along these lines cannot be overestimated, but the fundamental basis of hardening is the training of the body. For this the trainee must cut down external aids to heat conservation, such as clothes, to a level just short of the shivering point, and must never "let up." The naked body defends itself against heat loss by closing the sweat-glands, and eliminating as much of the skin circulation as possible so as to invest itself with a non-conducting layer—equivalent, according to Du Bois, to 1–2 cm. of cork. Prompt and sustained muscular action by the arterioles is obviously a great factor, a function not fully used during ordinary civilised life, and capable of much development. The fainting which often follows standing up suddenly after a few weeks in bed is familiar testimony to the ease with which the faculty of redistributing vascular tone can be lost. But it is doubtful whether any such reversible change can explain the acclimatisation which is certainly acquired. Levick cites the hardiness of the natives of Tierra del Fuego, whom Darwin describes as virtually naked and sleeping without adequate shelter in a shocking climate. Darwin also remarks, however, that these naked savages, at a distance from a camp fire which barely kept Europeans warm, streamed with sweat. The sweat itself argues a generous cutaneous blood-supply, and some more permanent adaptation than unusual vascular control seems to be needed to account for a simultaneous resistance to cold and susceptibility to heat. This could be a thickened insulating layer (often invoked to explain why women stand cold better than men), an increased basal metabolic rate of the tissues as a whole, or an ability to maintain, even during sleep, an unusual degree of muscular contraction.

Modern work suggests that BMR does in fact vary appropriately with the habits of life imposed by climate, although it is a long-term adjustment, and not part of the day-to-day temperature-regulating mechanism. This would fit in with Levick's dictum that the hardening of troops cannot be hurried: only a certain degree can be achieved in a certain time. The fundamental meta-

lic behaviour of the tissues is presumably directed by e pituitary, thyroid and suprarenal glands. It is an teresting question whether these could be "exercised" r alternate periods of training in cold and hot conditions as to render their potentialities more readily available. djectives such as "hard" and "soft" are a little isleading. Levick points out that athletes in training ay be soft in the sense of being unable to withstand old and damp. But would they be soft in India or aq where their presumed efficiency in dealing with xcess heat might stand them in good stead? Or are here three kinds of hardness, each with its appropriate aining, represented by ability to withstand cold, bility to withstand heat, and ability to withstand uscular fatigue?

A battledress appropriate to all the activities of a oldier's day, as well as for sleeping in, can hardly be magined, let alone invented. Colonel Georges Doriot, n an address[1] given early this year, noted that a nan sleeping generates about 70 kg. calories per hour; while standing guard he generates about 120, while walking 270, while carrying a pack 360. If the climate n which he is fighting has a wide daily range he may have o endure a high temperature during the day, while ne is active, and a low one at night when he ought to be passive. His clothes cannot vary accordingly. Using a unit happily called a "clo" (equivalent to the thermal insulation given by ¼ in. of still air, or of enough textile to immobilise that air) Doriot notes that 4 clo is the maximum thickness a soldier can work in, 8 clo the most he can carry as sleeping gear and 2 clo the most he can wear on his hands without serious loss of dexterity. The commando trainee, however, must do without sleeping gear and travel light.

SOVIET GRAMICIDIN

IN spite of the requirements of total war and of the invasion of Russian soil, which at one time necessitated the partial evacuation of Moscow, medical research in the Soviet Union has not been allowed to flag. The articles by Prof. G. F. Gause of the Moscow Institute of Tropical Medicine and his colleagues which we published last week are evidence of the tenacity with which current medical problems have been pursued. A search among the gram-positive sporing bacteria commonly found in the soil and air will reveal some strains which inhibit the growth of other micro-organisms.[2] A strain of *Bacillus brevis* isolated from Russian soil has been investigated in detail, and a crystalline product of high antibacterial activity, named gramicidin S, has been prepared from the sediment obtained after the acidification of fluid cultures. This substance, which has the properties of a polypeptide, invites immediate comparison with gramicidin and tyrocidine, the crystalline polypeptides with antibacterial properties which Dubos and Hotchkiss[3] prepared from cultures of a strain of *B. brevis*. Like tyrocidine, but unlike the gramicidin of Dubos, gramicidin S acts at almost equally high dilutions against gram-positive and gram-negative bacteria, but it apparently differs from tyrocidine in retaining its activity against gram-negative bacteria in nutrient broth.[2] No evidence is given whether, like tyrocidine,[4] it is inhibited by blood and serum. Since these substances are insoluble in water there is no question of systemic use in therapeutics. Both the substances of Dubos are, however, of low toxicity to tissue cells relative to their antibacterial power,[5] and gramicidin and the crude product tyrothricin, which contains both gramicidin and tyrocidine, have been used locally in medical[6] and veterinary practice in the United States with some success. From the brief report of a clinical trial of gramicidin S in a wide variety of local infections the results appear to be promising. It is to be hoped that cultures of the Russian strain of *B. brevis* will be made available to workers in this and other countries. Apart from the possible clinical applications of gramicidin S, among which the control of local infections with gram-negative bacilli is the most desirable, the addition of a new member to the very small group of crystalline polypeptides which are biologically active is of considerable theoretical interest to the biochemist.

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2. Dubos, R. J., Hotchkiss, R. D. *J. exp. Med.* 1941, **73**, 629.
3. *J. biol. Chem.* 1940, **132**, 791, 793; **136**, 803.
4. Robinson, H. J., Graessle, O. E. *J. Pharmacol.* 1942, **76**, 316.
5. Herrell, W. E., Heilman, D. *Amer. J. med. Sci.* 1943, **205**, 157. With Gage, R. P. *Ibid*, 1943, **206**, 26.
6. Rammelkamp, C. H. *War Med.* 1942, **2**, 830.

SOCIETY AND THE CHILD

DOCTORS who wish to respond to Professor Ryle's exhortation that they should be teachers will find much to interest them in a little book by Prof. C. M. Fleming,[1] addressed to teachers, parents, club leaders, foremen, managers, husbands, wives, and all who have tried their hand at education. The social and psychological factors that influence educability are important at present, being linked, as she points out, with ultimate peace or war, neurotic distresses or mental health, and with tyranny or coöperative living in homes, schools and workshops, states and continents. She defines educability as flexibility of response, and adaptability. The mature person should be capable of adjusting himself to events—he should be submissive or aggressive, coöperative or resistant, a spectator or a performer, according to the requirements of the situation. The energies of the teachers, then, are more usefully expended in studying children in relation to the formative influences of their family and their community than in classifying or labelling their isolated attributes. To assume that certain individuals are inherently stupid, difficult, sickly, or uncoöperative, is merely an excuse not to try the effects of a different type of teaching, a different sort of nutrition, or a new variety of social relationship. All this should seem obvious to doctors, but it is a fact that the school-teacher's tendency to select and classify children by their intellectual performance has favoured the separation of children into educational streams at increasingly early ages. In fact, some still think the chief task for the future is to perfect methods of segregating them. Teachers who are prepared to accept variations in physical and moral development often do not seem to realise that changes in environment can influence intellectual performance. About 80% of mental defect has been attributed to inheritance, but it has been claimed that the effect of a really good home environment on a child with a low mental ratio may be to raise the intelligence quotient by 20 points. Again, delinquency or difficult behaviour due to unsatisfactory home life may be cured by a successful teacher; taking into account the needs, interests and abilities of the child, she can provide opportunities for him to join in coöperative ventures with the other children, and so help him to achieve the emotional satisfaction of being an accepted member of a successful group.

When it comes to dealing with the teacher's failures, Professor Fleming has the educationist's outlook. She classifies failures in learning as due to lack of intelligence, physical defect, unsuitable feeding, inadequate sleep, lack of equipment or unwise methods of tuition. Where the parents are to blame, she believes that the task of teaching them to understand the child better should fall on the educational psychologist and the visiting teacher; when teachers fail with both parents and child then it is time, she thinks, to seek medical advice. Valuable as child-guidance clinics can be in elucidating the causes of peculiar behaviour or delinquency, she finds their scope too limited when it comes to prevention. Possibly with many of these failures physical treatment

1. The Social Psychology of Education. C. M. Fleming, ED B, PH D. (Kegan Paul, Trench, Trübner. Pp. 110. 7s. 6d.)

is needed more often than psychological. Whatever the rightful place of the doctor in trying to correct an educational failure, it seems clear that doctors and teachers could with advantage work together more closely.

CANAVALIN

Of the so-called viruses, the only ones which have proved susceptible either to sulphonamides or to penicillin are the agents of lymphogranuloma venereum, trachoma, inclusion blenorrhœa, and mouse pneumonitis. These, recent work has shown, probably belong in a group of infectious agents which occupies a position intermediate between viruses and bacteria, analogous to the rickettsias. None of the true viruses have been demonstrated to have any susceptibility to the chemotherapeutic weapons now available. Being closely adapted to the metabolism of the cells of the host and living in symbiosis with these cells, the viruses are not affected by substances of broad antagonistic action which do not affect the tissues. Because the metabolism of viruses is largely that of the host's cells, any attack on these functions must first destroy or damage the cells. The fundamental approach to the chemotherapy of virus diseases must therefore be the search for substances of much narrower specificity than those now available—the development of highly specific enzymes or other substances which will attack certain fractions of the viral antigenic complex. In some of the larger viruses such complexes include proteins, lipoids and carbohydrates, and any enzyme system which can attack one of these three components may have promise as a specific chemotherapeutic agent. The lead in this approach to chemotherapy, at least as it affects bacteria, has already been pointed by the fundamental work of Dubos, whose carbohydrate enzyme was capable of attacking the specific polysaccharide of pneumococcus type III, and thereby rendering this organism avirulent and readily phagocytosed. Unfortunately, further advances along this line have been slow. Lately, however, Farley [1] has been working with what he believes to be a complex enzyme or system of enzymes, divided on the one hand from the jack bean and on the other from the vitamin-B complex, which attacks and kills the polysaccharide components of some bacterial pathogens. This substance, canavalin, is said to act on a wide range of polysaccharides (starch and glycogen as well as those of bacterial origin) and yet appears to be non-toxic for tissue cells. From his preliminary communication it is impossible to judge the significance of Farley's work, but the theoretical implications behind it are of first importance.

DEATH IN THE BATHROOM

When Queen Elizabeth took a bath, no common event, she ordered several doctors to attend in the anteroom. Today few of us rank the hazards of a good wash quite so high; but Dr. Eric Gardner's address to the Medico-Legal Society on Oct. 26 must have sent many a medicolegal man home to examine his bathroom cupboard and the fittings of his geyser. The bathroom, Dr. Gardner declared, is the most dangerous room in the house. There the grandmother hides the weed killer from the children, and takes it herself in mistake for an aperient; there the shortsighted man mistakes strong carbolic for his eye lotion; there too the boy with a taste for gadgets uses an electric immersion heater and dies in the water; or the woman drying her hair at an electric radiator is killed as the wet strands touch the wires. Suicides, anxious not to give unnecessary trouble, often choose the bathroom for their purpose; others accidentally drown themselves in the bath; and even natural deaths in the bathroom are not rare, a fact which Queen Elizabeth probably had in mind. Fits, falls, and scalds, all take their toll; but in Dr. Gardner's opinion the chief avoidable risk comes from the faulty or badly-fitted geyser, and he described 10 deaths in which a geyser played a part. At times the bathroom ventilation was at fault: some fumes collected, but in addition the burners devoured the small supply of oxygen, so the bather died partly of carbon monoxide poisoning but mainly of asphyxia. Sometimes a blocked vent forced the fumes back into the room: in one case a dead starling, stopping the vent, took the life of a boy; in another, a wife who did not like smuts blowing back through the vent sent her husband up to fit over it a perforated tin lid—and later lost the husband. Sometimes a geyser, no longer serviceable but kept in commission, filled the bathroom with incompletely burned fumes, and in one case a larger volume of fuel gas per hour was being delivered than such an old corroded geyser was able to consume.

Dr. Gardner was careful to point out, however, that compared with the number of people who use geysers unscathed the victims of defective ones are few; and even these could be reduced if geysers were always installed by qualified gas-fitters and afterwards maintained by the gas companies—who at present have no statutory right of entry for such purposes. His 10 cases were seen over a period of as many years, and for the five years ending in 1939, there were only 49 deaths from geyser fumes in England and Wales, or 10 a year. Moreover, so much care has been taken to make them safe that modern geysers are well within the limits of the stringent tests imposed by British Standards Specifications. An overloaded geyser of modern type, burning in a bathroom of only 300 cubic feet, with vent-pipe completely blocked, and ventilation allowing only two changes of air per hour, will produce no more than 0·03% of carbon monoxide in half an hour. Nearly ten times that amount can be inhaled for an hour before even 30% of the blood is saturated.

It is perhaps noteworthy that of the 49 deaths from geyser fumes in 1935–39, 37 were men and 12 women. Dr. Gardner suggests that this may indicate a masculine taste for lingering in the bath.

PENICILLIN IN BEESWAX

As penicillin becomes more generally available for infections which are not severe enough for treatment in hospital, the need for more manageable methods of administration becomes more apparent. In the Services gonorrhœa is not proving as amenable to sulphonamide therapy as was hoped, and penicillin is replacing sulphonamide as the drug of choice, as well as being required for sulphonamide-resistant infections. The best results in gonorrhœa have been obtained with a series of 5–6 injections of 20,000 units at three-hourly intervals. Obviously it would be advantageous to reduce the number of doses if the bacteriostatic effect of each dose could be continued longer than the customary 2–3 hours. We have already commented on the experimental use of *p*-amino-hippuric acid to delay excretion of penicillin, apparently by interfering with its passage through the cells of the renal tubule.[1] Another likely method seemed to be the use of an oily excipient to delay absorption from the site of injection. Peanut and other vegetable oils and protamine zinc have been tried for this purpose, but were not very effective. Romansky and Rittman [2] now report experiments with mixtures of peanut oil with beeswax, which has previously been used for prolonging the action of histamine and heparin. *USP* bleached beeswax was added to peanut oil in proportions from 0·75% to 6%; 2–3 c.cm. of the mixture was pipetted into an ampoule of purified penicillin powder, and the mixture was then shaken up with a few beads to ensure uniform dispersion of the drug. Preparations of this kind kept in the refrigerator, at room temperature,

1. Farley, D. L. *Surg. Gynec. Obstet.* 1944, **79**, 83.

1. *Lancet*, Oct. 21, p. 542.
2. Romansky, M. J., Rittman, G. E. *Science*, 1944, **100**, 196.

in the incubator at 37° C., retained their original potency for 30–62 days. Initial experiments with rabbits showed that after an injection of 5000–10,000 units of penicillin in 1 c.cm. of the oily fluid, an inhibitory level of penicillin was maintained in the blood for 6–12 hours compared with 2 hours for the same dose of penicillin in saline. Injections of 41,000 to 66,000 units of penicillin in 2·0 to 2·4 c.cm. of beeswax oil into three human volunteers gave demonstrable blood-levels for 6–7 hours and penicillin was present in the urine for 30–32 hours after the injections. None of the patients complained of local pain or irritation. Because of these findings, 12 patients with gonorrhœa were given one dose of penicillin (unitage not stated) in beeswax oil and 11 of them were cured; 53 others were later cured by a single injection.[3] Further data on this method of administration are promised and are obviously needed.

DEMOCRACY ON THE MARCH

OVER here the work of the Tennessee Valley Authority has been viewed mainly from the scientific and technical aspects. Most of us know that a great, turbulent river has been harnessed to produce electric power and control flooding. We know too that the TVA has done much to check erosion of the soil and foster scientific agriculture; to bring industrial prosperity to the valley; and to promote health and welfare among its people. A new book[4] by David Lilienthal, chairman of the authority, tells how the job was done and discusses the underlying philosophy of this great experiment. The story is of immediate interest to every medical man who wishes to think clearly about the democratic basis of any national service.

Lilienthal writes frankly as an enthusiast: "No one," he says, "can be so absorbed in this work as for a decade I have been and remain passionless about a task so altogether heartening." But his enthusiasm does not go to his head. When he says that the achievements that science and technology now make possible may bring no benefits—may be disastrous to the human spirit—unless they have a moral purpose, he means just that; because he has been taught by experience. He points out that the Act creating the TVA was the deliberate and well-considered creation of a new national policy: "For the first time in the history of the nation the resources of a river were not only to be 'envisioned in their entirety'; they were to be developed *in that unity with which nature herself regards her resources*—the waters, the land, and the forests together, a 'seamless web'—... of which one strand cannot be touched without affecting every other strand for good or ill." Under this new policy there were to be no joint authorities or advisory councils, no dissection into little bits that would fit into the various administrative departments central and local. The whole scheme was to be the responsibility of one agency—a regional authority with full executive power to carry out the general policy laid down by the central government. It is not decentralisation "when bureaux or departments are moved out of crowded Washington. ... You do not get decentralisation unless you meet two tests: First, do the men in the field have the power of decision? Second, are the people, their private and their local public institutions, actively participating in the enterprise?" Lilienthal is well aware of the difficulties in securing the active participation of local citizens, but the experience of the TVA has been encouraging. Almost every community has proved to be a reservoir of talent for public service. "Decentralisation," he says, "is a kind of mirror in which one can see how well or how badly the work responds to its broad purpose." Because it is a regional agency, doing its work and making its own decisions in the valley, TVA cannot escape the sight of its mistakes, or irresponsibly turn its back on the stream of daily life. Success can come only through a technical leadership in which the people, not in the mysterious aura of distance but under the revealing and commonplace light of proximity, have confidence.

There is more to it than this. Under the TVA scheme the regional authority is a national organisation working in partnership with local bodies, both voluntary and statutory. There is nothing in the region's experience to support the fears that the establishment of a regional agency with executive powers would mean the undermining and ultimate destruction of local government. The contrary has been the case. "It is indisputable from the record that state government is stronger in the Tennessee Valley today than it was ten years ago and has more functions to perform. It is notably true that local community government and functions are more vigorous. I know of no other place in the United States of which this can be said with equal basis in performance." David Lilienthal's book states the case for regional government clearly, cogently and concisely, and his conclusions are based on ten years of solid achievement. The function of "dynamic decentralisation" (as he calls it) is that of leadership, stimulus, guidance—planning in the broadest sense.

3. *Bull. US Army med. Dept.* October, 1944, p. 43.
4. "TVA," David E. Lilienthal. Penguin Special. Pp. 208. 9*d*.

NOTABLE NAMES

CHANCE and luck, perhaps, decide whether or not any man's name shall be linked with a disease, a physical sign, an anatomical structure, or a piece of equipment. But once an eponym is forged, it takes strong hold on the imagination. Thus the aqueduct of Sylvius is more memorable than the iter ab tertio ad quartum ventriculum, because it provokes a picture of the anatomist happily likening the little tunnel to a water conduit. In the same way Paul's tubes, Erb's palsy, Friedreich's ataxia, Dover's powder, Hodgkin's disease, Thomas's splint and the Trendelenburg position call up energetic visions of somebody doing something positive. Conscientious students of great names, however, may wonder what the giants really looked like: and Mr. Hamilton Bailey and Mr. Bishop have taken the trouble to show them.[1] A fascinating picture-gallery of those who gave their names to things is supplemented by short informative accounts of the things they gave their names to. If the book shatters some illusions it also renews some faiths: in a profession more renowned for intelligence than good looks, there are the fine heads of Scott and Sims, and Volkmann's magnificent whiskers, to bring up the average; and the text is a reminder of the variety and ingenuity of the human mind. But what has become of Parkinson's disease?

Sir HERBERT EASON has been re-elected president of the General Medical Council for a further three years.

Dr. A. G. H. SMART has been appointed representative of the United Kingdom on the UNRRA Far Eastern Subcommittee on Health. Dr. W. H. KAUNTZE succeeds him as medical adviser to the Secretary of State for the Colonies.

1. Notable Names in Medicine and Surgery. Hamilton Bailey, FRCS, and W. J. Bishop, FLA. Lewis. Pp. 212. 15*s*.

UNIVERSITY OF MELBOURNE.—Dr. S. D. Rubbo, senior lecturer in bacteriology in the university, has been appointed to the chair of bacteriology.

ROYAL SOCIETY OF MEDICINE.—At 2.30 PM, on Tuesday, Dec. 12, at the section of psychiatry, Dr. Markus Engler will open a discussion on mongolism. Dr. R. M. Stewart and Major T. A. H. Munro will also speak. On Dec. 14, at 2.30 PM, at the section of neurology, Mr. Harvey Jackson will read a paper on orbital tumours.

Special Articles

NATIONAL HEALTH SERVICES IN NEW ZEALAND

(*Concluded from page* 732)

THE following facts and figures provide a background for discussions on the shape of the New Zealand health services. Wherever possible they have been extracted from official publications, or from articles in the *New Zealand Medical Journal*. A new book, *New Zealand, a Working Democracy*, by Mr. Walter Nash, now New Zealand resident minister in Washington, and formerly minister of finance and of social security for New Zealand, has been a valuable source of information. Much help has also been received from doctors formerly in practice in New Zealand but now in this country.

DOCTORS AND MEDICAL STUDENTS

The population of New Zealand is just over 1,600,000. In 1943 the number of doctors on the register was 1809, of whom about 1500 were in active practice. These figures include about 90 in full-time, and 30 in part-time, government employment, and some 360 in the Forces. The absorption of so large a proportion of doctors by the Forces has meant a more than proportional decrease in the number available for the civilian population. It is estimated that if there were an even distribution of all the active practitioners in New Zealand in peace-time, there would be one practitioner for each 1170 people; but after allowing for the doctors in the Forces, and for hospital and full-time State employees, the present figure is about 1 per 2300. As this includes both specialists and general practitioners, the average general-practitioner ratio may be only 1 per 3000, and in some towns it is as low as 1 per 5000. It is difficult to classify the available doctors accurately, because in New Zealand, compared with this country, more of them combine general practice with specialisation in some particular branch. This is particularly true of the country districts, where pure specialism does not pay.

About 80–90 students graduate each year. Not all these remain to practise in New Zealand, but the numbers that do remain approximately replace losses by death and retirement. Encouraged by the increase in the number of State bursaries, and the relatively easier and safer remuneration of general practice under the Social Security Act, the annual entry of students rose in 1943 to 275, or about three times the normal. This is an inordinately large figure for a country as small as New Zealand; of every 60 boys in the appropriate age-group 1 was taking up medicine. But it is apparently thought that this level of entry can be maintained for three or four years without risk of lack of demand for their services in New Zealand after qualification. It is of course possible that as more qualify the average earnings may fall. This would be likely partly through greater competition, and partly through division of the available Social Security funds among more beneficiaries.

FINDING THE MONEY AND SPENDING IT

The Social Security Fund is financed by a tax of 1*s.* in the £1 on all incomes. This yielded in the financial year 1943–44 £13 million, to which was added £4 million from general taxation. The major outgoings from this fund were £8 million in respect of old-age pensions, £1 million for widows and orphans, another £1 million for the blind or permanently incapacitated, and slightly less than £1 million in children's allowances. Sickness benefits cost £376,000, and unemployment benefit only £32,000. These last figures are of vital significance. Unemployment is at its lowest in time of war. It is easy to see that a return towards conditions such as existed before the war (as in 1938–39, when the expenditure on unemployment relief in New Zealand was over £7 million, and the total yield of the Social Security tax only £5½ million) might make economies on other parts of the Social Security budget politically imperative.

In 1943–44, the total payment from the Social Security Fund for medical benefits was approximately £4¾ million. This included payments to hospitals, to general practitioners, to nurses and midwives, to pharmacists and for certain specialist services such as radiological examinations and physiotherapy. It represented an increased expenditure of about 27% on the previous year when these same services had cost £3¾ million. The share of the general practitioners in 1943–44 amounted to approximately £1,342,000, made up of £33,000 paid to salaried general practitioners, £56,000 in capitations, £1,026,000 by the different refund and item-of-service systems taken together, some £167,000 from claims for midwifery, and £60,000 mileage fees. Those doctors who undertook dispensing also received a share of the pharmaceutical supplies benefits, which were more than £760,000. This sum represents a drug expenditure of 9*s.* per head of population, and as it excludes all medicines supplied to inpatients in hospitals, and takes no cognisance of any expenditure on patent or other remedies privately purchased, it seems unexpectedly large. One must conclude that the new service has not deterred, but rather encouraged, "the bottle of medicine habit."

The hospitals receive in all about £2½ million, which includes £283,000 to private hospitals and £334,000 to maternity hospitals, many of which are also privately conducted.

THE DOCTOR'S INCOME

It would be interesting to calculate from the above figures the average income derived from the Social Security Fund by practitioners. As the number of general practitioners is not known it is impossible to be exact; but if the figures quoted above as to the war-time distribution of doctors are accepted—and they come from a careful survey made by Prof. Hercus and Dr. Purves in the *New Zealand Medical Journal* for June, 1943—they would mean that each practitioner was getting from the fund about £2400. From the numbers (as far as they are known) of practitioners accepting salaries or capitation fees, it seems likely that they too receive incomes around £2000. Of course, this does not represent the total incomes of general practitioners, for many will be charging additional fees to the patient amounting to 30–50% of what they receive from the government, and some will be receiving part-time salaries and private fees as consultants.

How this compares with previous earnings is again difficult to say, but doctors always were in what was, for New Zealand, the high-income group. Most of them approached and many exceeded a gross income of £2000, despite bad debts, which (in the absence of any national scheme of health insurance) were often 20–30%. Practice expenses on the whole were less than in this country, and might roughly be assessed at 20–25%. These expenses will no doubt be even less now that the supply of all necessary drugs is chargeable to the Social Security Fund.

In considering all these figures, two factors should not be forgotten—namely, that the New Zealand £1 is exchanged for only 15*s.* English money, and that the toll of income-tax rises very steeply, particularly on incomes over £2000. The first factor is offset to a certain extent by the lower cost of living; rents, food costs, schooling and holidays are all cheaper than in England. So the second is perhaps the more important.

There is a personal exemption from income-tax on the first £200 of income, with a further allowance of £50 for the wife, and £50 for each child under 18. After that, tax must be paid on all income on a steeply graduated scale, commencing at 2*s.* 6*d.* in the pound on the first taxable £100, and rising (with supertax) to 15*s.* 6*d.* when the taxable income reaches £3700. Besides these taxes, everyone pays 1*s.* in the £1 Social Security tax, and 1*s.* 6*d* in the £1 National Security tax. (The latter, though at present levied for war purposes, is rapidly becoming regarded—from its mode of collection—as part of the Social Security tax, and might easily be allowed to persist as such if post-war conditions demanded its retention.) The total effect of these additional direct taxes is that the highest incomes are taxed at 18*s.* in the £. The following table shows the steep way that taxes rise, particularly from about £1500 upwards.

The fact that, of all income earned over £2500, approximately two-thirds, and of all income over £3700 nine-tenths, will be returned in taxation, makes rather illusory the increases in income now reported to be obtainable. Nor is the stability of these incomes assured for the years after the war. It has been

TOTAL DIRECT TAXES (SOCIAL SECURITY, NATIONAL SECURITY, AND INCOME TAX) ON EARNED INCOME OF MARRIED TAXPAYER WITH TWO CHILDREN

Assessable income	Total tax	Tax expressed as percentage of income
£600	£120	20
£800	£188 6s. 8d.	23·5
£1000	£263 6s. 8d.	26·3
£2000	£738 6s. 8d.	36·9
£10,000	£7587 18s. 4d.	75·9

emphasised that the doctors' incomes are among the highest earned in New Zealand. Should the war-time prosperity of the Dominion not be maintained during peace doctors may find it difficult to justify their continued receipt of so large a subsidy from the public purse while retaining their right to charge private fees as well. The treasury, on its part, might well find in times of greater financial stringency (especially if they coincide with a greater availability of medical personnel) that it could not afford to carry, in perpetuity, the unlimited commitments placed upon it by a system paid for on an item-of-service basis, and might very well seek to extend the salaried or capitation schemes at the expense of the refund system.

The small number of doctors in the Dominion makes the profession more vulnerable; for any situation that brought about the appearance of 200–300 doctors simultaneously needing posts might alter the whole outlook. On the other hand, the small number of doctors and the relatively very high proportion of them enrolled in the New Zealand branch of the British Medical Association (said to be about 95%) makes for more effective collective bargaining.

Nevertheless, the medical profession can nowhere afford to hold the community to ransom, and ultimately they must convince the public of the justice of their demands, if they are to retain the privileges and the emoluments to which they consider themselves entitled. It is hard to do this if any part of the accepted system is admittedly open to abuse.

REBUILDING FAMILY LIFE

A CONFERENCE arranged by the National Association of Maternity and Child Welfare was held on Nov. 23 and 24 at Friends House in London. Speakers drawn from a wide range of occupations and interests, among them Mr. Willink, the Minister of Health, discussed the rebuilding of family life after the war, under the headings of housing; social and health services; population; the housewife and mother; the viewpoint of the rural areas; nursery schools; education; broken family life; illegitimate and delinquent children; and substitute homes.

Mr. WILLINK, reviewing the advances made during the war, pointed out that nearly every low record in infant and child mortality has been broken, and many new schemes are under way. Prof. JAMES YOUNG inclined to think we have not done as much for child welfare as other countries, especially Holland and New Zealand; like the Minister, he felt that a lot of work lies ahead of us.

Miss ELIZABETH DENBY felt that rehousing must be accomplished by providing homes for individual families, and that flats must be left to childless couples. She believed in keeping housing schemes within city boundaries; new properties on the outskirts add to the sprawl and encroach on the countryside. The plans made for Chelsea and other areas intended for the rich, she suggested, show that houses can be at least 26 to the acre—not 12 or 8, which the Ministry of Health has laid down as the standard. The prefabricated two-bedroom bungalows were criticised by speakers on the grounds that they would discourage people from having children. Mr. Willink defended them; it would not be difficult, he said, to move into a larger house as the need arose. However, anxiety is perhaps misplaced since Group-Captain J. A. C. WRIGHT, MP, left the meeting with the impression that the extinction of the human race is at hand: in 1990, he said, there will be 8 people over 60 to every child.

Miss F. HAWTREY, speaking of nurseries and nursery schools, explained that they were not in conflict. After the war, she said, there will still be a need for both residential and day nurseries even after nursery schools have been established for children down to the age of 2. Such residential nurseries, as other speakers pointed out, will be wanted for illegitimate children and for those whose mothers have nowhere to leave them while another child is arriving. In this connexion many speakers mentioned the importance of providing home helps. Dr. C. FRASER BROCKINGTON suggested that these should be recruited, trained, employed, and supervised by the maternity and child welfare authority. Dr. HELEN STANDING suggested that applicants should be interviewed by the superintendent health visitor before being engaged, and that their work should be supervised by the midwife, health visitor, or district nurse attending the case.

GENERAL MEDICAL COUNCIL

WINTER SESSION, NOV. 28–DEC. 2

AT the conclusion of the President's address, reported in these columns last week, a vote of thanks was proposed by Prof. Sydney Smith. Lord Moran of Manton was introduced by Dr. Parsons as representative of the Royal College of Physicians of London; Professor W. J. Dilling by Dr. Clark as representative of the University of Liverpool; and Mr. James Lyons, LDS, by Dr. Fish as an additional member under Section 16 of the Dentists Act.

Penal Cases

The council directed the erasure of the name of *Ernest Mathias Buckley*, Dentists Act 1921, registered as of 45, Little Horton Lane, Bradford.

After considering some adjourned cases without making any erasure, the council considered the case of: *Archibald Walker*, registered as of The Manor House, Waxwell Lane, Pinner, MB GLASG. (1926), who had been summoned on the following charge:

That being a registered medical practitioner: (1) You committed adultery with Mrs. Marie Lucy Francis-Hughes Boyes on numerous occasions in May and/or June, 1942, and/or behaved improperly to the said Mrs. Marie Lucy Francis-Hughes Boyes during the said period; (2) you wrote improper letters to the said Mrs. Marie Lucy Francis-Hughes Boyes on numerous occasions during the period from May, 1942, to September, 1942; (3) you stood in professional relationship with the said Mrs. Marie Lucy Francis-Hughes Boyes at all material times. And that in relation to the facts so alleged you you have been guilty of infamous conduct in a professional respect.

The complainants were the Colonial Office, for whom Mr. Gerald Howard, instructed by Mr. Winterbotham, solicitor to the council, opened the case. Respondent was accompanied by Mr. Carthew, KC, and Mr. H. Dickens, counsel, instructed by Messrs. Radcliffe and Co. Mr. Howard brought forward evidence of the professional relationship and read a long series of love-letters. He read extracts from the report of the inquiry made in the Gold Coast, in which Mr. Boyes described how he had discovered the relationship and obtained possession of the letters, which had been parcelled for return to respondent. As a result of the inquiry Dr. Walker's name had been removed from the register of doctors practising in the Gold Coast. Mr. Howard pointed out that much wholly inadmissible evidence had been given at the inquiry, but that respondent had not been found guilty of adultery. Mr. Carthew submitted that there was no shadow of evidence to support charge (1), and the council agreed to strike this charge out.

Dr. Walker gave evidence and admitted in cross-examination that he had had a flirtation with Mrs, Boyes on the night of May 24, and kissed her for the first time, and that next day she had had blood taken for a test in the hospital by a sister acting under his instructions.

Mr. Howard: And next day you wrote this letter, beginning "My darling——." Do you think that is a proper letter to write to a woman who is your patient?

Dr. Walker: Probably not. I was the only doctor available; every woman in the place was potentially a patient of mine.

Dr. Walker agreed that at the material time he had been less than 18 months married to his second wife, who had been the cause of the divorce from his first wife.

He and Mrs. Boyes had been in love. In asking her to come away with him, he had been acting lightly; in his official capacity it would have been impossible for him to live with her. He thought this was foolish conduct, but not heartless. Looking back on it, he agreed that his conduct had been improper and dishonourable. In reply to the Legal Assessor, he agreed that Mrs. Boyes had been brought to him by her husband, who had been suddenly called away from the Gold Coast shortly before May 25, 1942, returning in February, 1943. He understood that during their two years' residence in the Gold Coast Mr. and "Mrs." Boyes were not married, Mr. Boyes having a legal wife in America.

The Registrar was directed to erase his name.

Two cases were taken together, those of:

Alexander Zelmanovits, registered as of 609, Clive Court, Maida Vale, London, W9, MD PRAGUE (1938), and of *Anthony John Watkin*, registered as of 11, Woodville Road, Newport, Mon., BM OXFD (1943), who had both been summoned on the following charge:

That you were at the session of the Central Criminal Court commencing on June 27, 1944, convicted of the following felony, namely, of unlawfully using an instrument or some other unknown means with intent to procure the miscarriage of Dorothy Muriel Davies.

Dr. Zelmanovits had been sentenced to 12 months' imprisonment, and Dr. Watkin had been ordered to enter into his own recognisance in the sum of £10 for his appearance to hear judgment if called upon within two years.

Dr. Zelmanovits conducted his own case; Dr. Watkin was represented by Mr. Oswald Hempson, solicitor, on behalf of the Medical Defence Union. Dr. Zelmanovits explained that he had performed the abortion for personal and compassionate reasons. Mr. Hempson said that Dr. Watkin was greatly indebted to Dr. Zelmanovits for educational help. Dr. Zelmanovits had implored his help in a terrible position. He had at first refused, but on a second appeal had agreed to lend a room, and a rubber sheet for the operation, and to assist by sterilising the instruments and giving an anæsthetic.

The name of Dr. Zelmanovits was erased from the Register; judgment on Dr. Watkin was postponed for two years subject to the usual provisos.

The council also directed the erasure of the name of:

David William Jones, registered as of 71, Weymouth Street, London, W1, MRCS (1914), who had been summoned on the following charge:—

That you were on Sept. 1, 1944, convicted (after having pleaded guilty) at the Clerkenwell Police Court of the following misdemeanours—viz., (1) With intent to defraud by false pretences, obtaining £10 from William David Cooper at 2, Leighton Grove, NW (date of offence Aug. 24, 1943) and were sentenced to 3 months' imprisonment; (2) obtaining by fraud, other than false pretences, at Blackmore Gate, North Devon, credit to the extent of £26 from James Brown (date of offence Jan. 22 to Feb. 27, 1944) and were sentenced to 2 months' imprisonment; (3) obtaining by fraud at Taunton, Somerset, the sum of £2 6*s.* 8*d.* from Louisa Mary Dee, of Trust Houses Ltd. (date of offence Feb. 15, 1944) and were sentenced to 2 months' imprisonment; (4) with intent to defraud, by false pretences, obtaining £3 from Doctor Arthur Wade Highbridge, Weston-super-Mare (date of offence Feb. 28, 1944) and were sentenced to 2 months' imprisonment.

ALLEGED CANVASSING

The greater part of the session—involving postponement of seven cases until the February meeting—was occupied in hearing the case of:

Matthew Morgan-Daley, registered as of 15, Small Street, Trafford Road, Salford, 5, MB DUBL. (1939), who had been summoned on the following charge:

That being a registered medical practitioner:
1. In or about February, March, and April, 1944, you directly, and/or by employing, or sanctioning the employment of, an agent or agents and/or a canvasser or canvassers, canvassed the patients of Mr. Nathan Shlosberg, MB MANC., in a practice at 31, Trafford Road, Salford, 5, which he had purchased on or about Feb. 25, 1944, and in which you had been employed as a locum tenens in Feb. 1944, before the said practice was purchased by him, and/or the patients of the said practice and other persons, for the purpose of inducing them to become patients of yours, and in particular (1) on or about Feb. 26, 1944, you offered James Langrish, a person residing on the premises a 31, Trafford Road, Salford, 5, where the said practice was carried on the sum of 10*s.*, and made to him a promise of employment, on condition that he would furnish you with the names of patients of the said practice; and by means of the said offer and promise you obtained access to records of the said practice, and copied therefrom the names and addresses of patients of the said practice; (2) on or about Feb. 26, 1944, you canvassed a woman unknown who was a patient of the said practice, and was seeking treatment on the premises where the said practice was carried on, and thereby induced her to attend at your surgery; (3) on or about Feb. 28, 1944, you canvassed two women unknown who were patients of the said practice and were seeking treatment on the premises where the practice was carried on, and thereby induced them to attend at surgery at 33, Trafford Road, Salford, 5, where you had been to carry on practice on or about Feb. 28, 1944; (4) on or about Feb. 1944, you employed, or sanctioned the employment of, an a to canvass persons who were patients of the said practice, a other persons, and in particular Alfred Bowman, Thomas Ha and David Ribeiro, and thereby induced four or more such pe to attend at your said surgery; (5) on or about Feb. 29, 1944 canvassed Olive Purves and another woman unknown who w patient of the said practice; (6) during the period between Feb. 26 and about Feb. 29, 1944, you employed, or sanctioned employment of, an agent to canvass Mrs. Clara Robinson, a pa of the practice of the said Mr. Nathan Shlosberg; (7) in or a March, 1944, you employed, or sanctioned the employment of agent to canvass Mrs. Maria Ratcliffe, a patient of the practice, thereby induced her to become a patient of your practice; (8) about March, 1944, you employed, or sanctioned the employment an agent to canvass John Herbert Whittingham, a patient of practice, and thereby induced him to attend at your said surgery March 24, 1944, and you then canvassed him with a view to indu him to become your patient; (9) in or about April, 1944, you canvassed one Healey, a person insured under the National He Insurance Acts who was included in the list of the said Mr. Nat Shlosberg for the purposes of medical benefit under the said with a view to inducing him to transfer to you as an insuran practitioner; (10) in or about May, 1944, you canvassed Pe Porter, Ada Coxon, and Annie Green, persons insured under t National Health Insurance Acts who were included in the list of t said Mr. Nathan Shlosberg for the purposes of medical benefit un the said Acts, and thereby induced them to transfer to you as insurance practitioner.

2. In or about February, 1944, you advertised for the purpose obtaining patients or promoting your own professional advanta by exhibiting the following sign in a window of the premises 33, Trafford Road, Salford, 5, where you had begun to carry practice on or about Feb. 28, 1944: "Dr. Daly, MA, MB, BC BAO, Physician; Surgeon; Oculist and Ophthalmic Medic Specialist"; and in particular on the occasion on or about Feb. 1944, specified in subhead (5) of head 1 above, you drew t attention of the said Olive Purves and of the said woman unknow who was a patient of the practice to the said sign.

And that in relation to the facts so alleged you have been guilty infamous conduct in a professional respect.

The complainant was Dr. Nathan Shlosberg, represented by Mr. A. A. Pereira, counsel, instructed by Messrs. Le Brasseur and Oakley, on behalf of the London and Counties Medical Protection Society. Respondent was represented by Mr. Oswald Hempson, solicitor, on behalf of the Medical Defence Union. Dr. Shlosberg stated that he and a Dr. Clein had been close neighbours with entirely separate practices. On the imprisonment of Dr. Clein early in the year, Mrs. Clein had engaged the respondent as a locum with a view to purchase, but the agreement had fallen through, and in the end Dr. Shlosberg had purchased the practice. Within a week of the purchase Dr. Daley had set up in practice in an adjacent house. At the time of purchase (on Feb. 25) Dr. Clein's practice had had about 1250 patients, of whom 604 had transferred to Dr Shlosberg. At the end of the first quarter he had lost 100 patients. Dr. Daley had kept the visiting-book from Dr. Clein's practice.

Sixteen witnesses were called and testified variously that they had seen the notice described in the charge; that they had seen a man standing outside Dr. Clein's surgery pointing the way to Dr. Daley's house; that Dr. Daley had instructed patients how to change their panel doctor by getting them to write out the necessary formula, and then, without their knowledge, sent the application in to the Ministry; and that a woman had called on them inquiring about a possible change of doctor. In cross-examination several of the witnesses admitted that they had written out and signed statements that they had consulted Dr. Daley of their own free will and on their own initiative. One of them said that she had only done this because Dr. Daley had pestered her to.

Mr. Hempson then called, on behalf of Dr. Daley, eight witnesses and read a number of statutory declarations from others, testifying that the statements of the complainant were wholly untrue. The man alleged to have been standing at the gate touting declared he had merely been talking to friends. The mother-in-law of a family which had transferred to Dr. Daley said that the initiative to do so had come from the mother and not from Dr. Daley. They also testified that the women he was alleged to have approached in the street had in fact approached him first; and that he had actually ordered Mrs. Purves away from his premises, knowing her to be Dr. Shlosberg's dispenser. Several witnesses had seen the notice put up and declared that it contained nothing but his name, qualifications and surgery hours. A witness who had been asked to be present at two conversations said that Dr. Daley had told him that he understood that a case was being "framed" against him by

Shlosberg and he had therefore taken precautions n an early date.

The council ruled that there was no evidence to support rges 1 (9) and 2.

Dr. Daley gave evidence on his own behalf, confirming t of his witnesses and vehemently denying that he d ever canvassed any patient. He had left Dr. Clein's iting-book on the table, and anyway it had no addresses it. He had never employed any agent.

The council decided to erase Dr. Daley's name from e Register.

RESTORATIONS TO THE REGISTER

The following names were restored to the Medical egister after penal erasure: Richard Murray Barrow, onald James Eadie, James Leslie Hill, and George acdonald Thomson.

In England Now

A Running Commentary by Peripatetic Correspondents

THE peripatetic correspondent in your issue of Nov. 11 aves an unfriendly inference to be drawn by all amateur assoon players. The bassoon, when in unskilled hands nd its double reed in unskilled lips), is less offensive han most inexpertly-played instruments of the orchestra. n order of horribleness I would place badly played iolins, violas, 'cellos, brass generally, clarinets and boes before bassoons.

I once read an article on the personalities of orchestral layers in which the bassoonist was likened to the doctor on the grounds that he was soothing without being sympathetic. I like to think that we doctors are the bassoons of this orchestra of human life. Prout called the bassoon the clown of the orchestra, which was slander. In ensembles and the tutti it keeps its place like a good citizen, but in the solo passages written for it by the great composers it displays in turn all those characters most loved and respected in a good physician:

1. It has a huge sense of joy and humour (see Beethoven's 8th and 9th symphonies).
2. It is the king of debunkers, a fact appreciated by nearly all opera and ballet writers.
3. It has great powers to exhibit gentleness and charm; observe how Mozart's works show this.
4. It can, when roused, give forth such noble clarion calls as can only be equalled by the horn—

says Beethoven through his bassoon player at the end of the 5th symphony.

5. Its powers of sympathy and compassion are nearly without limit; observe its pathos in the sorrowful moments of symphony, oratorio or cantata.

Fate has led me to earn my living as a doctor and to play the bassoon for love; but when I stand at the gate of eternity I intend to arm myself with a bassoon and not a stethoscope.

* * *

"Though not my work," commented the Wodehouse butler, while delivering his employer from a trying situation. Our profession, some think, defines the limits of its duty just as sharply, and goes outside them even less willingly than the butler. Not long ago Mr. S. Black, FSMC, said as much—rather well, I thought—in the *Optician* (Sept. 15, p. 105).

> "Faced with diseases ... due to bad housing, poor nourishment and unhealthy working conditions, the medical profession has applied itself energetically to the task of curing these diseases instead of making a bold stand and demanding the abolition of the causative factors."

Still, we are beginning to grow social consciences and no doubt in time we shall be ready to tackle preventive medicine in the round—or the raw. More depressing is his doubt lest the early stages of training deprive the medical student of pity, or at least teach him to beware of it. Certainly most medical students defend themselves against its inroads, when they first enter the wards, by an assumed toughness, and by concentrating on the manifestations of disease—on the case, not the patient. This protective device should deceive nobody; and good teachers see to it that the misplaced emphasis is soon restored to the true. Yet the state is dangerous, for as Bacon says, "custom only doth alter and subdue nature." Callousness first adopted as a pose may become automatic. Anyhow, Mr. Black thinks we are rather short on human sympathy: otherwise we could not tolerate so placidly the discomforts which patients at some of our hospitals still suffer. He cites long hours of waiting in outpatient departments, and the rough-and-ready behaviour of some of our colleagues to hospital patients. Since most patients nowadays help to maintain hospitals through the contributory schemes, they naturally dislike both the waiting and the bluntness. He might have added other bad habits: the old hospital custom of rousing patients to wash them, which makes nonsense of our faith in the healing value of sleep; our indifference about hospital food, so often ill-balanced, unappetising and even insufficient; and the occasional disregard of a patient's fears when his disease is discussed before a class. Moreover, Mr. Black brings the charge, which unfortunately cannot be repudiated out of hand, that patients who have seen a doctor or surgeon privately may get priority when it comes to finding a bed. I have seen those who subscribe to contributory funds or are employed by generous subscribers equally favoured: and the man with a more urgent condition but no special backing may be forced to wait or go elsewhere. Many will soon be coming back into medicine who have been trained to give precedence to wounded men whose need is urgent. If they teach us to turn an equally critical eye on hospital waiting-lists they will be putting one of the lessons of war to good use.

* * *

No wonder foreigners sometimes look on us as a nation of hypocrites! We run many societies for preventing cruelty to animals, any experimentation on animals must be licensed and—I think quite rightly—is subject to restriction and supervision, and in today's *Times* there is an appeal for money to stop cruelty to animals in North Africa. Yet we allow the Minister of Agriculture to brush aside the law of the land in permitting war agricultural committees to set steel traps in the open, for which purpose some of them have been employing Italian prisoners. Probably more animal pain is caused by these steel traps in one county in one night than in all the so-called vivisection experiments in a year. Besides killing—after a few hours' torture—the rabbits for which they are intended, they also kill many useful birds and other animals. Nor do I believe they are necessary. A Cornish farmer in rough country told me he got more rabbits with bright lights such as headlights and dogs at night than with traps, and I myself in a Morris 8 with the screen up and a gun have in a few nights cleared off the rabbits from a 20-acre flat piece of land where many trees had been planted. It was murder, but merciful murder.

A writer to the *Times* says the steel trap is a blot on our civilisation, and anybody who has not a heart of stone and has seen it in operation must agree.

* * *

Hens are more human than I thought. A friend of mine has been a headmaster at two different schools. As soon as he decently could after his second appointment he retired and bought a farm so as to be the youngest retired headmaster who had been a headmaster twice, if you see what I mean. He says that if only he had studied poultry farming before instead of after taking up schoolmastering he would either (*a*) have dodged headmastering altogether, or (*b*) have been a far better headmaster (twice). For instance, if you want to move your henhouse six feet to the left or right, it's no good just moving it that distance. The hens simply won't coöperate. It takes longer than ever to get them to go to bed, because the poor mutts insist on roosting in the open on the old site. No, the thing to do, he has found, is to move the henhouse 400 yards away. The hens reorientate themselves much more quickly; and when you have gained that point you move it back 398 yards, and again they get the new idea with convenient alacrity. And it's just the same with reforms and reorganisation in a school. My friend says his reforms weren't sweeping enough. He tried to shift things gradually inch by inch, and he could never budge people out of their old ways.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

THE King's Speech has had no unexpected features but it has produced a phrase which arouses doubts as to the likelihood of social legislation being implemented. Certain Bills, such as those on electoral reform and local elections, local-government finance, Colonial welfare, and the regulation of wages and conditions of employment, are foreshadowed in words which make their introduction definite. But the social legislation is dominated by the phrase "as opportunity serves." Mr. Greenwood, speaking for the Labour Party, urged that "It is a high duty upon us to see that, so far as we can do it, the promises that were made are implemented." The session now opened is, in the Prime Minister's words, "the closing session of this long ten years' Parliament," and Mr. Greenwood appealed to the House and to the Government "to make this session one of dedication to public ends, and to the fulfilment of those promises and aspirations which the people of this country, in all quarters, so richly deserve to have realised." The Prime Minister, in the course of the debate, pointed out that the leading men in both the principal parties—and in the Liberal Party as well—were pledged to this great mass of social legislation and he could not conceive that they would fail to support it in the new House, however constituted. Mr. Eden, winding up the debate on Friday, went further. He promised on behalf of the Prime Minister and his party that if a Labour Government were returned at the next election the Conservatives would support the passage of the Bills dealing with this social legislation. If on the other hand a Conservative Government were formed they would feel they had the right to count on the Labour Party to give them support.

Exchanges like this call to mind the elegancies of the debate on the King's Speech in pre-war days when mover and seconder might be seen in Court dress with lace ruffles—the costume of Fontenoy—and using the words of an ancient courtesy. And it is to be hoped that the social legislation already outlined in the King's Speech is by this inheritance lifted out of the ruck of acutely contested party discussion.

FROM THE PRESS GALLERY

The Gracious Speech

ON Nov. 28 Parliament was prorogued by Royal Commission, and on the following day the new session, the tenth of the present Parliament, was opened by the King with customary ceremony. In the course of the Gracious Speech from the Throne His Majesty said that the Government would continue their policy of ensuring fair distribution of the necessaries of life so long as there was scarcity. The Government also intended that, as opportunity served, progress should be made with legislation for a comprehensive health service, an enlarged and unified scheme of national insurance, a new scheme of industrial injury insurance, and a system of family allowances. Parliament would also be asked to approve measures for a national water policy. Other measures which would be laid before Parliament in the new session would deal with the adjustment of local-government areas and Colonial development and welfare.

In moving the address in reply to the Gracious Speech in the House of Lords, the Duke of NORTHUMBERLAND, speaking as president of one of the largest voluntary hospitals, said that the Bill foreshadowed for a comprehensive national health service was assured of a general welcome. But to be successful it must enlist the wholehearted coöperation of the medical profession, the voluntary hospitals, and the local authorities in association with the Ministry of Health. Compulsion and regimentation either of doctor or patient would be alien to the spirit and design of the scheme. Much would depend on the action taken on the recommendations of the Goodenough Committee for the coördination and medical staffing of hospitals, local and voluntary alike. He hoped that the areas which were to be the planning units of the service might be of sufficient size each to contain a university whose influence could spread through that area. Apart from the special problem of the teaching hospitals, it should surely be our object to retain the existing voluntary hospitals unimpaired. While no doubt it would be necessary to set up in each area an effective regional council, representative of the universities and the medical profession as well as of the local authorities and municipal hospitals, to arrange for the staffing and location of the various types of hospital, he suggested that the management of each of these hospitals, whether municipal or voluntary, should be left free to conduct the internal affairs of their respective institutions. Moreover, grants of public money to the voluntary hospitals should come direct from the Government. The voluntary hospitals had shown themselves capable of coöperating to the full with the local authorities, and they were eager to play the part in public health which they alone could play. The aim of Parliament must be to ensure that the Government in their preoccupation with the organisation of a comprehensive health service did not unwittingly destroy a system which had always given the lead in the medical, social, and economic problems involved in a modern and progressive health service. The crux of social insurance appeared to him to be the price which the people of this country would have to pay, not only through public money, but also in private contributions, and it would be for the people to decide whether they were prepared to pay that price. The Government had given assurances that the country could pay, but had been at pains to point out that the whole success of the scheme would depend on the maximum efficiency of production. And that, affirmed the noble Duke, could be achieved only by a nation freed from disturbances due to industrial unrest.

AS OPPORTUNITY SERVES

Lord ADDISON said that the phrase "as opportunity serves" in the Gracious Speech did not buoy him up with hope. The Beveridge report and the Government's splendid white-paper had been before the country for a long time and surely there had been sufficient time to draft the necessary legislation. He feared that the source of the delay was the lack of agreement on the instructions to be given to the Parliamentary draftsman. He hoped that the country, which expected these things, and had been promised them, would have something better than ground for misgivings that they were going to be put off because opportunity would not serve until after a General Election. But Viscount CRANBORNE, replying for the Government, insisted there was nothing sinister behind "as opportunity serves." The words were not intended to bear the interpretation which had been put upon them in the debate. The legislation foreshadowed in the Gracious Speech was immense in scope and in ordinary times would certainly have occupied several sessions of Parliament. Even at the present time it was uncertain how long it would take to pass these Bills through both Houses. The Government did not wish to promise more than they could certainly perform. It was, he suggested, for Parliament itself to decide how quickly it could pass the Bills. If means were found of expediting them no-one would be more delighted than the Government.

In the debate in the Commons Mr. ARTHUR GREENWOOD also called attention to the phrase, which he said had disturbed many members of the House. What the country was hoping for was the fulfilment by this Parliament of the pledges which had been given. He realised that we might be in for very difficult times, but it was certain that the country would regard it as a betrayal if, when party political struggles were resumed, the present Parliament and the Government had not substantially fulfilled the promises that they had made. The PRIME MINISTER asked the House to recognise that no more could be done in the way of legislation than to proceed with it as opportunity served. The progress that might be made in this session would be governed by the length of the session, which depended on the duration of the European war. As to the post-election period Mr. Churchill said that amid much that was uncertain he saw this measure of certainty: whatever the complexion of the next House of Commons he could not conceive of the leading men of the parties, committed as they were to a great mass of social legislation, failing to make good their commitments to the people.

The Manufacture of Penicillin

On the motion for the adjournment in the House of Commons on Nov. 29, Mr. GEORGE GRIFFITHS raised the question of the manufacture of penicillin and the agreement between the British and United States Governments. Mr. Griffiths was disturbed that manufacture of this life-saving British discovery was being handed over to five or six companies. This was in contrast to what happened 25 years ago when insulin was immediately given to the world. At first it was costly, but as production increased the price was brought within the reach of the working people. But the British Government had practically handed over the manufacture of penicillin to the United States and only 5% of the output was made in this country. In the West Riding county council laboratory at present there was a young Czechoslovakian doctor, Dr. Berger, who had been able to manufacture pure penicillin with a loss of only 5% in the process; even this loss he had been able to recoup. Yet the British manufacturers were losing up to 45%. The Ministry of Supply had been asked to grant facilities for the West Riding laboratory to be extended, but sanction had been withheld.

At this point Mr. Griffiths expressed his regret that the Minister of Supply was not present, and Sir GRANVILLE GIBSON asked the Speaker if it was not customary for ministers affected to be present when a subject was raised on the adjournment. The SPEAKER replied that the member who raised a question was responsible for seeing that the appropriate minister was in attendance. Mr. Griffiths interposed that he had not been able to get the Minister of Supply to be present, but there were other ministers on the Government bench who would no doubt convey to Sir Andrew Duncan what had been said. Continuing, he said that five firms in the British Isles had a monopoly of penicillin manufacture. It was said these firms did not wish to divulge what they were doing because it was not desired to let the Germans know about it, but that was a paltry excuse. In 1941 a Research Corporation was formed, including Messrs. Boots, May & Baker, the Wellcome Foundation, the Glaxo Laboratories, ICI, and Kemball, Bishop, Ltd., to inquire into penicillin production. Those firms were trying out different processes so that they could make penicillin more effective. He challenged the Ministry of Supply to bring forward a penicillin which was better than that which was being produced in the West Riding laboratory. Was it not time that this monopoly was finished and that everybody in the country who needed penicillin should be able to get it?

QUESTION TIME

National Insurance

Sir ROBERT TASKER asked the Minister of National Insurance if he would make it clear whether under the white-paper a waiting period of two years was contemplated before the proposals contained in the white-paper could be effective. —Sir W. JOWITT replied: I cannot at this stage indicate the date on which the Government's proposals may be expected to come into operation.

Vitamins for British Prisoners of War

Replying to a question Sir JAMES GRIGG stated that the composition of the food parcels sent out by the British Red Cross Society and Order of St. John War Organisation was designed and is reviewed by experts in nutrition in relation to the rations issued by the Detaining Power. All practicable steps were being taken to restore the normal flow of Red Cross parcels. His medical advisers informed him that the reduction in the issue of parcels was unlikely, unless unduly prolonged, to prejudice materially the health of the prisoners.

War-time Social Survey

Sir E. GRAHAM-LITTLE asked the Minister of Health if he would state the yearly expenditure, from inception up to date, upon the war-time social survey; how many persons had been employed in the service and with what range of salaries; whether questionaires were formulated for visitors to present to the persons visited; and what were the questions which the public were invited or required to answer.—Mr. H. WILLINK replied: I presume the question refers to the health index investigation carried out for my department by the War-time Social Survey. So far six surveys have been made at two-monthly intervals, at an estimated total cost of £9800. It is not possible to estimate accurately the number of persons employed since the staff are engaged during the greater part of their time in research for other departments. Field investigators are paid between £5 15*s.* and £6 15*s.* a week. Questions are put orally, and answers are invited, not required.

Release of Medical Student

Sir E. GRAHAM-LITTLE asked the First Lord of the Admiralty whether he would consider for release from the RN a medical student, who volunteered for the RN in 1940 when he had nearly completed his studies for the second examination of the medical degree, but now was anxious to finish his course and assist his father, an overworked medical practitioner, or whether he would secure priority of demobilisation for this student.—Mr. A. V. ALEXANDER replied: I am afraid that it is not possible to give any special preference to medical students for release from the Royal Navy. While I appreciate the motives which prompted this young man to join up at a time when he was reserved, there are so many students serving in the Armed Forces whose studies have been interrupted by the war that it is not possible to give any of them exceptional treatment. Their position has not been overlooked, however, in connexion with the various Government Schemes for resettlement and further education.

Public Health

Temporary Houses in London

A REPORT presented to the London County Council last Tuesday deals with the provision in London, and at the Council's cottage estates, of emergency factory-made houses to be supplied by the Government. It is thought that some 20,000 such houses will be required for the most urgent cases.

It has been agreed with the Ministry of Health that in London the temporary houses shall be erected on (1) small sites capable of taking two or more and not suitable for the early erection of permanent dwellings; (2) sites reserved for open spaces in reconstruction areas and on LCC housing estates; and (3) parts of open space on developed housing estates where open space is plentiful. Upwards of 2000 small sites are likely to be available in London, accommodating from 8000 to 9000 houses. Delivery in London is expected from Jan. 1, 1945, at the rate of 250 a week, and before then the Ministry of Works will need to provide foundations. The Ministry is prepared to begin site works at once and has asked the Council to find, in conjunction with the metropolitan borough councils, sites for some 3000 houses in the first three months of 1945. The Council has authorised its officers to settle which sites shall be used, how many houses each can accommodate, and how each site should be developed, and in consultation with officers of the borough councils to consider whether the houses, when erected, shall be managed by the Council or by the borough councils. Generally speaking, it is intended that, inside London, the Council will manage the larger groups of temporary houses, those in the near neighbourhood of its permanent housing estates, and those on its own land.

The Council's approval has been asked for a first-instalment estimate of £1 million for acquisition of sites and provision of necessary services on them. Surveys so far indicate that only about half the 20,000 houses can be placed in London and on LCC cottage estates; so the selection of other sites outside the county is being considered.

SCIENTIFIC FILM ASSOCIATION.—The first annual general meeting of the association was held in London on Nov. 25, with Mr. Arthur Elton in the chair. He stressed the need for critical appreciation in the field of scientific films. The world of publishing had an elaborate organisation for criticism and documentation of every book directly it was published. Without some such machinery the film would remain an ephemeral thing instead of being part of our national culture. He hoped this deficiency in the scientific film would be made good by the association, which was now publishing an annotated catalogue. A show of scientific films which followed the discussion included a short film on brownian movement made at the Glasgow Technical College, the new film *Children of the City*, and the British Council film depicting the development of the rabbit.

Letters to the Editor

VENOUS SPASM PREVENTING TRANSFUSION

SIR,—During two years' research in the burns unit of the Glasgow Royal Infirmary (1942–44) considerable experience of this condition was gained. With severe burns, venous spasm is the rule rather than the exception. Present in both arm and leg veins, it always gives more trouble in the leg—presumably because of the greater length of vein traversed by the fluid. The spasm is not temporary; it does not pass off after forcing in the fluid under pressure; and its persists as a rule until the period of "shock" is over (24–36 hours). Generally speaking, in the internal saphenous vein the spasm is sufficient completely to prevent the flow of serum or plasma under gravity, though occasionally the "drip" will run very slowly. Non-protein fluids will flow fairly fast, but whether this difference is due to their lower viscosity or to a specific venospastic agent in plasma and serum is not apparent.

Attempts to overcome this spasm were unsuccessful. Application of heat to the course of the vein, or raising the leg, had little or no effect. Some improvement could be obtained by massaging the vein in a proximal direction, but it was very temporary and appeared to be chiefly mechanical. In some cases the spasm could be almost abolished by injecting 0·5–1·0 c.cm. of 1% procaine into the "drip," but this effect was also temporary, passing off in 2–3 minutes. The fluid could be forced in under pressure, but this caused such severe pain along the line of the vein that it was not practicable for any length of time.

In the early stages of our work several patients undoubtedly died because of our inability to transfuse quickly enough sufficient plasma or serum through a spastic internal saphenous vein. Indeed, so constant was the phenomenon that the ankle veins were finally abandoned as a route of administration. As a rule the arm veins proved satisfactory in spite of the slight degree of spasm; fluid would run under gravity or under very slight pressure. When, however, the arm veins were involved in the injury some other route had to be found, and the external jugular was the best. Spasm was never observed in the external jugular veins, even in the most extensive cases of burning. This may be because of the short distance between the vein and the right side of the heart, or because the vein is fixed to the deep cervical fascia which it pierces in the root of the neck. The vein is easily cannulised, and is undoubtedly the route of choice when there is severe peripheral venous spasm.

BLA. THOMAS GILSON.

BEDS FOR TUBERCULOUS PATIENTS

SIR,—I could answer Dr. Constant Ponder's letter in your issue of Nov. 25 at great length, but the danger of State control of medical services is so well known to your readers that I would ask you only to print a few headings.

Of course Dr. Ponder and the medical committee for Kent do their best; but it is the system under which they work that breaks down, and is harmful to the best interests of the patient. In voluntary hospitals the first thought is the patient. In State, or municipal, hospitals, organisation—or, as Dr. Ponder calls it, "normal procedure"—tends to take first place.

I know of one hospital of nearly 1000 beds, which comes under the Kent County Council. Their committee meets once a month; their "decisions" have to go to Maidstone, 40 miles away, for confirmation by a committee which meets once every three months. In a hospital run by responsible people, the sense of frustration caused by such delay in taking decisions has to be experienced to be believed. In a voluntary hospital, the medical officer in charge can and does give quick decisions on anything which may affect the welfare of the patient. I understand that, in voluntary hospitals, if the decision is a big one, the house committee meets once a week.

Directly a doctor becomes an administrator, it is not in the nature of things possible for him to keep up to date to the same degree as a consultant. And, forsooth, Dr. Ponder takes exception to my asking the advice of the tuberculosis officer on the spot, because he is ("tell it not in Gath") a subordinate official and is not in a position to speak on the council's policy.

No-one realises better than I the difficulties of wartime; but instances are still coming to me of persons suffering from tuberculosis who are compelled to live in their homes; and, in the opinion of one tuberculosis expert, one "free" case affects on the average eight or nine others. The vicious circle now being created will take ten or twelve years to break down. Of course this is a national problem, but it is my duty to bring to the notice of the authorities the sufferings and disabilities of my constituents, and I shall continue to do so, regardless of personalities. It is interesting to note that Dr. Ponder thought the matter deserved an explanation in *The Lancet*. "Qui s'excuse, s'accuse."

Through the Fighting Fund for Freedom, 1, Dover Street, London, W1, of which I am chairman, we are doing all we can to educate the voters of this country against the mortal danger of State control—of which an outstanding example is the medical white-paper recently issued by the Government; and in this nation-wide movement we should welcome the help and coöperation, already strongly in evidence, of doctors and nurses.

Knockholt, Kent. WALDRON SMITHERS.

TREATMENT OF DIPHTHERIA

SIR,—In your leading article of Nov. 11, on Diphtheria in Germany, you recommend dosages of 8000–16,000 units of antitoxin in early doubtful cases, and of 50,000 units intravenously, together with expert nursing during at least the first fortnight of the disease, to combat the risk of cardiac failure in cases of the nasopharyngeal type with a "bull neck." We do not agree that this is an entirely sound practice. The former dosage is often wholly inadequate, especially with invasive strains of high virulence, even in early cases. After administration of serum the practitioner is liable to become complacent, thinking that he has done all that is necessary. He may have something of a shock when even a few hours later there is a rapid spread and the patient is at length sent into hospital. Many such cases have been seen by us both in Service and civilian patients.

Neither do we agree that a dose of 50,000 units intravenously is massive: for the nasopharyngeal type of infection a dosage of 100,000–200,000 units, the greater part intravenously, is essential.

With regard to expert nursing, even the mildest cases require such care until they are convalescent, which is never within 2 weeks. The severe type needs skilled attention for at least 7 to 9 weeks. Cardiac failure, often associated with severe palsies, is by no means unknown between the 5th and 7th weeks, even in adults, and may occur as late as the 9th week.

There is much difference of opinion about serum dosage, and one's ideas on this subject are influenced by the severity of the disease, which seems to vary considerably in different localities. It would be interesting to hear the views of others on this question.

D. F. JOHNSTONE.
Plymouth. J. FLUKER.

THE EXAMPLE OF NEW ZEALAND

SIR,—Whether an editorial, or annotation, should "educate," or reflect, public (medical) opinion is a matter for consideration, but it would appear to some of us that THE LANCET has decided in the former sense so far as the white-paper on a comprehensive medical service is concerned.

Whatever the disadvantages of the New Zealand scheme may be, it seems to mitigate two risks: (1) the risk of destruction of the doctor-patient personal relationship, and (2) the risk of a learned scientific but essentially humane vocation becoming a branch of a worthy but impersonal civil service under government control. Your "special article" says that a serious disadvantage of the New Zealand scheme is that the Social Insurance Fund has to meet an unpredictable, unlimited, and "bottomless" liability. Alternatives in the scheme, apparently not popular with doctor or patient, leave a comparable "bottomless" liability to the doctor in terms of demands upon his mind and body. A solution, and middle course, should be possible.

It is true that responsibility for the finance and

dministration of any national service rests primarily with the government; but the doctor (as well as the patient) is concerned when the methods chosen appear to endanger in some respects the adequacy of his medical service, his conception of the traditions of medical practice, and his social-economic place in the changing order of society. The aspiration to provide, under State control, a comprehensive medical service for all, equal to any other form of medical service—not only in its basic essentials but including, for example, the amount of time given to each patient to satisfy his or her emotional needs, quite apart from the doctor's standards of medical practice—will have to be examined in the light of facts relating to the number of patients, the number of general practitioners, the number of consultants, the number of private and ward beds available in hospitals, and the standard of living of doctors and their dependants in relation to the rest of the community.

When many doctors opposed the National Health Insurance Act in 1911, they probably did so because they felt the next step would be the equivalent of the present white-paper, and they were apparently right. When some doctors advocate extension of NHI as an alternative to the white-paper it probably is because they believe the latter will lead to a complete State medical service. They are illogical only superficially, not fundamentally, and many believe their prognostication would prove right again.

Nevertheless doctors have done and are ready to do as much as any other branch of the community to help to solve the complex problems of social and economic evolution, and they realise that this may involve some personal sacrifice. I believe that they are resolved that any such sacrifice should be in the best interests of medicine and humanity, and not to satisfy, or compromise with, party politics, medical politics, or an ideology divorced from reality; and above all it must not destroy the ideals and traditions they serve.

It may be that these fragmentary observations apply chiefly to general practice, but the consultant is not justified in dissociating himself from the problems his colleagues in general practice have to face and with which he himself is bound to be directly or indirectly concerned.

London, W1. S. L. SIMPSON.

ADVANTAGES OF MEPACRINE

SIR,—Discussions on drugs for malaria do not seem to have sufficiently stressed the comparative tastelessness of mepacrine as opposed to the excessive bitterness of quinine derivatives, especially when they are used in solution. A prophylactic obviously loses its efficacy when not used regularly by every exposed person, which happens frequently with quinine, largely owing to its unpleasant taste. Methods of enforcement may be more or less successful in the Armed Forces, but they are not applicable to civilians and merchant seamen, and persuasion seems insufficient to make big children take bitter medicine. A tot of rum as taste corrective used to show results, but with Asiatic sailors even this stimulant is not reliable and the quinine queue gets thinner in proportion to the distance from mosquito-ridden shores—long before immunity can be expected. It is therefore its tastelessness—apart from other considerations—which gives mepacrine a valuable advantage in malaria prophylaxis.

London, W9. PAUL EDERER.

MALIGNANT MELANOMA

SIR,—Miss Tod's article in your issue of Oct. 21 is so stimulating that one hopes it will be expanded by further correspondence. For in spite of the horrifying calamities therein described, dictum no. 1, that "it is never justifiable to remove, for cosmetic reasons, a pigmented lesion which shows no sign of active growth," appears so sweeping that it may defeat its own object of reducing the incidence of malignant melanoma.

Every surgical procedure carries a small potential of tragedy, which cannot be removed by the negative advice to "let it alone." Surely the 34 deaths through "meddlesome and incompetent treatment," which have come to the notice of the Holt Radium Institute during a period of 9 years must represent a minute percentage only of those patients who in the same period of time have been harmlessly rid of a black wart by means of the knife, cautery, or thread. On the other hand, having regard to the known tendency of pigmented moles to undergo spontaneous malignant change, one is left wondering how the statistics of this terrible complication would have been affected if all moles were left strictly alone until they had begun to give trouble as in cases 1 and 4 out of the 6 cases mentioned in the article.

I am sure the fraternity plus sisterhood of general practice will be grateful for this article, if only because it deals with a problem of everyday occurrence (mole not melanoma). I shall in future cut out my moles together with a generous base of healthy skin; but I would like to learn more about the implication of local anæsthesia.

W. R. E. HARRISON.

P.S.—Since writing the above I have read with satisfaction the letter on the same subject by Dr. J. E. M. Wigley and Dr. R. T. Brain (Nov. 25) in which they rightly deplore the disintegrating effect of ill-balanced criticism. The time may soon be coming when general practitioners in particular may have to withstand a chilling discouragement to enterprise in the treatment side of their work; not because of the anxiety inseparable from the task of doing something to (and we hope for) a fellow human being, but through fear of censure from "above."

MEDDLESOME AND INCOMPETENT TREATMENT

SIR,—The criticism of Miss Tod's paper on malignant melanoma by Dr. Wigley and Dr. Brain in your issue of Nov. 25 brings up the old problem of etiquette in the medical profession. It is my firm belief that this etiquette business is being taken too far: I suggest that it is a stumbling-block to progress. As a professional man I know it is a nice feeling to know that fellow practitioners will stand by you, and even protect you from the public when you are professionally in error. In actual practice, professional etiquette is more an official policy than a private and practical one.

The case in question is interesting from this point of view. Miss Tod is accused of being discourteous to the profession. What discourtesy is there in sincerely expressing—in, be it noted, a professional and not a public paper—the opinion that "six patients died as a result of meddlesome and incompetent treatment." I admire Miss Tod for having the courage of her convictions and for making them known to her fellow practitioners. The fact that the article in question was quoted by the *Evening News* was not of course Miss Tod's fault. I feel that frankness would do the profession a world of good. As to destroying the confidence of the public, we can destroy it in ways other than by being honest and candid.

Let us have professional etiquette by all means, but do not let us use it as a shield against our patients, or even as a protection against open criticism from our colleagues.

J. J. HODSON.

PENICILLIN IN ACUTE NEPHRITIS

SIR,—I have read with interest Dr. Alan Moncrieff's letter of Nov. 25. I have in hospital a companion case in a farm labourer of 42 who was admitted with a hæmolytic streptococcus infection of the throat and nephritis. The nephritis was not in all probability a first involvement of the kidney, though he was ignorant of any previous attack. Granular casts were present and the blood-pressure was considerably raised. The throat had been inflamed for 14 days before admission, œdema of the face had been present for 7 days, and of the legs for one day. The next day blood and pus appeared in the urine, the temperature rose from 103° to 104° F, and erysipelas developed on the face. Anti-streptococcal serum had no effect, so it was decided to try penicillin; the evil reputation of erysipelas when associated with nephritis is well known. He was given 15,000 units of penicillin every 3 hours for 24 hours, and 10,000 units every 3 hours for a further 24 hours. The effect was dramatic, but it is too soon to say if the nephritis has settled down to its state before the onset of infection.

Perhaps penicillin is especially indicated in such cases because the defective elimination by the diseased kidney allows a more continuous action to be maintained in the blood.

Prince of Wales's Hospital, Plymouth. T. H. G. SHORE.

MECHANICAL RESPIRATORS

SIR,—To the interesting list of conditions treated with the Both respirator given in your annotation of Nov. 25 may I add a personal case of myasthenia gravis so treated in 1940? The patient was readmitted to hospital in serious relapse with acute respiratory embarrassment. It was decided to use the respirator for a few hours in addition to the usual remedies. Though successful, it may be argued that this treatment was not life-saving in itself and that it therefore did not justify the acute anxiety of the patient during the preliminary manipulations.

Chertsey, Surrey. JOAH BATES.

SIR,—I have no doubt that Mr. Marshall, who in your issue of Oct. 28 described the use of a slightly altered Both respirator in the treatment of crush injuries, has designed a satisfactory modification. I hope however that others who may attempt to adopt his methods will first make sure that the alteration they plan will not interfere with the prime function of the machine as a respirator.

In your issue of Nov. 25 Mushin and Faux (p. 685) point out that the respirator may be of considerable value in the prevention of postoperative chest complications. This suggests a greatly extended field for the normal use of the machine, and makes it still more desirable to avoid alteration to the design which might lead to mechanical weakness precipitating a breakdown with disastrous results to some urgent case of respiratory failure. I suggest, therefore, that sooner than interfere with the planned design of the cabinet a more effective (and, for the patient, a considerably more comfortable) adaptation may be provided by the use of a box or boxes large enough to encompass the affected limb or even the body from the waist down. Such a box could be coupled direct to the mechanically operated bellows via the flexible hose. Any competent handyman should be able to construct a set of boxes from strong plywood or other material capable of withstanding the necessary pressure. In the absence of the professional handyman it might be possible to make a "box" by applying a suitable thickness of plaster-of-paris bandage over a wire cradle or similar skeleton frame. No great amount of ingenuity would be required to make the necessary connexions. The leak valve on the bellows-unit will serve to control the negative pressure. Adequate control of positive pressure must be arranged, and should present no difficulty if the simple design of the valve in the Both cabinet is studied. The small capacity of the unit relative to the bellows should be remembered, and pressure-check with a manometer must not be omitted.

Western Hospital, Fulham. W. HOWLETT KELLEHER.

A CENTRALISED AMBULANCE SERVICE

SIR,—In your annotation of Oct. 21 (p. 540), attention is drawn to certain shortcomings in existing ambulance services, which may or may not be due to the war. It is stated that (*a*) "... unhappy incidents have arisen from the rule that ambulances should not operate outside the area of the authority which provides them"; (*b*) "... those engaged in the ambulance service should be properly trained whole-time workers"; (*c*) "there is not always anyone to accompany the drivers of an ambulance..."

The Home Ambulance Service of the Order of St. John and the British Red Cross Society is administered throughout England and Wales on a county basis with headquarters in London. The organisation lends itself readily to any regional or national scheme. The service, free from red tape, is always ready to meet emergencies as they arise. No ill-judged rules or regulations as to areas or boundaries are permitted to delay the prompt aid that may mean the difference of life or death to the patient. In such a service the welfare of the sick and injured must be the first consideration. Its 530 ambulances work in a field where they are self-dependent, to a very large extent, for the preparations of the patients for safe transport. They must not only be equipped with first-aid materials and sick-room requisites but must include staffs trained and qualified to deal with casualties and invalids under the most difficult conditions. It is for just such work that the training demanded by the Order of St. John and the British Red Cross Society equip their members. Duties are more or less evenly divided between the men and women in the divisions and detachments. The nurse escort is an aspect of the work which has been developed considerably in recent years and with the return to normal the ambulance staffs of the Order and the Society will be available as a trained and sympathetic body of men and women ready to take their place in the National Health Service.

Order of St. John and British Red Cross Society, London, SW1. H. ATTENBROW, HENRY T. FERRIER, Joint Secretaries, Home Service Ambulance Committee.

A COMPREHENSIVE DENTAL SERVICE

SIR,—My boy aged 10 will not enter dentistry, for the following reasons.

(1) The financial return is not comparable with that of the allied professions of medicine, law, accountancy and education. Bursaries and grants will never alter the entry to the profession until this is changed.

(2) The work is far more exacting, and in time of illness income ceases, except for any payment due under a sickness or accident policy. This is *not* applicable to the other professions mentioned.

(3) Owing to the abominable piecework system instituted under National Health Insurance, the dental surgeon is only paid by returns; and now this is also true of most private work.

I should perhaps add that I have not been entirely unsuccessful in the profession. Aged nearly 42, I am dental surgeon to the local voluntary hospital, to the municipal hospital, and to the school for the deaf and dumb. My work starts at 9.15 AM and goes on till 9.15 PM with 1½ hours' break for meals—six days to the week. Returns and balance-sheets are at your disposal.

Preston, Lancs. A. E. J. BERRY.

DOCTORS FOR GERMANY

SIR,—I imagine that I am not the only serving doctor who rubbed his eyes in astonishment on reading the letter from Dr. Andrew Topping of UNRRA which appeared in your issue of Nov. 18. Dr. Topping states that he has the names and records of a considerable number of doctors who have offered and who are available to assist in the control of displaced persons in Germany. He implies, moreover, that he will not need anything like the number who have volunteered.

While appreciating the needs of UNRRA and the "arduous and possibly thankless task ahead," I feel that an explanation is called for. Just who are this large body of volunteers, and how does it happen that they are in a position to be spared?

Can it be that the acute shortage of doctors has been suddenly relieved? If this is so and if, as I assume, these gentlemen are more interested in working abroad than at home I have a suggestion to offer. Let any who are not needed by UNRRA and who are of military age enter the Services. This would, no doubt, release a number of men and women who would be only too glad of the opportunity of working at home for a change.

It is, of course, just possible that the Far East might not have the same appeal as the Continent.

'FIVE YEARS.'

*** We understand that in response to Dr. Topping's appeal 84 doctors volunteered through their local medical war committees. Another 12 had already approached UNRRA directly, making a total of 96. The Central Medical War Committee decided that 51 of these were releasable: all of them were unsuitable for the Services either from age or on medical grounds. A total of 34 (20 British and 14 Allies) have so far been interviewed, and 9 British and 11 Allies selected for appointment. None of the 20 are recruitable for the Services.—ED. L.

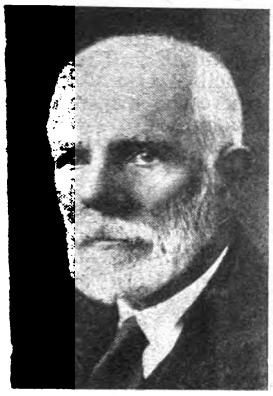
FROZEN FRESH MILK FOR HOSPITAL SHIPS.—United States army hospital ships will soon be supplied with enough frozen milk to provide each patient with a quart of milk a day. Graded pasteurised homogenised whole milk will be used, frozen immediately after pasteurisation. It is expected to remain palatable for at least six weeks after freezing.

Obituary

JOSEPH ARTHUR ARKWRIGHT

KT, M D CAMB, F R C P, F R S

THE death of Sir Joseph Arkwright on Nov. 22 brings to a close a long life of research in various branches of microbiology. The son of Arthur William Arkwright, of Broughton Astley, Leicestershire, he was born on March 22, 1864, and was educated at Wellington, at Trinity College, Cambridge, and at St. Bartholomew's Hospital. He qualified in 1889, held house-appointments at his own hospital and elsewhere, and then settled in practice at Halesowen, Worcestershire. In 1905 he joined the staff of the Lister Institute as a voluntary worker, and in 1909 he was appointed assistant bacteriologist; and though he resigned this post in 1927 he continued his researches as an honorary member of the staff. He was elected a member of the governing body in 1932 as representative of the Royal Society, and served until the beginning of this year.



Arkwright's early work dealt with the application of bacteriological knowledge in public-health problems, such as the spread of diphtheria in schools by carriers and the examination of epidemic and sporadic strains of meningococcus. *The Carrier Problem of Infectious Diseases*, a book which he wrote jointly with his friend and colleague the late Sir John Ledingham, gives evidence of his grasp of the subject.

In 1915 he studied an epidemic of cerebrospinal meningitis among troops encamped upon Salisbury Plain, and recorded his observations on the grouping of the strains of meningococcus isolated. Later he joined the RAMC, becoming pathologist at St. George's Hospital, Malta, and with Dr. E. A. Lepper he wrote on the occurrence of 16 cases of blackwater fever in the Eastern Mediterranean area. In 1918 he became a member of the War Office committee on trench fever, and investigated with his colleague Arthur Bacot the virus of this disease and its transmission by lice. Arkwright, Bacot, and Duncan made convincing observations on the constant association of the virus of trench fever with *Rickettsia quintana* in lice. At this time, too, Bacot and he worked at the nature of the virus of typhus and the transmission of the disease to monkeys and guineapigs by lice. In January, 1922, the services of Arkwright and Bacot were placed at the disposal of the Egyptian Government by the governing body of the Lister Institute with the object of studying the ætiology of typhus. After two months' work in Cairo both contracted the disease; Bacot succumbed, but Arkwright, after a very severe illness, recovered. A joint paper on the results they obtained was published in 1923, and showed that the excreta of typhus-infected lice could convey the disease to guineapigs.

Arkwright's sound knowledge of general biology and of genetics led him at an early stage to observe and note instances of bacterial variation. In 1921 his well-known paper on variation of bacteria as evidenced by colonial form and agglutination by salts and by specific serum was the starting-point of numerous world-wide researches on the variants denoted by him as R and S (rough and smooth). The fundamental investigations carried out during the next 20 years on the relation of these forms of bacteria to virulence and on the chemical nature of the strain-specific and type-specific bacterial antigens that are associated with virulence combine to make a fascinating story, culminating—for the moment—in the remarkable recent work of Avery, MacLeod, and McCarty on the isolation and identification of the active principle in an extract of S type III pneumococci which brings about a transformation in vitro of R type II pneumococci into the S form of type III pneumococcus; the transforming substance is apparently desoxyribonucleic acid. In his Bradshaw lecture to the Royal College of Physicians in 1929 on the virulence of micro-organisms in infective disease Arkwright included an account of his work on bacterial variation; and he opened the discussion on variation at the Second International Congress which was held in 1936 in London. He contributed the chapters on variation and agglutination, and also those on typhus (with A. Felix) and trench fever to the *System of Bacteriology* of the Medical Research Council.

An important part of Arkwright's active life was devoted to the study of animal diseases and of animal nutrition. In November, 1920, he was seconded for a year from the Lister Institute to investigate foot-and-mouth disease under the auspices of a committee appointed by the Ministry of Agriculture. From 1925 to 1933, as a member of the committee, he supervised the researches on the virus of this disease by workers in the institute, and later he became chairman of the committee. He was a member of the Agricultural Research Council from its creation in 1931 until 1940. He was chairman of the committee on *Brucella abortus* and took a very active part in founding the Field Research Station at Compton, Berkshire, where the work on this organism was carried out. He was also chairman of the joint committee on tuberculosis of the Agricultural Research Council and of the Medical Research Council; and he presided over the ARC committee on Johne's disease of cattle.

In 1916 he was elected fellow of the Royal College of Physicians, and he served on the council from 1929 to 1931. He became FRS in 1926 and was knighted in 1937.

Sir Joseph was a good working field naturalist and specialised in field botany; he had a sound knowledge of cultivated plants and took great pleasure in gardening. His interest in the problems of heredity was lifelong. He was a researcher who noted and pondered over details in his work whose significance might easily have been missed. He was friendly and encouraging to youthful colleagues, treating them as equals and so giving them a confidence that enabled them to do better. His statements in serious conversation were luminous and stimulating, and he kept a well-balanced and thoughtful outlook on problems arising in the course of discussion. He was extremely kind in his estimates of other workers, his generous impulses making it natural for him to dwell on their merits and to be oblivious to their weaknesses or defects. His personality was an unusually attractive one: the modesty of his bearing was part of his charm. He leaves a widow and three daughters.

HENRY BRIGGS

M B EDIN, LL D LPOOL, F R C S

Dr. Henry Briggs, emeritus professor of obstetrics and gynæcology at Liverpool, who has died at 88, began his work in that city under conditions very different from those of today. The old Hospital for Women in Shaw Street was a block of converted houses, fine mansions of the merchant princes in their time, but straggling and inconvenient as a hospital; while the old "Maternity" was a group of villas connected by covered ways, perched above the smoke and noise of a railway cutting. Yet Briggs, Wallace, and John Gemmell made these unpromising places into centres of first-rate practical work and teaching. When the new medical school was built, extra accommodation for the department of midwifery and gynæcology was released in the old school; but the university could not afford to fulfil Briggs's vision, and he equipped classrooms and laboratories at his own expense. The departmental museum, still a magnificent memorial to his work, was his special hobby, and any time he could spare from his hospital and private practice was spent there, supervising the carving of a pelvic mannikin, the making of a plaster cast of a fœtal head moulding, or the mounting of specimen. Hitherto students had gone to Dublin for their clinical midwifery, but Briggs now financed and furnished Brownlow House as a resi-

dence for those doing their midder cases at the hospital or in the district. He was a remarkable and startling teacher, and many of his students will recall his humorous method of fixing an important point.

Briggs would begin a lecture, R. C. relates, with an entertaining but apparently irrelevant story of the vicar's wife pushing her pram down the village street. About five minutes from the end of the lecture, you would realise that he had been talking about eclampsia, or fibroids, or the first stage of labour—and then you remembered a host of important facts which ever after became part of the vicar's wife and her pram.

He was fond of bringing one student out of the class and using him as a whipping-boy. From the pocket of his tail-coat, he would pull a pessary or a sanitary pad wrapped carelessly in a piece of newspaper, hand it to the unfortunate student, and cross-examine him mercilessly, to the delight of the rest of the class. When the student gave the right answer, Briggs would sometimes pat his head with a hand wet with pathological specimens, and call upon high heaven to witness what a clever student this was. His battered gladstone bag bulged with specimens which he had removed at hospital or nursing-home; he bubbled over with simple, homely and often broad illustrations. Upon the student who said that the fœtal head was larger than the breech, he poured several minutes of good-humoured scorn, finally telling him to try whether his own head or breech would go more easily through the lavatory seat. Lecturing upon placenta prævia, he used a glass model of the uterus with a placenta and fœtus in position. He worked up the excitement of the situation, turned the fœtus in the model and pulled down a leg. Then he beamed serenely on the class, "There," he said, "can't you hear baby Doris saying 'It's all right now, Mummy. I'm sitting on it.'"

Henry Briggs was born at Pilkington, Lancs, and educated at the Manchester Grammar School, and Owens College, Manchester. As senior medallist in anatomy under Sir William Turner, and Lister gold medallist, he graduated MB at the University of Edinburgh in 1877. He went to Liverpool as resident medical officer at the Stanley Hospital and was appointed surgical tutor at the Royal Infirmary, and later demonstrator in anatomy and lecturer in surgery at University College, Liverpool. After he took the FRCS in 1884 Lord Lister advised him to come to London, but he decided to stay in Liverpool and to specialise in obstetrics and gynæcology. He was appointed to the staff of the Hospital for Women and the Liverpool Maternity Hospital and to both gave over 30 years' unbroken service. On the death of John Wallace in 1898 Briggs was appointed to the chair of obstetrics and gynæcology in University College which he held till 1921. He held office as president of the obstetrical and gynæcological section of the Royal Society of Medicine and was a fellow of the Edinburgh Obstetrical Society and an original member and honorary fellow of the North of England Obstetrical and Gynæcological Society. Always deeply interested in the training of midwives he started courses of lectures for them in his department and was for many years a member of the Central Midwives Board. At the centenary celebrations of the Liverpool medical school in 1934 he was awarded an honorary degree, and in 1936 past students and friends subscribed to a tablet in his honour, designed by Malcolm Miller, which was unveiled by Lord Derby.

In his early days Professor Briggs was fond of golf and shooting, and till within a few weeks of his death he continued to work in his well-tended garden. He is survived by two married daughters.

JULIUS LÖWY

M D PRAGUE

Prof. Julius Löwy, formerly professor of occupational diseases in the University of Prague and director of the university institute for industrial hygiene and medicine, who died in London on Nov. 15, was well known outside Czechoslovakia as the representative of his country on the commission of industrial medicine and hygiene of the International Labour Office, and on the health section of the League of Nations. Born at Carlsbad in 1885, the son of Dr. Bernard Löwy, he graduated in medicine at Prague in 1909 and came to London three years later to do postgraduate work at St. Bartholomew's Hospital. His appointment as assistant chief physician at the General Hospital of the medical school at Prague was interrupted during the last war while he served as chief physician of the Epidemic Hospital in Serbia and as chief inspector of the Malaria Control Service. But in 1917 he became lecturer for internal medicine at the University of Prague, and in 1928 was appointed to his chair which he held till he was dismissed after Munich for his loyalty to the republic. Löwy came to London as an exile in 1939, but he soon found the means to continue to serve his country. He was one of the founders of the Czechoslovak Medical Association in Great Britain, of which he later became chairman, and editor of its bulletin. Throughout the blitz he remained in London, and in 1942 he was appointed to the health council of the Czechoslovak ministry of social welfare, where the experience he had gained in Prague on expert commissions of the ministries of labour, social welfare, and public health and as a member of the State Social Institute, the State Institute of Hygiene, and the Masaryk School of Social Welfare, stood him in good stead. In 1943 he was among the group who inaugurated the Interallied Health Charter Movement. Löwy's outstanding work, the *Klinik der Berufskrankheiten*, which was later translated into Russian, was published in Vienna in 1924, and his second and longer work, *The Medical Expert on Internal Diseases*, followed four years later.

JEAN ORR-EWING

B M OXFD

STUDENT, lecturer, tutor, fellow and for many years member of council of Lady Margaret Hall, Oxford. Jean Orr-Ewing, who died lately at the early age of 47, was not only an important member of her college, but a bacteriologist of note, and a woman of unusual vitality and character. She entered Lady Margaret Hall as an undergraduate in 1916, leaving in 1920 to continue her clinical studies at St. Mary's Hospital, London. In 1923 she passed the conjoint examination and in 1924 she took her Oxford degree. For some years after that she was engaged in biological research, working at Oxford under Prof. E. S. Goodrich. In 1929 her college recognised her work in this field by electing her to a lectureship in natural science, and she became a member of council in the same year; she was made tutor and fellow in 1938. In 1940 the Medical Research Council made her a grant for research on the bacteriology of war wounds, and she worked with Prof. H. W. Florey on penicillin. In collaboration with others she published, in 1941, a study of the bacteriology of wounds treated by the closed-plaster method.

R. S. P. writes: "In 1919 she appeared a giantess with the head and hair of a lion. She was a student of whom, as a freshman, one stood in great awe. But her whole life (though she led several generations of us gallantly and vigorously against other colleges in games and debate) was centred in the study and laboratory. As soon as one came under the same shaded study lamp with her, then her real personality was able to share its life in the warmest way; and to the newest and humblest science student she poured out not only information on how to proceed from the bottom rung, but also such a genial enthusiasm for life, and such a sense of personal integrity, that one was encouraged to return again and again to share that lamplight."

THE URBAN BANTU BABY.—O. S. Heyns and S. S. Hersch (*S. Afr. J. med. Sci.* 1944, **9**, 33) have studied over 2000 Bantu babies, half from Johannesburg and half from Durban, towns 400 miles apart. The cases were consecutive and the only criterion was that the birth-weight must be over 4 lb. Births requiring craniotomy were excluded. The authors deal with their material from three aspects: birth-weight; the incidence of antenatal syphilis; stillbirth and premature labour. The mean value of the birth-weight was 108·40 ± 0·68 oz., with a coefficient of variation of 14·60%, and a range of 64 to 175 oz.—that is, 67–70% of Bantu babies at term weighed between 5¾ and 7¼ lb.; only a sixth of all the birth-weights were below 5¾ lb. A positive Wassermann reaction was found in 660 mothers. There was no statistical difference in the birth-weights of the positive WR series. A positive WR was found in 23% of Durban mothers; the proportion in the Johannesburg series was 40%.

On Active Service

KILLED IN ACTION

Captain PAUL SABEL ADLER, MRCS, RAMC

MENTIONED IN DESPATCHES

Surgeon Lieut.-Commander C. P. BAILEY, MB CAMB., RNVR

MEMOIRS

NEWS has been received of the death of Captain PERCIVAL BINNINGTON as a prisoner of war; he went to France shortly after D-day and was posted as missing in August. He was born at Westcliff-on-Sea in 1908, but his parents moved to Paisley five years later and he went to school there. In 1931 he graduated MB at Glasgow and after holding house appointments at the Royal Infirmary and the Victoria Infirmary, Glasgow, he moved to Hull where he served as resident at the Royal Infirmary. In 1934 he joined Dr. H. Wildeboer in practice in Hull. "Binnington's gentle manner," Dr. Wildeboer writes, "gave him a special place in the affection of his friends and patients. They will long miss his gay conversation and understanding ways." Binnington joined the RAMC in 1942. He leaves a widow and young daughter.

Whorwell Photo, Dover

Captain G. F. H. DRAYSON, who went to Arnhem with his airborne unit on Sept. 18, was killed next day while attending to casualties. He had himself been wounded earlier but continued to do fine work under grave difficulties. He was the only son of Paymaster Rear-Admiral E. H. Drayson, CBE, and had intended to join his father's Service, but an attack of rheumatic fever affected his heart, and after leaving Bedford School he graduated MB at the University of Edinburgh in 1940. After holding a house-appointment at Ballochmyle Hospital, Ayrshire, he joined the RAMC and was sent to the Middle East. Through trying months in Palestine, Tripoli, Tunisia, and Italy his work never slackened and a friend describes with admiration the open-air clinics Drayson held in olive groves for the Arab children in his spare time. "On cross-country runs," he continues, 'Gremlin' was always the first officer home, and on schemes and in action it was amazing the amount of work he did and the enormous amounts he carried. It used to be rather fun watching him at his various anti-disease campaigns, especially in his determined drives against mosquitoes and flies. Always all out to help the men, he was a tower of strength both on the medical side and off duty." Dr. Drayson was 27 years of age.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED NOV. 25

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 2350; whooping-cough, 1388; diphtheria, 616; paratyphoid, 1; typhoid, 4; measles (excluding rubella), 7137; pneumonia (primary or influenzal), 755; puerperal pyrexia, 165; cerebrospinal fever, 41; poliomyelitis, 10; polio-encephalitis, 2; encephalitis lethargica, 1; dysentery, 380; ophthalmia neonatorum, 81. 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 Nov. 22 was 813. During the previous week the following cases were admitted: scarlet fever, 56; diphtheria, 23; measles, 31; whooping-cough, 16.

Deaths.—In 126 great towns there were 1 (0) death from an enteric fever, 10 (0) from measles, 1 (0) from scarlet fever, 9 (1) from whooping-cough, 8 (1) from diphtheria, 8 (2) from diarrhœa and enteritis under two years, and 7 (2) from influenza. The figures in parentheses are those for London itself.

Newport, Mon, reported the fatal case of enteric fever.

The number of stillbirths notified during the week was 92 (corresponding to a rate of 28 per thousand total births), including 11 in London.

Notes and News

THE MINISTER ON MENTAL HEALTH

THE Royal Medico-Psychological Association, for all its 103 years, looked vigorous enough when entertaining the Minister of Health in London on Nov. 29. Lieut.-Colonel A. A. W. Petrie, the president, described its guest as the repository of the profession's hopes and fears for the mental service of the future, and Mr. Willink spoke of his own hopes of a unified mental service working under a single set of authorities, with one responsible body in each area. The Minister foresees a great development of outpatient centres and of social psychiatry, and wants to see mental and general hospital brought closer together through exchanges of staff. He also aims at the better training of students and psychiatrists, at providing conditions in which psychiatry can do all that is possible for the patient, and at fostering research. He admitted that all this could not be done in a moment, but thought that with the help of the psychiatrists the work could go forward.

Lord Moran said a few words about the difficulty of selecting men for appointments; he held that the ability to sum up a candidate was extremely rare. Dr. Thomas Seagroves recalled the birth and youth of the association and spoke in warm terms of the growth of membership.

THE BOLOSCOPE

IN 1941 a German broadcaster[1] described a new "metal finder" invented by the German Siemens Werke. In this a special sound was connected up with a loud-speaker and when the sound came near a particle of metal a characteristic tone was given out by the loud-speaker. Next year Robbe[2] described the successful use of this instrument in war surgery, and his report was amplified by Schlaaf,[3] who was so satisfied with the "Boloscope" that in 1943 he said that the problem of localising projectiles lodged in the tissues was solved.[4] His view was based on the removal of 1200 such fragments by operation. In this series there were 10 failures, only 3 of which were technical failures, for in the other 7 cases the operation had to be broken off for surgical reasons. He emphasised the importance of careful and exact preparations before the operation. First X-ray pictures in two directions must be taken to determine the approximate position. This can be aided in some cases by transillumination or by stereoscopic X-ray pictures. The boloscope is used shortly before and during the operation. After removal of the missile, any fibrous tissue capsule is removed as completely as possible and an iodoform gauze drain is left in for 24 hours. Only wounds of the joints and spinal cord are primarily closed. Schneider[5] this year reported the successful treatment of a number of cases of missiles lodged in the heart and said he had found the "Metallsucher" most valuable for the rapid and accurate localisation of the missile. British surgeons, however, have found similar instruments singularly unhelpful.

THREE MORE FILMS ON ANÆSTHESIA

THE Realist Film Unit have finished three more of their *Technique of Anæsthesia* series. These maintain the high quality, both pictorially and in content, which marked the first three in the series.

Handling and Care of the Patient considers anæsthesia from the patient's point of view—how to reassure him, how to make the ordeal least unpleasant, how to avoid mishaps in transfer from trolley to table (this aspect is dealt with in a sequence of a comedy of errors appalling to watch), how to deal with postanæsthetic vomiting and so on. It tends on the whole to be a "how not to" rather than a "how to" film; but it does it well. Some precautions are overlooked—for instance, the nurse who allows the patient to hold her hand will get it badly crushed one day, and we are not shown how to insert a gag so as to avoid including the lips between the instrument and the teeth. Running time 25 minutes.

Endotracheal Anæsthesia shows the apparatus required and the method of making tubes, the preparation of the patient, the method of intubating by direct vision with a laryngoscope (this includes good diagrams and direct films of the landmarks seen); and "blind" nasal intubation. The necessity for avoiding force in this manœuvre is adequately stressed, and

1. See *Lancet*, 1941, i, 699.
2. Robbe, A. *Dtsch. Militärarzt*, 1942, 7, 12.
3. Schlaaf, J. *Ibid*, p. 191. Abst. in *Bull. War Med.* 1942, 3, 159.
4. *Chirurg*, 1943, no. 20, 601.
5. *Dtsch. med. Wschr.* Sept. 15, 1944, p. 527.

the film includes a slow-motion study of a tube being passed blind. A new and more pleasant voice gives the commentary on this film. One point which was not mentioned is that the mouth should be held closed for blind intubation if the breath-sounds are to be heard most clearly through the tube. Running-time 38 minutes.

Spinal Anæsthesia shows with diagrams the route of entry of the needle, and then goes on to demonstrate the apparatus required and the drugs used. The techniques for localising anæsthesia are fully demonstrated for light and heavy 'Nupercaine,' and supplementary medication is considered. The film ends by discussing the risks of complications, and the contra-indications of the method. This film includes a good example of one way in which the film is superior to real-life demonstration as a teaching medium: the introduction of the drug, its dispersal, and the effect of barbotage are all visualised on a glass model which would be difficult to rig up for each lecture but which can now be presented at any time. From the clinical side it seems likely that the use of iodine as a skin antiseptic will be rejected by many teachers; and the standardised posture recommended should have been shown for each demonstration. Running time 35 minutes.

The launching of this anæsthesia series has been an important event in the progress of the medical film. Here we have six films prepared, and five more promised, all made under one comprehensive plan, under unified direction, and for a common purpose with a common method of presentation. Apparatus required, how to work it, how to use it and the complications which may arise from its use are methodically considered each in turn throughout the series, and the photography throughout is up to the best theatrical standards. The personal techniques of the medical advisers (Dr. Ivan Magill, Dr. G. S. W. Organe, and their associates at the Westminster Hospital) are described in detail, and but few distracting alternatives are included. The actual names of the drugs preferred by these anæsthetists are given, and they are right to describe only their own tried methods.

University of Manchester

Dr. G. J. Langley has been appointed dean of postgraduate medical studies.

British Institute of Radiology

On Thursday, Dec. 14, at 8 PM, at 32, Welbeck Street, London, W1, Dr. A. Craig Mooney will speak on disc lesions in relation to pain, and Dr. Hugh Davies on cervical intervertebral disc lesions.

Faculty of Radiologists

AT a meeting of the diagnosis section to be held at 2.30 PM on Friday, Dec. 15, at 32, Welbeck Street, London, W1, Dr. Peter Kerley will open a discussion on the non-tuberculous lesions detected by mass radiography.

Army Medical Services

Colonel (acting Major-General) NEIL CANTLIE, MC, FRCS, has been promoted to the rank of major-general and Colonel (temp. Brigadier) JOSEPH WALKER, CBE, MC, to the local rank of major-general. Major-General O. W. MCSHEEHY, CB, DSO, OBE, KHS, who has reached the age for retirement, and Colonel E. W. WADE, DSO, OBE, who has completed four years in this rank, are retained on the active list.

Supply of Blood to the Forces

Lecturing to the Royal Society of Arts in London on Nov. 29, Brigadier L. E. H. Whitby, FRCP, said that the British Army policy of establishing a transfusion service with its own highly trained officers and men, and with sources of supply separate from general medical stores supply, has paid handsome dividends. "In this respect, the British Army differs from all other armies, Allied or enemy, who have relied upon the general medical officer to do this important work and have obtained their supplies mainly through commercial firms and ordinary supply channels. America has begun to imitate us by establishing at least a special service of whole blood." The home depot of the Army Blood Transfusion Service began with a staff of about 80, nearly all men; it now has over 500, nearly all women. The number of donors bled, up to Sept. 30, was 624,388. From 10% to 15% of wounded require transfusion. The supplies sent overseas between D-day and the end of August provided, for every 100 wounded, 46 pints of blood, 93·5 pints of plasma, and 90·5 pints of saline.

It is announced that under the Ministry of Health Emergency Blood Transfusion Service over 330,000 persons gave blood during the first six months of this year.

Biochemical Society

The society will hold a joint meeting with the Pathological Society of Great Britain and Ireland at 1, Wimpole Street, London, W1, on Saturday, Dec. 16, at 11 AM, when there will be a discussion on cancer.

Typhus Vaccine

The expiry date on the United States Army's typhus vaccine has been extended from 12 months to 18 months.

Colonel J. P. HUBAN, IMS, has been appointed honorary surgeon to the King in succession to Major-General Hugh Stott, IMS, who has retired.

Mr. A. A. MCCONNELL has been elected president of the Royal Academy of Medicine in Ireland.

Dr. CECIL WALL will deliver the FitzPatrick lectures at the Royal College of Physicians of London on Tuesday, Dec. 12, and Thursday, Dec. 14, at 2.15 PM. He is to speak on the history of the English medical profession in 16th and 17th centuries.

Appointments

BRATTON, A. B., MB CAMB.: pathologist in charge of the LCC Central Histological Laboratory, Archway Hospital.
LANG, F. J. L., MRCS: examining factory surgeon, Hoddesdon, Herts.
RENAUD, R. E., MRCS: RSO, King George Hospital, Ilford.
STEYN, J. J. B SC PRETORIA: entomologist, Uganda medical department.

Births, Marriages and Deaths

BIRTHS

BURGESS.—On Nov. 27, at Hitchin, the wife of Captain W. M. Burgess, RAMC—a son.
CARDEW.—On Nov. 29, at Carlisle, the wife of Surgeon Lieutenant P. H. Cardew, RNVR—a daughter.
FRANCIS.—On Nov. 20, at Guildford, the wife of Captain Graham Francis, RAMC—a daughter.
LEWIS.—On Nov. 23, at Oxford, the wife of Mr. Emlyn Lewis, FRCS—a daughter.
LITTLE.—On Nov. 30, at Bognor, the wife of Dr. G. Mellanby Little—a son.
MOORBY.—On Nov. 26, at Ipswich, the wife of Surgeon Commander A. L. Moorby, RN—a son.
SIMMONDS.—On Nov. 26, at Northwood, Middlesex, the wife of Lieut.-Colonel F. A. Simmonds, RAMC—a daughter.
STEPHEN.—On Nov. 28, at Woking, the wife of Lieutenant C. S. M. Stephen, RAMC—a son.
WHITESIDE.—On Nov. 28, in London, the wife of Captain C. H. Whiteside, RAMC—a son.

MARRIAGES

MACLENNAN—MELLIS.—On Nov. 29, in London, John Duncan MacLennan, major RAMC, to Beryce Winifred Mellis.
MULLER—INGLIS.—On Nov. 27, at Turriff, Hendrik Muller, MRCP, captain RAMC, to Jeannie Elizabeth Winton Inglis, MB, major RAMC.
SLOAN—FRIEDMANN.—On Nov. 30, George Thomas Wake Sloan, MB, of Castleford, to Gerda Friedmann, LRCPE.

DEATHS

BLAKE.—On Nov. 27, William Henry Blake, MD BRUX., LRCP, LSA, of West Wickham, Kent.
CARRUTH.—In October, Gregory Reid Carruth, MB BELF., formerly of Treeton, near Rotherham, and late RAMC.
COCHRANE.—On Nov. 30, in Edinburgh, William Alexander Cochrane, MB EDIN., FRCSE.
DODD.—On Nov. 27, at Tunbridge Wells, Percy Vernon Dodd, MD DUBL., formerly of Hythe, Kent, aged 89.
FRYER.—On Nov. 29, at Leeds, John Henry Fryer, MB CAMB., aged 71.
GOODALL.—On Nov. 29, at Hove, Edwin Goodall, CBE, MD LOND., FRCP, lieut.-colonel late RAMC.
HORSFALL.—On Nov. 26, Alfred Herbert Horsfall, DSO, MB MELB.
JOYNT.—In November, through enemy action, Norman Lockhart Joynt, MC, MB NUI.
O'KEEFE.—On Nov. 29, at Camberley, Sir Menus William O'Keefe, KCMG, CB, MD RUI, LLD BELF., major-general AMS, colonel commandant RAMC, aged 85.
REID.—On Dec. 1, at Bournemouth, George Alexander Reid, MD ABERD., FRCS, aged 71.
WATSON.—On Nov. 27, at Burnley, John Harry Watson, MB LOND., FRCS.
WHEELER.—On Nov. 28, at Worthing, Percy Charles Edward d'Erf Wheeler, MD BRUX., FRCSE, formerly superintendent of the English Mission Hospital, Jerusalem, aged 85.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

INHALATION OF CHEMOTHERAPEUTIC SUBSTANCES

N. MUTCH, M D CAMB., F R C P
SENIOR PHYSICIAN TO GUY'S HOSPITAL

With technical assistance of H. L. HOSKINS, A I M L T

SUBSTANCES are administered by inhalation with two different intents—to ensure their rapid parenteral absorption through the extensive surfaces of the air passages, or for the topical therapy of the lungs themselves. Gases and vapours, provided they are not irritant, are inspired without difficulty, but non-volatile substances must be inhaled as mists or dusts, or introduced into the trachea directly by syringe or tube. The object of the present inquiry has been to assess the quantitative factors governing the employment of nebulised fluids, and particularly to ascertain whether chemotherapeutic substances can be introduced in this form by the pulmonary route in clinically significant amounts either for local or general therapeutic purposes. Sulphonamides have been selected as test substances because of their low toxicity and relative freedom from irritant action on the respiratory mucosa.

THERAPEUTIC MISTS

Production.—Clinical nebulisers utilise the disruptive power of compressed air or oxygen as it expands suddenly through a narrow orifice into the general atmosphere or into a suitable container. Droplets produced in this way vary from the visible down to fractional μ diameters. The greater the pressure behind the jet the more completely does the blast split up the liquid on which it impinges.[5] But the patient's ventilation rate and the readiness with which very fine jets become blocked set a limit to the pressures which can be employed economically.

Modification.—During its conveyance to the patient the mist undergoes a series of changes determined largely by the physical characteristics of the conducting system of the equipment. In the types commonly employed the nebulised material sprays forcibly against the wall of the container. The larger droplets coalesce and run back into the sump, the smaller ones survive and pass along the conduits where they come under the influence of centrifugal force, gravity and turbulence which destroy much of the mist by causing mutual collision of the constituent droplets and further impaction against the walls. Turbulence is probably the most important of these factors. It results from defective streamlining and from the sudden checks and flow reversals imposed by the patient's respiration. The coarser units are more affected than the small ones. Many of the low and fractional μ sizes which exhibit brownian movement are lost by spontaneous coagulation subject however to the antagonising action of such electrical surface charges as the droplets may carry. Thus the mist emerging at the face-piece is less heterogenous than that produced in the phial, having lost both its coarsest and its finest elements.

When there are opportunities for evaporation the droplets shrink rapidly, and solid droplet-nuclei quickly form. The vapour-pressure established as the fluid in the nebulising chamber evaporates under the influence of the oxygen stream (observational details are given later) restricts this process but it becomes a conspicuous feature when any air gap is permitted between the face-piece and the patient. Evaporation rates are proportional to the diameter of the droplets and not as might have been anticipated to their surface area.[7 11] Consequently in an unsaturated atmosphere small droplets vanish with an almost unbelievable rapidity. For example, the life of a 2 μ droplet of water in dry air is only 0·0006 second. Even a 20 μ droplet only survives for 0·06 second.[14] Liquids of much higher boiling-points volatilise at equally surprising rates. Glycerin, with boiling-point 290° C, lasts a little longer and being a hygroscopic substance its presence may cause the droplets to swell in a moist atmosphere from the acquisition of water.

Assay.—The mist as it emerges from the face-piece in its final form can be defined by a size-frequency curve which shows the relative number of particles of each size range down to a limit which the technique of measurement imposes and by a drug-distribution curve showing the proportion of drug carried by the droplets of each size range. Unless the proportion of droplets of small dimensions is very high and the maximum size of droplet included is low, relatively little drug will be carried by the smaller sizes. One droplet of 50 μ diameter has the same weight as 125,000 droplets of 1 μ diameter; consequently if a mist is made up of 99% 1 μ droplets and 1% 50 μ droplets, only 0·08% of the total weight of drug in the mist is carried by the 99% of 1 μ droplets present. It is extremely difficult to measure the size frequencies of mists and changes occur continuously in the mist during the procedure. The older observations on droplets deposited on plates are so crude as to be almost devoid of value. Modern methods require elaborate optical equipment and very few reliable observations are available.

FATE IN THE LUNGS

The basic considerations are (1) the depth of airborne droplet penetration into the bronchial tree; (2) the extent to which deposition occurs on the lining membrane of the airways; (3) the topical distribution of such deposit as is laid down; (4) the rate at which the deposit is removed by absorption; and (5) the redistribution of the surface deposit by inward flow under gravity and inhalation, and by outward flow promoted by cough and ciliary action.

Two important points must be borne in mind—that although fine stabilised mists undoubtedly penetrate to the deepest recesses of the lungs they have no curative value if carried out again with the expired air; and that a deposited drug cannot exert any local therapeutic action if rapid absorption prevents the building up of suitable concentrations in the affected area.

Penetration. (*a*) *Airborne.*—It has often been stated that a 5 μ particle will float airborne to the smallest bronchus,[6] and although the evidence on which this statement rests is open to criticism there does not seem to be any physical reason why it should be untrue. The terminal bronchioles are 300 to 400 μ in diameter,[1] so a 5 μ particle should have no difficulty in making the passage. Heubner [4] passed Spiess-Dräger mists along glass tubes with complicated bends, forks, narrowings and expansions, and measured the deposits on the walls. He found these to be considerable even at the end of his 3 metre system.

(*b*) *After deposition.*—Liquids such as 'Lipiodol' or aqueous malachite green introduced through the larynx quickly flow along the mucosal surface as far as the finest bronchi.

It can be safely assumed therefore that portions of any non-irritant mist containing components of small μ size will reach all parts of the bronchial tree and possibly even the alveolus itself. After deposition in intermediate zones the material will penetrate the finer ramifications by a process of simple flow unless removed rapidly by absorption.

Deposition.—The factors governing deposition on the mucosa are very similar to those which lead to deposition in the air conduit of the apparatus:

(A) Increase in droplet size from collison, coagulation and hygroscopy.

(B) Impaction on the mucosa (1) under the influence of gravity and centrifugal force; (2) as determined by the brownian oscillations of the fractional and low μ particles in close proximity to the walls; (3) caused by eddies in the air stream arising from (*a*) imperfect streamlining of inspiratory or expiratory flow, (*b*) stream reversal during the change over from inspiration to expiration, (*c*) turbulence produced by the rhythmic variations in the length and calibre of the bronchi during respiration; (4) induced by unknown ionic and electrical factors.

If the external air conduits are well designed the mist loses many of its larger droplets during transit. The intrapulmonary effect of gravity will therefore be less and centrifugal force only operative at sharp bends where high angular velocities are developed. Turbulence however remains as an outstanding cause of collison and impaction. The vesicular murmur heard on auscultation over the lungs indicates that the airways are not streamlined perfectly for the inspiratory flow. The biphasic

bronchial sounds audible when the intervening lung is solid indicate that the bronchi are not streamlined for air flow in either direction. If a nebulised solution of malachite green be inhaled dense staining appears in the trachea where the inspiratory stream becomes turbulent as it expands after passing through the glottis. Other localised deposits are found in the larger bronchi around the orifices of small lateral branches. In these places eddies are set up during expiration as the narrow stream from the branch enters the wide bronchus at an abrupt angle. The greatest turbulence of all is that provoked by the reversal of the air stream at the beginning of expiration, and this is probably the most important single precipitating factor.

Absorption.—Mineral oils and iodised oils remain in the respiratory passages for long periods, but water and substances dissolved in water are rapidly absorbed. Sehrwald [10] found that dyestuffs disappeared from the bronchi very rapidly. Washitzky [13] reported that potassium iodide, atropine, strychnine and chloral hydrate quickly appear in the urine after the injection of their aqueous solutions into the trachea. Peiper [9] made similar observations with salicylates and curare. Excessively rapid absorption is undesirable when an antibiotic concentration is to be built up at a mucous surface and further work is needed to ascertain how best to retard it. The normal physiological method of retaining moisture in the bronchial tree is by the provision of mucin, an unabsorbable hydrophilic colloid. Mucin or some other hydrophilic colloid acceptable to the mucosa might therefore be added to the nebulising fluid, for example 0·5% tragacanth or 0·5% mucilage of cellofaz WFD. A further retardation might be secured through the vasoconstrictor effect of cold air or by the addition of such drugs as adrenaline, ephedrine or cocaine, provided the blood flow was not diminished to a point prejudicial to the local defence mechanism.

SULPHONAMIDE MISTS

For maximum deposition in the lungs, compounds of high solubility must be selected so that strong solutions can be employed. Sulphanilamide, sulphapyridine, sulphathiazole and sulphadiazine are therefore unsuitable for the purpose. The mist must not irritate or damage the respiratory mucosa. Many of the soluble variants of the commonly used sulphonamides form highly alkaline and even caustic solutions. For example, 30% soluble sulphapyridine possesses a caustic pH which is greater than 10; 30% soluble sulphathiazole also possesses an alkalinity greater than pH 10; but 20% 'Soluseptasine,' 30% sulphacetamide-soluble and 30–50% 'Sulphonamide EOS' are for clinical purposes neutral.

In the present inquiry a 50% w/v aqueous solution of sulphonamide EOS [3 8] was used. The corresponding mist can be inhaled without provoking any cough or flow of mucus or causing the slightest distress.

NEBULISER

The Collison inhaler, an improved direct descendant of the old German Spiess-Dräger apparatus, was used. The circuit is indicated in fig. 1. Two nebulising phials are provided which can be used singly or together and are attached to a metal conduit which screws into a standard oxygen cylinder. The mist loses its coarsest particles by splash action against the side of the phial; others are centrifuged out at the angulations in the metal conduit. The mist delivered at A passes along a wide-bore rubber tube to the metal face-piece attached at B. A rubber bag conserves the mist during expiration. Metal inspiratory and expiratory valves are built into the face-piece. Unfortunately the rubber bag destroys the streamlining, and eddies which develop as the airway expands lead to considerable deposition. Loss by impaction is noticeable at the inspiratory valve, and when the apparatus is in use turbulence set up in the face-piece by rhythmic stream reversal during respiration produces conspicuous deposits in this area and on the adjoining parts of the patient's face.

Calibration.—The following observations were made:

1. Rate of discharge of the drug from the phial. As nebulisation proceeds the concentration of the drug in the residual solution rises because an appreciable amount of solvent is lost by simple evaporation quite independently of that lost as droplets of solution. As already pointed out, this vapour plays an important part in limiting droplet evaporation in the delivery ways. The loss in weight of the phial is therefore not a true index of the amount of drug discharged. Table I, showing the rise in specific gravity during nebulisation, demonstrates the point.

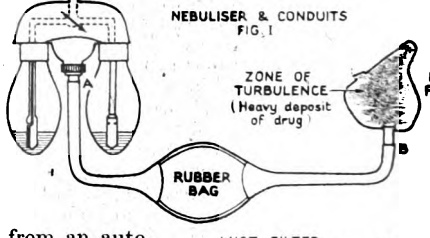
TABLE I—SIMPLE EVAPORATION OF SOLVENT DURING NEBULISATION INDICATED BY RISE IN SPECIFIC GRAVITY DURING ½ HOUR NEBULISATION

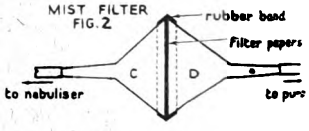
Rate of oxygen flow (litres per min.)	Aqueous solution nebulised	
	50% sulphonamide EOS	50% glucose
	Specific gravity	
0	1200	1180
4	1220	1200
8	1230	1210
12	1240	1220

In table II (col. 2) is shown the actual amount of drug discharged from the phial as ascertained by loss of weight and by estimation of the relative concentrations of the drug in solution before and after nebulisation. The loss corresponds to 4–8 c.cm. of the original solution per hour.

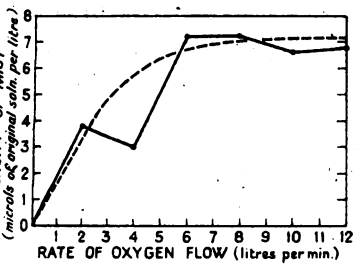
2. Loss by deposition in the rubber delivery tube and bag during steady flow is indicated in table II (col. 3). The figures were obtained by analysis of the washings from this part of the apparatus. The deposit amounts to 12–15% of the drug leaving the phial.

3. The amount of drug delivered as mist at B gives the truest measure of output, and its estimation involves the recovery of the mist by disruption and total deposition. The mist cannot be destroyed by bubbling through columns of water or other solvent. It was therefore filtered through a double layer of Watman's no. 1 filter paper by applying sufficient suction on the distal side to maintain the original unobstructed rate of flow from the nebuliser as indicated by the behaviour of the rubber bag. The apparatus shown in fig. 2 was substituted for the face-piece of the Collison inhaler. Suction was secured by passing steam under pressure from an autoclave through an ordinary metal jet suction pump. The two layers of filter paper were stretched across the mouths of two opposing glass funnels which were then held in position by a broad rubber band. The first paper became wet as the mist deposited but the second one remained dry and no visible fume could be seen on its distal side in funnel D. The sulphonamide deposited on the paper and in the funnels was estimated chemically. It can be assumed that all droplets were caught down to those of 1 μ or 2 μ radius. The loss of drug in these small droplets would amount to only a very small fraction of the total recovered from the filters. Estimations were made at various rates of flow and the findings are given in tables II (col. 4), III, and IV. Subject to a small allowance for incomplete filtration and leakage at joints, table II (col. 5) shows the amount of drug deposited in the metal part of the conduit system. Correlating the data in tables I and II, it becomes apparent that the drug delivered as mist at the face-piece does not amount to more than half the amount anticipated from simple observation on the loss in weight of the nebulising phial.





The data given in table IV and fig. 3 show that as the rate of flow increases the density of the mist increases also up to an early maximum, after which no further increment occurs. This maximum mist density is specific for the particular apparatus (nebuliser and conduit system) and the particular fluid nebulised. With the apparatus and solution employed it is attained con-



ig. 3—Relation of density of mist delivered at face-piece to rate of flow, using Collison inhaler with one phial containing 50% w/v aqueous sulphonamide EOS. The points on the full line represent the observations actually made. The dotted line is an idealised graph. It indicates a steady increase in the amount of drug carried per litre of mist as the rate of flow is increased until a maximum of 7 microls of solution per litre of mist (3·5 mg. of the drug itself) is reached at a flow of 8 litres per minute. From this point onwards the concentration of the drug in the mist does not change appreciably.

veniently within the common range of resting lung ventilation rates. The physical characteristics of the mist probably do not vary significantly over this range.

When two phials are in use the mist may become coarser and the mist density may fall below the full characteristic value unless a minimum delivery of 12 litres per minute is maintained. This is due to the relation-

hip which exists between jet pressure and rate of ow. These values are not strictly proportional to one nother and in common circumstances the flow may ary with the square of the pressure. With two jets use the rate of flow through each must be halved in rrelation with the ventilation rate and the jet pressure ay then fall to such an extent as to be inadequate for gh-grade nebulisation.

The most appropriate setting for local chemotherapy

BLE II—DISTRIBUTION OF SULPHONAMIDE EOS (50% IN ATER) AFTER 2 HOURS NEBULISATION IN COLLISON INHALER

Rate of flow l. per min.)	Loss of drug from phial * (g.)	Deposit in rubber tube and bag (g.)	Collected as mist at input to face-piece (g.)	Excess of loss from phial over drug recovered (g.)
6	4·2	0·5	2·6	1·1
10	8·0	1·3	4·0	2·7

* One only in use.

the lung is one nebulising phial supplying 6–12 litres mist per minute, the actual flow being adjusted to the tient's ventilation rate as assessed by observation of e rubber bag.

The maximum amount of drug which can be adminis-ed in this way equals the maximum mist density ltiplied by the patient's ventilation rate. With a st density of 3·6 mg. of sulphonamide EOS per litre of ygen and a ventilation rate of 8 litres per minute, 3 g. of drug can be administered hourly. Assuming s to be applied to the mucous membrane of the

BLE III—MIST DELIVERED TO FACE-PIECE OF COLLISON NHALER (One phial in use, containing 50% aqueous urea r 50% aqueous glucose)

Rate f flow er min.)	Collected as mist at input to face-piece (g. per hour)		Density of mist (mg. of solid per l.)	
	Glucose	Urea	Glucose	Urea
4	0·23	0·20	0·9	0·8
8	0·64	1·30	1·3	2·7
12	1·20	1·85	1·7	2·6

nchial tree, which has a total area of about 15 square res,[3] it would take 8–9 hours to coat the entire face with the original 50% solution to a depth of 2 μ, subject to suitable dilution with bronchial moisture milar film could be produced in a minute, and if orbed it could be replaced once in every minute at a centration of 96 mg. of drug per 100 c.cm., at which ngth its bacteriostatic action should be adequate.

MAL ABSORPTION OF INHALED SULPHONAMIDE MISTS

o assess more accurately the concentrations secured he lung during actual inhalation, observations were made on the drug contents of the blood and urine of normal young men (10 medical students and laboratory workers). Bratton and Marshall's [2] method was used for the analyses. Preliminary trials were carried out and the following routine adopted. A Collison inhaler provided a flow of 8 l. per min. through a single nebulising phial. Inhalation was carried out during four half-hour periods with intervening half-hour intervals of rest.

TABLE IV—SULPHONAMIDE EOS (50% W/V IN WATER) DELIVERED AS MIST TO FACE-PIECE OF COLLISON INHALER

Rate of flow (l. per min.)	Phials in use	Sulphonamide EOS (g.) delivered as mist per 2 hr.		Density of mist (mg. sulphonamide EOS per l. of oxygen)
2	1	0·44	0·45	1·9
2	1	0·46		
4	1	0·70	0·7	1·5
4	1	0·66		
4	1	0·65		
4	1	0·76		
6	1	2·75	2·6	3·6
6	1	2·40		
8	1	3·40	3·5	3·6
8	1	3·60		
10	1	4·00	4·0	3·3
10	1	3·90		
12	1	5·0	4·9	3·4
12	1	4·8		
8	2	1·2		1·3
12	2	7·5		5·2

Urine was collected at the end of each rest period and the balance of the 24-hour excretion was collected also. The blood was sampled at the end of the 4th hour—that is, half an hour after the conclusion of the 4th inhalation session. The 50% w/v aqueous solution of sulphonamide EOS was renewed in the phial at the beginning of each half hour session to obviate difficulties arising from simple evaporation of the solvent. The analytical results are given in table v.

Considerable individual variations are to be noted, blood values ranging from 0·75 to 2·0 mg. per 100 c.cm. and 24-hour excretions from 71 to 174 mg. Some of the low figures suggest an imperfect adjustment of the face mask. The general pattern of the events is however

TABLE V—URINARY EXCRETION AND BLOOD CONCENTRATIONS* AFTER INHALATION OF SULPHONAMIDE EOS MIST IN 10 NORMAL MEN

Period (hours)	Total sulphonamide in urine (mg.)										
	Subject										Av.
	1	2	3	4	5	6	7	8	9	10	
0–1	tr.	7	2	nil	5	1	9	9	10	9	5
1–2	8	7	6	9	8	3	16	13	16	12	10
2–3	10	6	6	28	30	5	17	19	30	28	18
3–4	14	6	40	20	20	41	12	10	40	50	25
4–24	76	54	17	40	36	26	25	28	60	75	44
Total 24	108	80	71	97	99	76	79	79	156	174	102
	Blood values at 4th hour (mg. per 100 c.cm.)										
—	..	2·0	..	..	0·75	0·75	1·3	1·2	1·4	2·0	1·3

* Calculated as sulphonamide EOS throughout this paper.

constant throughout. Excretion commenced during the first hour and increased hourly during the four inhalation sessions. This cumulation may have been caused by slow absorption but more probably was due to excretion lag and to diminishing diffusion from the blood-stream into the tissues. The disproportionately high concentrations found in the blood at the end of the fourth hour point to a similar conclusion.

After the administration of a substantial dose of sulphanilamide by mouth, the greater part is excreted within 24 hours and eventually very little remains unaccounted for, as much as 93% of the original dose being recoverable from the urine during the first 3 days.[12] When the dose is small, as in the present instance, the proportion excreted during the first 24 hours is much less.

TABLE VI—24-HOUR SULPHONAMIDE EXCRETION AND BLOOD VALUES AFTER ADMINISTRATION OF DRUG BY MOUTH IN FOUR NORMAL MEN

Subject	Excretion (mg.) after administration of:				Conc. in blood at 4th hour (mg. per 100 c.cm.)	
	(a) 120 mg.	(b) 240 mg.	(c) 360 mg.	(d) 480 mg.	(a)	(d)
H	24	96	120	180	nil	0·6
M	34	48	122	170	nil	0·75
G	23	102	112	225	tr.	0·6
C	18	86	125	..	nil	..
Average	25	83	120	192	tr.	0·65

To ascertain the relationship between the excretion values recorded in table V and the administration doses which they represent, sulphonamide EOS solution was given by mouth in accordance with a timed schedule analogous to that of the inhalation experiments. The dose divided into 4 equal fractions was given at ¼, 1¼, 2¼ and 3¼ hours respectively. Blood estimations were carried out at the 4th hour and 24-hour urine excretions determined. The results appear in table VI.

It is evident that a considerable portion of the administered drug does not appear in the urine during the first 24 hours. The fraction recovered increases with the dose, and the percentage excretions given in table VII indicate that at the range of urine values with which we are concerned (table V) the 24-hour excretion only represents about a third of the amount given (fig. 4), compiled from these analyses, enables one to calculate the approximate amount of sulphonamide EOS absorbed when the 24-hour excretion is known. With its aid the significance of the urinary findings of the inhalation

TABLE VII—PERCENTAGE OF DRUG RECOVERED FROM 24-HOUR URINE AFTER ADMINISTRATION BY MOUTH OF VARIOUS DOSES OF SULPHONAMIDE EOS IN FOUR NORMAL MEN

Subject	Dose (mg.)			
	120	240	360	480
H	20	40	33	37
M	28	20	34	35
G	19	42	31	47
C	15	36	35	..
Average	21%	35%	33%	40%

series can be determined. Thus, the average excretion of the 10 normals represents an average absorption of 306 mg. of sulphonamide EOS, and the extreme absorptions were 213 mg. and 522 mg.

SULPHONAMIDE MISTS IN BRONCHIECTASIS

The foregoing data encourage one to believe that the inhalation of antibiotic substances may prove an effective therapeutic procedure. The method was applied tentatively to patients with mild bronchiectasis, on each of whom serial observations could be made. The routi was that already adopted for the 10 normal contro The patients appreciated the treatment and did n experience the slightest discomfort from it. The resu are given in table VIII.

The general pattern of excretion followed that alrea observed in normals, but the values both in the uri and in the blood were definitely higher (table IX). T drug absorption corresponding to these excretio (see table VII and fig. 4) show approximate maxima 650 mg. and 560 mg. for patients 1 and 2. The patien were not dyspnœic and the high values of drug absorpti cannot be attributed to increased ventilation rate They may represent increased deposition induced b abnormal turbulence in the distorted bronchial tree.

Site of absorption.—The drug recovered from the urin and blood may have been absorbed from the lungs an upper respiratory passages or it may have been deposite

TABLE IX—BLOOD AND URINE VALUES AFTER INHALATIO OF SULPHONAMIDE EOS MIST. NORMAL AND BRONCH ECTATIC AVERAGES COMPARED

	Av. blood and urine values (mg. EOS)			
	Pt. 1	Pt. 2	Pt. 3	Normals
Urine				
Inhalation 1st session	9	13	10	5
,, 2nd ,,	21	40	14	10
,, 3rd ,,	29	34	17	18
,, 4th ,,	40	39	21	25
Balance of 24 hrs.	95	58	86	44
Total 24-hour excretion	194	184	148	102
Blood (mg. per 100 c.cm.)	2·5	2·2	0·9	1·0
	Maximum values			
Urine 24-hour excretion	298	236	151	174
Blood (mg. per 100 c.cm.)	3·2	2·7	1·2	2·0

in the mouth and swallowed to be absorbed subsequently from the alimentary tract. Comparison of the rates at which the concentration of the drug rose in the blood supports the former supposition. The average 4-hour blood value after inhalation was 1·3 mg. per 100 c.cm. in the normal group with a maximum of 2·0 mg. In the bronchiectatic patients it was 1·9 mg. per 100 c.cm. with a maximum of 3·2 mg., while after administration of sufficient drug by mouth to secure fully comparable 24-hour excretions the average blood value was only 0·65 mg. per 100 c.cm. with a maximum of 0·75 mg. Clearly after being inhaled the drug gains the blood-stream much more rapidly than it does after simple ingestion.

Two inferences appear to be justified—that the drug is truly absorbed from the respiratory tract, and that the rate of absorption of sulphonamide EOS through the respiratory mucosa is rapid.

SUMMARY OF OBSERVATIONS ON COLLISON INHALER SYSTEM

Sulphonamide EOS nebulised as a 50% w/v aqueous solution in a Collison inhaler can be absorbed through the respiratory tract at the rate of 1 g. per 4 hours. In dyspnœic conditions the amount absorbed will increase

TABLE VIII—BLOOD AND URINE VALUES AFTER INHALATION OF SULPHONAMIDE EOS MIST IN THREE CASES OF BRONCHIECTASIS

Period (hr.)	(1) *Male aged* 46 *yr.* Total sulphonamide in urine (mg. EOS)						(2) *Female aged* 18 *yr.* Sulphonamide in urine (mg.)					(3) *Male aged* 45 *yr.* Sulphonamide in urine (mg.)						
	Nov. 3	8	11	13	15	Av.	Nov. 18	22	25	29	Av.	Jan. 24	26	28	31	Feb. 2	4	Av.
0–1	9	8	8	7	15	9	22	nil	17	14	13	9	15	6	10	8	10	10
1–2	38	20	10	16	23	21	24	65	51	18	40	30	11	10	8	11	11	14
2–3	32	36	22	21	36	29	27	46	33	30	34	21	30	12	12	13	14	17
3–4	54	43	24	25	53	40	22	55	35	45	39	31	27	15	12	17	24	21
4–24	165	93	48	100	70	95	55	21	105	50	58	60	50	100	105	110	90	86
Total	298	200	112	169	197	194	150	187	241	157	184	151	133	143	147	159	149	148
	Blood values at 4th hr. (mg. per 100 c.cm.)						Blood values at 4th hr. (mg. per 100 c.cm.)					Blood values at 4th hr. (mg. per 100 c.cm.)						
	3·0	3·2	1·7	2·4	2·4	2·5	2·0	2·7	2·3	1·6	2·2	0·5	1·2	1·0	0·75	1·0	0·75	0·9

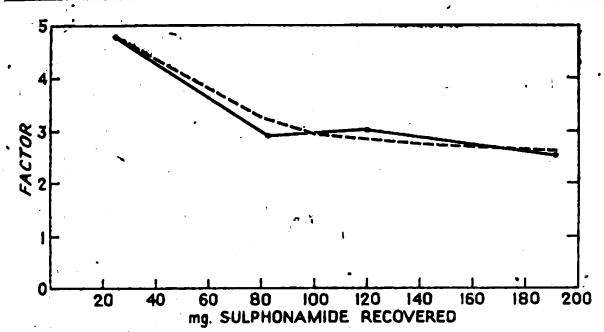


Fig. 4—Factor expressing relationship between dose administered and amount recovered from 24-hour urine, expressed as sulphonamide EOS. Each point represents average of 4 normals. From this graph the unknown dose of drug administered can be calculated by multiplying the measured 24-hour excretion by the factor indicated (2·5 to 4·8).

as the ventilation rate rises. When the rate of mist production is 6 litres per minute, the fate of the nebulised solution is as follows—

Sulphonamide lost from nebulising phial	2·1 g. per hr.
Delivery as mist into face-piece ..	1·3 „ „ „
Absorbed by the patient	0·15–0·3 „ „ „

Only 7–14% of the drug leaving the phial eventually reaches the blood-stream. Much of the loss arises from turbulence in the face-piece which leads to premature precipitation of the mist, and from the failure of inhaled mist to deposit on the respiratory mucosa. At least 77% of the mist emerging from the conduits is lost in these ways. The maximum mist density which can be secured at the entrance to the face-piece is 7·2 microls of the original solution per litre (i.e., 3·6 mg. sulphonamide EOS per litre).

The 0·25 g. of the drug actually deposited in the respiratory passages hourly during quiet respiration is sufficient to provide a continuous 2 μ film for the bronchial mucosa at a strength of 14 mg. per 100 c.cm., renewable every minute. Such a concentration possesses definite therapeutic potentialities but might be increased greatly by improved technique. Nebulising jets or other devices are needed which will furnish suitably fine mists of higher densities than 7·2 microls per litre and more complete precipitation of the mist within the bronchial tree might be secured by electrical or other procedures. These are matters for independent research but the technique of the present experiments can be used to investigate the serious loss caused by turbulence in the face-piece. With this end in view, the standard metal face-piece was replaced by various devices. Patient 3 (table VIII) offered himself as the subject.

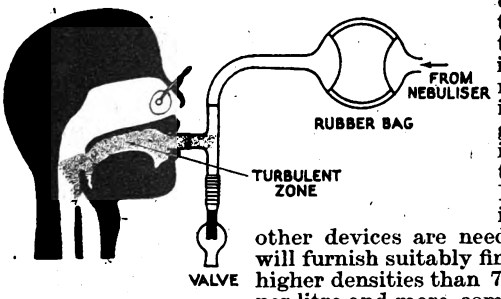


Fig. 5—Mist is introduced directly into the mouth through a wide tube. The nose is closed by a clip. The stippled area represents the extrapulmonary turbulent zone where the inspiratory and expiratory streams mingle and unwanted deposition is likely to occur.

Circuit 2.—A complete BLB oxygen apparatus was substituted for the Collison face-piece and bag.

Circuit 3.—The mist was delivered directly into the mouth through a wide tube fitted with an expiratory valve. The inspiratory valve was omitted to improve the input streamlining. The nose was controlled by a clip (fig. 5).

Circuit 4.—The mist was introduced through the nose, using the rubber nosepiece of the standard BLB mask. Expiration was through the mouth. No valves were employed other than the patient's lips, which acted as an expiratory valve (fig. 6).

In circuit 2 there was increase of turbulence in the external apparatus which caused almost total destruction of the mist. The urinary excretion was negligible, the blood sulphonamide was too little to estimate. In circuit 3 (fig. 5) there was still an external zone of turbulence at the beginning of each respiratory phase (indicated by stippling in the diagram) and further turbulence occurred in the mouth. The deposits in both areas fell outside the limits of the respiratory passages. In circuit 4 (fig. 6) there was no clash of opposing air streams in the external conduits or in the mouth, and the only deposits lost by swallowing were those on the very limited surfaces indicated by stippling between the nasopharynx and the glottis. The analyses are given in table X. Mist production and the timing of the inhalations and sampling were kept constant, and the original results with the standard metal face-piece are included for comparison.

The figures demonstrate the steady increase in the urinary output of sulphonamide as the opportunity for turbulence in the apparatus is restricted. The blood values rose pari passu and attained a peak with circuit 4 (fig. 6) in which buccopharyngeal turbulence also is reduced to a minimum. In this circuit the drug deposited in the alimentary tract and subsequently swallowed must reach its lowest proportions, and the outstandingly high concentrations of sulphonamide found in the blood indicate that the drug is absorbed much more rapidly from the respiratory tract (nose and lungs) than when taken by mouth. With this nasal unit attached to a Collison nebuliser the standard absorption rate is doubled and for 50% w/v aqueous sulphonamide EOS approximates to 1 c.cm. of the original fluid or 0·5 g. of the drug per hour.

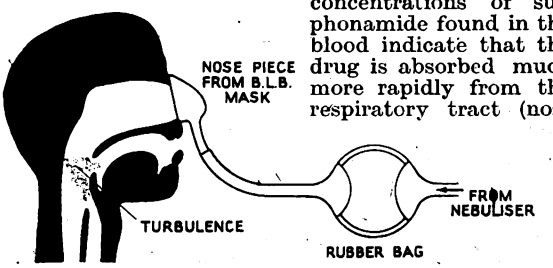


Fig. 6—Mist is introduced through a valveless nosepiece. Expiration takes place through the mouth, the lips being closed during inspiration. The stippled area indicates the only zone in which extrapulmonary turbulence is set up at the beginning of each respiratory phase. Deposition of drug on the alimentary mucosa and in the external apparatus from this type of turbulence is clearly reduced to a minimum.

APPLICATIONS

It is hoped that this calibration carried out with sulphonamide EOS will furnish the requisite background against which the probable local and general actions of more potent nebulised drugs can be judged. The special indications for employment of mists are:

(1) For respiratory conditions in which the air-passages are unobstructed. Free access for the mist to the affected areas is essential. Examples—bronchitis, asthma, irritant gas poisoning and all conditions such as bronchiectasis and lung cavitation in which there is excessive saprophytic activity in static sputum and exudates.

(2) For the administration of drugs which are destroyed and therefore rendered inactive or toxic when given by mouth. Examples—penicillin, organic arsenicals, insulin, parathyroid and posterior pituitary extracts.

TABLE X—BLOOD AND URINE VALUES AFTER INHALATION OF STANDARD SULPHONAMIDE EOS MIST BY PATMENT 3 THROUGH VARIOUS DEVICES

Device	Sulphonamide in 24-hr. urine (mg.)							Sulphonamide in blood at end of 4th hour (mg. per 100 c.cm.)						
	Serial observations						Av.	Serial observations						Av.
1. Standard Collison oronasal face-piece (fig. 1)	151	133	143	147	159	149	148	0·5	1·2	1·0	0·75	1·0	0·75	0·9
3. Directly into mouth (fig. 5)	..	..	..	..	..	..	170	..	..	..	..	..	..	1·25
4. Rubber nose-piece (fig. 6)	295	282	330	..	..	..	302	4·5	3·5	3·7	..	..	..	3·8

The case for giving penicillin by this method can be stated as follows. Soluble penicillin compounds of a potency equivalent to 400 or more units per mg, are in common use and the advocated daily dose is about 100,000 units. If a 25% solution were nebulised in a Collison apparatus and administered through a valveless closely fitting nosepiece, a total of 1 hour's inhalation per day would suffice to deposit 100,000 units in the respiratory tract, and a series of spaced doses—e.g., 5 minutes' inhalation 2-hourly—should secure an adequately constant level in the blood.

If a guide substance suitable for chemical assay and one which would be absorbed, diffused and eliminated at rates comparable with those of penicillin were added to the nebuliser fluid, it should be possible to deduce the penicillin concentration in the blood from estimations of the amount of guide substance present. The advantage of the scheme would lie in the substitution of a quick chemical method of estimation for a protracted bacteriological one. Analytical technique would be simplified and the time lag between the collection of the blood sample and the completion of the estimation would be greatly reduced.

Soluble sulphacetamide commends itself for trial. It is possible to prepare a 30% aqueous solution at pH 7, and the corresponding mist does not irritate the respiratory mucosa. Unlike 50% sulphonamide EOS mists however it is irritant to the eye, but the effect passes off after a few minutes and does not interfere seriously with the administration. The form in which it appears in the blood gives better colour responses during analytical procedures than those given when sulphonamide EOS is used and for this reason low concentrations can be estimated with greater accuracy.

Patient 3 offered himself again as the subject for quantitative trial. Circuit as in fig. 6 was used. A single 30-minute inhalation of 30% soluble sulphacetamide produced blood concentrations which could be determined with reasonable accuracy. The blood value ¼ hr. after the end of inhalation was 0·75 mg. and ½ hr. after inhalation 0·50 mg. per 100 c.cm. A standard series of 4 inhalations of 30 min. each gave results comparable with those secured with sulphonamide EOS, due allowance being made for the different concentrations of the nebulised solutions. Half an hour after the end of the 4th inhalation the blood concentration of sulphacetamide was 5 mg. per 100 c.cm. Twenty-four-hour urine contained 260 mg. sulphacetamide, equivalent to an absorption of about 0·5 g.

If then a solution be made containing w/v 28% of soluble sulphacetamide and 7% penicillin (400 units per mg.) and the inhalation sessions are of 30 minutes duration repeated 3 hourly, 112,000 units should be absorbed daily and the blood concentrations of sulphacetamide will be sufficiently high for estimation. Division of the sulphacetamide figures by the factor 4 will give inferential values for the blood concentration in respect of the penicillin preparation used. It is not suggested that these deductions are quantitatively accurate. They represent the expected order of values and illustrate the principles underlying the proposed method of penicillin administration and assay. Before a definite routine could be advised it would be necessary to test the stability of the penicillin-sulphonamide solution during nebulisation and to correlate by actual observations the relationship between the concurrent concentrations of penicillin and sulphacetamide in the blood.

GENERAL SUMMARY

Quantitative details are given of the fate of sulphonamides inhaled as mists formed from their aqueous solutions. Sulphonamide EOS and soluble sulphacetamide were used. Mists were produced by the Collison inhalation apparatus. Various devices were substituted for the standard oronasal face-piece and their relative efficiencies estimated. The constants of the apparatus were measured and biological data are given for patients with bronchiectasis and for normal controls. The importance of eliminating air turbulence in the external air conduits and in the mouth has been demonstrated.

When a 50% w/v aqueous solution of sulphonamide EOS, nebulised by 6–8 litres of oxygen per minute, is inhaled through a small rubber nose-mask, the patient absorbs about 1 c.cm. of the original solution per hour. Bronchiectatic patients appear to absorb more than do normal students. The application of these findings to the problems of inhalation therapy in general is discussed with special reference to the administration of penicillin. It is suggested that a guide substance which can easily be estimated chemically should be administered with the penicillin to simplify assay. Sulphacetamide seemed to be a suitable substance.

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INFECTIVE DERMATOSES
TREATED WITH PENICILLIN

P. H. TAYLOR, MRCS K. E. A. HUGHES, MRCS
MAJORS RAMC

AT a large military hospital penicillin was used in the treatment of a number of cutaneous diseases. These included sycosis barbæ, impetigo contagiosa, furunculosis, and other varieties of the large group of eruptions known as the infective dermatoses. Penicillin was applied locally in various ways in an endeavour to find the most efficient and most economical. The preparations were :

1.—Crude penicillin filtrate, in a base consisting of equal parts of 'Lanette' wax SX, soft paraffin and water. (6 Oxford units of penicillin per gramme.)
2.—Calcium penicillin in a base of 30% lanette wax SX in water. (400 units per g.)
3.—Sodium penicillin in a base of 30% lanette wax SX. (200 units per g.)
4.—Sodium penicillin in aqueous solution at a strength of 200 units per c.cm. Applied as a spray.
5.—Penicillium mould of about 14 days' growth. (Roughly 30 units of penicillin per g. of mould.)
6.—Penicillium mould crushed up in a base of 30% lanette wax SX in water. (2 parts of mould to 1 part of base, giving a strength of about 20 units per c.cm. of ointment.)

Three separate series of cases were treated. In the first series preparation 1 was used, in the second series preparation 2, and in the third series preparations 3–6.

Before treatment each case was examined bacteriologically. Cultures on blood-agar were made with a wool swab. The plates were incubated for 24 hours or longer, as required, the organisms growing were identified, and a rough colony-count was made. All organisms grown were tested for sensitivity to penicillin, and all staphylococci had their coagulase-production assessed. During treatment, daily cultures were made in a similar way, care being taken to swab the same areas of the lesions on each occasion, so that reasonably comparable bacteriological counts could be made. Sensitivity and coagulase tests were repeated from time to time.

FIRST SERIES

Preparation 1 was used in 10 cases :

	Cases		Cases
Sycosis barbæ	5	Pustular dermatitis of feet	1
Ecthyma	1	Impetigo	1
Septic ulceration of leg	1	Tinea cruris	1

Dressings were applied three times a day over 8–10 days. As a rule some clinical improvement was seen in the early stages, but nearly every case became eczematised, owing, it was thought, to the use of an impure batch of soft paraffin in making the base. Penicillin had no healing effect in the case of tinea cruris.

Bacteriology.—Excluding the case of tinea cruris, all grew coagulase-forming staphylococci in considerable

numbers. Of these, 8 were normally sensitive to penicillin, and 1—from a case of sycosis barbæ—grew both sensitive and insensitive strains in the primary cultures. The insensitive strain required 10 units of penicillin per c.cm. to inhibit its growth, as compared with 0·02 unit per c.cm. for the standard Oxford staphylococcus. Nevertheless some clinical improvement took place up to the time when eczematisation occurred, although the resistant strain persisted throughout. In another case an even more resistant strain appeared after about 300 units of penicillin had been applied. This organism required more than 200 units per c.cm. to inhibit its growth. Staphylococci disappeared in 6 of the remaining cases and were greatly reduced in 1.

Other organisms which made brief appearances during treatment were coliform bacilli, proteus, and pyocyanea, all of which were as usual insensitive, and a hæmolytic streptococcus which was normally sensitive.

Unfortunately the ultimate bacteriology of these cases could not be determined, since eczematisation brought the experiment to a premature conclusion.

SECOND SERIES

Preparation 2 was used in 15 cases, the dressings being applied twice a day (table I).

CASE 6.—This case proved resistant to treatment. When first seen there were many follicular pustules on the front of his chin and neck, and in spite of many forms of treatment these continued to spread. Dressings with penicillin were applied for 5 days (31,000 units); 2 days later he showed slight further activity; dressings with penicillin were renewed for 5 days (14,000 units), when an acute weeping dermatitis developed. Penicillin was stopped, and other treatments given for 9 days. Culture then grew staphylococci which were penicillin-sensitive and coagulase-positive; penicillin was recommenced, and in addition sulphathiazole was given internally. After 2 days, acute eczematisation again developed, and both sulphathiazole and penicillin were stopped (? sulphathiazole sensitisation). The lesions were then treated for 25 days with lotions (ichthyol, calamine, eau d'alibour, silver nitrate) and at the end of this time only 3 small lesions remained. Culture grew staphylococci which were penicillin-sensitive and coagulase-positive. It was then decided to try penicillin spray (200 units per c.cm.) four times a day for 2 days, 620 units being applied. Dramatic improvement followed, and the patient was discharged to his work. Total penicillin used, 51,000 units.

Seven days later there was slight further activity, and penicillin spray was given to him in the outpatient department twice a day for 28 days. This was followed by epilation doses of X rays, and penicillin was applied once every 3 days. The condition has now cleared entirely. The patient, an inspector of armaments, came into contact continually with TNT powder, a known skin irritant, which may partly account for the obstinacy of his case.

Bacteriology.—In all cases a penicillin-sensitive staphylococcus was grown before treatment commenced. Of the 15 cases 14 were coagulase-producers. During or after treatment, however, 5 of the strains isolated failed to form coagulase; 8 became sterile, while in the remainder the numbers of colonies were greatly reduced. Secondary organisms occasionally appeared in small numbers during treatment. In 1 case these were diphtheroids, and in 2 cases hæmolytic streptococci; the 4th showed both these organisms. All were sensitive to penicillin. The diphtheroids did not persist longer than 3 days, but the streptococci proved rather more difficult to eradicate in spite of their apparent sensitivity in vitro.

Cultures were also taken from the normal skin in 2 cases which relapsed after treatment had been stopped. One of these grew a coagulase-positive penicillin-sensitive staphylococcus, and the other a coagulase-negative but penicillin-sensitive staphylococcus together with a penicillin-sensitive hæmolytic streptococcus.

Only one strain of relatively insensitive staphylococci was isolated in this series. This was in a case of impetigo (case 1) which had had 29,000 units of penicillin over 5 days; 2 days later a routine culture grew two strains of staphylococci, one of which was coagulase-positive and of normal sensitivity. The other was coagulase-negative, and required 10 times as much penicillin to inhibit its growth. No clinical evidence of disease was seen at this time or later.

THIRD SERIES

Preparations 3, 4, 5, and 6 were used in 21 cases (table II). Cases treated with preparation 4 were sprayed four times a day, and those treated with preparations 3, 5, and 6 were treated once a day.

CASE 24.—At the end of 20 days' penicillin treatment, all that remained were a few fresh scattered pustules, the organisms from which were penicillin-insensitive staphyloccoci. These lesions were then treated with sulphathiazole and proflavine powder for 5 days, and thereafter with eau d'alibour and Lassar's paste. There was no sign of activity 2 months after this.

CASE 17.—Extensive sycosis barbæ with a large patch of secondary impetiginisation of the left side of the face and neck; a few scattered follicular pustules on the right side of the face and neck; and a small patch of impetiginisation on the front of the ear and on the lobe. Treatment was given with penicillin spray four times a day for 16 days, when all trace of sycosis had disappeared, but the impetiginised areas had become wet again after initial improvement. The staphylococci grown from the wet patch were now penicillin-insensitive and coagulase-positive. Total penicillin used, 21,560 units. Various applications were used on the wet patches for the next 3 weeks with little or no improvement. Organisms grown during this period were staphylococci, diphtheroids, and coliforms. On the 42nd day a penicillin-sensitive staphylococcus was grown, and penicillin spray was again applied for 8 days (12,600 units). Some slight improvement was shown at first, but weeping began again when a pure growth of coliform organisms appeared. Treatment was then changed to 4% ichthyol lotion and 1% brilliant-green lotion. On the 59th day staphylococci were again grown which were penicillin-sensitive, and penicillin spray was again applied. This was continued for 18 days, when all lesions were almost healed. On the 78th day no sign of any recurrence of sycosis was seen.

In this case, relapses of impetigo and eczematisation always corresponded with the appearance of penicillin-insensitive organisms.

CASE 29.—Left axillary furunculosis with several thickened and indurated areas and surrounding infective dermatitis; also a discharging furuncle above the left nipple with induration and surrounding infective dermatitis. Treatment was given to both chest and axilla with preparation 3. After 7 days, during which the boils had improved, an acute infective dermatitis developed in the left axilla, and a heavy growth of *B. coli* appeared on culture, and treatment with penicillin was stopped. Treatment was changed to ichthyol lotion, 4%, followed by sulphathiazole, which eventually cleared the axilla. The boil and dermatitis of the chest had almost cleared after 7 days' treatment. After 12 days' treatment culture grew penicillin-insensitive staphylococci, and treatment was changed to 5% sulphathiazole ointment. After 26 days both chest and axilla were clear, and on the 34th day there was no sign of activity. In this case penicillin treatment was stopped because of the appearance of penicillin-insensitive organisms.

Bacteriology.—All 27 cases in this series grew staphylococci before treatment was instituted; 26 of these were normally sensitive, and 23 were coagulase-producers. Other organisms isolated at the primary culture were hæmolytic streptococci three times, and coliform bacilli and monilia once each. The streptococci were sensitive, while the coliform bacilli and monilia were, as usual, insensitive.

Choice of method.—The effects of the different methods were as follows:—

Penicillin spray.—Of the 9 cases treated, 5 became sterile and 4 had their organisms greatly reduced in number. Coagulase-production varied from time to time in the strains found on daily culture. Coliform bacilli, diphtheroids, and *Neisseria flava* were the only secondary organisms noted during treatment, each appearing in 1 case only. The diphtheroids were sensitive, and the two others insensitive.

Penicillin in lanette ointment.—At the end of treatment only 1 of the 8 cases treated was found to be sterile, although 2 others had shown periods of sterility; 5 others had their colony-counts considerably reduced; 6 grew secondary organisms, and 4 produced strains of relatively insensitive staphylococci while under treatment. Coagulase-production was variable

TABLE I (SERIES 2)—15 CASES TREATED TWICE DAILY WITH PREPARATION 2

Case	Diagnosis and preparation used	Duration	Organisms grown: (*a*) before, (*b*) during,* (*c*) at end of treatment	Under treatment (days)	Units	Comment
1	Impetigo (2)	5 dy	(*a*) Staph. ++, P + C + (*c*) Sterile	5	29,000	Cured.
2	Impetigo (2)	14 dy	(*a*) Staph. ++, P + C + (*c*) Staph. +, P + C + *Strep. virid.* ±, P +	5	30,600	Cured. Relapse 2 days later. Settled in 2 days.
3	Impetigo (2)	14 dy	(*a*) Staph. ++, P + C + (*c*) Staph. ±, P + C +	5	56,000	Cured. Lesions very extensive.
4	Impetigo and sycosis barbæ (2)	21 dy	(*a*) Staph. ++, P + C + (*b*) Hæm. strep. before 3rd course, P + (*c*) Staph. ±	5 6†	24,000	Cured. Relapses day after 1st course and 10 days after 2nd. Clear after 3rd.
5	Sycosis barbæ (2)	6 mth	(*a*) Staph. ++, P + C + (*c*) Staph. +	5 5†	52,000	Cured. Relapse 7 days after 1st course and 5 days after 2nd; spray weekly for 4 weeks. Cleared.
6	Sycosis barbæ (2)	3 mth	(*a*) Staph. ++, P + C + (*b*) Occas. diphtheroids, P + (*c*) Staph. +	5† 5 28	60,000	Much improved (see text).
7	Sycosis barbæ (2).	1 yr	(*a*) Staph. ++, P + C + (*b*) Diphtheroids; hæm. strep., P + (*c*) Sterile	12 14† 8‡	86,000	Much improved. Relapse 8 days after 1st course and 3 weeks after 2nd. Lesions controlled by weekly spray.
8	Pustular dermatitis (2)	4 mth	(*a*) Staph. ++, P + C + (*c*) Staph. ±	13	90,800	Cured. Extensive lesions, groins, chronic inflammatory œdema of skin; 46 days later, skin almost normal.
9	Pustular dermatitis (2)	3 wk	(*a*) Staph. ++, P + C + (*c*) Sterile	12	77,800	Cured. Lesions very extensive.
10	Pustular acne with cyst abscesses (2)	2 yr	(*a*) Staph. ++, P + C − (*c*) Sterile	38	125,000	Much improved. Skin normal over large areas.
11	Furunculosis of axilla (2)	8 dy	(*a*) Staph. ++, P + C + (*c*) Sterile	14	38,000	Cured. No pain after 1st application.
12	Furunculosis of neck (2)	7 dy	(*a*) Staph. ++, P + C + (*c*) Sterile	5	7000	Cured. No pain after 1st application.
13	Carbuncle (2)	7 dy	(*a*) Staph. ++, P + C + (*c*) Sterile	9	12,800	Cured. No pain after 1st application.
14	Infective dermatitis (2)	9 dy	(*a*) Staph. ++, P + C + (*c*) Staph. ±	5† 5	45,600	Cured. Relapse 3 days later. Normal skin grew staphs., P + and C +.
15	Infective dermatitis (2)	21 dy	(*a*) Staph. ++, P + C + (*b*) Hæm. strep., P + (*c*) Sterile	5† 7 5	25,600	Improved. Relapsed repeatedly, and again 2 months later.

P + = penicillin-sensitive. C + = coagulase test positive. P − = penicillin-insensitive. C − = coagulase test negative.
++ = heavy growth. + = moderate growth. ± = slight growth. ± = very slight growth.
* Second organism grown after treatment had started. † Plus 1 application daily for 4 wk. ‡ Plus 1 application daily for 9 wk.
The preparation used in each case is shown in parentheses in the second column.

Penicillium mould.—Among the 10 cases treated with mould, or mould in lanette ointment, 5 showed considerable diminution in the numbers of colonies grown, but only 1 became sterile. The colony-counts of the remainder were little influenced by treatment; 3 cases grew insensitive strains of staphylococci and 5 cases various secondary organisms, all insensitive. Coagulase-production was again variable.

It seems from these bacteriological results that the spray was the most effective method adopted, since more cases were sterilised by it, and fewer insensitive staphylococci were isolated.

DISCUSSION

In the three series reported, various methods of application were used. The premature termination of the experiment in series 1 was unfortunate, but trouble with impure batches of soft paraffin has previously been noticed. In series 2 the dosage of penicillin used for each case appeared to be excessive, and we decided to try a fresh series (3) with a weaker strength. A few cases were then treated with sodium penicillin, 200 units per g. of 30% lanette wax SX base. It was noticed that certain strains of staphylococci grown during treatment were developing penicillin-fastness, whereas the organisms grown before treatment were penicillin-sensitive. A few experiments were carried out to ascertain the reason for this. It was found that in vitro the diffusibility of penicillin from the lanette ointment was only about half its diffusibility from water. It was also found that penicillin in the lanette ointment deteriorated rapidly, especially at room temperature; and even if it was kept in the refrigerator its efficiency was not maintained for more than 10–14 days. Owing to the lowered stability and diffusibility of penicillin in lanette ointment, the dose in contact with the organisms in the lesion is probably not maintained at therapeutic levels; and some organisms become penicillin-fast and are not destroyed.

This difficulty did not arise, however, in the second series when ointment at a strength of 400 units of penicillin per g. was used.

We are trying to find a more suitable base, and the following seems satisfactory: Stearic acid dr. 20, liquor. ammon. fort. min. 100, and water to 1 lb. Both the stability and diffusibility of penicillin are much higher, and a strength of 200 units per c.cm. is sufficient.

The spray technique was then evolved. This proved to be satisfactory; application was simple, and it was the most economical method of treatment. The results were much better than those with any other method. The solution kept well at room temperature for at least a fortnight, and retained reasonable therapeutic potency for at least a month when stored in a refrigerator.

A few cases were also treated with penicillium mould, a supply of which was obtained from Messrs. Burroughs Wellcome and Co. The results were disappointing, probably owing to the low penicillin content (30 units per g.) of the mould. The only virtue of the method was that use was being made of what is normally a waste-product.

SUMMARY

Penicillin is effective in the local treatment of certain skin diseases caused by cocci.

The most satisfactory method of treatment of sycosis

TABLE II (SERIES 3)—27 CASES TREATED WITH PREPARATIONS 3, 4, 5, AND 6

Case	Diagnosis and preparation used	Duration	Organisms grown: (*a*) before, (*b*) during, (*c*) at end of treatment	Under treatment (days)	Units	Comment
16	Sycosis barbæ (4)	2 yr	(*a*) Staph. ++, P + C + (*c*) Sterile	14	8500	Relapse after 40 days. Sprayed daily; immed. improvement.
17	Sycosis barbæ impetiginisation (4)	10 yr	(*a*) Staph. ++, P + C + (*b*) Staph., P −; coliform, P −; diphtheroids, P + (*c*) Staph. +	16 8 18	52,360	Sycosis cured (see text).
18	Sycosis barbæ (4)	9 mth	(*a*) Staph. ++, P + C + (*c*) Sterile	15	3850	Cured.
19	Sycosis barbæ (4)	8 mth	(*a*) Staph. ++, P + C + (*b*) Neisseriæ, P − (*c*) Sterile	26	8600	Cured.
20	Sycosis barbæ (4)	5½ mth	(*a*) Staph. +, P + C + (*c*) Sterile	25 27	80,000	Extensive lesions; seborrhœa. Relapse 6 days later; condition promising after 27 days' treatment.
21	Sycosis barbæ, chronic blepharitis (3)	1 yr	(*a*) Staph. ++, P + C + (*b*) Diphtheroids, P +; hæm. strep., P + (*c*) Staph. +	Syc. 22 Bleph. 37	11,200	Seborrhœa; slight relapse 40 days after treatment. Improved.
22	Sycosis barbæ (3)	3 yr	(*a*) Staph. ++, P + C + (*b*) *Strep. virid.*, P + (*c*) Staph. ±	15	7000	Cured.
23	Sycosis barbæ (3)	2 yr	(*a*) Staph. ++, P + C + (*b*) Diphtheroids, hæm. strep. (*c*) Staph. ±	12 5	16,000	Cured. Relapse 5 days later; cured by 5 days' treatment.
24	Sycosis barbæ (3)	3 dy	(*a*) Staph. ++, P + C + (*c*) Staph. ++, P − C +	20	14,360	Cured but for few fresh lesions (see text).
25	Sycosis barbæ (5) (6)	3 mth	(*a*) Staph. ++, P + C + (*b*) Coliform (*c*) Staph. ±	7 11	1500	Soon relapsed.
26	Sycosis barbæ (6)	3 mth	(*a*) Staph. +, P + C + (*c*) Staph. ±	17	760	Cured.
27	Sycosis barbæ (6) (4)	2½ yr	(*a*) Staph. ++, P + C + (*b*) Coliform (*c*) Staph. ±	18 40	860 14,000	Clear 14 days later. At 18 days heavy growth. Mould spray applied.
28	Furuncle, nose (3)	3 dy	(*a*) Staph. ++, P + C − (*b*) Diphtheroids (*c*) Staph. ++	6	2000	Pain lost in ½ hr. Did not discharge. Cured.
29	Furunculosis, infective dermatitis, chest, and axilla (3)	On and off for 2 yr	(*a*) Staph. ++, P + C + (*b*) Coliform, P −; diphtheroids (*c*) Axilla: coliform ++ chest: staph. +, P −	Axl. 7 Chst. 12	8200	Difficult (see text).
30	Furuncle of nose (3)	4 dy	(*a*) Staph. ++, P + C + (*c*) Sterile	7	2100	Pain lost in ½ hr. Did not discharge. Cured.
31	Furuncle, labium maj. (3)	2 dy	(*a*) Staph. ++, P + C +; *B. coli* ±, P − (*b*) *B. coli* ± (*c*) Staph. +	5	1340	Pain lost in 4 hr. Boil discharged after 36 hr. Cured.
32	Furuncle, right axilla (5) (6)	6 dy	(*a*) Staph. ++, P + C − (*c*) Staph. ±	5 6	1400	Cured. Relapse 10 days later. Cleared with prep. 6.
33	Furunculosis (5)	6 dy	(*a*) Staph. ++, P + C + (*b*) *Strep. virid.* ++, P − (*c*) Staph. ++	12	..	Much improved.
34	Furunculosis; chron. absc. of old scar (5)	4 mth	(*a*) Staph. ++, P + C + (*b*) Coliform + (*c*) Staph. ±	15	..	All lesions healed. No follow-up.
35	Carbuncle, groin (6)	6 dy	(*a*) Staph. ++, P + C + (*c*) Staph. +	13	840	Pain lost in 1 day, discharging after 3. Healed.
36	Cellulitis, knee (5)	2 dy	(*a*) Staph. ++, P − C +	2	..	Treat. stopped (insensitive organisms).
37	Infect. dermatit. (5)	3 dy	(*a*) Staph. ++, P + C + (*c*) Staph. ++	6	..	Healed.
38	Impetigo (4)	5 dy	(*a*) Staph. ++, P + C + (*c*) Sterile	4 2	5630 960	Underlying seborrhœa; relapse 4 days later; cured in 2 days.
39	Impetigo (4)	8 dy	(*a*) Staph. ++, P + C +; hæm. strep. ++, P + (*c*) Staph. ±	6	7400	Cured.
40	Impetigo, eczematisation (4)	22 dy	(*a*) Staph. ++, P + C +; hæm. strep. ++, P + (*c*) Staph. ±	6 1	9500	Relapse 5 days after 1st course; cleared by spray, 1 day. Cured.
41	Chronic ulcer, knee (5)	2 mth	(*a*) Monilia, staph. +, P + C − (*b*) Coliform (*c*) Sterile	18	..	Ulcer healed.
42	Impetigo (4)	4 dy	(*a*) Staph. ++, P + C +; hæm. strep. +, P + (*c*) Staph. +	7	10,430	Cured.

barbæ and impetigo is to spray the lesions with an aqueous solution containing 200 units of penicillin per c.cm.

An adequate dose of penicillin from the start is essential to prevent the development of penicillin-fast organisms. A strength of 200 units of penicillin per c.cm. or 400 units per g. of lanette base seem to be sufficient.

The pain in deep-seated lesions (furuncles) is much relieved after application of penicillin.

An underlying seborrhœic state in cases of sycosis and impetigo is liable to cause relapse soon after cessation of treatment, and necessitates further courses of treatment.

The appearance of penicillin-insensitive organisms indicates that further treatment with penicillin is of little value.

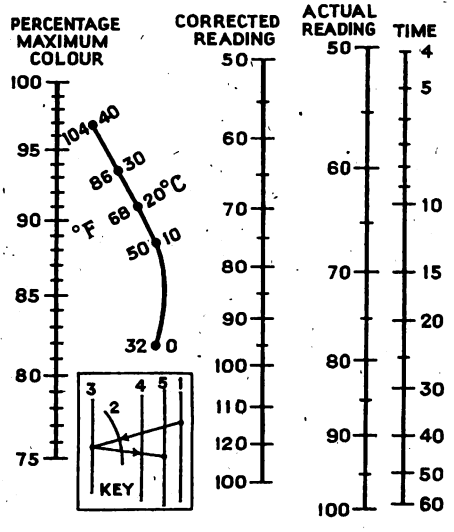
NOMOGRAM FOR CORRECTING SAHLI HÆMOGLOBINOMETER READINGS

G. H. BELL, B SC, M D GLASG.
MARY L. MCNAUGHT, B SC GLASG.
Institute of Physiology, University of Glasgow

SOME investigators have condemned the Sahli method of estimating hæmoglobin because of the darkening of the colour on standing; others—perhaps more enterprising—have endeavoured to supply correcting factors. Although it has been tacitly assumed that temperature affects the rate of development of the brown colour no-one seems to have investigated the matter systematically. Our results show that temperature is a factor which can by no means be neglected.

By means of a photoelectric absorptiometer (Bell and Guthmann 1943) we have measured the increase of colour with time when blood is added to N/10 hydrochloric acid at various temperatures: 0°, 10°, 20°, 30° and 40° C. The rate of increase of density at any given temperature is independent of the part of the spectrum used and accordingly the curves obtained by the photoelectric colorimeter apply equally to visual estimations. Our curves have a slightly different shape from those of Newcomer (1919) and Ashford (1943), both of whom used visual methods notoriously difficult when small differences of colour are being estimated.

By good fortune, when the results are plotted on double log paper—log percentage of maximum colour reached at time t against log t—we get very nearly a straight line for any given temperature. Thus it is easy to construct a nomogram which will, without calculation, give a standard reading—namely, the value which would have been reached if the acid hæmatin had been allowed to stand for 24 hours or more at room temperature.



How to use the nomogram.—To make use of the corrections shown in the figure the Sahli estimation is made in the normal way, preferably using N/10 HCl for diluting up to the match. A note is made of the time elapsing between the adding of the blood to the acid and the moment when the match is reached (time t). Our experiments indicate that t should never be less than 5 minutes because the colour increases too quickly in the first few minutes to allow accurate matching. The temperature of the stock bottle of N/10 HCl must also be noted.

Now in the nomogram join time t (scale 1) to the temperature on the curved scale 2; this will intersect scale 3 to give the correcting factor. If this point is then joined to the actual reading on the hæmoglobinometer (scale 5) the line will intersect scale 4 at the standard or corrected reading. (If the actual reading is less than 50 it should be doubled; the corrected reading will then be halved.) The key included in the chart indicates the moves across the nomogram—for example, if the match is made 9 minutes after adding blood to the N/10 HCl which is at 20° C the percentage of the colour reached will be 90·5, and if the actual reading on your apparatus is 80% then the corrected reading is 88%. To avoid damage to the nomogram the lines should be indicated either by holding a thread stretched between the hands or by using a transparent ruler. By taking a few practice values the effect of time on the hæmoglobinometer readings will be easily appreciated. The effect of temperature can readily be seen by joining, say, 5 minutes to 10° and 40° C, values which are by no means unlikely under Service conditions. If these corrections are applied then the standard or corrected readings can be directly compared no matter the conditions under which the individual estimations were made.

There are those who have an affection for the Sahli apparatus; for them this nomogram may justify their affection. There are those who will say that our work merely points out another serious error in the method and that there is no further doubt now that the method should be abandoned. But the Sahli method has advantages in portability and in density of colour; and if the simple corrections given in this nomogram are applied it should be at least no worse than its competitors.

We are indebted to Dr. K. J. W. Craik for discussing with us the applicability of results obtained photoelectrically to visual colorimetry. The expenses of this work were defrayed by a grant from the Rankin Medical Research Fund of the University of Glasgow.

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PROGNOSIS AFTER SUCCESSFUL PNEUMONECTOMY

J. M. CHEALE, MB LOND.
LATE HOUSE-PHYSICIAN AND ASSISTANT RESIDENT MEDICAL OFFICER, BROMPTON HOSPITAL
F. H. YOUNG
MD CAMB., FRCP
PHYSICIAN TO THE HOSPITAL

DURING the past few years pneumonectomy has been performed with increasing frequency. In the hands of skilled operators the mortality has diminished so much that the operation has ceased to be performed merely in cases when the saving of life is the sole criterion. We found that, while we could estimate the likely mortality, we had no dependable evidence on which to foretell the likely time of stay in hospital, the time which would elapse before work could be resumed, and the capacity for normal life or work which would remain. Reference to published work was not helpful.

The material used in the following investigation consisted of patients in whom the operation had been performed at the Brompton Hospital between 1935 and 1940, and who were alive at the end of 1941—i.e., had survived the operation for at least a year. The data were derived from the hospital records and a questionary sent out to the patients. A reply was received from most of them, 25 cases being available for study.

The symptom which most often prevents a surgically successful case from following a gainful occupation is dyspnœa on mild exertion; accordingly a test of this applicable to all cases in war-time had to be applied. The test adopted was the degree of dyspnœa produced by walking up the stairs from the ground to the first floor of an ordinary house. It was felt that if this could be done without dyspnœa the patient could lead a useful life. The estimation of the vital capacity in relation to the degree of dyspnœa would have been interesting; these estimations are rather unreliable unless repeated and carefully controlled, and would have necessitated the attendance of the patients, which was impracticable.

The condition of the remaining lung is of course an important factor. In bronchiectasis, where the severity of the condition was sufficient to merit operation at the date when the operations in this series were performed,

ANALYSIS OF RESULTS IN 25 CASES OF PNEUMONECTOMY

Case	Sex and age (yr.)	Bronchial fistula	Months in hospital after operation	Occupation before illness or operation	Length of incapacity before operation	Occupation after operation	Months after operation before starting work	Short of breath		Vital capacity after operation. Remarks
								Walking on level	Climbing stairs	
1	F 14	Yes	4	School	1 yr.	School	?	No	No	..
2	F 20	No	4	Clerk	1 yr.	Clerk	8	No	No	Symptomless
3	M 26	Yes	4	Clerk	..	Clerk	6	No	No	Slight dyspnœa on exertion
4	M 15	Yes	3	School	1 yr.	Light gardening	9	No	No	..
5	M 23	No	3	Cinema operator	..	Cinema manager	?	No	No	Can run 100 yd. easily
6	M 20	Yes	3½	Navy	3 yr.	Grocer's hand	15	No	No	2250 c.cm.; can run upstairs
7	M 31	No	1½	Undertaker	..	Undertaker	2	No	No	..
8	M 16	No	4	School	..	Lorry driver	5	No	No	2500 c.cm. Fit as average man
9	F 32	No	4	Domestic	..	Domestic	?	No	No	1100 c.cm.
10	M 53	Yes	4	Engineer	3 mth.	Engineer	12	No	No	1750 c.cm.
11	M 17	Yes	8	Nil	..	Shoe repairer	18	No	No	1900 c.cm.
12	M 10	Yes	9	School	..	School and joiner's labourer	?	No	No	..
13	F 35	Yes	6	Domestic	..	Domestic	20?	No.	Slight	Less than 1000 c.cm.
14	F 17	Yes	4	Factory	..	Riveter	12	No	No	..
15	M 15	Yes	2½	School	..	Wireless factory inspector	10	No	No	..
16	M 17	Yes	2½	Engineer	..	Engineer	6	No	No	..
17	F 22	Yes	2	Domestic	1 yr.	Domestic part-time clerk	?	No	Slight	1400 c.cm.
18	M 24	Yes	4	Sports referee	6 mth.	Farm work	24	No	Slight	1400 c.cm.
19	F 40	No	3	Domestic	..	Domestic	18–24	No	Yes	1700 c.cm.
20	M 6	No	2	Nil	..	School	?	Yes	Yes	Survived pneumonia
21	M 16	Yes	4	Coalminer	3 mth.	Cinema operator	?	No	No	1200 c.cm.
22	M 50	Yes	4	Engineering agent	..	Engineering agent	?	No	Slight	..
23	F 31	Yes	4	Shop assistant	..	Shop assistant	12	No	Slight	1200 c.cm.
24	F 30	No	2	Bank clerk	..	Nil	?	No	Slight	..
25	F 52	No	1	Domestic	..	Domestic	?	No	Slight	1600 c.cm.

* After climbing from ground to first floor of ordinary house.

the likelihood of some damage to the bronchial walls of the better lung was considerable, though gross dilatation was excluded. Accordingly, the results given are the minimum likely to be achieved. Most of the cases in this series were suffering from bronchiectasis or chronic lung sepsis. In cases of operation for carcinoma the results, if no recurrence takes place, are likely to be better. Again, the technique of the operation has much improved with the result that bronchial fistulæ are less common and the average results will gradually approach those in which no fistula has occurred. The series emphasises that bronchial fistula is the determining factor in the length of stay in hospital and the length of time before work can be resumed, since only in exceptional cases can work be carried out with a tube in position.

ANALYSIS OF CASES

Time in hospital.—The average stay in hospital after operation was 15 weeks, but when no bronchial fistula developed (9 cases) the average was 11 weeks; where a fistula did develop it was 17 weeks. No other feature seems to be a constant factor, so as the operative technique improves the average stay in hospital will fall.

Length of invalidism before work can be begun.—This is complicated by the fact that several of the cases were housewives, and it is difficult to say when they were fit for, or started, ordinary work. Of the 13 cases gainfully employed of which details were available, the average time from the operation to starting work was 11 months, but when there is no fistula the time can probably be halved.

Capacity for work.—Of the 25 cases, 18 obtained gainful employment. Only one was not employed and the remainder were doing domestic work or were at school, the exact amount of work being unknown.

Extent of dyspnœa.—Only one case reported that she was short of breath at rest—a child of 6 years. It was also reported that she had survived an attack of pneumonia, so it is pretty certain that an element of bronchial spasm was present. On the stairs test, 15 cases reported that they were not short of breath; 7 said that they were slightly, and 2 definitely, short of breath. Bronchial fistulæ had no outstanding effect on dyspnœa, but age was certainly a factor: of 9 cases aged 30 years and upwards, 6 had some dyspnœa; of 15 cases under 30 years only 3, including the child previously referred to, had any dyspnœa on the stairs test. In the table the vital capacity after operation has been given where available, but generally it was not noted. Patients' remarks have been appended. The lack of disability in some cases under 20 years of age was remarkable.

SUMMARY

Patients who have had a pneumonectomy performed have a good prospect of obtaining gainful employment and of leading at least a quiet life without dyspnœa. The younger patients may expect more lung function than those in the older age-groups.

CONWAY EVANS PRIZE.—The presidents of the Royal Society and of the Royal College of Physicians have awarded the Conway Evans prize to Sir Thomas Lewis, FRS, in recognition of his contribution to medical knowledge on the normal and abnormal mechanisms of the heart and circulation of the blood.

PREGNANCY AFTER PULMONARY LOBECTOMY

A. GRAHAM BRYCE
MD MANC., FRCS
EMS CONSULTANT IN THORACIC SURGERY

ELEANOR M. MILLS
MB MANC., FRCS, MRCOG
CHIEF ASST, SURGICAL UNIT, ROYAL INFIRMARY

Manchester Coördinated Thoracic Surgery Service

THERE are now doubtless many women who have surmounted the trials of pregnancy and labour after being subjected to resection of the lung, but we have been able to find only one record of such a sequence. Tyson (1943) mentions a patient who was delivered of a healthy child after right upper lobectomy for a giant pulmonary cyst. The following case therefore seems worthy of record.

CASE-HISTORY

A woman of 23 developed a slight cough after tonsillectomy in January, 1937. A month later there was severe pain on the left side of the chest. In March, 1937, hæmoptysis was followed by the expectoration of putrid pus. The symptoms continued and the patient was admitted to the Manchester Royal Infirmary under the care of Dr. T. H. Oliver in August, 1937. Bronchograms showed a localised bronchiectasis of the left lower lobe. On Dec. 4, 1937, the left lower lobe was removed by the Brunn-Shenstone (tourniquet) method, a procedure which is nowadays perhaps best described as the subtotal operation. A bronchial fistula persisted for some months but eventually closed.

On Oct. 30, 1942, she was again referred to the department of thoracic surgery from St. Mary's Hospital, where she had attended the antenatal clinic. At that time she was in the seventh month of her first pregnancy and the desirability of terminating it came into question. This course was not advised, since apart from a little dyspnœa she was entirely free from symptoms referable to her chest. She went into labour spontaneously at term on Jan. 3, 1943, and was admitted to St. Mary's Hospital. The fœtus was presenting by the vertex in the left occipito-anterior position. The first stage continued for 48 hours. After the second stage had lasted for 2 hours, the fœtus showed signs of distress. Under ether anæsthesia a mid-forceps extraction was carried out and a living female child was delivered, an episiotomy being necessary. Throughout the long labour the patient showed no cardiac or respiratory embarrassment. She went home on the 16th day and was able to continue breast-feeding for 8 months, at the same time carrying out all her household duties.

Follow-up bronchograms, made in August, 1943, demonstrated the entire freedom from bronchiectasis of the right lung and the remaining left upper lobe.[1]

DISCUSSION

Cases of this kind are important in these days, when lobectomy and pneumonectomy have attained an established position in the treatment of bronchiectasis and other pathological conditions of the lung.

Longacre and his colleagues (1937), Longacre and Johansmann (1940) and Bremer (1937) have studied experimentally the physiological and histological changes which occur in the remaining lung after total pneumonectomy. As might be expected the functional disability is less in young than in adult animals. While kittens and puppies appeared to have the power of true regeneration of lung tissue, the changes in the remaining lungs of adult animals were more like those seen in pulmonary emphysema. Graham (1940) removed, in stages, the right lower and middle lobes and the left lower lobe and lingular process of a boy aged 14. The patient was subsequently able to indulge in all activities usual at his age. Lester and others (1942) have studied the pulmonary function of three children 1–3 years after the operation of total pneumonectomy. They found that persistent compensatory overdistension of the remaining lung was the factor which most impaired respiratory efficiency. Such overdistension is not likely to be severe when only a portion of one lung has been removed.

A number of cases of pregnancy after thoracoplasty have been reported. While this operation does not involve the ablation of any of the functional diffusing respiratory area, it does impair the capacity of the lung on the operated side to act as an organ of respiration in proportion to the extent of the rib resection. Hartung (1938) describes the case of a woman who was successfully confined after a total thoracoplasty for tuberculous empyema. Severe collapse developed 3 hours after labour, but the patient was resuscitated by an intravenous injection of glucose-saline solution. Seeley et al. (1940) record 13 pregnancies in 10 of their patients after thoracoplasty for tuberculosis; 8 pregnancies went to term and the patients were well. The unfortunate outcome in some of their cases seems to have been due not so much to the operation as to the deleterious effect which pregnancy is well known to have on the course of pulmonary tuberculosis. They collected 20 additional cases from published work. On the whole, they consider that the fear of respiratory difficulty during pregnancy and labour is not borne out by their case-records, though there have been some reports of considerable and occasionally serious dyspnœa during labour.

The question of inducing therapeutic abortion after resection of the lung must be determined in each case. We advised interruption in the case of a woman aged 30 in her second pregnancy, who had undergone a left lower lobectomy and subsequently a lingulectomy for bronchiectasis and who still had a discharging bronchial fistula. In her case, the presence of a persistent septic focus and the possible danger of an abdominal hysterotomy, if it should have proved necessary in the later months of pregnancy, were held to justify emptying the uterus at the end of the third month. We should not, however, regard the mere fact of a successful lobectomy (or even a total pneumonectomy) as a sufficient reason for terminating pregnancy in an otherwise fit woman.

We desire to thank Dr. T. H. Oliver, Dr. W. R. Addis, and Dr. C. P. Brentnall for allowing us access to their case-records.

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1. Since this record was written a multipara, aged 34, in her sixth pregnancy, has been delivered of a 5½ lb. child in the 37th week of pregnancy. The mother had undergone a left lower lobectomy for bronchiectasis 20 months before the confinement. The baby died when it was 15 days old. Delivery was by natural forces and the puerperium was normal.

Medical Societies

ROYAL SOCIETY OF MEDICINE

AT a meeting of the section of medicine on Nov. 28, with Dr. GEOFFREY EVANS in the chair, a discussion on

Nutritional Factors in Liver Disease

was opened by Prof. H. P. HIMSWORTH. Dietetic lesions in the liver, he said, are of two kinds: massive acute necrosis, either killing or causing scarring and nodular hyperplasia; and diffuse hepatic fibrosis resembling portal cirrhosis. Because both lead to fibrosis of the liver they have been confused under the term "dietary cirrhosis." The development of massive acute necrosis depends, he has been able to show, on the amount of protein eaten. The amounts of vitamin, choline, fat and carbohydrate in the diet have no effect on this lesion. Different proteins vary in their ability to prevent the appearance of necrosis; thus, small amounts of casein are effective, while large amounts of yeast protein are ineffective. Casein differs from yeast in being rich in the amino-acid methionine, and yeast enriched with methionine protects as effectively as casein. Rats fed on a diet low in protein seem to remain well for some weeks; then without warning they fall ill, sometimes dying in a few hours from massive necrosis of the liver, and sometimes surviving to develop nodular hyperplasia, with jaundice, ascites, and œdema. Professor Himsworth specially noted that the latent period is long, that the liver looks normal until the sudden onset of necrosis, and that it is always scarred if the animals survive. A variant of the condition is partial hepatic necrosis, in which only the left half of the liver is affected. This appears in rats receiving just sufficient protein to protect them against generalised hepatic necrosis. The blood from the superior mesenteric vein goes mainly to the right half of the liver, while that from

the splenic vein goes mainly to the left half. The products of protein digestion are carried by the blood in the superior mesenteric vein, so that the right half of the liver suffers less from protein deficiency than the left half, which receives the impoverished blood from the splenic vein. The diets causing the second type of liver lesion—diffuse hepatic fibrosis—are either rich in fat or deficient in lipotropic factors, and all produce fatty infiltration of the liver. Unlike massive necrosis, which appears after a period of weeks, this condition takes months to develop; health gradually deteriorates without any acute stage and the changes in the liver also develop gradually. Necrosis is absent, but fatty infiltration precedes and accompanies the fibrosis. Possibly when the liver cells are choked with fat the flow through the tortuous sinusoids may be so much retarded that by the time the blood reaches the centre of the lobule it is largely depleted of nutriment. Cells in the centre may therefore be dying off unobtrusively all the time; and repeated attacks of centrilobular necrosis are known to lead eventually to portal cirrhosis.

In man massive necrosis can be produced either by poisons (toxipathic hepatitis) or by dietary deficiency (trophopathic hepatitis). In toxipathic hepatisis there is transient zonal necrosis; in trophopathic hepatitis massive necrosis leads to scarring and nodular hyperplasia. In temperate climates, massive necrosis is only seen in association with pregnancy, or after infective hepatitis, or after exposure to poisons such as TNT. In pregnancy, the mother's nutrition may suffer to meet the needs of the fœtus. The mortality from jaundice following yellow fever vaccine (which is related to infective hepatitis) was only 0·2% among well-fed American troops, but 2·5% among ill-fed Brazilians. An isomer of TNT is known to combine with some amino-acids, and may thus make them inaccessible for use by the body. Massive necrosis may develop as a complication of zonal necrosis, because in the tense and swollen liver the circulation is impeded. If the blood is poor in protein, the slow rate of flow may prevent the liver cells from getting enough nutriment to survive. From the tropics outbreaks of "yellow fever" are sometimes reported which prove on investigation to be epidemics of massive hepatic necrosis. Such outbreaks are only seen among peoples living on diets grossly deficient in protein. Professor Himsworth quoted other examples of liver necrosis and fibrosis in tropical countries, all associated with some dietary deficiency, either direct or produced by disease. He recalled that portal cirrhosis in western countries is traditionally associated with alcoholism; but recent investigations, he said, suggest that alcohol is at most a contributory factor. In the East cirrhosis occurs among people who take no alcohol. Long-standing fatty infiltration of the liver is an essential precursor of experimental portal cirrhosis, and there is good clinical evidence that it also precedes such cirrhosis in man. Alcohol contains no lipotropic factors; in excess it impairs appetite and thus limits the addict's intake of protective foods. Fatty infiltration of the liver is thus favoured. Proteins and alcohol are both expensive, and he who can afford to buy good food as well as much drink may escape cirrhosis: the condition is thus commoner in the poor alcoholic. In the East a gross fatty infiltration occurs in native races, apparently as the direct result of a poor diet, and among them portal cirrhosis is common.

Dr. L. E. GLYNN showed lantern slides illustrating the pathological states of the liver in man and rats discussed by Professor Himsworth. Massive acute necrosis of the rat's liver resulting from a methionine-deficient diet was compared with human acute yellow atrophy at all stages from the onset of necrosis to that of postnecrotic scarring with nodular hyperplasia. The points of similarity in the acute stage which were particularly emphasied were the massive character of the necroses with relatively little hæmorrhage, and the haphazard distribution of the surviving liver cells. Attention was also drawn in both species to the rapid removal of the necrotic liver cells followed by intense infiltration with lymphocytes and macrophages, the latter apparently derived from the Kupffer cells; the often considerable proliferation of bile-ducts; and finally the regeneration of nodules of liver cells from the irregularly distributed survivors, which together with the development of scar tissue in the areas of histiocytic infiltration, results in the characteristically coarsely nodular scarred liver of so-called toxic cirrhosis. The remarkable tendency, both in man and rats, towards localisation of the lesions to the left half of the liver in the less acute cases was also illustrated. Slides were then shown of various stages in the development of diffuse hepatic fibrosis in the rat's liver consequent on prolonged fatty infiltration due to diets deficient in lipotropic factors. Corresponding stages in the evolution of human portal cirrhosis were also shown—intense fatty infiltration, progressive increase of portal-tract connective tissue, subsequent invasion of the individual lobules by this tissue resulting in the ensnaring of groups of liver cells, and finally nodular regeneration in these ensnared groups causing a finely granular organ with complete loss of its normal regular lobular pattern.

Prof. JOHN BEATTIE discussed the possibility that outbreaks of infective hepatitis and postarsphenamine jaundice were related to deficiencies of protein in the diet. He mentioned the high incidence of hepatitis among Army recruits from some African tribes which take a diet poor in protein, and the low incidence among others who are meat-eaters. The severity of hepatitis occurring in burn cases, in pregnant women, and in surgical cases where there is a history of undernutrition also supports this view. Yet Pickles's report of the Wensleydale outbreak of hepatitis contained no suggestion of dietary factors, and in fact the protein intake of those patients was rich and high. The virulence of the infective organism must, he thought, be taken into account. In his study of postarsphenamine jaundice he was also unable to obtain anything more than a very general correlation between the occurrence of the disease and the dietary background of the cases. Experiments on the protective value of methionine in preventing jaundice in such cases suggested that 3 grammes of methionine daily, whether as supplement or contained in food, materially reduced the severity of jaundice and delayed its appearance, but probably did not reduce its incidence. In the cure of jaundice much larger doses of methionine are required to obtain an effect. In very severe cases 10 g. may be given intravenously at intervals of a few days—but this method of treatment may not be without danger in some exceptional cases. The effect of methionine on the hepatic condition in already jaundiced patients may be considerable but methionine alone cannot cure the illness. Unless adequate dietary protein is available at this stage relapse may follow or at least a very long period of convalescence. Two series of cases had been observed. In one the available protein was less than 120 g. daily. In the other there was unlimited protein available and the individual consumption was never less than 150 g. While weight losses were common in the first group, large weight increases were the rule in the second group. The average stay in hospital for cases of comparable severity in the first group was 14 days longer than in the second group. Prof. Beattie emphasised the importance of providing adequate protein food during the recovery phase when attempting to assess the value of methionine as a therapeutic agent in cases of hepatitis. In some cases this might only be optimal when the food provided 300 g. of protein daily.

Major CLIFFORD WILSON was not convinced by the evidence that dietetic factors have any influence on the course of infective hepatitis as seen in this country. He had conducted methionine trials in 100 soldiers with infective hepatitis admitted to hospital at Cambridge during the past year; alternate cases were used as controls. Methionine, 5 grammes daily, was given by mouth from the time of admission until 5 days after bile had disappeared from the urine; diet was not restricted. Since most of these cases are recovering when they come to hospital, he said, it is difficult to assess results, but he has used the following criteria: duration of jaundice and of liver tenderness; time in hospital; duration of biliuria; the days taken for the serum bilirubin to fall to 2 mg.; the maximum serum bilirubin; and the level of hippuric acid at the end of treatment. There was a slight difference in favour of the treated group throughout, but it was not statistically significant in respect of any single factor. All he could say was that if the methionine

in the diet was increased to twice the normal intake there was no observable effect as judged by these criteria.

Dr. H. W. ALLEN mentioned some results of anti-syphilitic treatment in French workers. The higher the dose of NAB the greater, he found, was the likelihood of jaundice; and the underfed were more likely to suffer than the well fed. He pointed out that starvation alone can produce jaundice in dogs, and that alcoholism predisposes to arsenobenzene jaundice. He thought it doubtful whether methionine is more valuable as a protection than an ordinary good diet.

Professor HIMSWORTH, in replying to questions, stressed two points. First, that his results did not prove that massive hepatic necrosis was directly due to methionine deficiency: to prove this, experiments in which amino-acids provided the only source of dietary nitrogen were needed. What had been shown was that this lesion was produced by a low-protein diet, particularly one deficient in sulphur amino-acids, and that it was prevented by methionine. Secondly, he said, the results gave no indication that the incidence of hepatitis due to poisons or viruses could be influenced by diet, though they did suggest that a high-protein diet, or methionine, might prevent such cases developing the complication, massive hepatic necrosis.

Reviews of Books

Year Book of Dermatology and Syphilology, 1943

MARION B. SULZBERGER, MD; RUDOLF L. BAER, MD. (Year Book Publishers; Lewis. Pp. 584. 19s.)

As usual the Year Book consists of abstracts of all the important published work of the year and is well up to standard. The customary original article at the beginning is on skin-tests and is specially well-timed now that dermatitis has at last been recognised as one of the most important and serious of industrial hazards. Industrial skin disease appears to be on the increase, possibly owing to the growing number of complex chemical substances in use in industry. The editors do not confine themselves to industrial irritants, however, but include almost every known substance which can cause a reaction in the skin. They keep skin-testing in its proper perspective, pointing out that without proper history-taking and study of the case such tests may prove valueless. Careful instructions about technique and interpretation are given, and anyone taking up skin-testing for the first time will do well to follow the plan outlined.

Invisible Anatomy

A Study of Nerves, Hysteria and Sex. E. GRAHAM HOWE, MB LOND., DPM. (Faber. Pp. 333. 10s. 6d.)

THERE is nothing in common between conventional medical psychology and the theme of Dr. Graham Howe's hortatory and expository manual, with its pervading appeal to the "ancient wisdom of the East." He assumes the rôle of the teacher, the "student of the unseen Laws" who wishes to bring together the Eastern and the Western standpoints; only those are likely to appreciate him who find meaning and help in the esoteric doctrines of Buddhism—or what passes for these in our time and country. In many passages the influence of C. G. Jung and of Rudolf Steiner is apparent. Psychology here becomes a matter not of scientific study and demonstration but of occult speculation and intuition.

Advances in Enzymology and Related Subjects of Biochemistry

(Vol. IV.) Editors: F. F. NORD, Fordham University, New York, NY; C. H. WERKMAN, Iowa State College. (Interscience Publishers. Pp. 332. $5.50.)

THE need for books in English on this subject has been recognised for some time and this work meets the need well. The fourth volume, like its forerunners, helps the biochemist to keep pace with advances in a wide field, and the contributors deal with a number of biochemical problems from the point of view of the enzymologist. Their reviews are well written and brief; critical discussion has been curtailed and only modern findings are given at length. The book makes good reading for the advanced student. The bibliography is extensive and stresses the need for a volume of the *Advances* on this subject.

New Inventions

BOARD FOR CUTTING SKIN GRAFTS OF DEFINITE WIDTH

WHEN a skin-graft is being cut freehand, a wooden board is usually employed to flatten the skin in front of the knife,[1] so that the knife will have an even surface to work on. Kilner [2] devised a skin-stretching apparatus for this purpose, and Blair [3] used a suction-box. With the usual board the width of the graft cut depends on the width of the flat surface in front of the knife—it is not possible to cut a narrow graft from a broad thigh, and there is no other way of controlling the width of the graft than by choosing an appropriate donor area. The Blair suction-box permits definite control of the width

Fig. 1—Stainless steel board.

of the graft, but it is necessary to have a different box for each width, and a good suction apparatus is not always available. In practice the wooden board is most used because of its simplicity, but with a board it is not easy to cut a skin-graft freehand from such excellent donor areas as the abdomen, the chest or the back.

I have overcome these difficulties by devising a simple board made of stainless steel (fig. 1) to determine the width of surface for the knife to cut. It has four notches of different sizes—2, 2½, 3½ and 4½ in.—and when pressed down on the donor area produces a flattened salient the same width as the notch (fig. 2); the width of graft obtained is about half an inch less. It is necessary to hold the metal board more nearly perpendicular

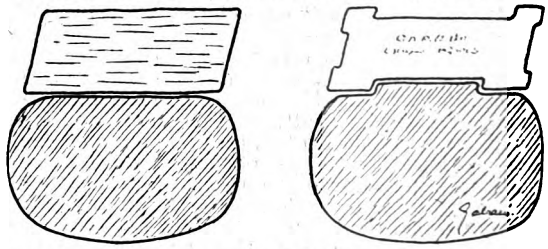


Fig. 2—(a) Flat surface obtained with the ordinary wooden board applied to a limb. The width of the graft depends on width of donor area. (b) Surface obtained with the new board applied to same limb. There is a flattened salient of a definite width which is independent of width of donor area.

to the surface than the usual board, and to apply slightly more pressure, but this adjustment is simple in practice.

This board has been employed, with satisfactory results, for over two years, using the Blair or Humby knife, or the old amputation knives (which I should recommend). With the Humby knife, which allows one to control the thickness of the graft cut, and this board, which controls its width, it has been possible to cut, free-hand, grafts of any width and thickness not only from the classical donor areas—the inner side of the arms and thighs—but also from the buttocks, chest, back and abdomen. The board is made to my design by Messrs. C. F. Thackray Ltd. of London.

P. GABARRO, MD BARCELONA,
Plastic surgeon at an EMS Hospital.

1. McIndoe, A. H. In Hamilton Bailey's Surgery of Modern Warfare. Edinburgh, 1941, p. 155.
2. Kilner, R. Plastic Surgery. Part 19 of Maingot's Post-Graduate Surgery, London, 1937, vol. III.
3. See Fomon's Surgery of Injury and Plastic Repair, Baltimore, 1939, fig. 66, p. 134.

THE LANCET

LONDON: SATURDAY, DECEMBER 16, 1944

Now for Negotiation

The BMA conference has shown clearly that doctors know very well what they do not want, and that on many matters of administration their objections are well founded. But it has not revealed at all what doctors do want, except to be left alone. From an impressive mass of negative resolutions it emerges only that the conference has willed almost all the ends and rejected almost all the means.

THIS caustic comment by the *Times* will scarcely surprise anyone who goes through our report on p. 795. But those who attended the Annual Representative Meeting, with knowledge of its antecedents, may fairly take a more hopeful view. For two years the Government's intention to devise a comprehensive medical service has been causing intense anxiety in the profession; and though this anxiety was temporarily allayed by the soothing tone of the white-paper issued last February, it revived as some of the implications of the proposed National Health Service became apparent. Opposition has been cultivated by zealots, and some of it is based on ignorance—either of the proposals themselves or of the contemporary world. But many criticisms of the Government scheme are constructive, and most of them are entirely reasonable from the standpoint of the critics. It is natural that a professional gathering should record and emphasise the reactions of its constituents, leaving someone else to reconcile them with those of the community. This the Representative Body has done. Being, like all assemblies, at the mercy of any able speaker with arguments temporarily unanswered, it reached some curious—not to say inconsistent—decisions. But it listened more patiently than in former years to the opinions of the dissident; it agreed to negotiate with the Government; and its choice of negotiators was by no means illiberal.

In principle, and where it is not directly concerned, the Association evidently supports the great programme of social reform undertaken by the Government: without discussion the meeting wholeheartedly welcomed the scheme outlined in the white-paper on social security. But if this scheme is approved, its consequence must be the provision, as soon as possible, of a comprehensive medical service covering everybody. If a government agrees to pay money, on a substantial scale, to all who are unfit for work, it must surely take steps to ensure that no-one becomes unfit, or remains unfit, through lack of due medical attention. It must see, therefore, that everyone has ready access, without financial barrier, to a general practitioner, and to every kind of specialist and hospital and reabling treatment he or she may require, within the limits of what can be supplied. We have enough faith in medicine and doctors to believe that it would pay this country to spend money on such widening and deepening of its medical services. And if, as is probable, social security (or national insurance) is to cover every citizen, the medical service will have to cover every citizen likewise: the question of merely extending NHI to dependants—well described by PEP as an elaborate device for excluding 10% of the population—will not arise. The meeting did well to suggest that proposals for a new health service should not be brought before Parliament as part of a National Insurance Bill. Nevertheless, social security requires as a corollary the organisation of medical work so as to get the best possible results from existing resources. The greater the shortage of doctors or hospitals, the greater the need for using to full advantage their skill and facilities. The present system wastes both.

Time after time we have repeated the axiom from the white-paper that if Parliament offers medical care, free of charge, to those in need, it must place on somebody the responsibility for seeing that it is provided. The Government wanted this executive responsibility to be borne in each medical area by an ad-hoc authority which should administer all the municipal hospitals of the area and plan the other services. Because executive powers of this kind can be vested only in elected representatives of the public, the new authority was to be formed of delegates from the local authorities—advised by a health services council of experts. This arrangement, however, gave displeasure in three quarters. The local authorities disliked it because they did not want to lose direct control of their hospitals and of money raised by their rates. The voluntary hospitals disliked it because their work was to be planned by a body on which they had no representation, formed by local authorities many of which have a poor record in hospital management. Doctors disliked it for the same reasons and because they mostly consider local authorities bad planners and bad employers. In face of this peculiar triple alliance, the Ministry of Health (as Lord MORAN and Dr. DAIN have now divulged) is prepared to examine an alternative scheme which will no longer place the administrative responsibility on the joint boards. The boards, reinforced by representatives of the voluntary hospitals and the profession, might remain as planning bodies; and in addition, as Lord DAWSON suggested, there would certainly be need for regional planning councils to coördinate their work; but responsibility for the service would rest centrally on the Minister of Health and locally on the counties and county boroughs. The main objection to this concession, from our point of view, is that existing local authorities, bad as well as good, will retain full charge of their hospitals, which contain some two-thirds of all the hospital beds of the country. We have yet to learn by what means, other than withholding of grants, it will be possible to secure improvement of conditions for doctors and patients in the hospitals of backward authorities; and we also regret the loss of that efficiency which is achieved only when planning and administration are performed by the same body. On the other hand, the new scheme has two decided advantages, in that it avoids an artificial administrative separation of clinics from hospitals and does nothing to damp the interest of progressive authorities in their own institutions. Undoubtedly, in remodelling the joint boards, the Ministry will go far to overcome the objections of the three parties supplying the service, and may secure from them the cordial coöperation necessary for success.

Rightly enough, the BMA's first objective in the forthcoming negotiations is to reach agreement

on the administrative arrangements. But the profession must be prepared to render unto Cæsar the things that are Cæsar's. The claim for a "predominant share in the organisation and control of the medical services," taken at its face value, lays us open to ridicule:

> "What in effect is being suggested," says the *Times*, "is that doctors will lose their professional freedom unless the community, which will be disbursing at least £30,000,000 a year in payments to general practitioners in the public service, leaves it wholly or mainly to them to decide how to spend that money, and how, where, and in what form the public shall receive the medical care for which they will be compelled to pay."

The doctor in a hospital has not built, and does not own, the building where he works, and strictly speaking the only things he has a right to administer are himself, his assistants, and his medicine. Nevertheless, in voluntary hospitals the medical board, by reason of its knowledge and experience, is able to exert great influence on administration; and one of the reasons why we welcome the prospect of a planned medical service is that it would enhance the usefulness of the profession by enabling it to exert this kind of influence at all levels. The exact form and functions of the expert body advising the Minister at the centre is still open to argument: apart from constitutional questions, we are not sure that direct election by the profession is a suitable method of assembling the best possible team; and there are disadvantages as well as advantages in claiming the right to publish immediately any advice that is rejected.[1] But we have no reason to doubt that adequate safeguards for professional freedom of practice and speech will be conceded as soon as their propriety is proved in detailed discussion with the Government. And we have always held that in entering such a service doctors would be in a far better position to insist on clinical and political freedom for all their colleagues, and not merely on its preservation in privileged institutions. There is many an "assistant medical officer" who needs liberating, and can be liberated as soon as the rest of us are concerned with the conditions of his work.

Not least of Dr. DAIN'S many valuable contributions to the meeting was his summary of what had been decided; and a review of his ten conclusions increases confidence in the outcome of the negotiations. The Government, like the BMA, favours development of the medical services by evolution and is willing to modify the white-paper scheme. If development has to be slow, the Government might well agree that hospital and specialist services should have priority. The Government proposed from the first that general practitioners should, as under NHI, be employed by central rather than local authority, and it has never suggested that local authorities should be concerned with such practitioners, or that payment by salary should be customary, except in health centres. The Government has expressed no wish to curtail the profession's clinical or political freedom, and in our opinion the mechanism it proposed for equalising the distribution of practitioners, though it might be improved on, did not merit the term "direction." The Government, again, will no doubt be willing to start by discussing administration before turning to other topics. In short, there seem to be no insuperable obstacles in principle. We must not minimise the very real difficulty of agreeing on the interpretation of principle—of satisfying all parties in the vital matters of detail. This can be done only by patient and friendly debate round a table. But, given good will and a sense of realities, it can be done. The task of the Negotiating Body and the Ministry is, as it were, to design for the profession a new battledress for the war against disease. To succeed in this task they must concentrate always on the purpose to be served and on the nature of the materials to their hand. The result should be workmanlike—a garment that we can all approve if not admire. But it will, of course, be nothing of the kind if half the designers are trying all the time to make it resemble a frock-coat.

1. See *Lancet*, 1944, i, 438.

Too Much Rest

THE healing power of rest has been acclaimed since HIPPOCRATES. Every doctor can recall patients who owed their recovery to the rest, physical, mental, and emotional, that he brought to the pain-wracked body. Yet like all good things one can have too much of it. Those doctors who, as COLE [1] puts it, spend their lives sending patients to bed and so establishing unshakable reputations for prudence sometimes forget the shortcomings and dangers of rest as a remedy. American physicians, surgeons, obstetricians, and psychiatrists lately combined to draw attention to the abuse of rest in their several branches of medicine. In traumatic surgery its limitations have been increasingly recognised—immobilise the fractured bone completely till union is sound, but actively mobilise every joint which does not need to be fixed, is becoming the accepted principle.[2] And a similar principle is beginning to be applied to general surgery. RIDDOCH,[3] for instance, has protested against the long rest in bed after straightforward hernia operations or laparotomy, quoting the case of a house-surgeon who walked upstairs to her room unaided on the 3rd day after appendicectomy, and HILL[4] has adopted a maximum of 10 days in bed for Service men after simple excision of a hernial sac. POWERS [5] allows his patients to get up the day after major abdominal operations, and in 100 consecutive cases saw no harm therefrom and a reduced period of convalescence. EASTMAN,[6] of Baltimore, supports the views of his colleague ROTSTEIN,[7] that no harm is done by getting a mother up on the fourth day after delivery—in fact, that this early rising encourages involution, stimulates the lochial flow, reduces the incidence of thrombophlebitis, and leaves no higher a proportion of retroversions than the traditional ten days. MENNINGER [8] has little difficulty in demonstrating that the prescribing of rest in psychiatric and psychological disturbances is irrational, and that the restless patient does not need rest alone but the canalisation of his energies into channels where they will find their legitimate and satisfying outlet.

1. Cole, L. *Lancet*, 1943, ii, 561.
2. Watson-Jones, R. Fractures and Joint Injuries, Edinburgh, 1943, vol. II, p. 916.
3. Riddoch, J. W. *Lancet*, 1944, i, 614.
4. Hill, R. C. J. *Ibid*, 1944, ii, 29.
5. Powers, J. H. *J. Amer. med. Ass.* 1944, **125**, 1079.
6. Eastman, N. J. *Ibid*, p. 1077.
7. Rotstein, M. L. *Ibid*, p. 838. See *Lancet*, Oct. 14, 1944, p. 509.
8. Menninger, *J. Amer. med. Ass.* 1944, **125**, 1087.

It is perhaps in the treatment of heart disease that there is the greatest tendency to over-enthusiastic prescribing of absolute rest. In the American symposium, HARRISON [9] quoted experimental work on rats to support his clinical impression that there is seldom any need to keep patients with heart-failure or coronary thrombosis in bed for the long periods usually recommended, and he emphasised the liability of bedridden patients to venous thrombosis and the development of a cardiac neurosis. The risk of embolism was stressed by DOCK,[10] and LEVINE [11] has urged that recumbency may upset the balance between the right and left sides of the heart and thus increase the strain on the failing heart, besides increasing the total blood-volume. In coronary thrombosis we must be prepared occasionally to relax our insistence on absolute rest. Until the third week of the illness absolute rest must practically always be insisted on, to ensure that only the minimum of strain is put on the myocardial infarct until healing is well established. Even in the mildest cases this is a wise rule, the only possible exception being the elderly patient. Subsequently it may be well in some cases not to insist on the patient staying in bed for the usual six weeks. But the patient with a coronary thrombosis has often been overworking and this may be the first adequate rest he has had for years. In the treatment of acute rheumatism the decision when to start allowing the patient to move about is often difficult to make. It is as wrong to keep a child with rheumatic fever in bed for too long as to allow him to move too early. The other group of rheumatic diseases in which rest tends to be abused is arthritis. In the acute stage rest is essential, but unless we know that we can produce a cure, or at least a real improvement in the state of the joint, the patient must not be allowed to vegetate in bed. The rheumatologist is familiar enough with the patient with chronic arthritis who previously managed to contend with his crippling and lead a reasonably happy life, but entered on a slow but steady process of disintegration when he was ordered to bed. The care of the aged comes into a category by itself. Here it has long been recognised that absolute rest is seldom wise. Even when the heart is obviously failing the old patient is often much better (and happier) sitting in a comfortable armchair than lying in bed. It is regrettable that we seldom see nowadays those large armchairs with a cushioned ledge fixed to the armpieces which used to be a constant feature of all medical wards, and in which the aged patient with a failing heart spent the greater part of his days and nights. Attention to two points will sometimes alleviate the discomforts of rest in bed. One is the use of a bedside commode rather than a bedpan; the other is massage to the legs. Every patient confined to bed, who is not suffering from an acute infection, should have daily massage to the lower limbs, unless there is any lesion in the limbs themselves. Such massage reduces the risk of thrombus formation, helps to maintain the peripheral circulation, and ensures that the muscles do not become atrophied from disuse.

In prescribing rest, then, three cardinal principles must be recognised. First, we must not overlook the close integration of mind, body, and psyche; to treat one and ignore the others is to lose our chance of complete therapeutic success. Secondly, we must remember the adage about one man's meat; what is rest for one man may prove the acme of unrest for another. Thirdly, as MINOT expressed it, "rest means many things to many persons." In other words, rest should not be prescribed by rule-of-thumb without considering the type of patient and the nature of the disease.

9. Harrison, T. R. *Ibid*, p. 1075.
10. Dock, W. *Ibid*, p. 1083.
11. Levine, A. *Ibid*, 1944, **126**, 80.

Annotations

VASOCONSTRICTORS IN THE COMMON COLD

No progress has recently been made in our knowledge of the ætiology of the common cold, but the increasing understanding of nasal physiology is helpful in assessing therapeutic claims. The dominant factors are the preservation of ciliary activity and the anti-infection power of the mucus secretion. Ciliary action shifts the mucus, which should exist as a continuous sheet throughout the nasal cavities and accessory sinuses, into the nasopharynx whence it is swallowed. It is moved at the rate of 4–6 mm. a minute, and the nose has a new film of mucus about every 10 minutes. Cultures taken from the posterior two-thirds of the nasal cavities are normally sterile, showing the efficiency of the natural mechanism for dealing with organisms. The usual pH of the nasal secretion varies from 5·5 to 6·5, and this is presumably the optimum value, but it alters on very slight provocation. Cold induces alkalinity and heat acidity. In acute rhinitis the reaction becomes increasingly alkaline. Rest and sleep, on the other hand, produce a shift towards acidity, and this immediately suggests one form of treatment. It seems impossible in modern life to insist on every sufferer from the common cold going to bed at the onset, though this alone undoubtedly shortens the attack and its severity and checks spread by contagion. It is more usual for the sufferer to continue doughtily with his job, passing on his infection to his associates and trying to relieve his discomfort with his favourite remedies, of which aspirin and various nasal drops, jellies, and inhalants are most often chosen. This attitude is fostered by some of the advertisements in the popular press and elsewhere. The remedies intended for intranasal application are nearly all vasoconstricting or astringent, and the patient is impressed by the sensation of clearness and coolness they suddenly, and as it were magically, produce in his nose. The reactionary congestion which comes later is ascribed to the cold, the obvious treatment for which is more drug. This cycle of congestion and decongestion often results in subacute and even chronic rhinitis. In the severe case the nasal mucosa is thickened and sodden, and the patient has the local symptoms of a perpetual cold. In Toronto Gollom [1] has examined the claims of one of this family of salves, 0·1% privine hydrochloride. The drug, related to epinephrine in chemical constitution, is isotonic and of pH 6·2. Its sponsors, Fabricant and Van Alyea,[2] claim that it does not impair ciliary activity, and that it keeps the pH of the nasal secretions slightly acid and has a lengthy decongestive action. Gollom saw 30 patients in 1943 who had become more or less addicted to the drug, some complaining of a sense of suffocation unless they applied it every 2–3 hours day and night. Discontinuing its use finally cured the symptoms. He urges that the drug should not be used for more than a few days at a time, and that to ensure this it should be sold on prescription only. A similar restriction should perhaps be applied to the other members of this family

1. Gollom, J. *Canad. med. Ass. J.* 1944, **51**, 123.
2. Fabricant, N. D., Van Alyea, O. E. *Amer. J. med. Sci.* 1943, 122.

of cold-relievers. But the doctor would be on firmer ground in advising his patients if a large-scale investigation was carried out to show whether in practice they do prolong the colds they seek to relieve, encourage complications, or leave permanent damage to the mucosa.

PENICILLIN IN RHEUMATIC FEVER

BECAUSE of the association between infection of the pharynx by hæmolytic streptococci and the development of acute rheumatic fever it was justifiable to hope that drugs which successfully dealt with the former might do good in the latter. But the sulphonamides failed in this respect, although possibly of some value in prophylaxis. New reports from America suggest that penicillin is similarly a failure in established acute rheumatism. Watson, Rothbard, and Swift [1] record experiences with 8 young men with typical rheumatic fever, each treated for two weeks with penicillin either intramuscularly or intravenously. Very full laboratory control was carried out. All of the group A hæmolytic streptococci recovered from the throat of 6 of the 8 patients were susceptible to penicillin in concentrations much below those maintained in their blood during most of the period of treatment. In 7 of the patients there was no evidence that the penicillin altered the course of the disease, which was of a severe type with high fever and polyarthritis, together with pericarditis in 2 subjects. In the remaining patient salicylates were started on the second day of penicillin treatment and then withdrawn after three days without any recrudescence of his rheumatic fever. Is it possible that in this observation lies the seed of a successful combined therapy? It is recorded that no toxic manifestations to penicillin were observed in this series, but in a report on 38 US Army Air Force patients with rheumatic fever treated with penicillin Foster and others,[2] while confirming that there was no evidence of benefit, record that "in some cases it appeared clinically that the course of the disease was aggravated."

RENAL EXTRACTS IN HYPERTENSION

THE hopes raised by reports that kidney extracts would reduce hypertension in patients [3] and animals [4] received a set-back when Schales, Stead and Warren [5] produced similar results by injecting kidney extracts with all their hypertensinase activity destroyed. The beneficial effects were only observed in patients in whom fever and severe general reactions were produced, and the lowering of blood-pressure was concluded to be part of the reaction to the injection of foreign protein. Page and his collaborators in a later paper [6] admit that pyrogenic and local tissue reactions may contribute to the lowering of the blood-pressure, but claim that the clinical results in 37 patients were encouraging. It should be noted however that, though the beneficial effects of some of their extracts paralleled their hypertensinase activity, this was not invariably so. Further laboratory investigation seemed advisable before such treatment was extended to patients generally. Remington and his colleagues [7] have carried out such investigations on a scale reminiscent of the Curies' efforts to extract radium from pitch-blende, using 4 tons of hog kidney in their experiments. Their final, heat-labile product contains 40–60 mg. for each 200 grammes of fresh kidney, the quantity required on the average to lower the blood-pressure in hypertensive rats by about 30 mm. from the initial value of 160 mm. Hg. Their active material is contained in the albumin fraction, and the progressive concentration of activity during the fractionation procedure suggests that it is not a general bodily reaction to foreign protein that is involved, since the test animals show no symptoms of anaphylactic shock and no changes in temperature. No activity was present in such common proteins as egg albumin, pepsin, diphtheria antitoxin, renin or casein. When the extraction procedure was applied to other material it was found that albumin fractions from hog spleen or muscle were also active. Hog blood albumin had slight activity, while horse serum was the richest source of activity investigated, the albumin fraction being 25 times more active than that from hog kidney. A steroid extract of kidney was also active. These findings, like those of Schales and his colleagues, oppose the view that hypertensinase activity is responsible for the lowering of pressure. Moreover the hypertensin-destroying activities of various samples assayed by Page did not parallel their blood-pressure-lowering activity. Any hope that such extracts may be of value in human therapeutics is vitiated by the fact that their activity is only temporary and that the blood-pressure of the hypertensive rats returns to the pre-injection level within 10–15 days in spite of continued injections. The lowering of pressure is regarded as a response to foreign agents to which the body soon becomes adapted. This report may be expected to end the attempt to lower the pressure in human hypertension by the injection of crude kidney extracts. Meanwhile other workers have extended the scope of the investigation by reporting anti-pressor factors completely divorced from the kidney. Grollman and Harrison [8] have found that cod and sardine oils show anti-hypertensive activity when given by mouth to hypertensive rats. But perhaps the most hopeful report is that of Oster and Sobotka [9] who have investigated the anti-pressor activity of *o*-quinonoid adrenaline compounds. These compounds lowered the blood-pressure in hypertensive rats but not in normal rats. Pharmacological investigations did not disclose any parasympathomimetic, sympatholytic, or direct muscular actions to explain the effects, so the investigators conclude that the compounds inactivate the pressor substances released by the ischæmic kidneys. If these results are confirmed a rapid advance may be made in the treatment of hypertension, though there are many differences in the effects of the compounds in different species—a fact which has also been noted in renin-hypertensin investigations.

SEX EDUCATION AND THE PRACTITIONER

DOCTORS, in spite of etymology, are not teachers, and many of them find it an irksome task to give information about sex to children and adolescents. Indeed their equipment of knowledge does not always suffice, even if their educational talents are considerable; they have, it is true, an ample and even embarrassingly rich store of detailed information about the anatomy and physiology of the matter, but on the social, psychological and moral issues they may be little wiser than the average sensible citizen. Furthermore, teaching is a skilled job, for which more is necessary than knowledge of the subject to be taught; and it is proper that the imparting of information about sex should be included in the ordinary routine of school education, though of course parents and doctors will on appropriate occasions need to anticipate or amplify the teaching thus provided. The difficulty hitherto, apart from obscurantism and prudery, has been the lack of any authoritative guide

1. Watson, R. F., Rothbard, S., Swift, H. F. *J. Amer. med. Ass.* 1944, **126**, 274.
2. Foster, F. P., McEachern, G. C., Miller, J. H., Ball, F. E., Higley, C. S., Warren, H. A. *Ibid*, p. 281.
3. Page, I. H., Helmer, O. M. *J. exp. Med.* 1940, **71**, 495. Page, I. H., Helmer, O. M., Kohlstaedt, K. G., Kempf, G. F., Gambill, W. D., Taylor, R. D. *Ann. intern. Med.* 1941, **15**, 347.
4. Grollman, A., Williams, J. R., Harrison, T. R. *J. biol. Chem.* 1940, **134**, 115.
5. Schales, O., Stead, E. A., Warren, J. V. *Amer. J. med. Sci.* 1942, **204**, 797.
6. Page, I. H., Helmer, O. M., Kohlstaedt, K. G., Kempf, G. F., Corcoran, A. C., Taylor, R. D. *Ann. intern. Med.* 1943, **18**, 29.
7. Remington, J. W., Cartland, G. F., Drill, V. A., Swingle, W. W. *Amer. J. Physiol.* 1944, **140**, 627.
8. Grollman, A., Harrison, T. R. *Proc. Soc. exp. Biol. NY*, 1943, **52**, 162.
9. Oster, K. A., Sobotka, H. *J. Pharmacol.* 1943, **78**, 100.

or textbook, and the scarcity of suitably trained teachers. A book has now been published which should do much to remedy, and to indicate further ways to remedy, the situation.[1] Mr. Cyril Bibby is education officer to the Central Council for Health Education and has had vast experience of lectures and courses in sex education up and down the country; he also has, as his book shows, a balanced and practical grasp of the problem in its varied aspects—and only those who have tackled sex education in schools and youth organisations know how thorny and varied these aspects are. He does not dodge any crux or well-known pitfall; he is neither intemperately enthusiastic nor overcautious; and he is evidently acquainted with the best medical, educational and psychological opinion. He holds that information on venereal disease should come from the doctor, who will also often be approached for advice about preparation for marriage; but he thinks that doctors will not be able to fulfil this obligation well unless they have given more careful study to the psychological and sociological aspects of sex as well as to its physiology. "Is it too much to hope," he says, "that medical training might in the future pay more attention to these and other related matters? No doubt, as in the training of teachers, there is the difficulty of already overcrowded syllabuses. But would not some little study along these lines be of more value to the general practitioner and his patients than a painfully acquired familiarity with the fine details of human anatomy?" Doctors, like teachers, should, he suggests, now attend special courses to equip themselves to undertake certain aspects of sex education. Among the instructors for these special courses he would include a biologist with experience of teaching and youth clubs, a physician with a knowledge of psychology and some understanding of educational methods, and a social worker with a background of biology and psychology and a real familiarity with the problem of people of all ages. These key workers, the teachers of the teachers, should be "people of fairly high academic status; they must be people of wide vision and warm human understanding; they must be people intellectually alive and emotionally balanced."

THE GENETICS OF NEUROSIS

COLLECTION of precise data about predisposition to neurosis is beset with difficulty. Eliot Slater and Patrick Slater,[2] in attempting to study predisposition from the genetic point of view, suggest that theories of neurosis may be classified in three main categories:

(1) Those which imply that causes of neurosis are wholly exogenous.
(2) Those which postulate a unitary endogenous factor determining variations in susceptibility to neurosis; it may be either (*a*) a single abnormal gene, or (*b*) a large number of separate genes of small but similar effect.
(3) Those which assume more than one genetic factor with dissimilar effects, to account for the neurotic constitution. They may either (*a*) be specific to a particular type of neurosis, or (*b*) overlap in their effects and produce predispositions to more than one type of neurosis.

These workers favour theory 3 (*b*); but they do not claim that the hypothesis can be finally proved or disproved on existing or readily accessible evidence: they only suggest that it may prove useful for experimental purposes. In one experiment six tests used by the Army for selecting personnel were given to 200 men admitted to hospital for neurotic illnesses. They had the same average age as men serving in the Army, and reached the same average scores on tests for mental abilities, but they were less agile and their hearing was poorer. In a second group of 200 neurotics sight was tested, and proved to be poorer than sight among men in the Army as a whole. From this they infer that those who happen to be deficient in two or three abilities are those most likely to find their way into a neuroses centre. They argue that if neurotic illness depends on many genetic factors with dissimilar effects, the neuroses should be heterogeneous; whereas if it springs from a unitary genetic factor neuroses should be homogeneous. They therefore studied the intelligence scores of these men for evidence of heterogeneity, and found that whereas obsessionals score significantly higher than others, anxiety neurotics and hysterics do not differ significantly from each other or from the miscellaneous group. When age is considered, heterogeneity is demonstrated by the difference between reactive depressives and others; and heterogeneity is found among psychopaths when the reaction times are measured. Clinical experience, too, suggests that the neuroses are not homogeneous. They conclude that the theory that neurotic constitution is determined by a very large number of genes of small effect is in accord with known facts; that in so far as these genes are similar their effects may be additive, producing lowered resistance to stress; and that in so far as they are dissimilar the type of stress producing breakdown and the symptoms produced will differ.

Much hard thinking has gone to this paper and it is likely to serve its avowed purpose of provoking further study of the neuroses along genetic lines. But there is danger in oversimplification of a problem of this kind. Statistics are lacking relating to neurosis in the general public among those who do and do not break down under stress, having regard to sex, age, social class and many other factors. Probably the subject is not yet mature enough for statistical treatment. The sample examined by the Slaters was highly selected in many ways, but may not be homogeneous in the sense that about the same degree of provocation has determined the breakdown of its individual members. And while selected samples can be examined statistically in the light of generalised facts, error is inherent in any attempt to generalise from a selected sample.

We may all feel convinced that there is a genetic basis to neurosis, but the case is similar to that of cancer or tuberculosis in that the genetic factor is masked by environmental influences favouring or discouraging the appearance of symptoms. It resembles them also in the fact that neurosis is so relatively common that multiple types of manifestation in the same family may be of no significance. But the Slaters have begun to define the problem.

SURGEONS MEET

ABOUT fifty fellows and members of the Royal College of Surgeons of England met at Lincoln's Inn Fields on Nov. 16 to discuss the white-paper on a national health service and the Goodenough report on medical schools, as well as the College's domestic affairs. Six representatives of different branches of medicine, including general practice, were present by invitation, and the meeting approved of the proposal to apply for a supplemental charter after the war which would permit the council to coöpt up to six such representatives. Only by coöption is it possible to ensure that the different branches of the profession are represented on the council. The supplemental charter will also empower the College to grant the fellowship to ophthalmologists and a fellowship in dental surgery, increase the number of elections to the fellowship permitted each year, and make non-members eligible for the fellowship. Sir Alfred Webb-Johnson, the president, asking for the meeting's views on the white-paper, said it had been made plain to the Ministry of Health that there could be no compromise on fundamentals. Mr. Lawrence Abel wanted no more bureaucratic control of the profession. He had hoped to see an enlargement of

1. Bibby, C. Sex Education. (London: Macmillan. Pp. 291. 7*s.* 6*d.*)
2. *Jour. Neurol., Neurosurg. Psychiat.* 1944, 7, 49.

National Health Insurance, leaving private practice untouched. Mr. Dickson Wright did not believe that the proposed system of social security was inevitable, and thought it should be fought against; a new Parliament was necessary to deal with the matter. The meeting gave its consent to nine points which had been tabled by the council:

1. That the administrative structure, both centrally and locally, should be modified to ensure that the medical profession had a more direct responsibility for advice and administration through nominees chosen by representative bodies of the profession.
2. That the scheme should not apply to the whole population, and that the general-practitioner service particularly should be "provided" only for those below a certain income limit.
3. That contributions under a social security insurance scheme allotted to the health services should be devoted entirely to the financing of the general-practitioner service, and that the hospital and consultant services should be provided for by general taxation.
4. That the regions for hospital administration should be large enough to provide a complete service for all purposes, and that no existing local authority is in a position to provide such a complete service.
5. That there should be no "direction" of members of the profession, but that they should be free to practise in places of their own choice. An adequate supply of doctors should be obtained for areas sparsely staffed by offering special inducements.
6. That the security of the voluntary hospitals should be ensured.
7. That tendencies towards the conversion of the profession into a whole-time salaried service should be resisted.
8. That control of the profession by the Civil Service and the local authorities was not in the interests of the people.
9. That the facilities of health centres should be available for all practitioners in the district.

Turning to the Goodenough report, the President said the council disliked the suggestion that financial pressure should be applied to compel medical schools to comply with proposals such as admission of women to all schools, reform of the curriculum, and so on. The council, he said, strongly contested the suggestion that a university degree should be the only qualification for the profession. It was the duty of the College to maintain a portal of entry which was entirely under the control of the profession and independent of any subsidised body like a university. The Royal Colleges exerted an influence in the Empire such as no university could have. The council also objected to the principle that all medical schools should be large; many men did far better in small classes than they would do in a class of a hundred students. At the end the meeting studied the plans for reconstructing the College on the present site.

ERYTHROPOIETIC FACTORS

IT is a long time since Wilkinson in this country and Castle in America showed that the factor responsible for normal red-cell formation, whose absence causes pernicious anæmia, is formed by interaction of an "intrinsic factor," hæmopoietin, secreted in the gastric juice, with an "extrinsic factor" brought in with the food. Considerable research by workers in several countries has given us highly purified materials representing these factors, but we still do not know exactly what they are.

The intrinsic factor was at first thought to be produced by the glands in the pylorus and the first part of the duodenum, possibly Brunner's glands; but although this is almost certainly true for the pig it is doubtful in man, since in pernicious anæmia the main anatomical change is an atrophy of the glands in the fundus and body of the stomach, the pylorus being relatively unaffected. The latest report by Cox[1] has confirmed his predecessors'. The work of Jacobson,[2] on the other hand, has revealed that the argentaffine cells, found mainly in the cardia and the pylorus, are practically absent in pernicious anæmia and sprue, but present in other macrocytic anæmias which do not respond to liver treatment. These cells were shown to contain a pterin, probably uropterin, a particularly interesting observation, since many workers[3] have reported hæmopoietic responses after the administration of xanthopterin (synonymous with uropterin) to rats and monkeys. Xanthopterin has also been found in liver extracts.[4] Wright and Welch[5] further showed that there is an increase in the formation of folic acid when rat liver slices are incubated with synthetic xanthopterin. They therefore suggest that xanthopterin enters the folic molecule in this way. There is no rise in folic-acid production, as Totter and his colleagues[6] have demonstrated, when chicken liver slices are substituted for rat liver, which may be the reason why O'Dell and Hogan[7] failed to obtain a hæmopoietic response from xanthopterin administration to milk-anæmic chicks. In the monkey, however, a consistent response to xanthopterin is obtained. Hæmopoietin has been concentrated in fractions from the press-juice of hogs' stomachs according to the technique of Klein and Wilkinson[8]; it had been separated from pepsin as early as 1933, but no further progress was made in determining its nature. Agren[9] has published experiments showing that in the purification of preparations from pyloric mucosa the hæmopoietic activity and the aminopolypeptidase activity run parallel, and he therefore suggests that hæmopoietin and the enzyme aminopolypeptidase may be identical. This suggestion awaits confirmation.

With regard to the extrinsic factor, it was early noted that sources of this factor, such as beef muscle, milk, eggs, yeast and wheat germ, were also sources of the vitamin-B complex, and that chemical procedures that removed the extrinsic factor also tended to remove the vitamin-B complex. The possibility that vitamin B and extrinsic factor might be connected was strengthened by the finding that some cases of pernicious anæmia could be treated, partially at least, with yeast autolysates like 'Marmite.' The next step was to test individual members of the B complex. Riboflavin and nicotinic acid have been excluded and now Castle and co-workers[10] have shown that all the identified members of the B complex are inactive: extrinsic factor is not thiamine, pyridoxine, pantothenic acid, biotin, xanthopterin, folic acid, choline or inositol. Nevertheless Castle, in the belief that there are depths of vitamin B yet unplumbed, thinks it is still "reasonable to continue to regard the extrinsic factor as a thermostable component of the vitamin-B complex as yet unidentified."

No better fortune has attended the investigations into the nature of the "liver principle," found in the liver and produced by the interaction of intrinsic and extrinsic factors. The material is rather easier to handle and has been greatly purified, especially by Dakin and West[11] and by Wilkinson.[12] The latter prepared material 18 mg. of which was sufficient to initiate a reticulocyte response and rapid remission in a patient with pernicious anæmia. Yet recent electrophoretic studies[13] indicate that even these products are still mixtures of clinically active and inactive materials.

1. Cox, A. J. *Amer. J. Path.* 1943, **19**, 491.
2. Jacobson, W. *J. Path. Bact.* 1939, **49**, 1.
3. Tschesche, R., Wolf, H. T. *Z. physiol. Chem.* 1936, **244**, 1; 1937, **248**, 34.
4. Jacobson, B. M., Subbarow, Y. *J. clin. Invest.* 1937, **16**, 573. Mazza, F. P., Penati, F. *Arch. Scienze biol.* 1937–38, **23**, 443.
5. Wright, L. D., Welch, A. D. *Science*, 1943, **98**, 179.
6. Totter, J. R., Mims, V., Day, P. L. *Ibid*, 1944, **100**, 223.
7. O'Dell, B. L., Hogan, A. G. *J. biol. Chem.* 1943, **149**, 323.
8. Klein, L. J., Wilkinson, J. F. *Biochem. J.* 1933, **27**, 600.
9. Agren, G. *Nature, Lond.* Sept. 30, 1944, p. 430.
10. Castle, W. B. et al. *Science*, 1944, **100**, 81.
11. Dakin, H. D., West, R. *J. biol. Chem.* **1935, 109, 481.**
12. Wilkinson, J. F. *Lancet*, 1936, **i**, 354.
13. West, R., Moore, D. H. *Trans. Ass. Amer. Phys.* **1942, 57**, 253.

Special Articles

BRITISH MEDICAL ASSOCIATION

FUTURE OF MEDICAL SERVICES

THE Annual Representative Meeting of the Association was held in London from Dec. 5 to 8, with Dr. PETER MACDONALD in the chair.

NEGOTIATION OR NOT?

Dr. GUY DAIN (chairman of council), presenting the council's views on a National Health Service, said he hoped the meeting would decide that negotiations with the Government should go on, and that they would appoint a body to negotiate. As yet no-one knew in what ways if any, the Government was likely to modify the scheme set out in the white-paper. The Minister had announced his intention of carrying out the principles laid down in it. "That is our intention, too," Dr. Dain affirmed. But the profession were not satisfied that the proposals of the white-paper were going to carry out the principles. He did not wish to see medicine put into the same position as the teaching profession, where the school-leaving age had been raised before enough teachers were available to cope with the increase of pupils. He was anxious to get from the meeting a proper opinion on the form the service should take.

Captain S. LAURIE SMITH, for Blackpool, countered with a resolution disapproving of a comprehensive medical service as envisaged in the white-paper and suggesting that its consideration should be postponed until after the war. The men now away in the Forces, he said, were in danger of coming back to find themselves involved in an undesirable service in which all the best posts had already been taken. Dr. W. B. J. PEMBERTON (Camberwell) commended the first clause of the motion as showing the Government that doctors were determined to oppose control of the profession; but Dr. G. DE SWIET, thought it would cast a blight over negotiations. Dr. A. C. DE B. HELME quoted Sir Wilson Jameson as having said that the important part of the white-paper was "the dry bones of administration." It was these very bones, he implied, that the bulk of the profession felt should be buried; and he was for passing the first part of the motion. But the more temperate counsels of Dr. F. GRAY, Dr. D. STARK MURRAY, and Dr. J. A. IRELAND prevailed, and the meeting agreed to pass to the next business.

A motion by Dr. J. H. THOMPSON, for Croydon, opposing any decision on a National Health Service being reached at this stage, brought a protest from Dr. DAIN who again urged the meeting to decide clearly what line they wanted taken in the negotiations. He reminded them that the Representative Body would be called together to discuss proposals before any decision was taken on them, and on this assurance Dr. Thompson withdrew the motion.

Dr. R. W. COCKSHUT expressed Hendon's view that the white-paper proposals would be a satisfactory basis for negotiations only if altered in essential particulars. If implemented as they stood, they would produce a whole-time State service and a servile profession! This, he said, was no reactionary attitude: for years the profession had been hammering for reform of the medical services. His motion merely meant that it was determined that the service should be a good one. The meeting agreed with him heartily, only 1 dissenting.

"CONTROL"

A motion by Cumberland, introduced by Mr. MARK FRASER, desired to see:

> the extension of the full facilities of medical care and attention to the whole community under conditions of privacy, freedom of contract, and personal responsibility of the doctor directly and solely to the patient, subject only to the Common Law and the ethical tradition

and went on to express opposition to "control of doctors by any form of central or local authority that has statutory or other power to alter the private contractual relationship between doctor and patient."

Dr. DAIN asked whether the meeting was in favour of no control at all or a minimum of control: he was puzzled to imagine a service in which there was no control. Mr. ANTHONY GREEN (Guildford) wished the meeting to distinguish between control and administration. Dr. DAVID HALER (Guildford) and Mr. C. E. BEARE (Reigate) supported the motion with examples of hampering bureaucracy. Mr. LAWRENCE ABEL (Marylebone) suggested that the words "any further" should precede control, and he was supported by Mr. A. DICKSON WRIGHT. Dr. J. G. THWAITES (Brighton) remarked that the profession already suffered more control than that applied by Common Law and tradition. Dr. DOUGLAS BOYD (Belfast) said that in Northern Ireland they were opposed to control. In any service, doctor or patient should have the right to opt out. He supported the motion. For Mr. A. STAVELEY GOUGH (Watford), however, the motion was a mixture of unreal sentiments, and Dr. J. B. MILLER asked why only Common Law was mentioned: what about statutory law? Dr. DAIN hoped the meeting would vote against it, and they did so by a large majority.

A motion introduced by Dr. I. D. GRANT, for Glasgow, was slightly amended, little discussed, and carried by a large majority. In its final form it read:

> That while the ARM is prepared to continue a panel service, and would welcome its extension to dependants, which for a quarter of a century it has advocated, and while it desires that cottage hospital facilities including X ray and other diagnostic facilities should be available to every practitioner, together with access for their patients to consultants, it is wholly opposed (*a*) to a whole-time State salaried service for general practitioners; (*b*) to civil direction of practitioners, to government of the profession by local health authorities, in short, to most of the machinery of the white-paper; and (*c*) to any and every measure which tends in any respect to limit the freedom of action of the practitioner or to weaken his full responsibility for his patient.

ADMINISTRATION AND FREEDOM

Further discussion took place on a motion:

> That the Association considers that the administrative proposals and the form of control they involve envisaged by the white-paper are inimical to efficiency and progress. In the interest both of the public and the profession the Association is therefore not prepared to coöperate in a service so designed.

Dr. C. G. TAYLOR held that if these proposals were implemented the vast majority of doctors would have no alternative but to come under a full-time State salaried service. Mr. A. DICKSON WRIGHT (Marylebone) said that restrictions had sat lightly on the profession in the past only because doctors knew they were always at liberty to escape into free practice whenever they liked. Dr. E. A. GREGG pointed out that many undesirable things in NHI had been straightened out in the course of years. Dr. DAIN and Dr. TALBOT ROGER suggested that the aim should be to find out the best methods of administering the service. Dr. Rogers felt that if the negotiating body was given an opportunity to get power decentralised they would be able to arrange something not too burdensome.

Nevertheless after a little further discussion the meeting accepted the motion.

Bournemouth got unanimous support for a motion affirming that the Representative Body would resist any Government control of doctors in clinical matters, or any interference in the present doctor-patient relationship, and that no doctor should be compelled to undertake medical practices which were contrary to his conscience. Dr. O. C. CARTER, introducing it, reminded the meeting that the conduct and practice of medicine hinged to the Hippocratic Oath, and begged them not to be seduced into singing departmental ditties. He feared the proposals in the white-paper would generate a vertical hierarchy of ambitious office-bearers.

Without discussion the meeting accepted a motion by Bradford requiring for the practitioner in a National Health Service full rights of scientific and political publication, freedom of speech, including the right to criticise the service, and full political rights.

SUPPORT FOR COMPREHENSIVE SERVICE

Equally united support was given to three resolutions introduced by Dr. F. GRAY for Wandsworth. The meeting warmly welcomed the Government's declared

intention of ensuring that in future every man and woman and child would be able to rely on getting all the advice and treatment and care which they needed in matters of personal health; and it agreed that the proposed National Health Service should be the best that could be established. But, "being gravely disquieted by the proposals of the white-paper to place the administration of the service under the Ministry of Health and the local authorities," it called for a thorough and impartial inquiry into the proposed central and local administrative structure.

THE 100% ISSUE

The meeting then settled down to consider whether a National Health Service should cover the whole population or only 85–90%. Dr. DAIN began by begging it to defer any decision on this point pending more information on the administrative methods contemplated and the machinery devised to protect private practice. Some of the speakers held that both the doctor and patient (whatever his income level) should have the right to opt out. Some considered it impossible to exclude from the service anyone who was required by his country's laws to pay a subscription to it. Some thought that a 100% scheme was synonymous with the end of private practice, others did not. In the view of some, to agree to 100% was to sign away the freedom of the profession; others held that the capitation fee would be pared down if a proportion of the public was not covered, and the profession would return to the NHI position by which private fees subsidised panel fees. Moreover, since those who can well afford to pay for medical care are unevenly distributed about the country, some doctors would be better rewarded than others. It was suggested that if private practice ceased the Government would have the monopoly of the health services.

Dr. D. STARK MURRAY (Richmond) reminded the meeting that they believed in a single standard of medical care for all sick people; and pointed out that a 100% service would relieve doctors of the need to consider the financial position of the patients. Dr. J. A. BALCK FOOTE (Winchester) thought that while a service covering 100% would give uniformity, it would only pay lip-service to equality, for the poor man would be forced into the State service while the rich man could afford to pay two doctors, the one he chose to consult privately and the State doctor whom he would not use. Dr. J. A. PRIDHAM feared the profession might become the instruments of a monstrous tyranny.

In the end the meeting passed the following resolution:

> That pending further information on (1) the general professional and administrative arrangements, both central and local; and (2) the machinery whereby private practice is to be continued, including safeguards to secure its preservation for those members of the community who are able and willing to provide the medical service for themselves, there be affirmed the view of the ARM 1943 "that a comprehensive medical service should be available to all who need it, but it is unnecessary for the State to provide it for those who are willing and able to provide it for themselves."

PRINCIPLES, CRITICISMS, AND POSITIVE PROPOSALS

An amendment to the council's report by Dr. J. H. STEPHEN, for Aberdeen, was somewhat languidly accepted.

> This emphasised four freedoms: no compulsion into the new service, either for patient or doctor; freedom for people to choose their own doctors; freedom for the doctor to pursue his own methods in his own individual way; and preservation of the doctor-patient relationship. It went on to stress the principle that the profession should have as much responsibility for the new service as was possible without sacrificing the control of expenditure by Parliament and the local authorities, and that the service should not be a full-time salaried service under Government or local-authority control.

The meeting again took the opportunity of asserting that the principles enunciated in the white-paper could never be realised by its proposals.

A motion, by Dartford, that any national service must include all existing and future civilian medical services carried some notable implications. Dr. D. M. THOMSON, the mover, said that the profession wanted to give a complete service, including industrial health, school service, maternity and child welfare, and any new types of service that might be introduced. Other speakers felt it important that the factory doctor should be the servant of some independent body, not of the factory owner; though Dr. W. N. LEAK (Cheshire), as a part-time officer employed by ICI, did not agree, feeling that he was more successful in his care for the workers just because the management gave him their confidence. The motion was passed.

The council's positive proposals for implementing the white-paper principles were criticised in amendments by many areas, chiefly on the grounds that they retained the principles of central control and ignored other methods of providing complete medical care for the nation. One of these amendments being chosen as the prototype, it was put by Dr. A. C. DE B. HELME (Guildford): the council, he said, had not given due consideration to schemes in other countries—Norway and New Zealand, for example. Dr. J. C. A. NORMAN (Bournemouth) feared that the central control proposed would interfere with the four freedoms. Moreover, a statutory advisory body, such as the council foreshadowed, would have no real influence. As usual the word "control" filled the gathering with misgiving; and Dr. P. JACOB GAFFIKIN reminded them that a dog "under control" was interpreted by park-keepers as meaning a dog on a chain. Dr. R. COVE-SMITH (Marylebone) produced a number of gloomy synonyms from Webster's dictionary, including "dominate," "regulate," "curb" and "subject," but Dr. DAIN pointed out that in NHI for thirty years they had been experiencing central control by the Minister—and that without any sort of body through which they could make their views known to him. The council's proposals tried to ensure that there should be no control over the contract between doctor and patient; and if a proper advisory body was appointed the profession would be in a much stronger position than it had been in the past. Thus fortified, the meeting rejected the motion.

THE EXAMPLE OF NEW ZEALAND

Nine divisions brought forward the New Zealand refund system (type B) as an example of alternative methods of securing medical service for all on a private practice basis. Mr. C. E. BEARE explained that on this system the doctor charges his usual fee and the patient reclaims 7*s.* 6*d.* from the Government. An objection to the system was that the doctor was not allowed to sue for fees. Dr. C. J. KIRK (Darlington) found another objection in the fact that it presupposed that the bill would be paid. In industrial areas when money was scarce the doctor's bill was kept with other forgotten papers behind the china dogs at each end of the mantelpiece, to be thrown away at spring-cleaning. The only person who would benefit by the system would be the dispenser-secretary who would need another £1 a week for her extra work.

Dr. TALBOT ROGERS said that when, under NHI, payment per item of service was tried in Manchester and Salford, it involved irksome book-keeping, worked to the disadvantage of the skilful doctor who got good results with fewer attendances, and required complex modifications. In New Zealand it led to worse abuses because unlimited money was available: one doctor had even sent in a claim for treating himself.

Dr. S. WAND pointed out that if the doctor was to help his patients to achieve positive health they must be able to consult him on minor matters and casually. The New Zealand scheme would be retrograde in this country. "We're out to make a better and fitter nation, and we're not going to do it by putting the emphasis on treatment and payment per item of service rendered."

Dr. DAIN said that the New Zealand government had arbitrarily fixed the refund at three-quarters of the fee formerly paid by most patients, and the public was increasingly disinclined to pay more. "There is no service, as we understand it, in New Zealand"; the services of a general practitioner were provided free, but consultants were not paid at all. Instead of approving this very awkward method of getting back the fee, or part of it, would not the meeting rather take part in negotiations for a complete service?—The meeting agreed that it would.

EXTENSION OF NHI

Dr. J. C. A. NORMAN, for Bournemouth, expressed the opinion that health legislation should proceed by evolution and that it would be best to start by extending National Health Insurance to dependants of those now insured, at the same time providing institutional, specialist, and auxiliary services. This, he said, would cover 95% of the population and leave freedom for private practice.

Dr. H. H. GOODMAN (Newcastle) preferred the simple administrative machinery of NHI to that proposed in the white-paper: the doctor-patient relationship was untouched; private practice could continue; and the local authorities had no chance to interfere. Dr. D. M. THOMSON (Dartford) had never been aware of control under NHI: "and unless I'm a slacker or a scoundrel there will be no control." Dr. W. S. MACDONALD (Leeds), however, pointed out that doctors have no active part in the administration of NHI: and it was a disease service, not a health service. In policy something could be said for safety first, but perhaps the nation would benefit if the profession were more dynamic—if they used the sword instead of relying altogether on the shield.

Dr. C. F. TURNER said that Coventry had long advocated extension of the panel but now opposed this or any other interim solution. NHI was a sterile non-progressive and purely curative system, and not a satisfactory approach to the comprehensive medical service everyone hoped to see. Dr. C. MACKIE (Worcester) also did not want the panel system to continue: doctors had miserable representation on the insurance committee, and the patient had little or no say in the service except to make an occasional complaint. Dr. W. D. STEEL (Worcester) added that if the machinery had to be reconstructed by adding specialist care, it would be best to devise a complete service.

Dr. H. B. MUIR (Fife) said that provision of specialist and hospital care would require a contribution from the Exchequer, and the Government would then demand a measure of control. There was now a golden opportunity to redraft completely the medical services of this country, and it should be taken.

Mr. LAWRENCE ABEL said that NHI had provided only general-practitioner service: people who imagined they were entitled to specialist attention or hospital care found they had no such rights. In 30 years £300 million had gone into the coffers of the approved societies. This sum—£10 million a year—would have revolutionised the hospitals. What was needed was an improved medical service for the nation, and the first step should be to provide a complete service for workers already insured—Total Workers Insurance for Total Sickness. Accordingly, for Marylebone, he proposed:

> That health legislation should proceed by evolution, and the Representative Body is of the opinion that the objects aimed at will be achieved by completion of NHI service to embrace institutional, specialist, and all auxiliary services, and, when this is accomplished, the expansion and extension of NHI to include dependants of those insured and to others of similar economic status.

Mr. DICKSON WRIGHT, supporting, said this country already had many half-finished services—e.g., for tuberculosis. The Government was like a knitter who was surrounded by socks never turned at the heel but was now starting on a great big medical pullover for the nation. When they had managed to provide a comprehensive service for the workers at present insured it would then be time to consider dependants. Dr. O. C. CARTER believed that piecemeal extension would please nobody, but Dr. C. M. STEVENSON thought that consultant and pathological facilities should be provided before extending the service to dependants; for if dependants come first, the comprehensive service might not come at all.

Marylebone's motion was carried by 113 votes to 106.

Mr. ABEL then suggested that as development of hospital services would take years, much of the remaining agenda could be left to a later date; but the CHAIRMAN did not agree. Dr. WAND declared that the motion, which affected the policy of the Association, could not be passed without a two-thirds majority; but the CHAIRMAN regarded it as within the ambit of BMA policy.

A CORPORATE BODY?

Dr. DAIN explained that the council had gone into the merits of different types of central administration and felt that nothing would be gained by entrusting it to a corporate body, which must in any case be responsible to a Minister. The profession would exert just as much influence on the Minister through a proper advisory body. Indeed, a corporate body would be appointed by the Minister, and the profession would have no power over it. Dr. C. G. TAYLOR remarked that a corporation should be democratically elected, but Dr. DAIN replied that it could not.

Dr. TALBOT ROGERS, for Bromley, argued that "provided a Central Health Services Council is established in such a way and with such powers as to be satisfactory to the profession, the central body administering the service need not necessarily be a corporate body." Neither the Government nor the public would agree to a corporate body, and it would carry grave danger of putting the service into the hands of medical bureaucrats. He withdrew his resolution, however, on the assurance that the Association is no longer tied to a corporate body alone.

THE CENTRAL HEALTH SERVICES COUNCIL

Dr. DAIN introduced the council's recommendations on the Central Health Services Council. The medical members of this body, he said, should be elected by the profession, and besides publishing an annual report it should have the right to tender advice on its own initiative and publish this advice. Power to report to the public was necessary to ensure that advice which was not taken could be enforced if necessary by public opinion. Unless free speech was conceded to the council, negotiations should go no further. He was told that such rights for an advisory body were unprecedented, but it was also unprecedented for a free profession to be roped into the public service. To Marylebone, which argued through Mr. F. M. LOUGHNANE and Dr. COVE-SMITH that Parliament would never allow the profession to elect representatives on a statutory body, he replied that it already elected representatives to the General Medical Council. "Don't tie our hands, and let us get as near as possible to electing medical representatives."

Dr. COCKSHUT said that besides the intermittent advice of the Central Health Services Council the Minister would have day-to-day advice from his permanent officials. These officials must be found places on the council: "we must bend our energies to secure that the Minister has one source of medical advice and one only."

Mr. ABEL thought that the council, as a statutory body, must be appointed by the Minister, but it should be appointed from people nominated by the profession. He could have a little choice: "if he wants 30, we'll nominate 31."

Glasgow, Leeds, and Bromley carried, "with minimal dissent," a resolution in favour of a single Central Health Services Council representing all branches of medical practice. The British Hospitals Association, said Dr. VAUGHAN JONES, wanted to have a separate Central Hospitals Board. There was no reason why the council should not have subcommittees, but separation of functions at the head was most inadvisable. They should be integrated, not separated.

TIME TO MAKE A STAND

Before the council's recommendations were approved, various members again strongly opposed any action that would lead to further control. The choice, said Mr. DICKSON WRIGHT, seemed to be between hanging with a rope of Government manufacture or BMA manufacture. The medical bureaucrat was no better than another bureaucrat. The BMA must not go over to the other side, but it would do so unless a stand was made now. Dr. A. A. DUFFUS said that the council's proposals would hand over the profession to political control.

Prof. R. M. F. PICKEN, on the other hand, recalled the efforts of the BMA from 1929 onwards to improve medical services. The proposals they now put forward were those already approved. It would be no credit to the BMA if it turned them down in face of the bogy of control. The object must be to set up machinery that would leave control in clinical matters to the profession.

Dr. BALCK FOOTE was appalled by this readiness to make constitutional changes. Doctors should go to any length to keep up the position inherited from their fathers, which they hoped to hand on to their sons. Dr. DOUGLAS BOYD objected to a body "concerned with all civilian health and medical functions of central government" dealing with the personal relation between doctor and patients. A bureaucracy would be created, and the income of most of the profession would come from a central source.

Dr. G. H. SEDGWICK (Rotherham) recalled the opposition to the introduction of mechanical contrivances to run on rails, which were condemned as dangerous to cattle. It was nonsense to suppose that the profession could stop a scheme of some kind from being put through, and the only thing to do was to negotiate with the strength of unity.

Mr. H. S. SOUTTAR said it was up to the BMA to dispute proposals they disapproved, but it was also their duty to see that those they had themselves made were carried through. Dr. HELME disclaimed any attempt to avoid negotiation. But it was usual for medical advisory bodies to be put into the discard, and if the proposals were fulfilled the profession might at any time find itself the victim of departmental legislation.

Dr. DAIN pointed out that some of those who now objected to central control had been keen on extension of NHI, which was under the sole control of the Minister, yet had not so far involved any interference with clinical freedom. The Association must go forward with constructive proposals. On a vote the meeting supported him by an overwhelming majority.

THE CENTRAL MEDICAL BOARD

Dr. DAIN asked approval of the council's view that a Central Medical Board should have no power to make doctors seek permission before entering new public practices, or to require young practitioners to enter any particular form of public practice. Such powers, he thought, would be in the interests neither of the public nor of the medical profession, and smacked too much of conscription and civil direction to receive any support from the profession in peace-time.—The meeting agreed.

An amendment by Dr. W. B. HEYWOOD-WADDINGTON, for West Sussex, added that the Central Medical Board should be composed entirely of medical practitioners. This was carried, but an amendment by South Shields that the board should be elected by the profession was withdrawn on Dr. Dain's advice that the subject could more appropriately be considered by the negotiating body.

LOCAL AUTHORITIES AND THE SERVICE

The section of the council's report dealing with local administration condemns joint health authorities. In their place the council would have regional bodies for hospital and medical areas not necessarily conterminous with local-authority boundaries. These would represent local authorities, the medical profession, other vocational interests, and the voluntary hospitals. They would advise the Minister on the planning of hospital and health services in the region, and on the distribution of money. Each county and county-borough council should be advised by a statutory medical advisory committee elected by the local profession.

In proposing that this section of the report should be approved, Dr. DAIN said that, though the information was not official, he had reason to suppose that the joint board was not going to appear at all in the picture of the new medical service. This meant that the hospitals would remain in the hands of their present owners. If the advisory planning bodies proposed by the council had power to advise the local authorities and to enforce their decisions, then the profession would be getting into the system at a useful place. But he was anxious that the meeting should not tie the negotiators to any particular form of local administration; and he reminded representatives that nothing would be decided without reference to them.

A resolution by Mr. P. W. L. CAMPS, for South Middlesex, declared that the council's proposals were no more acceptable than those of the white-paper, and suggested that the BMA should enter into discussion with the local-government associations with a view to deciding the most satisfactory method of local administration for health services. It was a non-committal suggestion. Mr. Camps said, designed to clear the ground by friendly discussion. Dr. DAIN hoped that the meeting would not say the council's proposals were unacceptable: the negotiators must have some proposals to go forward on, and they expected at the proper time to get into touch with the local authorities for discussion.

Mr. H. J. MCCURRICH distrusted the local authorities, and Dr. H. S. GABB supported the motion hotly on behalf of Hastings. In his view the sections on local administration were the most obnoxious parts of the white-paper. Dr. S. F. L. DAHNE (Reading) admitted to being a member of a local authority: but his authority, he said, had turned down the white-paper and put forward its own ideas, which were that doctors should be free to practise where and how they like, and that there should be no salaried service but that there should be coördination and coöperation. He himself, he added, would be chary of serving as a doctor under a local authority.

Dr. C. K. CULLEN (City) wanted a partnership with the local authorities. In the main, however, speakers felt that the council's proposals were, in the words of Mr. STAVELEY GOUGH, substantial and progressive, and Mr. Camps's resolution was lost by a large majority.

Dr. D. G. MORGAN, for Cardiff, proposed that the regional councils should be given executive powers. He emphasised the advantage this would have in coördinating and expanding the hospital service: no-one listened to an advisory body. Dr. STEVENSON opposed Cardiff's amendment on the ground that it would be undemocratic to give executive powers to a body elected only at second hand. Prof. R. M. F. PICKEN thought that the proposal was merely a reversion to joint boards, which nobody wanted; but Dr. DAIN pointed out that the profession wished to get the maximum executive power for the body on which it had most representation. The council was sympathetic to the view, he said, that the regional body should have executive functions and that it should advise the Ministry on the disposal of moneys. But the greater the executive power the less was likely to be the representation of the profession. On his advice the Cardiff amendment was referred to council.

Dr. H. F. HOLLIS, for Leeds, persuaded the meeting that the regional councils should be responsible for planning all the medical services in the area—preventive and curative, institutional and non-institutional.

Dr. H. H. GOODMAN, for Newcastle-on-Tyne, proposed a change in Principle D approved by the Representative Meeting last year, part of which reads:

> The profession rejects any proposal for the control of the future medical service by local authorities as at present constituted.

Newcastle favoured the removal of the last four words, and so did the meeting.

VOLUNTARY HOSPITALS

Bath, Leicestershire, and Rutland stated that the Association was dissatisfied with the provision made for voluntary hospitals, and desired a more general representative administration of hospitals and medical services throughout the country. Mr. R. L. NEWELL, chairman of the hospitals committee, epitomised this feeling when he remarked that in effect the white-paper was saying to governing bodies: "Come and help us with our plan and don't forget to bring your hospitals with you." The public, he said, would be paying for a full service, yet the voluntary hospitals were told that they must rely on voluntary subscriptions to meet part of the cost of the service they gave. The meeting voted heartily for the motion.

GENERAL MEDICAL PRACTICE

Aberdeen, that city of long motions, proposed an addition to the council's report to the effect that the general practitioner should be responsible for the patients on his list, and that all treatment within his skill and experience should be given by him, and all other treatment arranged through him. The meeting sanctioned this amendment.

A motion by Crewe that midwifery should be left in the hands of the general practitioner, with the provision of special lying-in hospitals where necessary, was carried (as the CHAIRMAN put it) by a lukewarm majority

Bristol moved that in any comprehensive medical service an active relationship should be established between general practitioners and local hospitals on the lines suggested in Medical Planning Research, and regretted that the white-paper proposed nothing of the kind. Dr. T. MILLING, who introduced the motion, said that a scheme on these lines was in operation at Bristol; and that beds were provided in hospital where general practitioners could attend their own patients; there was also an annexe for their maternity cases. Dr. P. PHILLIPS (Bristol) thought that beds could be provided on similar lines for the patients of general practitioners everywhere, and encouraged by that hope the meeting passed the motion.

Dr. B. R. VICKERS was luckless enough to propose, for Bedford, that provision must be made to safeguard general practitioners against unnecessary night calls: these, the motion stated, were at present automatically limited by the fact of payment of fees. The institution of a no-fee system would result in many unnecessary late calls, especially as children would be covered. Dr. DAIN reminded the meeting that from the point of view of the patient there are no unnecessary night calls. He was applauded when he added that in his experience insured people did not abuse their privilege of calling the doctor for nothing, and the meeting firmly turned down the motion.

A motion from North Staffordshire that the basis of any contract for general practitioners must be between doctor and patient was naturally carried. And Dr. C. FRIER also gained the support of the meeting for a motion, from Kesteven, that as single practice will continue in most rural areas, the responsibilities peculiar to such forms of general practice will demand special consideration with regard to equipment and remuneration.

HEALTH CENTRES

Dr. C. K. CULLEN, for City, described health centres for general practice as the keystone of the National Health Service, and asked that centres should early be introduced, to operate from suitably staffed and equipped premises. Dr. WAND considered that the keystone of medical practice was not a building but the doctor. Would health centres give the public better service? Did the public want service in such buildings, and who would own them? If they were provided on a wide scale they would tend to become standardised, and this would stultify experiment. He deprecated all motions about types of health centres—of which there were some 25 on the agenda.

Dr. A. BEAUCHAMP (Birmingham), though an enthusiast for health centres, also opposed the motion in the belief that it would hinder experiment. It would cost, he said, over £1 per head of population to build a health centre, even at 1939 prices. If many of a wrong type were built the waste of money would be great. Dr. PEMBERTON believed that if this proposal was put into effect the LCC would control general practice in London in six months; and Dr. DAHNE thought it would make doctors the lackeys of local authorities. He had worked in what was virtually a health centre for years, but it was an association of free doctors, owing their own equipment. Dr. CULLEN, replying, reminded the meeting that most of the doctors answering the questionary had been in favour of health centres. Nevertheless, the motion was lost, and the meeting took the advice of Dr. Wand in passing over all further motions under this heading.

COMPENSATION

Speaking of the council's paragraphs on compensation, Dr. WAND said that a committee had been sitting for some time to investigate, with the aid of an actuary and other appropriate advisers, the position in regard to admission into practice by purchase. Some general principles had emerged: for example, the whole of general practice was involved even if only a few practices were affected. The committee was working out some principles relating to the value of practices, and the cost of annuities and pensions which might be purchased for sums paid in compensation. This was being done, he said, not because the council regarded the issue as decided, but because they wanted to be ready.

Dr. COCKSHUT, for Hendon, moved that it was in the national interest and essential for the independence of the profession that doctors should continue to own the goodwill of their practices. To compensate doctors at proper rates, he said, would probably cost £40 million, and no government was going to hand out such a sum without knowing what they were getting. What they would be getting was the freedom of the profession. Doctors would lose the right to nominate their successors and to say, for example, "My son is taking over." He could see nothing disgraceful about selling the goodwill of a practice. To talk about it in a nasty tone of voice, making it sound like a swear-word, was merely claptrap. He believed that the profession were the descendants of the yeomen and they should keep their freedom. If the Government offered them health centres they should insist on paying rent. Dr. STARK MURRAY pointed out that the buying and selling of practices was almost confined to this country and was not therefore synonymous with a free medical profession. The meeting carried the Hendon amendment.

Dr. T. C. S. WEBB, for Woolwich, moved that compensation should be general and not limited to those who take up service with the State; it should be on generous lines and assessed on gross receipts. If a doctor was not to continue to own his practice, he said, he should get compensation whether he entered the national service or not, for the purchase-value of his practice would in any case fall. There was some slight discussion, but Dr. WAND said that the phrase "take up service with the State" presupposed something which had not yet been decided, and, thus warned, Woolwich gained leave of the meeting to withdraw the motion.

Mr. STAVELEY GOUGH pointed out that if practitioners remained free agents working on a capitation or other non-salary basis, they need not give up the goodwill of their practices; so the question of compensation would not arise. Dr. WAND said the council was fully aware of the danger that an offer of compensation would attract people into an unsatisfactory service, and the committee was considering the subject in detail in case it should be raised. Dr. W. J. POOLE, for Ashton-under-Lyne, asked for an assurance that compensation should be considered separately from pensions, and Dr. WAND agreed that it was a separate issue. Compensation could be paid in a lump sum, or as an annuity, as the recipient preferred. But pensions were different: they were deferred pay.

Dr. A. C. E. BREACH, for Bromley, proposed that:

> During the first years of operation of any National Health Service opportunity should be given to doctors, who will have reached the age that would normally be the retiring age of the new service, to continue, if they so desire, in whole- or part-time public or private practice, without prejudice to their compensation rights.

The situation of older doctors, he said, was not a happy one. It was in the latter part of his working life that the practitioner usually hoped to put aside a little money. But evacuation of patients, absence of partners, high income-tax, and other consequences of the war had made this very difficult, and many at 60 or 65 were not in a position to go out of practice. Though the country needed all the doctors it possessed, the white-paper had given these men no reassurance.—The meeting accepted his resolution.

CHOICE OF CONSULTANT

Mr. DICKSON WRIGHT declared that the practitioner should be controlled by the patient, and the consultant by the practitioner. Germany had allowed patients to go to consultants direct, with the result that in Berlin there were 4000 consultants to 3000 practitioners. In this country the doctor-consultant relation must be maintained, and the practitioner must have every facility for taking his patient to the consultant of his choice.

INSTRUCTIONS TO NEGOTIATING BODY

Dr. DAIN proposed for the council:

> That it be an instruction to the Association's representatives on the Negotiating Committee that, without prejudice to other issues, including the 100% question, remuneration and compensation, consideration of administrative structure, central and local, should precede consideration of all other questions, and that agreement on this subject is an essential prerequisite to discussion of other subjects.

All shades of political opinion in the profession, he said, agreed that there must be professional freedom and that doctors must share the responsibility for administration.

Dr. H. B. MORGAN, MP, abhorred direction of the profession by bureaucrats, and suggested that the council should consider the advisability of incorporating Whitley Council machinery throughout the service. Dr. DAIN cordially accepted this suggestion, and the meeting passed his motion without dissent.

In further discussion Dr. G. P. WILLIAMS (Anglesey) maintained that too little had been said about money. No class of the community worked so hard for its living as the average busy doctor. Dr. DAIN said that the approach to the Minister should be not "What will you pay?" but "Doctors should earn so much—will you pay it?" The starting-point should be that doctors should not earn less than today.

Hendon proposed that before negotiations opened the Government should be asked to agree to "the indemnification of each doctor against financial loss attributable to the introduction of a National Health Service." Dr. DAIN accepted the justice of this demand; but must it be settled before doing any business? Compensation for income loss had not yet been considered.—The meeting referred this problem to the council, and a resolution by Hendon was then passed by a large majority:

> That concession by the Government should be obtained of the following fundamental principles as a preliminary to any negotiations: (*a*) freedom of choice by patient and doctor; (*b*) non-intervention in professional matters of any third party in the doctor-patient relationship; (*c*) medical representation at all levels of administration by election of the profession; and (*d*) the evolution of a National Health Service must be by stages and governed by the availability of medical personnel.

Dr. DAIN gave an assurance that if in the negotiations any doubt arose about the acceptability of the administrative structure proposed, the Representative Body would be called to consider it.

EMINENT COUNSEL

A brisk little discussion arose on the proposal of Dr. A. S. WIGFIELD, for East Herts, "that eminent counsel be employed to conduct the negotiations for the medical profession." He held that if we were to move from precedent to precedent and introduce new constitutional forms it would be necessary to have a lawyer to "wrap it up."

Dr. COCKSHUT regarded this as a very mischievous recommendation: lawyers did not present medical matters accurately, and a lawyer briefed by the Association would be speaking at second hand. Dr. H. H. D. SUTHERLAND thought that so long as the profession stood behind their chosen leaders their case was so strong that counsel could not improve it. The legal expert should be an adviser not a mouthpiece. Dr. COVE-SMITH took the view that on constitutional matters legal advice must be immediately at hand when needed, but Dr. H. B. MORGAN disagreed, remarking that the more eminent the counsel, the more he needed watching. The whole experience of large organisations was that the men who knew the subject from top to bottom and were dealing with it every day could present their case far better than lawyers. Dr. J. C. MATTHEWS added that employment of counsel to *conduct* the negotiations would create the wrong atmosphere, and the meeting concurred.

WHO IS FOR THE RIGHT?

Dr. W. E. DORNAN, for Sheffield, asked the council to ascertain at once what degree of unanimity might be expected in support of the majority view should it become necessary for the profession to make a stand against unacceptable Government proposals. Dr. G. E. KIDMAN (Derby) recalled that in the past the BMA had found itself in difficulty through not knowing what support it would receive in pressing its views to a conclusion.

Dr. DAIN pointed out that support could be ascertained only on particular questions as they arose. On some issues the profession would be unanimous; on others, such as "the 100%," they might be 50–50; and on remuneration, for example, there might be a sliding-scale view. In the end responsibility for refusal or acceptance would lie with the Representative Body.

The suggestion was referred to council.

TERMS OF SERVICE

The four following resolutions were carried:

> That in the case of women doctors marriage should not be a bar to any form of service in the National Health Service.
>
> That all medical practitioners, male or female, shall be given equal pay for equal work.
>
> That a reasonable security of tenure of office should be established on the lines of the tried-out existing contractual relations between the insurance practitioners and the insurance committees.
>
> That only those qualified and registered under the Medical Acts be admitted as medical practitioners in any medical service.

Belfast, proposing this last motion, pointed out that in Germany a lot of queer people, such as chiropractors, had got into the State service.

WALES

A motion proposed by Dr. W. V. HOWELLS, for Swansea, "that Wales should be treated as an entity in any National Health Service" won support from Dr. J. B. MILLER, Mr. TUDOR THOMAS, Dr. G. P. WILLIAMS, Dr. R. S. BROCK, Dr. J. A. IRELAND and Professor PICKEN and was carried by a considerable majority. Dr. DAIN did not see how Wales could at present be regarded as a medical entity, since the medical stream from North Wales flowed to Shrewsbury or Liverpool. But other speakers thought it would be possible to treat the country as an administrative entity for purposes of the service.

AGED, INFIRM, AND CHRONIC SICK

On a motion from West Suffolk it was agreed:

> That any future National Health Service should provide for all aged, infirm, and chronic sick an equal standard of medical service and nursing care to that existing in general hospitals. The care of such cases should form an essential part of the training of all nurses and medical students.

CONTROVERSIAL CHANGES IN WAR-TIME?

Dr. H. S. PASMORE, for Kensington, proposed:

> That this meeting noted with approval the Prime Minister's statement on Oct. 13, 1943, that "there is no question of far-reaching changes of a controversial character being made by the present Government unless they are proved indispensable to the war," and requests the council to press the Government to adhere to that pledge.

The Minister of Health's description of the white-paper proposals as evolutionary rather than revolutionary showed, in Dr. Pasmore's opinion, how far Whitehall was removed from realities. Doctors outside the meeting would be disappointed at the lack of resolution it had displayed. A newspaper had summed up in the words, "BMA still in doubt"; and their attitude should be made clear.

Dr. IRELAND thought that the opportunity of war was being used by certain people to put the shackles of bureaucratic control on the profession in perpetuity. Dr. STEVENSON said this argument could be applied to any and every change in war or peace; there was always a war on, or something else. The public was not at present troubling much about social security, but if at the end of the war it found nothing had been done there would be trouble; and if serving doctors came back and found things as they left them there would be trouble again.

But the motion was carried by a large majority.

DOCTORS IN THE FORCES

Kensington then moved "that legislation for a National Health Service be delayed until the majority of doctors serving with HM Forces return home and have an opportunity of expressing their views." Dr. COVE-SMITH, supporting, said that Service doctors had had almost no chance of discussing these questions with each other: they were out of touch and out of contact, and those at home were in a position of trust.

Dr. J. A. PRIDHAM (Dorset) believed that a great many doctors in the Forces were anxious that when they came home something should be settled so that they would know where they were. Dr. I. SIMSON HALL (Edinburgh) said that one after another of his former students asked, "What are you doing for us after we come out of the Army?" Unless the hospital services were reorganised there would be nothing for them.

Professor PICKEN maintained that the young men who constituted so large a proportion of those in the Forces were expecting that conditions should at least be defined when they returned. Legislation took a long time, and the "appointed day" might be several years ahead; but it would be regrettable to say now that nothing could be done to realise the plans matured over many years.

Dr. COCKSHUT, though he sympathised with the motion, described it as defeatist. It was based on the fear that when the BMA met the Government it would get caught in a net. "But we're going to meet the Government and get a service that will be satisfactory to us." Throughout the country there was a feeling that something must be done. The BMA could not call a halt, and he doubted whether the Government could.

Mr. ABEL reported that former colleagues and residents wrote to him saying, "Do get this thing put off till we've had an opportunity of doing something about it." Plans could go on: hospital planning could start immediately.

Dr. DAIN remarked grimly that it may be ten years, and will at least be five years before the majority return from the Forces. The business of the profession was to see that the public got the right kind of service. If it refused to take part in designing this service, legislation would be introduced over its head.

The motion was lost by 27 votes to 153.

A SEPARATE ACT?

Dr. J. C. ARTHUR, for Gateshead, introduced a motion which in its final form read:

> That in the implementing by legislation of any Health Service proposals the necessary legislation should be presented in a separate Bill, and that the Health Service proposals should not be incorporated in, nor be dependent on the financial provisions of, the Social Insurance measure.

A dangerous situation would arise, he said, if medical opposition to the Health Service proposals were interpreted by the public as opposition to the Social Security proposals. Criticism of the Health Service proposals might get no consideration because it would imperil Social Security as a whole, and a Bill which was partly bad might thus be forced through.

Dr. MARTIN BRODIE said that if there were two Bills, and Social Security was taken first, it might be very hard for the profession to oppose, for example, the inclusion of 100% of the community. Beveridge had linked medical benefit with the Social Insurance Fund. If it were divorced from Social Security it must be financed either by a contributory scheme (very difficult) or from general taxation as the Royal Commission on National Health Insurance foretold in 1926.

Dr. H. H. GOODMAN remarked that the man in the street had been told that a National Health Service was necessary as an adjunct to Social Security, but had not been told the reason—namely, to safeguard the Social Security Fund. There was a risk of legislation on health services getting on to the statute-book in the reflected glory of the Social Security proposals. What was wanted, added Dr. ARTHUR, was a health service for the nation and not a certification scheme for an insurance service.

The motion was carried with very few dissentients. Without discussion, the meeting also approved a motion by City stating that, in view of the close relationship between National Health and Social Security, it wholeheartedly welcomed the Social Security Scheme contained in the white-paper.

A SUMMARY

Dr. DAIN, chairman of council, summarised the conclusions reached. The Representative Body, he said, had shown itself in favour of developing medical services, but disapproved of the white-paper as it stood. It was willing to negotiate with the Government and had appointed negotiators. It preferred that the service should proceed by evolution from National Health Insurance, putting first the development of the hospital system and then extension of general-practitioner service. "We have added emphatically that we do not wish to be employed by local authorities, that there should be no civil direction; that there should be no whole-time salaried service for general practice, and that we should have no clinical control. We have instructed our negotiators that their first action shall be to try to agree with the Government on a form of administration to be submitted for approval, and that, failing that, no action shall be taken in the matter of negotiation. That gives the Negotiating Body a very fair start in the very difficult and important work of the next few months."

At the end of the meeting Dr. Dain received an ovation.

The Negotiating Body

The representatives of the profession who are to meet the Minister of Health number 31, of whom 16 will represent the British Medical Association. These are:

Nominated by the Council.—Lord DAWSON (president), Dr. DAIN (chairman of the council), Dr. J. A. BROWN and Dr. S. WAND (Birmingham), Dr. F. GRAY and Dr. E. A. GREGG (London), Mr. R. L. NEWELL (Manchester), and Dr. MARTIN BRODIE (Edinburgh).

Elected by the Representative Body.—Dr. J. C. ARTHUR (Gateshead), Dr. R. W. COCKSHUT (Hendon), Dr. J. F. LAMBIE (Glasgow), Dr. J. A. L. VAUGHAN JONES (Leeds), Dr. J. B. MILLER (Bishopbriggs), Dr. A. TALBOT ROGERS (Bromley), Dr. G. H. SEDGWICK (Rotherham), and Dr. S. A. WINSTANLEY (Manchester).

BMA Elections for 1944-45

The following re-elections have been announced:

President: Viscount DAWSON of PENN.
Chairman of Representative Body: Dr. P. MACDONALD (York).
Chairman of Council: Dr. H. GUY DAIN (Birmingham).
Treasurer: Dr. J. W. BONE (Luton).
Deputy Chairman of Representative Body: Dr. J. B. MILLER (Bishopbriggs).

The meeting concluded with warm tributes to Dr. Macdonald, and his deputy Dr. Miller, for their conduct in the chair.

On Active Service

CASUALTIES

KILLED

Captain CHARLES STEWART ROSS LOWDON, MB EDIN., RAMC
Captain F. M. WAINMAN, MB GLASG., RAMC

WOUNDED

Lieutenant W. N. COOMBES, MB CAMB., RAMC
Captain A. N. MACPHAIL, MB GLASG., RAMC
Captain I. MORRIS, RAMC
Captain A. B. UNWIN, MB CAMB., RAMC

AWARDS

MC

Captain G. B. HIRST, MB LEEDS, RAMC
Captain E. W. MOORE, MB BRIST., RAMC
Captain D. W. MOYNAGH, MB LOND., RAMC
Lieutenant W. A. SMURTHWAITE, MRCS, RAMC
Lieutenant HARRY THOMPSON, RAMC

MENTION IN DESPATCHES

Surgeon Lieutenant P. N. HOLMES, MB MANC., RNVR

LANGLEY MEMORIAL PRIZE.—This prize, value £21, is open to officers of the Colonial Medical Service who are serving, or who have served, in West Africa. Papers, which may consist of either published or unpublished work on tropical medicine or surgery, hygiene and sanitation, or entomology and parasitology, should be delivered to the secretary, London School of Hygiene, Keppel Street, London, WC1, not later than Oct. 1, 1945.

In England Now

A Running Commentary by Peripatetic Correspondents

IN Holland the food and fuel situation is even worse than it was in Belgium. This reserved and quietly courageous people have suffered greatly. Vast areas patiently reclaimed from the reluctant sea have been wantonly flooded by the retreating Huns, and the hopes and livelihoods of many lie drowned for a generation beneath the sullen tides. The sobbing winds sigh through the gaunt skeletons of ruined farms, the shivering branches of half-submerged trees, and the creaking trellises of derelict wind-mills, while dejected bands straggle along the muddy dykes carrying pathetic remnants of treasured lares et penates. Dead animals seem even more common than they were at Aunay, Tilly, and Falaise, and some more bloated and swollen than the others drift aimlessly on the muddy floods. One wag suggests that they will soon be airborne, but mirth smiles wanly under such circumstances.

We entered one small town with the liberating troops. A truce had been granted to allow the evacuation of all civilians before our artillery opened a devastating barrage. Those Germans who were not killed, or who had not escaped across the broad river, sought refuge with their fellow rodents in the cellars. But many animals could neither be evacuated nor seek safety underground, and we were much intrigued by the behaviour of the survivors. They were clearly suffering from shell-shock or bomb-happiness, terms officially frowned upon since the dawn of the brave new psychological era. Some were completely dazed, like a few ponies with sagging limbs, hanging heads, and half-closed eyes, standing under a splintered tree; and a solitary jackdaw perched forlornly on the corner of a flattened house was misery personified. It paid no heed to us and no petting or cajolery evoked any response. The horses, goats, cats, and poultry were affected differently. All were abnormally frisky, prancing or jumping around nervously, and it was remarkable how they all wished to get as near us as possible. Not a single dog, dead or alive, was visible anywhere. One half-grown calf nuzzled and whimpered over a dead cow, and another, mortally wounded, followed our movements anxiously with its dying eyes. Such scenes are not pleasant even to those who have seen too much of the ruin and suffering caused by war. Place them in different settings, magnify them thousands of times, mix them with untold misery, paint them with blood and tears, and from the noisy background let there emerge the anguished cries or feeble groans of the injured and dying, and then one begins to realise in some degree the ghastly horror of global war.

* * *

Billeted in this small French village I have had the good fortune to be entertained by the local "witch"—an elderly widow lady with a glass eye and an overwhelming passion for the science of la Radiésthesie, which appears to be the application of the principles of water-divining to medical diagnosis. Instead of the traditional hazel fork a small silver "pendule" on a chain is used, and an elaborate system for interpreting the pendule's decision has been worked out. It seems that the practitioners of this offshoot of the Sorcerer's art form an international body of some size and repute. I have been sent home after an excellent tea with its "proceedings," which I am ordered to read.

This lady is justifiably proud of her descent from the redoubtable Professor Baudelocque, after whom the maternity hospital in Paris is named, and who is described as the first Frenchman to put the art of obstetrics on a scientific basis. He was the author of what must surely have been the first volume in the popular Catechism series—"Principes sur l'art des accouchemens, par demandes et réponses, en faveur des sages-femmes de la campagne" (1775). It seems from the preface that the government had about two years previously decided that the high infant mortality was a bar to the full prosperity of the State, and a committee of "vigilateurs" had been appointed in each province to suggest remedies. The unanimous recommendation of these committees was for the better education of the country midwives, whose standard would have shocked Sarah Gamp herself. With this end in view Professor Baudelocque, who held the chair in the Académie Royale de Chirurgie de Paris, was invited to write this little book, which was distributed by the government to every midwife in France free of charge.

During the Revolution the author was arrested on the special order of the Public Prosecutor, Fouquier-Tinville himself, who subsequently arranged that the price of his liberty should be the successful delivery of his mistress who was "expecting." Later still he was appointed accoucheur to the Court of the Empress Marie-Louise where his last professional activity was to produce the ill-fated "King of Rome." Returning home he fell a victim to *la grippe*, and died two days later at the zenith of his fame.

* * *

The public received with a sardonic smile the news that ice cream was on the menu again. When the first chill of winter makes itself felt in November, when there is a fuel shortage, and when the Heavens open and rain descends in bucketsful, the Water Board graciously announces that we may now water the garden and the Ministry of Food kindly allots milk powder for the manufacture of ice cream.

The worried housewife would like, in winter especially, to give her husband and children generous cups of hot coffee with milk, as well as porridge and milk for breakfast; parsley sauce to make frozen cod or rock salmon more palatable for dinner; milk puddings to soften the austerities of fruit stewed with insufficient sugar; savoury vegetable soups well blended and enriched with milk for supper; and a cup of cocoa made with all milk to round off the day. Skimmed milk would suffice for these purposes, and if she could do all this she would be a more contented housewife. But she cannot do anything like it on a ration of 2 pints of liquid milk per week per person, with one tin of dried household milk per head to last eight weeks. Sometimes she can get a tin of evaporated or condensed milk on points, but not always. Then there are the old and delicate, who are not ill enough to have a milk priority certificate, but who are hard put to it to find enough food they can digest. Take, for instance, the old jobbing gardener, who at 70 still does his day's work, although more slowly than ever; for years before the war his evening meal consisted of a large bowl of bread and milk, which he declared suited him better than anything else. Now he must get on as best he can without it. With many of these old people teeth are the difficulty; they simply cannot masticate, and they miss the soft, milky foods which they need. An occasional egg would help them, but shell eggs have become rarer and rarer except for those who keep hens, and there seems to be an invincible dislike for what are called "cardboard eggs."

Ice cream is splendid for the warm, well-fed person and the active child as a treat, as a delicious wind-up to a satisfying meal, or just because it is nice on a hot day. Everyone enjoys it in summer, but in winter one needs to be in a warm room and to be comfortably lined inside in order to appreciate its pleasantness. Ice cream is not nourishment, except when it is made of real fresh cream with fresh fruit juice and white of egg, and that kind of cream ice is not in question here. Anyone who has had the strength of mind—or the carelessness—to let a twopenny ice from a barrow melt uneaten will have marvelled at the thin insubstantial fluid which resulted. Commercial ices are made with the skimmed milk which is a by-product of butter making. It is generally dried by the roller process, and this makes it more difficult for the milk powder to be reconstituted for household use; furthermore, it is packed in containers too large for convenient retail distribution. Most of it comes from USA under lease lend. Much of such roller-dried milk powder is used as an ingredient in the manufacture of various foods—e.g., flour-and-sugar confectionery. Where this means biscuits, it is all to the good, since biscuits keep and are a handy and digestible source of compressed nourishment. But many of the manufactured cakes which find their way to confectioners' and grocers' shelves are so unappetising in taste and consistency, and so apt to become rapidly mouldy, that their fate is too often to be tasted, eaten reluctantly at intervals and then to finish up as food for pigs or hens. Most housewives would rather have had the ingredients to make the cakes themselves. And they would have

liked to have had the milk for any of the purposes listed above. Hence the sardonic smile.

* * *

The BMA meeting was conducted in a pleasant spirit; but with 481 items on the agenda there was little scope for entertainment. Mr. Abel of the Marylebone ginger group was at first prevented from telling his story of the parrot; and, when at last he succeeded, Dr. Dain countered instantly with the remark that Marylebone seemed to be associated with parrots. "Ah yes," said a reflective voice, "the Parrots of Wimpole Street."

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

THERE have been important debates on issues of first-class economic and social concern in the House last week. On Tuesday Mr. James Griffiths opened a discussion on the social security aspect of the King's Speech by again appealing to the coalition government to give priority to matters on which there is a great measure of inter-party agreement. But everything now depends, to quote a phrase of the Prime Minister, on the time that is left to this Parliament. And Mr. Griffiths went on to ask for clarification of the hesitancy of the language used in defining any precise problem, and of ambiguities in indicating a definite time-table. Dr. Haden Guest raised the question of demobilisation as it affects the medical profession in the course of a speech strongly supporting the general plan of the government's white-paper on a national health service. The situation will be difficult, for many practices have been devastated by war and will need special consideration.

Mr. R. S. Hudson, the Minister of Agriculture, announced, also on Tuesday, a four-year plan of price-fixing of agricultural products to end in the summer of 1948. During this period there is to be a gradual expansion of livestock and livestock products, and a reduction from their high war-time levels of some crops. We are to have a substantial increase in milk and meat. This statement must be considered in relation to the adhesion of this country to the decisions on international food policy put forward at Hot Springs. Mr. Hudson, in answer to the demand for elucidation, and for a debate on agriculture, said that his proposals were "purely machinery." But on these proposals agriculture can build an increasing production which will make it easier to maintain that close connexion between agriculture, health, and nutrition which must be the scientific foundation of a country's economic policy.

On Thursday we had a sincere and well-informed speech on housing from the new Minister of Works Mr. Duncan Sandys. Mr. Willink, who summed up the debate, had good news of the extent of repairs carried out and of additional dwellings created by adapting large houses. Already 27,000 temporary houses have been allocated to local authorities in the London region and 94,000 to housing authorities all over England and Wales. But no great promises can yet be made about the provision of permanent houses. In the first two years after the conclusion of the war with Germany the programme is for about half a million. Unless greatly more is possible, we are to be an overcrowded and an under-housed nation for some time to come.

FROM THE PRESS GALLERY

WHEN the debate on the address in reply to the Gracious Speech was resumed in the Commons on Dec. 5, Mr. JAMES GRIFFITHS said that the measures of social security had gripped the imagination and hearts and minds of the people. High among the priorities which should be fixed for the legislation to be passed into law in the next six or eight months stood the group of social measures dealing with family allowances, national insurance, and the health services. But Mr. C. ATTLEE reminded the House that these large and complicated measures could not be rushed through in the same way as urgent war legislation. The general Beveridge plan was bound up with a new health service and a plan for full employment. Both were prerequisites of the general social security scheme and the policy there involved entailed an immense amount of detailed work which had to be done in the Government departments along with the heavy day-to-day work of carrying on the war. He assured the House that there had never been any obstruction of these social security schemes. They were, as the Prime Minister had said, in the forefront, but a complete timetable could not be given at this stage. He hoped, however, that the Bill for providing family allowances would be presented soon, and that the Industrial Injury Bill would not be far behind. The utmost vigour was being used to get the other Bills drafted.

Dr. HADEN GUEST interposed to say that the Ministry of Health had been working on the Bill for the comprehensive medical service for about three years. Surely they had arrived at something definite. Mr. ATTLEE replied that it was impossible to begin drafting a Bill before they had got a considerable way towards agreement.

Later in the debate, Dr. HADEN GUEST said that the comprehensive medical service involved considerations closely related to demobilisation. Were the doctors to come back from the Services to a confused and chaotic situation in which it would be difficult to fit themselves in, or were they to come back to a situation in which they could take their place in a health service already constituted? That was important, not only for the doctors, but for the whole country. It had been the practice, unfortunately, for years past for young doctors desiring to enter practice to get loans from insurance companies at fairly heavy rates of interest, the repayments being spread over many years. Were the Service doctors to come back to that iniquitous position, because it was their only alternative to working as assistants, or in some public capacity, unless our medical services were altered on a comprehensive scale? He hoped that in this the last session of the present Parliament the foundation of social security would be laid, especially of family and health security. During the war a convincing demonstration had been given of what the medical services could do for health in the Army, Navy and Air Force. They had kept men fit and prevented infectious diseases in tropical and temperate lands. In addition, there had been a splendid curative and hospital service, enabling the greater proportion of wounded and sick personnel to be not only made well again, but so far rehabilitated as to be able to rejoin their units. That was a remarkable medical achievement. The medical service had been so excellent because of its singleness of purpose. It had been devoted without question of financial consideration to improving health and keeping men at a high level of fitness. A comprehensive medical service for the nation in peace-time should have the same singleness of purpose. To attain that, the whole of our medical forces must be mobilised to serve the nation. There must be a full domiciliary service, a full consultant service, a full service of pathological help, and special services such as X rays, available for all without question of payment. There must be health centres as well as private practitioners everywhere and the closest coöperation with the public health and maternity services. Such a service would make an immense difference in millions of working-class homes, the difference between good health and chronic bad health. No-one but a doctor who was in general practice, or the unfortunate patient, or his family, knew how difficult it was to get poor people into hospital. A comprehensive hospital service, pooling the voluntary and publicly controlled and owned hospitals, which would guarantee to every sick person who required it a hospital bed without payment as long as it was necessary for him to be treated, would make a 100% difference in the health of many and contribute greatly to the speed and completeness of their recovery. Dr. Guest wanted to see another aspect of the Service work in this war carried on into the peace by an integrated hospital service. He wanted the tradition of coöperation between the voluntary and the publicly controlled hospitals carried on into the peace. If all the additional beds provided for the Emergency Medical Service hospitals were thrown into the pool of hospital accommodation the treatment of tuberculosis could be coped with. He also hoped that the excellent hospitals built by the Government for the United States Forces would be fully used after the war. If the country only had

the common sense to apply to the ordinary citizen the medical knowledge which had existed for years infantile and maternal mortality could be further reduced and physical and mental well-being improved to an extent which was not realised by the ordinary citizen. We ought also to make our medical service interchangeable with the Colonial Medical Service and have one vast Empire service in which men would serve in tropical or temperate countries. Dr. Guest concluded by urging that the promises which had been made to the people should be implemented this session. There were, he said, no irreconcilable differences inside the medical profession, and there were no administrative problems which were insuperable. The young medical men in the Services did not want to go back to the day-to-day drudgery of commercial medicine.

QUESTION TIME

Committee of Inquiry into Children's Homes

The Home Secretary announced that a committee of inquiry was to be appointed as soon as possible by the Minister of Health, the Minister of Education and himself to inquire into

> "existing methods of providing for children who from loss of parents or from any other cause whatever, are deprived of a normal home life with their own parents or relatives; and to consider what further measures should be taken to ensure that these children are brought up under conditions best calculated to compensate them for the lack of parental care."

The Government, he added, had also under consideration the question of the central administrative responsibility for such children which is at present shared between several Government departments and they hope to make their views on this question known to the committee as soon as possible. Mr. Morrison confirmed that the terms of reference would cover blind and physically and mentally defective children who are resident in homes, but he was not sure whether they included education and after-care.

A similar committee of inquiry will be appointed by the Secretary of State for Scotland.

Staffs in Hospitals and Sanatoria

Replying to a question, Mr. ERNEST BEVIN stated that no women domestic workers had been withdrawn from hospitals, and throughout the war hospital domestic work had been regarded as work of national importance carrying the appropriate priority. Following the report in November, 1943, of the Hetherington Committee which he set up to recommend wages and conditions for women domestic workers in hospitals, a special priority was accorded to domestic needs of hospitals and a widespread publicity campaign instituted, with special local campaigns in areas of particular difficulty. He also made available the help of his welfare officers to assist hospitals in overcoming any difficulties hindering the recruitment or retention of domestic staff. Between the granting of the special priority and Nov. 8, 1944, 38,000 women and 3000 men had been placed as domestic workers in hospitals, sanatoria, mental institutions, and nursing-homes. Wastage had, however, continued to be heavy, with the result that despite this large number of placings, the number of domestic workers employed in hospitals during the period January to September, 1944, increased by less than 5000.

Refresher Courses for Ex-Service Doctors

Sir E. GRAHAM-LITTLE asked the Minister of Health what facilities would be given for refreshing their clinical experience to medical officers returning from the war who wished to undertake independent practice, in view of the lack of experience of general medicine in the case of medical officers who had for several years been in the Services and whose principal duties had dealt with measures of sanitation and hygiene.—Mr. H. WILLINK replied: Proposals have been under discussion with representatives of universities and others with the object of enabling medical officers released from the Forces who had not before serving become established in practice to obtain three or six months' clinical experience in hospitals under expert guidance before going into practice, and also of providing short refresher courses for those who were previously general practitioners. It is intended to circulate particulars of the scheme, as soon as it has been settled, amongst serving medical officers.

Employment of Disabled Ex-Service Personnel

The Government as employers have accepted in principle the obligations imposed on employers generally by the Disabled Persons (Employment) Act, 1944. Whether special preferences will be needed cannot be decided until the quota arrangements under the Act have been settled. Meanwhile, however, the Civil Service commissioners have amended their regulations so as to enable persons whose health has been impaired by reason of service in the present war to be admitted to established employment notwithstanding their disability. (Mr. O. PEAKE replying to Sir IAN FRASER.)

Medical Research in India

Mr. W. GALLACHER asked the Secretary of State for India what steps he was taking to promote medical research in India; and if he would consider asking the Medical Research Council to investigate the effects of the famine in Bengal in respect of malnutrition and deficiency diseases.—Mr. L. C. AMERY replied: The Director-General of the Indian Medical Service has just completed a visit to this country and the United States of America in which he explored various means of promoting medical research in India and liaison between Indian research workers and those elsewhere. The government of India are looking forward to receiving recommendations on these subjects from the Health Survey and Development Committee under Sir Joseph Bhore and have already before them some valuable proposals made by Prof. A. V. Hill, FRS. The Famine Inquiry Commission under Sir John Woodhead has within its scope the effects of the famine in Bengal. Dr. W. R. Aykroyd, the director of the Nutritional Research Laboratory at Coonoor, is a member of the commission.

Replying to a further question, Mr. Amery added that the Bhore Committee consisted of 24 members drawn from all parts of India and included persons with practical experience of all aspects of the health problem. The committee's duty was to make a broad survey of the present position in regard to health conditions and health organisation in British India and to make recommendations for future development. It was holding its final meetings this month and he hoped would report shortly. The names of the members were as follows:—

Sir JOSEPH BHORE (chairman).
Dr. A. C. BANNERJEA, director of public health, United Provinces.
Dr. ABDUL BUTT, director of public health, Punjab.
Dr. R. B. CHANDRACHUD, chief medical officer, Baroda State.
Lieut.-Colonel EDWARD COTTER, IMS, public health commissioner with the Govt. of India.
Dr. D. Y. B. DADHABOY, ex-president, All-India Association of Medical Women, Bombay.
Dr. J. B. GRANT, director, All India Institute of Hygiene and Public Health, Calcutta.
Dr. M. A. HAMID, professor of pathology, Lucknow University.
Colonel J. B. HANCE, director-general, Indian Medical Service.
Sir HENRY HOLLAND, CMS Hospital, Quetta.
Sir FREDERICK JAMES, MLA, member, Central Advisory Board of Health.
Mr. N. M. JOSHI, MLA.
Dr. H. M. LAZARUS, CMO, Women's Medical Service.
Mr. PANDIT L. K. MAITRA, MLA, member, Central Advisory Board of Health.
Dr. A. L. MUDALIAR, FRCOG, vice-chancellor, University of Madras.
Dr. U. B. NARAYANRAO, president, All-India Medical Licentiate Association.
Dr. B. V. NATH, member of the Medical Council of India.
Major-General W. C. PATON, surgeon-general, Bengal.
Mr. B. SHIVA RAO.
Dr. B. C. ROY, president of the Medical Council of India.
Mr. P. N. SAPRU, member, Central Advisory Board of Health.
Lieut.-Colonel B. Z. SHAH, IMS, retd., superintendent, Mental Hospital, Poona.
Mrs. SHUFFI TYABJI, JP, KIH, Bombay.
Dr. R. WADHWANI, minister, Sind.
Dr. K. C. K. E. RAJA (secretary).

Social Insurance in the Colonies

Mr. JOHN DUGDALE asked the Secretary of State for the Colonies in which Colonies committees had been set up to inquire into the possibility of introducing social insurance schemes; whether the committees have met; and whether any reports have been received by them.—Colonel O. STANLEY replied: A committee set up in Mauritius reported in 1941. Committees are at present sitting in Jamaica, Trinidad and Ceylon, but I have not yet received their reports.

Highlands and Islands Medical Service

Mr. MALCOLM MACMILLAN asked the Secretary of State for Scotland whether the special conditions in the Outer Hebrides with regard to transport and communications and geographical factors would be borne in mind in the framing of health legislation affecting Scotland; and if he could make a statement as to what conclusions had been come to regarding the Highlands and Islands medical service.—Mr. T. JOHNSTON replied: I am at present discussing with the various interests concerned the shape of the proposed new national health service generally, and until those consultations are further advanced I am not in a position to make any statement

about the Highlands and Islands Medical Service. The remarkable success which has attended that service, and the other conditions to which my hon. friend refers will be carefully borne in mind.—Mr. MACMILLAN: Is the Minister aware that there is a good deal of anxiety among medical men concerned and others that the special place accorded to the Highlands and Islands Medical Service may not be continued under the national service?—Mr. JOHNSTON: I do not know any cause for that apprehension and anxiety. I have done my best to dispel it in the course of consultations.—Mr. A. S. MCKINLAY: Could we have a guarantee that the administration of this scheme will not be transferred to London?—Mr. JOHNSTON: I think the answer is yes.

SOCIAL INSURANCE BENEFITS AND INCOME-TAX.—Mr. PEAKE said that the Government broadly proposed that social insurance contributions should be deducted and benefits should be included in computing the taxpayer's taxable income.

Letters to the Editor

BEDS FOR TUBERCULOUS PATIENTS

SIR,—I cannot agree with the solution Dr. Hoffstaedt advocates. The advanced and chronic cases will not I think for long be satisfied with a simpler kind of hospital treatment in a public-assistance institution. In a very few years this institution will become known in the district as "the place where you die," and no unfortunate man or woman will go there or stay there if they can possibly persuade a wife, mother, sister, or other relative to take them in and look after them at home. After all, is it not rather hard on these patients to indicate so clearly to them that they are beyond hope, and will it not become increasingly difficult to get nurses to undertake so depressing a job? If prevention is better than cure, why should it be considered a waste of a sanatorium bed to keep a patient in for preventive reasons after the hope of cure has gone? The coming of surgery has caused too much emphasis to be placed on cure—the early suitable case may quite well become the advanced chronic case later on—and too little on prevention. What is wanted is adequate beds at sanatoria to accommodate both classes of cases without separating them.

Chard Sanatorium. D. B. PASCALL.

SMALLPOX AND VACCINATION

SIR,—War conditions necessitating exposure of troops to infection in areas where smallpox is endemic have created for many a new and intimate relationship with that disease. Large numbers of men have for the first time remained at risk for considerable periods, and for the first time many medical officers, often without much specialised background or experience in the subject, have found themselves responsible for the protection of these troops and for the diagnosis and care of those who develop smallpox. Under these circumstances it is not surprising that much confusion has been wrought in many minds. Attempts have been made by the Army Medical Department in their bulletins to advise on the technique of vaccination and on the reading of results; yet stories continue to be published which show only too plainly that the diagnosis of smallpox often presents difficulties which upset many preconceived ideas. More important, through imperfect appreciation of the fact that "vaccination" does not necessarily imply "protection," the ability of a *successful* vaccination to immunise against smallpox is being unjustifiably assailed.

Because the article by Illingworth and Oliver (Nov. 25) illustrates some of these points I venture, as a humble disciple of the Ricketts school, to examine critically a a part of what they have to say. These writers complain that the accepted descriptions of smallpox differed in many essential respects from their experience. I do not know what Illingworth and Oliver regard as "accepted descriptions," but I can suggest that careful study of Ricketts's teaching, much of which is available in his classical *Diagnosis of Smallpox*, would have resolved many of their difficulties. To take one or two points in illustration.

ILLINGWORTH and OLIVER: "Backache, said to be a diagnostic feature of smallpox [invasive stage] was not prominent."

RICKETTS: "The toxæmic symptoms are not characteristic . . . there is every variety . . . [they] do not differ from the symptoms of onset of several acute diseases—in [severe] cases the symptoms commonly prominent are a high temperature, severe frontal headaches and lumbar pain; *and of these the last is the least constant*" (my italics).

ILLINGWORTH and OLIVER: "In all the 78 cases of this [non-hæmorrhagic] type, the specific rash appeared first on the face and trunk . . . and never on the extremities . . . therefore, all had the same distribution as chickenpox . . . in the mildest cases no new lesions appeared after 24–48 hours . . . so that the rash never developed properly on the extremities and the rash throughout exactly resembled chickenpox."

RICKETTS: "In broad terms the rash begins at the top and travels downwards. In the mildest sorts of cases the whole rash may be out within 24 hours . . . on the other hand in severe cases the lapse of 48 hours may hardly see the last arrivals . . . the outcrop is a gradual process not only over the whole body but also in any one particular part. Under such circumstances the patient may exhibit on the first day of efflorescence a scanty rash on the face and upper part of the body only." Again: "In every epidemic cases arise at intervals in which the eruption is so highly modified and the character of the lesion is so anomalous that there is an inadequate basis for diagnosis . . . yet it must not be forgotten that it is not possible for discordant distributions to run in series also."

I am perplexed by Illingworth and Oliver's statement "This modified rash in its character, distribution, and course was often clinically indistinguishable from that of chickenpox." Taken literally this just does not make sense to me. If it was clinically indistinguishable from chickenpox there was surely no clinical justification for a diagnosis of smallpox (presumably the diagnosis was made in the laboratory). I have a personal experience of some 14,000 cases of modified smallpox: some of these cases gave rise to considerable diagnostic difficulties but none was clinically indistinguishable from chickenpox. Illingworth and Oliver make much of apparent anomalies of distribution. Such anomalies occur in every series, but there is always a reason for them.

However, it is the manner in which the vaccination states are presented by Illingworth and Oliver which invites the gravest criticism. They say that "70 of the 96 [smallpox patients] had been vaccinated successfully within 2 years." This is a misleading statement because it later becomes plain that the authors regard an immunity reaction as evidence of success (the bulletins of the Army Medical Department may be responsible for this dangerous misconception). "We vaccinated 19 proved cases of smallpox . . . 1–14 days after the appearance of the rash; 16 showed *the typical immune reaction* in 48 hours . . . *Successful vaccination* therefore did not exclude the diagnosis of smallpox" (my italics). Again: "even very recent vaccination is no guarantee of a modified attack for one patient vaccinated by one of us and observed to have a typical immune reaction died with gross hæmorrhagic manifestations two months later." In the face of such misconceptions and deductions, which must render worthless all vaccination statistics from such a source, it seems necessary to make clear the following fundamental points which I believe to have been established:

1. The act of vaccination in itself signifies just nothing in relation to protection. It is quite possible to vaccinate a corpse.

2. The criterion of *successful* vaccination is *vesicle* formation: anything less should be regarded with suspicion.

3. Successful vaccination does confer protection—in most cases absolute for a period of years, but in this there are certainly wide variations between individuals.

4. The so-called immune reaction or reaction of immunity, in my opinion, is a misnomer, a snare and a delusion: it is so dangerous that the general use of the term should be banned—not officially encouraged. This sensitivity reaction should on no account be regarded as a successful result: it does *not* necessarily indicate immunity (though often given by immune subjects);

and those who show it, but have histories that are at all uncertain, should be vaccinated again and again. Otherwise some of them will die of smallpox as soon as they are exposed to it.

5. It is possible to maintain 100% protection in a community (vide the records of the London smallpox hospitals, and others, over long periods), but this is a skilled, painstaking, and a personal job in the performance of which scepticism in regard to the results, histories, and records of others plays a not unimportant part.

Dartford, Kent. J. PICKFORD MARSDEN.

SULPHONAMIDE-INHIBITORY SERA

SIR,—The work by Boroff referred to in your leading article of Nov. 25 (p. 693) may well point the way to still further refinement in our use of the sulphonamides. The fact that "the proportion of successes obtained with sulphonamides in gonorrhœa is progressively falling" is very striking. Is this because there are, as time goes on, less and less people who have never at any time received a sulphonamide, who are "virgin soil" as far as these drugs are concerned? It is clear that successive groups of patients will contain smaller and smaller proportions of such persons, considering the rate at which the sulphonamides are now being used for so many conditions. Have some sulphonamide-inhibitory sera arisen because the patients concerned have received a sulphonamide on a previous occasion or occasions, and are these the sera whose inhibitory effect persists even after dilution of the serum to 1 in 20? What is the proportion of inhibitory sera among people who have never received a sulphonamide, and are these sera the ones whose inhibitory effect is removed (or much reduced) on dilution? One is reminded (although the comparison should be made with caution) of the low-titre "naturally occurring" O agglutinins for *Bact. typhosum*, as distinct from the agglutinins resulting from actual experience of the organism itself, whether by immunisation or infection.

If it can be shown that sulphonamide-inhibition is "conditioned" by previous taking of these drugs, this will be a strong argument for using them only when there is proper indication.

County VD Clinic, Camborne. E. C. H. HUDDY.

VD

SIR,—In your leading article of Dec. 2, you suggest that Service personnel with VD should be rendered non-infectious before demobilisation and that with the newer methods of treatment this standard should not be difficult to attain.

Penicillin, or the modified intensive arsenotherapy, may achieve rapid cure of syphilis, but this can only be proved by prolonged observation of the cases now receiving these treatments. In the meantime, we should remember that similar expectations from a few injections of 'Salvarsan' in the last war were not realised.

Service authorities tend to refer to syphilitic cases as non-infectious when they have received their preliminary treatment at a VD hospital and are returned to their units to continue observation or regular injections at a treatment centre. This claim is only true if adequate continuation treatment is obtained; under Service conditions this is now generally ensured, but some cases are discharged from the Services before completion of treatment. In such a case, the patient is advised to attend a civilian clinic. This would appear to be a simple matter; in actual practice there are several reasons why many cases do not attend:

1. The rapid disappearance of the lesions during treatment encourages the patient to accept a false security.
2. The new employment may not permit attendance during the clinic hours, or in rural areas travelling expenses or inaccessibility of the clinic may lead to default.
3. The remaining stigma of these diseases prevents the patient from applying for any necessary time off duty, or causes anxiety that neighbours or relations may discover his infection. A person going to the local town every Wednesday, if that is the day the clinic is held, can soon become suspect.

As circumstances bring these patients to default, there is potentially the risk of an increased VD problem in the post-war years, an increased incidence of congenital syphilis and late manifestations of incompletely cured disease, with the associated economic problems.

You rightly state that the VD case must not be penalised, but it is not so long since penalty was the recognised Services method of tackling the problem. Would it be penalising the VD patient to protect him from these difficulties, and, by completing his treatment before demobilisation, render him safe to return to civil life? If our outlook tolerates Regulation 33B, surely the logical solution would be legislation to empower Service authorities to demand an accepted standard of cure before demobilisation. The newer methods would be a rapid and justifiable procedure if the longer, proved, schemes of treatment are not practicable. Efforts should be made to obtain the coöperation of the patient for periodic survey after demobilisation, and it is probable that this would meet with more success than any continuation scheme which requires weekly treatment. In any case there are prospects that time will prove that adequate treatment had been given.

Consideration of the future public health surely claims some such attempt to overcome the difficulties which are at present widely recognised but frequently ignored.

London, W1. DAVID ERSKINE.

THE VOLUNTARY HOSPITAL WITH AN UNDERGRADUATE SCHOOL

SIR,—Having read Mr. Layton's learned address in your last issue, some of us will no doubt feel that we should thank him, not only for reconciling us to a future of practice without proper payment, but also for introducing us to a new word. "Diaspora" is not contained in the third edition of *The Concise Oxford Dictionary*. Since the students of the last one or two decades have entered the profession through the portals of examinations, called I believe Higher Certificate or School Certificate, for which Greek is not a necessary subject, one cannot but wonder why he did not use the plain English word "dispersion."

Gloucester. C. DE W. GIBB.

MALIGNANT MELANOMA

SIR,—Miss Tod's article and the subsequent correspondence still leaves the treatment of the pigmented mole somewhat obscure. Few would accept the advice that moles must be left strictly alone. I should give the following as indications for surgical removal of a pigmented mole: (1) cosmetic; (2) blue-black colour; (3) when the situation is such that friction may take place—this applies to all moles on the feet; (4) increase in size; (5) ulceration; (6) suspicion of malignancy. When a diagnosis of malignancy has been made clinically or pathologically, the tumour must be treated on recognised surgical lines.

Surely there can be no doubt about the use of local anæsthesia for the removal of pigmented moles. The anæsthesia is complete, 100% safe, and should in no way limit the extent of the operation. It is true that excision is at times attempted after the injection of a small quantity of anæsthetic solution beside or beneath the tumour. This results in the inadequate, inefficient removal that Miss Tod so rightly deplores. The method should be complete anæsthesia produced by a field block wide of the area to be removed. Injection of a local anæsthetic into any malignant tumour has been shown to be harmful and is unnecessary.

Manchester. PETER MCEVEDY.

A CHRISTMAS PRESENT

SIR,—In October and again last week Sir Thomas Barlow, as president of the Royal Medical Benevolent Fund, appealed in your columns for Christmas gifts for beneficiaries of the fund, aged or infirm medical practitioners, their widows and their dependants.

Sir Thomas Barlow is the senior fellow of the Royal College of Physicians and was its president for five years. This year he has reached his hundredth year, and the college is anxious to mark this notable occasion. A cheque for one hundred guineas is being sent by the college as a donation to the fund which Sir Thomas has for many years so faithfully served. I have no doubt that many of your readers will wish to be reminded of this anniversary.

MORAN,
Royal College of Physicians, SW1. President.

Obituary

WILLIAM ALEXANDER COCHRANE

MB EDIN., FRCSE

To Mr. W. A. Cochrane, who died on Nov. 30 after a heart attack, the furtherance of orthopædics was a crusade, and he was a doughty crusader. After an undergraduate career of distinction, Cochrane graduated in Edinburgh in 1915. During the last war he was wounded on the Somme while serving as a battalion medical officer, and after his recovery he was posted to Bangour Hospital, Edinburgh, where he began his apprenticeship to orthopædics under the guidance of Sir Harold Stiles. He continued this training in Boston, in the clinics of Goldthwait, Osgood, and Lovett, where he added to his experience of the rehabilitation of the war-wounded the insight into the preventive aspects of the care of crippled children which was to illuminate his mature activities. On his return to Edinburgh he had experience of general surgery, at first with Sir Harold Stiles and later with Sir David Wilkie, but orthopædics remained his major professional interest. "With his appointment in 1930 to the combined posts of surgeon to the Edinburgh Hospital for Crippled Children (afterwards the Princess Margaret Rose Hospital for Crippled Children), and lecturer in orthopædic surgery in the University of Edinburgh," writes J. R. L., "Cochrane was in a position to pursue his ideal, and it was quite clear to him. He recognised the need for preventive orthopædics, and for controlled postoperative care after orthopædic operations, as well as for proper surgical services; and recognised too the solution of the problem in the linking of peripheral clinics with hospital facilities under the same expert supervision. Until his death he pursued this ideal indefatigably, by word of mouth and by his pen; and he had the satisfaction of seeing the growth, under his robust direction, of an organisation which was the first and the most highly developed of its kind in Scotland. In 1926 his *Orthopædic Surgery* appeared and in the previous year he had collaborated with P. D. Wilson in *Fractures and Dislocations*. All Cochrane's writing was characterised by the firm grasp of principles and unequivocal views on treatment which his almost dedicated apprenticeship and great experience stamped with authority."

Tyrrell

Cochrane's organising ability and clinical acumen were often sought by committees, and in 1937 he was appointed to the National Advisory Council for Scotland on Physical Training and Recreation. Inevitably he took a leading part in arranging for the treatment of orthopædic cases in this war and was one of the orthopædists for the south-east area of Scottish Command. His training in the last war had been ripened by experience and it was quickened by the same solicitude for the welfare of his patients which had been so model a feature of his care of crippled children.

In his spare time Cochrane was an enthusiastic golfer and H. O. C. writes: "His powerful figure striding round the golf course beating down all opposition from his 'scratch' position was a familiar sight at all peace-time meetings of the British Medical and Orthopædic Associations. With the same relentlessness and good humour he argued the cause of orthopædics, and to everything which he did he brought a drive—as crisp, as accurate, and as powerful as at golf. His friends will for long miss the athletic figure, the forceful argument, the hearty laugh, the honesty of purpose, and the pleasant companionship of 'Willie' Cochrane."

Mr. Cochrane is survived by his widow and two children. He was fifty-one years of age.

Last week's obituary notice of Sir Robert Kelly should have said that in 1937 he presided over the annual meeting of the Association of Surgeons. He was never president of the BMA, which has not met in Liverpool since 1912.

Notes and News

SOVIET SURGERY

THE Anglo-Soviet Medical Council held its third annual general meeting on Dec. 8, at the Royal Society of Medicine, with Sir ALFRED WEBB-JOHNSON, the president, in the chair. Two Soviet orthopædic surgeons, Professor Priorov and Professor Kotov, who have recently arrived in this country from America, Colonel Osipov, lately returned from a tour of the British and American fronts in Western Europe, Professor Sarkisov and Dr. Lapteva, representatives in this country of the Soviet Red Cross and Red Crescent, were present.

Professor PRIOROV sketched an outline of the organisation of Soviet surgery during the war, and estimated its success by the fact that 70% of casualties were able to return to the fighting forces. The aim of Soviet surgeons was to establish the point at which first surgical treatment is given as near as possible to the wounded, to arrange for highly specialised treatment to be given during the first hours after injury, and to classify the wounded carefully before evacuating them to specialised hospitals. They had been successful in ensuring continuous and uniform treatment throughout the different stages of evacuation. The hospital organisation comprised: a network of specialised hospitals; large surgical departments in all general hospitals; the fifty medical institutes, in the republics and regions of the Union, with chairs of surgery; special central institutes, such as the Central Neurological Institutes, under Academician Burdenko, and the Central Institute of Traumatology and Orthopædics, of which Professor Priorov is the director; special hospitals for surgical rehabilitation, which admit cases of non-healing wounds, contractures, ankyloses, non-united fractures, and cases with sinuses; and special hospitals for the limbless where re-amputation is performed where necessary, and where artificial limbs are provided. Numbers of amputations had diminished by half as compared with the numbers done in the war of 1914–18.

Professor SARKISOV, just returned from a long visit to the USSR, said that Soviet medical workers are facing the urgent task of rehabilitating the medical services in the liberated areas where the Germans have destroyed all scientific and medical organisations. Research work never stopped in Leningrad during the siege, despite cold, hunger, bombing, and shell-fire. This year had seen the establishment of the Academy of Medical Science of the USSR, which he foresaw would help to develop the friendship between the medical professions in our two countries.

University of Dublin

On Dec. 6, at the school of physic, Trinity College, the following degrees were conferred:

MD—Violet K. St. G. Breakey and B. E. R. Solomons.
MB, B Ch, BAO—Andrew Aitken, Charles Boyle, I. E. P. Cope, Maurice Leon, Patricia M. Miley, J. B. C. Nabney, H. G. Nelson, Eithne J. O'Riordan, Mary M. J. Roberts, J. C. H. Shaw, A. R. A. Small, C. P. Williamson, and W. J. Wilson.
L Med., L Ch—D. B. de Courcy Wheeler.

Royal College of Physicians of London

Lieut.-Colonel C. H. Stuart-Harris will deliver the Goulstonian lectures at the college on Tuesday and Thursday, Jan. 16 and 18, at 2.30 PM. His subject is to be influenza epidemics and the influenza virus. On Tuesday, Jan. 30, at 3 PM, Mr. Desmond MacCarthy, FRSL, will give the Lloyd Roberts lecture on psychology in literature.

Royal College of Physicians of Edinburgh

At a meeting of the college held on St. Andrew's Day, when Dr. A. Fergus Hewat was re-elected president, Dr. L. H. F. Thatcher, Dr. A. Ninian Bruce, Dr. D. M. Lyon, Dr. W. D. D. Small, Dr. W. A. Alexander, and Dr. D. K. Henderson were elected to form the council for the coming year. Dr. D. M. Lyon was nominated vice-president.

Royal Faculty of Physicians and Surgeons of Glasgow

At a meeting of the faculty on Dec. 4, with Mr. William Sewell, the president, in the chair, James Black, MD, Seaham, co. Durham, and Matthew McLearie, MB, Leicester, were admitted to the fellowship.

Patent Medicine Advertising

The Pharmaceutical Society of Great Britain has decided to ask the Minister of Health to supervise the advertising of proprietary medicines and medical and surgical appliances to protect the public against misrepresentation.

Harveian Society of London

The Buckston-Browne prize of 1944, for an essay on the uses and abuse of sulphonamides, has been awarded to Dr. A. C. Frazer, professor of pharmacology in the University of Birmingham.

Association of Scientific Workers

The association is organising a conference to discuss the use of science in the post-war world, at the Caxton Hall, London, SW1, on Feb. 17–18, 1945. Further particulars from the association at Hanover House, 73, High Holborn, WC1.

Postgraduate Instruction after Demobilisation

The University of Cambridge has appointed Dr. A. C. D. Firth secretary of the committee which is to arrange, on behalf of the Ministry of Health, postgraduate instruction in the Eastern Counties for medical officers released from the Services.

Royal Society of Medicine

On Wednesday, Dec. 20, at the section of comparative medicine, Sir Henry Dale, OM, Prof. J. B. Buxton, FRCVS, and Prof. G. W. Pickering will open a discussion on the principles and relationships involved in medical and veterinary education. At a joint meeting of the sections of history of medicine and odontology, on the same day at 4.30 PM, Dr. J. D. Rolleston will give the C. E. Wallis lecture, on the folk-lore of toothache.

Scientific Film Association

The programme of medical films presented by the association at the Royal Society of Medicine on Dec. 7 included two Russian films, one of which showed the successful removal of a shell fragment from the heart wall, the ICI film on spinal anæsthesia reviewed in these columns on Dec. 9, and *The Genesis of Function*, made and personally commented on by Sir Joseph Barcroft and illustrating how the fœtal lamb first learns to move before it learns to keep still. Details of further programmes from the hon. sec. of the medical committee, Dr. S. J. Reynolds, 14, Hopton Road, SW16.

Civil Defence Awards

The OBE has been awarded to Dr. ELSIE BOYTON, medical officer in charge of a Battersea light mobile unit, to Dr. F. A. PHILLIPPS, medical officer in charge of Chelsea mobile unit, and to Dr. H. F. SPARLING, medical officer at a shelter medical aid post at East Croydon.

Dr. Boyton has devoted much of her time and energies to the training of her staff, and she has never failed to be present at incidents when the unit has been in action and her services have been at all times invaluable. On one occasion people were trapped on the fifth floor of a building hit by a flying bomb. The staircases were demolished and the only means of entrance was by a NFS turn-table ladder. Owing to the nature of the building this ladder could only be used at a maximum angle suspended away from the building. It was possible for only one person to mount at a time, and to enter the building it was necessary to climb over the side of the turn-table through a broken and dangerous window frame. Dr. Boyton insisted on being allowed to climb to the top of the building to render aid to a trapped casualty, with whom she remained until he could be removed. This feat is typical of the admirable work she has repeatedly carried out.

During an air-raid a HE bomb demolished a building and people were trapped in the wreckage which caught fire. For ten hours Dr. Phillipps supervised the rescue of many casualties and rendered the necessary surgical treatment. He performed a surgical operation on a trapped casualty under conditions of considerable difficulty and great danger before rescue was possible. Dr. Phillipps showed exceptional qualities of leadership and initiative.

Dr. Sparling has given great assistance to the rescue services in their efforts to rescue trapped and buried victims of flying bombs. On many occasions, at great personal risk, he has crawled under the ruins of houses to attend to victims. At one incident he was held by his heels suspended over the edge of a cavity until he had completed treatment of the trapped person.

The George medal has been awarded to Dr. JOHN BEESTON, medical officer in the Willesden civil defence casualty service.

A flying bomb demolished houses and people were trapped in the wreckage. A tunnel was driven into the debris, the weight of which was gradually forcing out the remains of a party wall. Dr. Beeston was able to get to a woman who was trapped in debris through which ran several large timbers supported by the arms of a chair. He decided that a blood-transfusion was necessary. An escape of coal-gas was affecting everybody working in the tunnel and the rescuers were relieved from time to time, but Dr. Beeston continued for 90 minutes with the casualty although a fall of debris took place just as the plasma bottles were being changed. As the casualty's condition continued to improve from the onset of the transfusion, rescue work was speeded up. With Dr. Beeston's assistance she was extricated and brought through the tunnel on a stretcher with the plasma-tube still in position. Dr. Beeston showed courage without regard for the dangerous load above and the presence of coal-gas. His skill, applied as it was on the spot, undoubtedly saved the life of the woman.

Army Medical Services

Colonel (local Brigadier) Sidney Smith, FRCP, KHP, who has reached the age for retirement, has been retained on the Active List.

London School of Hygiene

Prof. J. M. MACKINTOSH has been appointed dean of the London School of Hygiene and Tropical Medicine.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED DEC. 2

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 2279; whooping-cough, 1474; diphtheria, 637; paratyphoid, 3; typhoid, 7; measles (excluding rubella), 7810; pneumonia (primary or influenzal), 761; puerperal pyrexia, 134; cerebrospinal fever, 39; poliomyelitis, 10; polio-encephalitis, 0; encephalitis lethargica, 1; dysentery, 381; ophthalmia neonatorum, 64. No case of cholera, plague or typhus fever was notified during the week.

The number of service and civilian sick in the Infectious Hospitals of the London County Council on Nov. 29 was 887. During the previous week the following cases were admitted: scarlet fever, 61; diphtheria, 28; measles, 44; whooping-cough, 13.

Deaths.—In 126 great towns there were no deaths from enteric fever, 10 (0) from measles, 1 (0) from scarlet fever, 9 (1) from whooping-cough, 13 (0) from diphtheria, 31 (5) from diarrhœa and enteritis under two years, and 27 (1) from influenza. The figures in parentheses are those for London itself.

Birmingham reported 6 deaths from diarrhœa.

The number of stillbirths notified during the week was 220 (corresponding to a rate of 32 per thousand total births), including 18 in London.

Appointments

BURNISTON, J. H., MRCS: examining factory surgeon for Mitcheldean, Glos.

EVANS, G. C., MB WALES, DMR: radiotherapist to the Nottingham radium centre.

HOUSTON, T. C., MB GLASG.: examining factory surgeon for St. Austell, Cornwall.

Births, Marriages, and Deaths

BIRTHS

CAMA.—On Dec. 4, the wife of Surgeon Lieutenant Leonard Cama, RNVR, of Bishop Auckland—a daughter.

GRANT.—On Dec. 6, at Orpington, the wife of Dr. John Grant—a daughter.

HENEGAN.—On Dec. 2, the wife of Dr. Donald Henegan, of South Hetton, Durham—twins, son and daughter.

MACKENNA.—On Dec. 6, at Woking, the wife of Brigadier R. M. B. MacKenna, FRCP—a son.

MALONE.—On Dec. 5, in London, the wife of Captain Francis Malone, RAMC—a daughter.

MOORE.—On Dec. 5, at Guildford, the wife of Lieut. J. T. Moore, RAMC—a daughter.

PROPERT.—On Dec. 8, at Colchester, the wife of Dr. S. Propert—a daughter.

RICHARDSON.—On Dec. 4, in Edinburgh, the wife of Lieut.-Colonel Frank Richardson, DSO, RAMC.—a daughter.

MARRIAGES

BATCHELOR—SIMPSON.—On Nov. 15, in London, George Frederick Grant Batchelor, FRCS, to Helen Elspeth Mackintosh Simpson.

PATEY—MASON.—On Nov. 22, at Northwood, Middlesex, John Patey, squadron-leader RAF, to Jean Mason, FRCSE, of Handforth, Cheshire.

DEATHS

CAUTLEY.—On Dec. 1, at Bournemouth, Edmund Cautley, MD CAMB., FRCP, aged 80.

FINLAYSON.—On Dec. 7, at Hindhead, Henry William Finlayson, DSO, MB GLASG., surgeon captain, RN (retd.), aged 80.

FYFFE.—On Dec. 4, at Hove, Eric Leigh Fyffe, MB LOND.

LEWIS.—On Dec. 7, Thomas Charles Lewis, MRCS, Downe, Kent, formerly of Ramsey.

MATTHEWS.—On Dec. 5, at Crawley, Sussex, Sidney Philip Matthews, MRCS, JP.

SPEID SINCLAIR.—On Dec. 6, in London, James David Speid Sinclair, MB GLASG.

STEVENSON.—On Dec. 5, at Balladoole, near Castletown, Isle of Man, Henry Wickham Stevenson, CSI, MRCS, surgeon-general IMS (retd.), aged 86.

SINGER.—On Dec. 3, Professor Gustav Singer, MD, Privy Councillor of Vienna.

SOUTHCOMBE.—In Jerusalem, Arthur George Southcombe, MD DURH., aged 84.

WIGGLESWORTH.—On Dec. 8, at East Grinstead, Sidney Wigglesworth, MRCS, aged 80.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

TRAUMATIC URÆMIA

REPORTS ON EIGHT CASES*

E. M. DARMADY
MB CAMB., MRCP

A. H. M. SIDDONS
M CHIR CAMB., FRCS, MRCP

T. C. CORSON
MB EDIN.

C. D. LANGTON
BM SYDNEY, FRCS

Z. VITEK
MD BRNO

SQUADRON-LEADERS

A. W. BADENOCH
MD, CHM ABERD., FRCS

J. C. SCOTT
MS TORONTO, FRCS

WING-COMMANDERS

From a RAF Casualty Clearing Station in England

THE purpose of this paper is to report 6 fatal cases of uræmia occurring in young soldiers a few days after they were wounded by high-explosive missiles. The injuries were severe but did not seem in themselves sufficient to cause death. All the men developed oliguria, vomiting and a raised blood-urea.

The cases were seen while treating 2000 selected casualties from Northern France in a transit air evacuation hospital. The 6 cases accounted for a third of the deaths in the hospital. Two similar but less severe cases which recovered are also described. It is hoped that this brief report may assist in the recognition of the syndrome and lead to further investigation of its ætiology. A few similar cases have been reported (Jeffrey and Thomson 1944, Cutler and Sudansky 1944) but the cause of the uræmia does not seem to have been investigated.

CASE-HISTORIES

CASE 1.—A corporal, aged 19. Wounded on Aug. 11, 1944, by high-explosive shell. Compound fracture of femur and patella into knee-joint.

2nd day: Reached this hospital. Recorded as having had 1·5 g. sulphanilamide; no more given. Grossly contaminated wound excised and drained; hip spica; after operation, pulse-rate 130 per min. BP 100 mm. Hg, rising in two hours to 120.

3rd day: Condition fair. BP 140; anæmic; given 3 pints of blood. Oliguria.

4th day: Jaundiced; vomiting; stomach suction; given 2 pints of blood and glucose-saline. 5 AM, BP 86, later 30 and subsequently too low to record; blood-urea 72 mg. per 100 c.cm. 2 PM, died.

Autopsy (18 hours after death): Jaundiced; few petechial hæmorrhages. Localised sloughing of vastus medialis; cultures grew *B. proteus*, no clostridia. Heart normal. Lungs congested and œdematous, no evidence of blast. Liver, necrosis surrounding central vein. Stomach dilated with dark brown fluid. Spleen enlarged and septic in type. Kidneys,† rt. 215 g., lt. 225 g. Suprarenals, lt. normal, rt. some patchy œdema with pin-point hæmorrhages.

Microscopic sections of all organs confirm the above findings. Section of right suprarenal showed some patchy necrosis and a little polymorphonuclear infiltration.

CASE 2.—Regimental sergeant-major, aged about 30. Mine injury on Aug. 17, 1944. Gross mangling of left leg and multiple wounds of right buttock and left forearm, deaf from blast. Amputation through upper end left femur; surgical toilet of other wounds; 3 pints of blood and 2 of plasma: no record of BP.

1st day: Reached this hospital. Recorded as having had 10 g. sulphanilamide; no more given. BP 125/86. P 92.

5th day: Irrational. Blood-urea 240 mg. per 100 c.cm. Vomiting profusely; continuous gastric suction; 2 pints isotonic sodium lactate and 1 of glucose-saline. Urine 5 oz. albumin +.

6th day: Glucose-saline 1 pint. Blood-urea 285 mg., serum potassium 31 mg., inorganic phosphate 64 mg., sodium 323 mg., chloride as NaCl 399 mg. per 100 c.cm. Urine 2 oz. alkaline. Died.

Autopsy (14 hours after death): Superficial sloughing with some retained foreign bodies; culture grew *Bact. coli, Strep. fæcalis, B. subtilis* and diphtheroids; no clostridia. Section of muscle adjacent to wounds showed limited infection and no ischæmia. Heart normal. Lungs, left adherent, right congested with some areas of collapse; bronchitic changes; no evidence of blast. Liver, early fatty degeneration. Spleen fibrotic. Stomach some dilatation. Suprarenals normal. Kidneys: lt. 240 g., rt. 230 g. Bladder contained 100 ml. clear straw-coloured fluid. Brain some congestion.

Microscopic sections of all organs confirm above findings.

CASE 3.—Private, aged 18. Wounded on Aug. 9, 1944, by high-explosive shell. Penetrating wound of left foot; compound fracture of radius and ulna.

1st day: Surgical toilet of wounds.

3rd day: Reached this hospital. No record of having had sulphonamides; none given here. General condition poor and large hæmatoma in forearm interfering with circulation. Wounds re-explored; further excision and ligature of radial artery to control bleeding. After operation BP 96. Two pints of blood given (rigor).

4th day: Started vomiting. BP 80/50. Given 1 pint of blood, 3 pints glucose-saline. Urine 27 oz.

5th day: Jaundiced; vomiting. BP 124/66. Hb 52%. Given 2 pints isotonic sodium sulphate and 2 pints glucose-saline. Blood-urea 68 mg. per 100 c.cm. Urine (catheter) 3 oz. pH 5·8.

6th day: Extensive herpes labialis; continuous gastric suction. Given 2 pints isotonic sodium sulphate and 1 pint glucose-saline, BP 124. Blood-urea 270 mg. per 100 c.cm. Urine (catheter) 6 oz., pH 5·2.

7th day: Red cells 3,410,000 per c.mm.; Hb 58%; white cells 13,800 per c.mm. Blood-urea 408 mg., serum potassium 44 mg. per 100 c.cm. Given 2 pints isotonic sodium sulphate. Urine 6 oz., pH 5·2, contained numerous red cells, some pus cells, large numbers of organisms, no casts. Terminal pulmonary œdema. Died. No autopsy.

CASE 4.—Private, aged 23. Wounded on Aug. 5, 1944, by high-explosive shell. Penetrating wound of thigh. Surgical toilet within 48 hours. FB not found. Only BP reading during first two days, 130/80.

3rd day: Reached this hospital. No record of having had sulphonamides; none given here. Obvious gas-gangrene of thigh. P 112, BP 130/80. Blood-urea 80 mg. per 100 c.cm. CO_2-combining power 33·8 vol. Plasma proteins normal. Serum potassium 28·2 mg., inorganic phosphate 5·7 mg., sodium 287 mg., chloride as NaCl 535 mg. per 100 c.cm. Immediate amputation 6 in. below hip; 100,000 units anti-gas-gangrene serum; 3 pints blood.

4th day: 3 pints blood.

5th day: Spread of gas-gangrene. Muscles involved excised with 3 in. of femur; 180,000 units AGGS. After operation P 160, BP 120.

6th day: Vomiting started and continued for four days except when controlled by gastric suction. BP varied from 120 to 180. Intravenous fluid included 4 pints isotonic sodium lactate and 2 pints isotonic sodium sulphate. Daily output of urine fell to 3 oz. on the 9th day. Urine pH did not rise above 5·2. Blood-urea was 138, 260 and 424 mg. per 100 c.cm. on the 8th, 9th and 10th days. Died on 10th day.

Autopsy (19 hours after death): Slight jaundice. Amputation flaps clean; surrounding muscles normal, except iliacus which was necrotic and on culture grew *Cl. septique, Staph. aureus* and *Bact. coli*. Lungs showed basal consolidation with patchy collapse; no evidence of blast. Liver, early fatty change. Spleen (120 g.) firm. Suprarenals normal. Kidneys, rt. 225 g., lt. 230 g. Bladder contained 20 ml. of urine.

Microscopy of all organs showed some post-mortem degeneration but confirmed above findings. Liver showed necrosis surrounding central vein with some reticular replacement. Muscle from amputation site showed no evidence of ischæmia.

CASE 5.—Guardsman, aged 23. Wounded on Aug. 14, 1944, by high-explosive shell. Compound fracture of lt. tibia and fibula involving vessels. Laceration of right calf. Profoundly shocked; blood and plasma transfusions, quantity not known; responded poorly. Within 12 hours of wounding, amputated leg at site of fracture with tourniquet; surgical toilet of rt. calf. BP 80 at end of operation.

4th day: Poorly orientated, BP 110/70.

6th day: Reached this hospital. Irrational; gross dependant œdema, especially right thigh and buttock. Wounds examined under anæsthetic; stump satisfactory; œdema apparently spreading from wound of right calf, widely incised; plaster to stump and right leg. After operation BP 130/80; 3 pints of blood. Urine 16 oz.

* This work was made possible by the help of all members of the medical staff of the hospital, the sisters in the wards concerned, orthopædic secretaries, and technicians, particularly in the Department of Pathology. Post-mortem findings and histological reports were prepared by Squadron-Leader E. M. Darmady.

† The autopsy findings in the kidneys are described later.

7th day: No pyrexia. X ray of chest showed no evidence of blast. Started vomiting. Completed course of 22·5 g. sulphanilamide.

8th day onwards: Remained irrational. Severe œdema of right buttock; later spread to thighs and became bilateral. Local condition remained satisfactory. For fluid intake and output and blood chemistry, which showed remarkable changes see fig. 1. The extremely high blood-urea readings must be considered as approximate only. Repeated microscopy of urine showed only an occasional hyaline cast. There was no spectroscopic evidence of hæmoglobin derivatives.

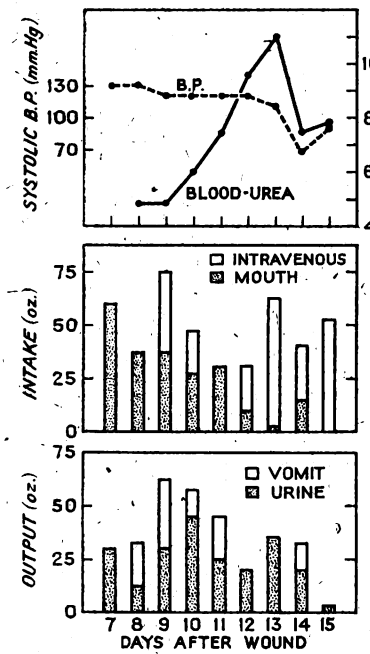
15th day: Died.

Autopsy (16 hours after death): Wound showed some superficial sloughing well walled off by barrier of fibrosis; culture grew *B. proteus*, *Strep. viridans*, diphtheroids and *B. subtilis*, but no clostridia. Right buttock and flank œdematous. Œdema localised to subcutaneous tissue, underlying muscle showing no evidence of necrosis or of œdema. Heart normal. Lungs, patchy consolidation and œdema; no evidence of blast. Liver, normal in size; surface rather gritty and some increased fibrosis. Spleen, advanced fibrosis, many localised yellowish areas consistent with small infarcts. Suprarenals normal. Kidneys, lt. 210 g., rt. 240 g. Bladder contained 24 ml. of clear yellow fluid. Brain showed slight congestion.

Microscopic sections confirmed the findings. The liver showed necrosis around the central vein with advanced fatty change. There was commencing reticular replacement and early fibrosis.

CASE 6.—Sergeant, aged 25. Wounded on July 19, 1944, by mortar bomb. Sucking wound chest, compound fractures left humerus, radius and ulna with musculospiral palsy, multiple soft-tissue wounds involving buttocks and lt. loin, traumatic perforation of ear-drum. Surgical toilet of wounds same day; 4 pints of blood and 2 of plasma; no BP recordings.

2nd day: Reached this hospital. No record of having had sulphonamides; none given here. BP 135. Vomited next 2 days and again from 10th day onwards; stomach aspiration. Intravenous fluids including sodium lactate, almost continuously from 2nd day on. Full record of urinary output not available, but fell to 6 oz. on 12th day. Urine microscoped, no casts seen. Blood-urea rose from 60 mg. on 10th day to 219 mg. per 100 c.cm. on 13th day. Lumbar puncture on 12th day, no abnormalities. Developed an intestinal fistula in loin without evidence of peritonitis, shortly before death on 17th day. No autopsy.



SERUM	Potassium	34	38	48	(16-22)
	Inorganic phosphates	8·0	9·7	11·9	(3-5)
	Sodium	375		321	(325-350)
	Chloride as NaCl.		443	449	(560-620)
	Calcium			8·6	(9-11)
	Total protein	5·75		7·25	(5·6-8·5)
	Albumen	3·2		2·4	(3·4-6·7)
	Globulin	2·5		4·85	(1·2-2·9)
	Van den Bergh	0·2			(0·2-1·5)

NORMAL RANGE — mg. / g. (per 100 c.cm.)

Fig. 1—Findings in case 5.

CASE 7.—Lance-corporal, aged 20. Wounded on July 19, 1944, by mortar. Compound fracture of femur involving vessels.

3rd day: Reached this hospital. Leg ischæmic.

5th day: Completed course of 25 g. of sulphanilamide.

6th day: Amputation through site of fracture. BP 125 before anæsthetic; after 'Pentothal' and ether, and before operation started, BP 90/30; 3 pints of blood and 2 of plasma.

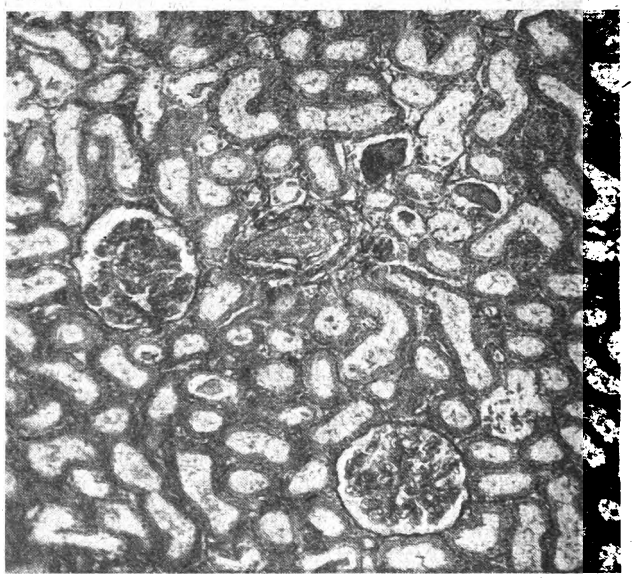


Fig. 2—Case 2 (× 90). Comparatively normal glomeruli are seen, with some evidence of eosinophil material lying around the periphery, but adhering to Bowman's capsule. First convoluted tubules show hyaline material which in some places has a granular appearance. In the centre of the field the vessel changes are consistent with ante-mortem thrombosis.

For the next four days systolic BP varied from 60 to 92 and two days later fell below 100 for a further four days; during this period was given ephedrine, desoxycortone, and picrotoxin. Vomited on first and third day after operation. Daily output of urine approximately 10–30 oz. for this period. Urine showed mild infection with few granular casts. Blood-urea rose to 148 mg. on 9th day and subsequently fell to normal. Serum potassium 16·2 mg. on 14th day.

Subsequent recovery uneventful.

CASE 8.—Private, aged 22. Wounded on Aug. 17, 1944, by mortar. Extensive penetrating wound of left calf, minor wounds of neck, chest wall and forearm, fracture of great toe. Surgical toilet 14 hours after wounding; at end of operation BP 70/50; 3 pints of blood; BP not raised; intravenous adrenaline drip; BP 94/50. Eighteen hours after operation BP 110/80. Vomited profusely for 2 days.

3rd day: Reached this hospital. Recorded as having had 2½ g. of sulphanilamide; none given here. BP 110/75. No oliguria here.

11th day: Urea-clearance test (Van Slyke), 1st hour 76%, 2nd hour 79%.

26th day: Urea-clearance test, 1st hour 143%, 2nd hour 121%. Recovery uneventful.

PATHOLOGY OF KIDNEYS

The kidneys from the four cases coming to autopsy were larger than normal (210–240 g.). On section the capsule was under tension and the cut surface swollen and everted. Demarcation of the kidneys was enhanced by the pale glistening and rather granular cortices. The pelvis showed slight congestion of the surface vessels, but no evidence of crystalline or amorphous deposits. There was no evidence of ante-mortem thrombosis in the major blood-vessels.

Microscopic findings.—The glomeruli showed no striking changes. The capillary tufts were intact, although occasionally congested. The capsular spaces were filled with slightly staining eosinophil material arranged peripherally. In cases 4 and 5 there was some evidence of epithelial replacement spreading from the mouth of the convoluted tubules.

The lumen of the first convoluted tubules contained a small quantity of amorphous debris resembling a catarrhal condition. There were occasional patches of epithelial degeneration (fig. 2). The descending limb of Henle showed similar but less definite changes. The ascending limbs of Henle were filled in many areas with structureless hyaline casts surrounded by a rim of

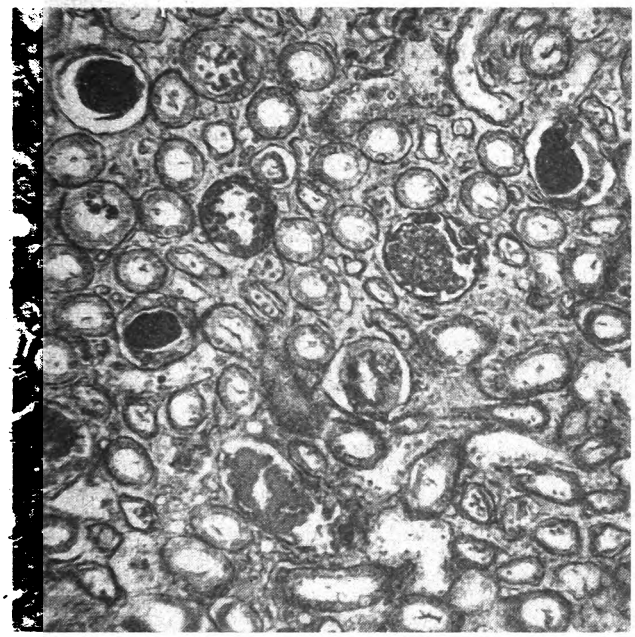


Fig. 3—Case 2 (× 160). The ascending and descending loops of Henle show some epithelial degenerative changes. Some of these tubules show evidence of hyaline casts and other granular material. In some the epithelium is denuded and is adhering to the outer side of the cast. Œdema of the interstitial tissue is also seen.

epithelium. Where hyaline casts were bulky the epithelium appeared to be compressed, and detached fragments were seen either lying free in the lumen or adherent to the surface of the cast. Frequently degeneration of the epithelium occurred without cast formation (fig. 3). In cases 4 and 5 hyaline casts were often surrounded by granular and epithelial debris. There were also casts composed only of epithelial debris. The second convoluted tubules showed similar changes, but the epithelial degeneration without casts was even more marked. In those that contained hyaline casts the lumen did not seem to be obstructed, the casts appearing as thin strands. Granular amorphous material was also noted to have largely replaced the hyaline material in case 4 and was widespread in case 5.

The collecting tubules showed considerable degeneration of the epithelium. In case 1 tubules were seen to contain clear material with many small granular deposits. In cases 4 and 5 epithelial plication had occurred and the tubules were loaded with plugs of granular amorphous material of variable staining reactions (fig. 4), similar to those seen higher in the nephron. There was some evidence of early regeneration of tubular epithelium.

The interstitial tissue showed a patchy œdema in all cases. In cases 4 and 5 reactive hyperplasia had occurred with early fibrosis. There was hyaline material in the interstitial spaces in some areas. In some parts this seemed to arise as the result of a rupture of the tubule. Many of the arterioles were normal although some showed ante-mortem thrombosis. In others there were cells resembling young fibroblasts interlacing and crossing the lumen of the vessel. In other areas obliterative endarteritis was occasionally seen. In the cases surviving more than a week there was considerable congestion of capillaries, particularly among the collecting tubules. Rupture of the tubules into the venous spaces was noted in all cases.

Frozen sections of the kidneys, lungs, brains and suprarenals showed changes consistent with the above findings. Evidence of fat was found in some lungs but not a sufficient quantity to cause death.

DISCUSSION

In searching for a possible causative factor the following features seem worthy of note:

1. The injuries in all cases were caused by high explosives.
2. There were considerable injuries to the extremities in all cases; in none was there a crushing injury nor was the local condition in itself sufficient to account for death.
3. Low blood-pressure was recorded at some stage in 5 cases. (In cases 2, 4 and 6 it may have been overlooked, since regular recordings were not made, but the extensive resuscitation given suggests that it was present.)
4. There was a lesion of a major vessel in 6 cases.
5. Sulphanilamide was given by mouth in 5 cases.
6. All cases were transfused with group-O blood, supplied by the Army Blood Transfusion Service. No clinical evidence of mismatched transfusion was apparent at the time of transfusion. (Case 3 had a rigor with subsequent slight jaundice; this we have found not uncommon after transfusion of stored blood; case 1 was also jaundiced.) Histologically the appearance of these kidneys and those from cases of mismatched transfusion are similar, but in our cases there was no evidence of pigment in the 1st convoluted tubules nor changes in any of the glomeruli.

There were incomplete clinical records in the German journals (Kayser 1922, Minami 1923) from the last war of renal failure after various injuries. Cases have been reported during the present war under the title of "crush syndrome" by various workers (Beall, Bywaters et al. 1941, Bywaters and Dible 1942, Longland and Murray, 1941, Maitland 1941, Mayon-White and Solandt 1941) in which the clinical picture and post-mortem findings in the kidneys are comparable to those found in our cases. More recently it has been pointed out that similar changes are sometimes found in injuries without crushing (Bywaters, Belsey et al. 1942, Glen 1941) including head injuries (Cumings 1942), and also in association with blackwater fever (Bywaters and Dible 1942, Maegraith and Havard 1944, Maegraith and Findlay 1944), pyloric stenosis with vomiting (McLetchie 1943) and septic abortion (Bratton 1941).

While the biochemical and renal changes associated with all these conditions are not identical, there is sufficient similarity to justify a search for a common ætiological basis. The fatal termination appears to be due to a renal failure with both biochemical and renal changes differing in many respects from those occurring in any kidney lesion of known ætiology. The mechanism which leads to the sequence of events is unknown. There seems to be two possible explanations—(1) a metabolic product carried to the kidney by the blood-stream; (2) anexia of the kidney, possibly resulting either from a period of hypotension or from a neurogenic vascular disturbance.

Evidence in favour of the "nephrotoxic theory" in crush syndrome has been brought forward by various

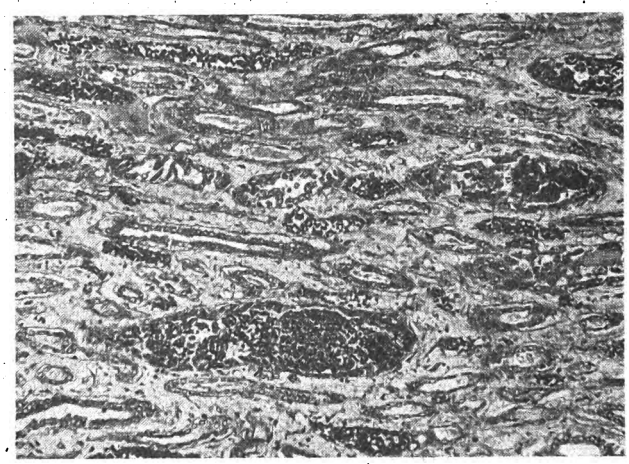


Fig. 4—Case 5 (× 90). Epithelial plication is seen in some collecting tubules. Others are swollen and distended with degenerative and granular material. The interstitial tissue shows capillary congestion and early fibrosis.

workers (Bywaters 1942, Bywaters, Delory et al. 1941, Bywaters and Dible 1942, Blalock and Duncan 1942, Eggleton 1944). The source of the toxin has been regarded as ischæmic muscle, which was only a minor feature in our cases; and we have seen many wounded with extensive muscle ischæmia and necrosis who have not developed signs of renal failure. These workers have failed to identify the toxic substance to their satisfaction and this theory remains open to some doubt.

Most of the evidence in support of the second theory is experimental. Renal anoxia has been produced by

clamping renal arteries in dogs and in rats—resulting in death in uræmia (Goldblatt 1937, Goldblatt, Lynch et al. 1934, Goldblatt, Weinstein et al. 1941, Wilson and Byrom 1939). If the clamp is released after an hour a renal histological picture not unlike that seen in our cases results (McEnery, Mayer and Ivy 1927). Oliguria has been produced by splanchnic (Bernard 1859) and peripheral nerve stimulation (Bradford 1889). Direct pressure on a limb by the continued application of a tourniquet has been shown to produce extensive retrograde arterial spasm (Barnes and Trueta 1941). It is obvious that persistent hypotension, either local or general, might produce renal anoxia. Such an explanation has been put forward in blackwater fever (Maegraith and Findlay 1944). A diminished blood-supply might account for the histological appearance in our cases, in particular the changes in the arterioles and the fact that those functioning portions of the kidney best supplied with blood have suffered least. The anoxia might be due to hypotension or vascular spasm or both. This theory merits further attention both from the clinical and experimental point of view.

BIOCHEMICAL METHODS

The methods used throughout for biochemical investigations were—

Blood-urea: Archer and Robb (Harrison 1939).
Serum potassium: Jacobs and Hoffman (1931).
Serum chlorides: Harrison (1939), after Whitehorn.
Serum inorganic phosphate: Hawk (1937).
Serum sodium: Harrison (1939), after McCance and Shipp.
Serum calcium: Kramer and Tisdall (Harrison 1939).
Urine urea: hypobromite method.
Van den Bergh: Harrison (1939).
Serum protein: biuret method.

For the last two methods, Lovibond comparator and discs were used.

SUMMARY

Of 8 cases of uræmia following war wounds 6 were fatal. These represented a third of the deaths occurring in an air evacuation transit hospital.

The kidneys and other organs of 4 of the fatal cases have been examined and bear a close resemblance to those described previously in crush syndrome.

It is suggested that the renal changes may be due to anoxia, secondary to hypotension or vascular spasm or both.

The main purpose of this report is to assist in the recognition of similar cases which may throw further light on the problem.

Our thanks are due to Air Marshal Sir Harold Whittingham, director-general of Medical Services, RAF, for permission to publish this paper; to Group-Captain G. A. M. Knight, officer commanding RAF CCS, for help and encouragement; to Prof. G. R. Cameron for preparing some of the slides and for his criticism; to Mr. E. J. King, D SC, on behalf of the Medical Research Council, for some of the biochemical findings in case 5; and to Mr. Hennell of the Metal Box Co. Ltd. for preparing the photomicrographs.

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DEFICIENCY BOWEL PATTERN

IN POLISH REFUGEES, AFRICAN AND INDIAN ADULTS AND CHILDREN (KWASHIORKOR)

J. SCOTT BROWN
M D EDIN., D T M & H, D M R E
RADIOLOGIST, MEDICAL DEPARTMENT, UGANDA

H. C. TROWELL
M D LOND., M R C P
LECTURER IN MEDICINE, UGANDA MEDICAL SCHOOL

THE part played by vitamin-B deficiencies in producing clinical syndromes associated with malnutrition has been emphasised by various authors. It now seems clear that beriberi is caused by a deficiency of vitamin B_1 (aneurine) but that pellagra, though largely due to a deficiency of nicotinic acid, has nevertheless other deficiencies of the vitamin-B complex. Classical beriberi is only common among those who eat polished rice, and classical pellagra is only common among those who eat maize. Neither of these diseases have been found, at least in its classical form, in the ordinary natives of Uganda, who eat mainly plaintains, sweet potatoes and cassava.

Various malnutritional states have however been described in the tropics which resemble one another, but differ from classical pellagra and classical beriberi. Thus Trolli (1938) in the Congo, Cecily Williams (1933, 1935, 1940) in West Africa, Gillan (1934) and Trowell (1937, 1940, 1941) in Kenya, have all described the same syndrome; although some described it in infancy and some reported it among adults. Its chief manifestations are diarrhœa and a dermatosis, with varying degrees of anæmia, œdema and pallor of the skin and hair. Cecily Williams, describing it in children, called it kwashiorkor.

Following on Ross Golden's (1941a and b) description of the radiological changes seen in the small intestine in vitamin-B deficiencies, changes which he called "deficiency pattern," cases of malnutrition in Uganda adults and children have been investigated, and in many of these deficiency pattern was demonstrated. Cases in Uganda presented a clear clinical picture and appeared to be more advanced than those seen in America.

Recently, 2 Polish refugees, who suffered great privations of food before they were evacuated from the Middle East to Uganda, were found to show the same syndrome and the same deficiency pattern. This communication describes our experiences in diagnosing and treating a malnutritional state, which in a minor form may be common ordinarily in Europe and in America, but which in its advanced stage is often seen in African adults and children (kwashiorkor), and which may also become common in Europe as a result of the war.

CLINICAL PICTURE

Apathy of the facies is exaggerated by the mild œdema which obscures the expression. The patient is mentally dull, sluggish in his movements, and appears depressed. The hair is scanty, and in negroes loses its natural crinkling and tends to become pale brown and dry. Œdema is seldom severe in adults, but is widespread; and in children it may be sufficient to suggest acute nephritis. The skin may be normal in colour, but in negroes tends to become coffee-coloured; small spots and areas, especially in children, lose their pigment, and may be almost white. The characteristic dermatosis consists of scaly shiny dark brown areas appearing over the pressure sites of the back and buttocks—or indeed anywhere. Only a few areas of dermatosis were seen in the 2 Polish cases, but these were typical. In the European cases erythema preceded the dermatosis, but in the negro skin redness could not be seen. On the legs, particularly over the shins, the keratin layers of the skin become thin and shining, and fissure and crack like

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an old oil painting. These dermatoses desquamate rapidly when the patient is given nicotinic acid. In most areas of skin, especially in children, the dermatosis becomes moist, resembling intertrigo, and peels to reveal pale areas. Cheilosis may develop.

The patient complains of a variety of gastro-intestinal symptoms.

A few have sore mouth with loss of lingual papillæ, and fissures appear in a raw red tongue. Stomatitis is common, salivation and dysphagia variable. Anorexia may be severe, especially in children; and twisting, burning abdominal pains, increased by eating, are often reported. Loose stools are almost invariable; they are most frequent at night and in the early morning, and are bulky, frothy and acid, but not often pale. They contain much undigested starch, the particles being visible to the naked-eye and demonstrable microscopically with iodine. Muscle-fibres are not digested well. Steatorrhœa has not been noted in adults, but those we saw were taking hardly any fat in the diet; it was common in the children who received milk. Flagellates, mainly *Giardia intestinalis*, or *Chilomastix mesnili* are very common, but treatment with mepacrine seldom relieves the diarrhœa much, although flagellates disappear. Much flatus is passed per rectum, and borborygmi are heard often by the patient and are unduly loud to the stethoscope.

The abdomen is but slightly distended; but advanced cases show distended coils of intestines, and peristalsis may be visible, especially after a meal, and is usually painful. Sigmoidoscopy may show a congested or granular mucosa. Ulceration has not been observed in uncomplicated cases, though both bacillary and amœbic dysentery are quite common temporary complications. Gastroscopy has not been performed, but test-meals reveal low acidity or even achlorhydria, which may be histamine-fast. Pyelitis, usually due to *B. coli*, was seen in many of the cases and appeared to be due to an unhealthy gastro-intestinal tract.

Nervous changes are slight, but there is always mental depression and sluggishness. Paræsthesiæ, often burning in character, are common in hands and feet, and signs of slight peripheral neuritis are present in many cases while others show slight lesions of the pyramidal tract. Severe paralyses or anæsthesia are never found, but some cases show a generalised rigidity, resembling parkinsonism or rigor mortis.

Anæmia is seldom advanced: it may be macrocytic or hypochromic or both, and it does not respond readily to iron or liver administered orally. All cases lose weight and are unable to gain weight or correct any of their numerous deficiencies when fed on an adequate diet. In all our cases there was a history of inadequate diet over a long period; their meals had consisted mainly of cooked carbohydrate and were deficient in total calories, animal protein, fat, green vegetables and many vitamins.

RADIOLOGICAL FEATURES

Those interested will already be familiar with the radiological changes seen in the small intestine in deficiency states, changes usually called the "deficiency pattern," a name coined by Ross Golden. Briefly, the radiological changes seen are due to disturbed bowel motility caused by damage to the intricate intrinsic nerve-supply of the bowel. In the part or parts affected, paralysis of the submucosal muscle causes smoothing of the plicæ, while interference with tone and propulsive mechanisms produce irregularity in the width of the bowel and "segmentation" (a tendency for barium to collect in clumps). Usually the passage of the barium is slow. On the screen the deficiency-pattern bowel presents a peculiarly inert appearance, at variance with the lively movements associated with normal motility of the small intestine. On reading Ross Golden's description we recognised that we had often seen the picture in Africans who, because of epigastric pain, vomiting and visible peristalsis, were suspected of having pyloric obstruction. Some of these patients had large stomachs but no organic obstruction—a common finding which we now know to be a part of deficiency pattern.

The radiological examination of our cases of deficiency states was less thorough than we would wish because too few films were available to take records at the short intervals recommended. Reliance was placed mainly on fluoroscopic examination, which usually limited our diagnostic criteria to evidence of gross segmentation. Films were taken only for illustrative purposes, in a selected series, to observe the effect of treatment. In addition to segmentation our examinations often showed, in the small intestine, smoothing of the plicæ in the jejunum and coarse flecking; but these features could only be distinguished with certainty on films. In the course of the radiological examinations the following observations were made.

In the preliminary screening great gas-distension of the colon was common. Some large atonic stomachs were seen, and in general stomachs became brisker in their movements after treatment. The appearance in the small intestine conformed to Ross Golden's description and is not described again here. Segmentation was usually seen in the middle part of the small intestine. In 2 cases there was great distension of the duodenum with no demonstrable obstruction. As a rule the colon was wide and poorly haustrated, and tended to show segmentation also. Nevertheless in such cases the colon emptied well. It seemed as if the normal colonic mechanisms were functioning badly and were being assisted or replaced by an alternative mechanism. Outlining of the gas-distended colon by an even layer of barium, 0·5 cm. thick, was often seen. Indeed radiological changes in the colon were as striking as changes in the small intestine and they merit further study. In no case was there any sign of enlargement of the heart such as is seen in beriberi. The soft tissues of many cases were remarkably radiolucent, even where no gas-distended intestine intervened. This probably indicates a deficiency of minerals in the soft tissues.

Deficiency pattern was not seen in every case of gross deficiency state; possibly the criteria were too strict. On the other hand previously unsuspected deficiency, later confirmed, was suggested by radiological examination.

A SERIES OF CASES

Table I summarises the main findings in 16 cases. Cases 1 and 2 were Polish refugees who had experienced severe malnutrition in Russia and Iran. Case 3 was an Englishwoman, member of a religious order, and was undiagnosed when originally examined. Case 4 was an Indian who had limited his diet after dental extraction. Cases 5–14 were underfed immigrant African labourers. Case 8 had limited his diet owing to a duodenal ulcer. Cases 15 and 16 were young underfed African children having the fully developed kwashiorkor syndrome. In all of them the diagnosis was confirmed by X rays and cure was followed by a complete disappearance of the radiological changes. Many other cases were diagnosed on clinical grounds, but our supply of films did not justify their investigation. It is, in our opinion, one of the commonest severe malnutrition syndromes seen in our hospital, some scores of cases being seen each year. Below, 4 cases are described in some detail.

CASE 1.—Polish woman. Diet very deficient during preceding 12 months, with little meat, milk or fresh vegetables; 7 months ill with salivation, burning pharyngeal, œsophageal and epigastric pain, vomiting, colicky abdominal pain, distension, flatus, borborygmi, almost complete loss of appetite, and much loss of weight. Stools watery, 5–10 daily, no blood or mucus, pale, a few fat globules and fatty acid crystals, no abnormal starch granules (but diet was almost entirely fluid), no abnormal organisms on culture, no amœbæ. Paræsthesiæ severe, much melancholia and irritability. Pyuria with pure growth of streptococci. The tongue was pointed with smooth edges. Abdomen rather distended; distended coils of intestines and much peristalsis visible; borborygmi audible. Moderate œdema of ankles. A few brown plaques of dermatosis appeared over the lumbar spines, and erythematous scaly areas over both patellar regions. Blood-count: red cells 2,900,000; Hb. 60%; colour-index (CI) 1·07; mean cell volume (MCV) 122 c.μ; mean corpuscular Hb. content (MCHC) 23·8%; white cells 10,800; neutrophils 8500. All tendon-jerks lost, slight blunting of perception of pin and vibration on hands and feet, no obvious paresis. Test-meal failed. X rays showed serious deficiency pattern.

Definite improvement on brewers' yeast, 2 oz. daily for 10 days, but fastidious appetite and nausea limited intake. Then given nicotinic acid 250 mg. daily and vitamin B_1 3 mg. daily for 20 days, but became worse, partly owing to a severe streptococcal urinary infection which arose half way through this period, and was controlled with difficulty by sulphapyridine. She took nothing and was very difficult to

TABLE I—FINDINGS AND RESULTS IN 16 CASES

Case	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Age (yr.) and sex	25 F	40 F	30 F	40 M	20 M	40 M	24 M	30 M	30 M	20 M	16 M	20 M	16 M	16 M	3 F	2½ M
Severity	++	++	+	+	++	++	++	+	+	+	++	++	++	++	++	++
Months ill	7	8	10	60	3	10	4	2	5	3	2	5	12	12	12	12
Weight (lb.)	80	84	?	134	83	60	66	96	102	129	80	98	77	84	14	13
Diarrhœa	++	++	+	+	++	++	++	0	+	++	+	0	+	++	++	++
Abdominal pain	++	++	++	+	++	++	++	+	+	++	+	++	+	++	++	++
Hydrochloric acid	?	?	?	?	R	R	0	R	N	0	R	R	R	0	?	?
Œdema	+	+	0	0	+	++	+	0	++	0	+	+	+	+	++	++
Hb. %	60	80	?	97	50	37	56	26	36	41	38	62	42	50	51	42
Dermatosis	+	+	?	0	++	+	++	+	+	+	+	+	++	++	++	++
Pale skin and hair	0	0	?	0	0	0	+	0	0	+	+	0	++	++	++	++
Urinary infection	++	++	?	0	++	0	+	0	0	0	0	+	+	0	0	++
Neurological signs	+	+	?	+	+	+	+	0	+	+	+	0	+	0	0	+
Gastric changes	?	?	++	+	0	+	+	0	0	0	+	0	++	0	?	?
Segmentation	++	++	++	++	++	++	++	+	+	0	+	+	++	++	++	++
Loss of mucosal folds	++	++	++	++	++	++	++	+	+	+	+	+	++	++	++	++
Colonic changes	?	+	?	++	++	+	++	0	0	0	0	0	+	++	?	?
Result	C	D	?	C	P	C	C	C	C	C	C	C	P	P	C	D

++ = severe. + = moderate. R = reduced in amount. 0 = absent. N = normal. C = cure. P = partial cure. D = death.

manage. All oral therapy was abandoned and injections of liver extract (BDH) 6 c.cm. were given daily for 6 days, with immediate improvement of appetite and spirits. This was later supplemented by the injection of the following vitamins on two occasions: vitamin B_1 15 mg., nicotinic acid amide 50 mg., riboflavin 1·5 mg., pyridoxin 2·25 mg., pantothenic acid 8·5 mg. (Lederle). Complete slow recovery with gain of 2 stone in weight.

CASE 6.—African, Soga male of about 40. Had lived largely on maize meal in a native prison for over a year. Developed severe anorexia, abdominal pain, limb paræsthesiæ and symptoms of anæmia. No loose stools until a purgative was administered two weeks before admission; this set up acute enteritis. On admission, toxic, dehydrated, temperature 100·6° F, pulse 130, feeble. Weight 6 st. 4 lb. Watery stools, 10 daily, no blood or mucus; a few pus cells present, culture negative.

No malarial parasites. Œdema of legs. Scaly dermatosis over shins and back. No neurological signs. Tongue thickly furred, normal papillæ, never sore. Abdomen distended and tense; hypochlorhydria. Widal and salmonella agglutinations negative.

No response to astringents given for 7 days, but prompt response to injections of liver extract (BDH), 12·0 c.cm. Diarrhœa ceased and dermatosis started to peel; 7 days later put on cooked liver, ½ lb. daily, ferrous sulphate, grains 15 daily, and brewers' yeast 3 dr. daily until discharge. Blood-count on admission: red cells 1,700,000; Hb. 37%; CI 1·09; MCV 115 c.μ; MCHC 22·6%. Megaloblasts in sternal puncture smear, reticulocyte response of 15·1% to liver injections. X-rays examination on admission showed severe deficiency picture; repeated at monthly intervals till discharge, when a normal picture was seen. He had gained 31 lb. in weight and the red count was 6,050,000; Hb. 91%.

CASE 7.—African, Ruanda male of about 14. Walked 600 miles to get work. Fell ill (probably from malaria) on road; lived for several weeks largely on cassava. Two months' burning and colicky abdominal pain, vomiting, diarrhœa, severe anorexia, limb pains, paræsthesiæ, weakness and depression. On admission, very weak, 4 st. 10 lb. Pale dry rough skin, cracked and shiny over shins (resembling a cured snakeskin); after admission developed black areas of dermatosis over pressure sites on back and thighs. Skin pale, hair pale, smooth and scanty. Slight œdema of face and ankles. Tongue red at edges; achlorhydria to gruel test-meal; free hydrochloric acid after histamine. Intestinal peristalsis seen in a doughy distended abdomen. Stools: about 6 daily; much undigested starch, a few fatty acid crystals; not pale, watery. A few hookworm ova present. Trace of albumin in urine, no cells or casts. Very scanty, subtertian malarial parasites. Red cells, 2,560,000; Hb, 56%; CI 1·10; MCV 97 c.μ; MCHC 31·9%.

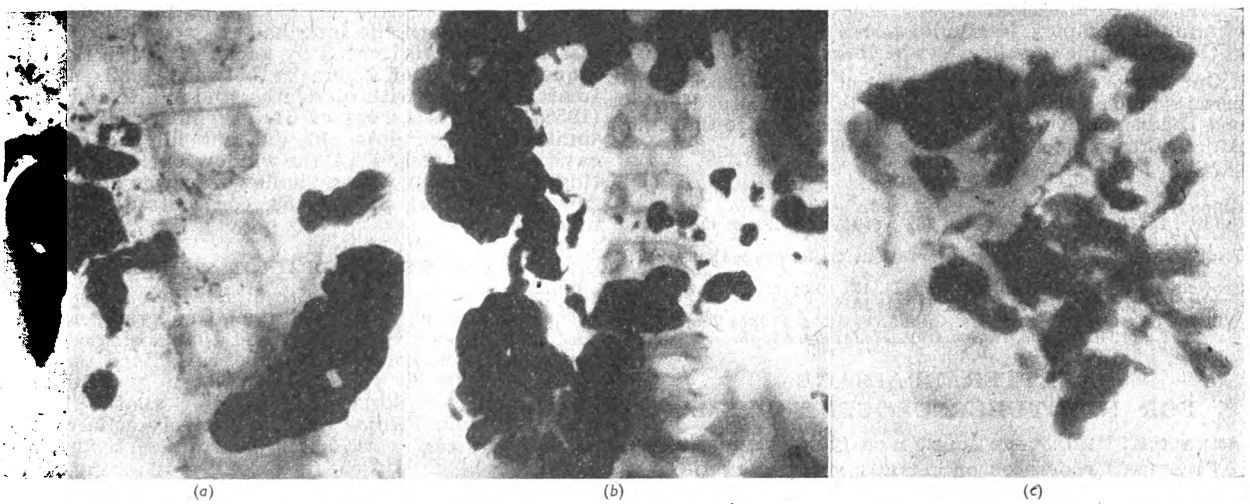
No improvement on ordinary hospital diet, astringents, quinine or emetine; he even developed more dermatosis. This peeled 3 days after he had started nicotinic acid, 600 mg. daily, but there was little improvement of diarrhœa or appetite during 2 months. He was then given vitamin B_1, 4 mg. parenterally; œdema disappeared and appetite improved slightly. Cheilosis however developed. He was next given cooked liver ½ lb. daily, with slow improvement in weight (2 st.) and in blood-count and general condition during next 3 months. X-ray examination on admission: severe deficiency pattern; 1 month after nicotinic acid and vitamin B_1, slight improvement; on discharge, normal.

CASE 15.—African Ganda girl, aged about 3, suffering from kwashiorkor. After weaning at 9 months she had taken only sweet-potatoes and cassava; no milk, eggs, green vegetables or fruit ever taken, meat once a month. Had ailed for a year, mainly diarrhœa. On admission, severe generalised œdema (like acute nephritis); unable to open eyes, unable to stand or sit. Fretful. Weight 14 lb. 9 oz. Dermatosis on pressure areas of thighs and back. Skin pale; hair pale, soft and

TABLE II—RESPONSE TO TREATMENT

Case	1*	2*	3†	4	5	6	7	8‡	9	10	11	12	13	14	15	16*
Brewers' yeast	+	..	..	..	+	+	..	+	..	..	++	+	++	..	..	?
Liver (cooked)	..	..	..	+	+	+	+	..	+	+	..	+	+	+	..	..
Liver injections	++	+	..	..	..	++	..	..	++	++	..	+	++	..	..	..
Nicotinic acid	0	?	..	..	?	..	+	..	..	..	..	+	+	+	+	?
Vitamin B_1	0	?	..	?	..	..	+	..	..	..	..	..	..	..	++	?

* Urinary infection. † First case, not diagnosed. ‡ Duodenal ulcer. ++ = good improvement. + = moderate improvement. 0 = no improvement. ? = doubtful.



(a) (b) (c)

Fig. 1 (a) (Case 6)—small intestine showing segmentation and flocculation. (b) (Case 7)—terminal ileum (bottom left corner) dilated and segmented. Proximal colon (top left corner) irregular haustration. (c) (Case 15)—deficiency pattern in small intestine of kwashiorkor in an infant.

scanty. Tongue red and smooth, gums and teeth normal. No neurological signs. Stools 2–5 daily, pale, bulky, much undigested starch; no obvious excess of fat (but had almost a fat-free diet). Distended doughy abdomen. A few hookworm ova. Some subtertian malarial parasites. Trace of albumin, no casts or cells in urine. Red cells, 4,700,000; Hb. 51%.

No response to quinine and iron. Given nicotinic acid, 50 mg. daily orally for 6 weeks, and dermatosis started to peel in 4 days and had disappeared in 2 weeks; but anorexia, malaise and œdema were worse. Given 4 mg. vitamin B_1 orally, and lost 10 oz. of weight with decrease of œdema. Continued with 'Marmite' 1 drachm daily but became worse. Given 3 mg. vitamin B_1 daily for 20 days, with diuresis, loss of 5 lb., disappearance of œdema and dramatic loss of anorexia. Would crawl to edge of bed and scream for food. Gained 1 lb. of weight weekly for 6 weeks and left hospital free of symptoms. X rays, on admission, showed severe deficiency pattern; on discharge almost normal.

Autopsy was refused on the 2 fatal cases in this series. Autopsies on previous cases have revealed no significant change in the structure of the small intestine if fresh material is examined. The liver in kwashiorkor has shown extreme fatty degeneration. A variety of intestinal helminths, chiefly tæniasis and ankylostomiasis, complicate the picture in all African adults but were not present in the European cases.

PROGNOSIS

In untreated cases the prognosis is uniformly bad. Almost all progress rapidly and without any remission to death in a few weeks or few months. Extreme anorexia and a fastidious appetite limit the intake of food, and the patients died of inanition, diarrhœa or more often of a respiratory, urinary or intestinal infection. Except in the last type of case, bacterial examination of the stools is always negative for pathogens.

RELATIONSHIP TO KNOWN VITAMIN-B DEFICIENCY DISEASES

The spontaneous remissions of classical pellagra, the classical pellagrous dermatosis on parts exposed to sunlight, and a definite psychosis have never been detected. The course is much more acute and progressive than in classical pellagra. Œdema, skin pallor, failure to digest starch and muscle-fibres (and perhaps fat in childhood) are novel features. The response of this syndrome to large doses of nicotinic acid is extremely disappointing, for although the dermatosis promptly heals, the effect on the diarrhœa is variable and in every case respect the patient deteriorates. All cases had the heart screened but no changes were detected; heart-failure does not occur, and peripheral neuritis is never severe.

The response to large doses of vitamin B_1 has been inadequately investigated; in one case the anorexia and œdema dramatically disappeared, but in others the result was inconclusive. The syndrome does not conform to classical descriptions of pellagra and beriberi. It appears to be a distinct syndrome or a combination of both, and has constantly a gastro-intestinal aspect not commonly described in either of the former diseases.

TREATMENT

Table II sets forth the main results of treatment. Cases did not improve when given an adequate diet: it seemed necessary to add vitamin concentrates. Early cases responded well to supplements of cooked liver (½ lb.) or brewers' yeast (1–2 oz.), given daily. More advanced cases did not respond to oral therapy but improved after very large doses of crude liver extracts, given parenterally. Most cases then slowly improved and became cured to a clinical and radiological examination. Very advanced cases, especially if complicated by infections, did not respond to any form of treatment and soon died. A few improved up to a certain point and then remained stationary as chronic invalids, showing no further improvement either clinically or to X rays.

Fig. 2 (Case 7)—Dermatosis peeling 7 days after beginning nicotinic acid treatment.

The effect of either nicotinic acid or vitamin B_1 is uncertain. The former always clears up the dermatosis, but its effect on the diarrhœa is variable. Vitamin B_1 may decrease the anorexia and the œdema but in other cases the result is uncertain. Parenteral administration of these vitamins, together with other members of the B complex, is probably indicated.

SUMMARY

Prolonged severe malnutrition may produce changes in the movements, and in some of the secretions, of the gastro-intestinal tract. This is reflected in a distinctive radiological picture of deficiency bowel-pattern, which may, however, occur in other conditions and is not specific.

A group of 16 cases of this syndrome are described in Polish refugees, an Englishwoman, an Indian, immigrant Africans and African babies (kwashiorkor).

The gastro-intestinal defect improves if the whole vitamin-B complex is administered. The relationship of this syndrome to pellagra or beriberi is uncertain.

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BETTER DRAINAGE FOR NON-TUBERCULOUS EMPYEMA

ARNOLD K. HENRY, M B DUBL., M CH (HON.) CAIRO, F R C S I
EMERITUS PROFESSOR OF CLINICAL SURGERY IN THE UNIVERSITY OF EGYPT

A CAREFUL collective review by Ehler of more than 1000 cases of non-tuberculous empyema in 1934–39 shows that the death-rate falls with better drainage. This fall is well exemplified in studies made on children by Hochberg and Kramer in New York (1939), and by H. L. Wallace (1938) in Edinburgh. Dealing at their own hospitals with large and comparable series which each embrace an ample use of "closed" and "open" methods, their independent finding is that well-timed rib resection gives fewer deaths than other means of draining pleural pus.

But this reduced mortality is still intolerably high: of 659 cases collected by Ehler of rib-resection done in the stabilised condition, when pus was thick, 98 died (14·8%). Of 185 cases thus drained in the series reported by Wallace, 21 died (11·3%). Hochberg and Kramer lost only 8 patients out of 151, but their low mortality for rib-resection drainage is offset by 12 cases that "failed to respond satisfactorily"—a phrase these surgeons use of patients who remained more than ninety days in hospital, with fever and discharging cavities.

Against this dingy background some brighter patches strike the eye: the pooled results of five surgeons in 194 cases (not included in the figures thus far quoted), with a technique which varied in the hands of one of them, showed a mortality of only 3%. First of these in the field was J. J. Connors of New York who *packed* an empyema in April, 1929.

Roeder, too, used packing a month later in 5 remarkably successful cases, and Stenbuck and Whitaker (1931) reported 3 good results. The latter do not state, however, whether they had any unsuccessful cases, and I omit their figures from the count of 194. Sauerbruch and O'Shaughnessy (1937) mention "tamponade of the wound" applied after the lung has been re-expanded by positive pressure through the mask of a Tigel-Henle apparatus—a different procedure from that of Connors. He, too—like Garrè, Quincke and Sauerbruch before him—advocates the treatment of pulmonary abscess by packing, and certainly his window in the chest should help us to locate the presence of an abscess linked with empyema, and let us drain the lung by an extension of the empyemal pack.

Dealing only with empyema patients (1934)—and not as in an earlier paper (1930) with a mixed lot of cases including the separate condition of lung abscess—Connors treated 74, in sequence from 1931 to 1938. Four of these had intercostal drainage; one died and 3 recovered. One patient who did not heal with intercostal drainage was then packed and cured. Thus 70 patients, two-thirds of them adults, were treated by packing. Biding his time, of course, until the mediastinal wall should stabilise, Connors cut away segments of two ribs, each 2–3 inches long, together with the intervening muscles, nerve and vessels; he thus secured an open window in the chest through which the empyema cavity was cleared and then inspected thoroughly. The empty space was filled at once with gauze, which was withdrawn on the second or third postoperative day; he kept the window open in the chest until the lung had re-expanded. Connors lost 4 cases of 70 treated by packing. With this technique Carnazzo of Nebraska between 1932 and 1938 treated 20 cases with no deaths, and White and Collins (1938) lost 2 cases out of 51. Weinberg (1938) cut a similar large window but did not fill the empyema cavity; he merely kept the window open by invaginating rubber dam whose shallow sac was stuffed with gauze. Weinberg records 53 consecutive cases with no deaths.

THE MIKULICZ DRAIN IN THE BELLY

The excellence of these results, which seem to owe success to thoroughness of drainage, suggests once more that specialties are artefacts and that a single method may have currency in fields considered separate. Repeatedly in 20 years I have been grateful to de Martel for a striking demonstration that a tampon due to Mikulicz, which one instinctively connects with hæmostasis, can work, *when packed less tightly*, as a drain.

During the International Congress of Surgery in Paris (1920) de Martel chanced, in removing a uterus, to wound the rectum. Demonstrating the tear to an audience (which for the third time that week included Charles Mayo) he told them he would counter, or at least reduce, the risk of sepsis by a "Mikulicz." Taking a large towel he thrust the centre of it, like a sac, into the pelvis, which in the high Trendelenburg position was cleared of all but its endemic organs. Through the gathered, wrist-thick neck of the sac he gently filled its fundus with counted swabs until their bulk had loosely occupied the cavity; the last few swabs preserved the lumen of the neck, round which he later closed the belly. This sac, he pointed out, would stop the dip and spread of moving gut, and thus reduce the seeding of infection; meanwhile it gave the mass of gut—packed off above—a chance to stabilise a smooth, uninfiltrated front with no re-entrant pocket. And, even if infection supervened, it would be likely to occur on the surface of a single plain-walled cavity; the pus which formed would do so in a film, between intestine and the Mikulicz, without stagnating into pools or tracts which might in time form leaking abscesses.

De Martel told us that after two days he would remove a swab, and one on each successive day until the sac was empty; by then it should be easy to withdraw the sac itself. He stressed that for removal of the sac no force whatever must be used; if one side stuck, another might be coaxed: the sticky piece came easily next day or the day after. The method served, he said, for dangerous, neglected cases of appendicitis, especially in children where an unwalled infection was about to spread as general peritonitis.

On our return from France we were confronted by a test case of the kind, in an only child, the late-born heir to an estate, who seemed a hopeless risk, but who was saved, we were convinced, by A. A. McConnell's decision to adopt this method. Since then, in Cairo, I have used the Mikulicz repeatedly in kindred cases of appendicitis; the only failure there was when a house-surgeon, relieving one of mine, was shocked to see an unfamiliar drain, and forcibly removed it after twelve hours; the patient died next day of general peritonitis.

THE MIKULICZ IN EMPYEMA

When, therefore, Ehler's review had focused my attention on Connors's method, the drain of Mikulicz—used as I came to use it for the belly—seemed, in perfection, qualified to serve for empyema.

The first case that presented was of three weeks' standing in a man aged 31, infected with a type I pneumococcus and previously assessed for open drainage by palliative aspirations. An X ray showed the left pleura filled to the level of the 2nd costal cartilage. Temperature and rate of pulse were only moderately raised, and his refusal of requests to sign the form consenting to an operation—lest it might lead to a divorce—seemed to suggest insanity. He was in fact profoundly toxic. Under gas-oxygen and procaine anæsthesia I made a window as described by Connors at the 8th and 9th left ribs, first cutting 2½ inch segments from each, together with intercostal structures, and then resecting

pleura, after gradually aspirating pus through a minute and guarded opening. This window let me see and lift out lumps of fibrin, large enough, if left behind, to cost the patient weeks of suppuration. Then, when the cavity was clear, I took a square yard of waterproof batiste, smeared lightly with dilute, non-toxic bipp. of Stoney's formula (where some might be content with other adjuvants). I thrust the centre, bipped side first, deep into the chest, and filled the sac so formed with sterile bandage to make it occupy the whole empyemal space. The superficial musculocutaneous wound was closed round the neck of the sac, just leaving room for smooth withdrawal of the bandage; this we began after 48 hours, taking two or three spans each day. In six days we removed the whole bandage, and the sac, which meanwhile had been shrinking steadily, was "breathed out" by the patient; next day the lung was level with the wound. Three days later we had striking outside confirmation of the peculiar speed with which this empyemal cavity had shrunk to nil: Dr. Duncan White, whose wide experience commands respect in every field of radiology, was so incredulous as to request assurance from the ward that the man sent him after operation was indeed the one on whom he had reported twelve days earlier.

This version of the Mikulicz, whose sac is formed of waterproof batiste, has more than one advantage over naked packs which most of those who use them change at intervals. That troublesome ordeal is shelved by the batiste. Its application will, of course, be limited by factors that condition other forms of open drainage: the mediastinum must not shift as air goes in—a state of fixity to be assessed by diagnostic and (in case of need) by palliative aspiration.

It is a common practice now to wait until the aspirated pus is seven-eighths solid on standing. This test appears to function well in non-traumatic empyema, though it is criticised for causing a delay in timely rib-resection by some who screen their patients to observe the moment when inspiration fails to bring about the normal narrowing of mediastinal structures. Nicholson and Scadding (1944), while seemingly content with the criterion of seven-eighths solidity for pus in postpneumonic empyema, find this guide treacherous in cases of infected hæmothorax:

> "The pleural reaction to infection is much more variable in a hæmothorax than in a postpneumonic empyema, and to assume that adhesions will be strong because the pus is thick is unwarrantable. The only safe way is for the anæsthetist to be prepared in advance to control the lung if few adhesions are found. This is not to advocate early rib resection, but to point out that, even when by ordinary rules drainage should be safe, inadequate adhesions may still be present."

Once this form of Mikulicz is properly in place the air will cease to enter, for tissues of the chest sewed round the neck of the batiste squeeze in and hold it close against the core of bandage; pus, meanwhile seeping out, fills up the gutters that twine round the outer surface of the crumpled neck. Then, too, the residue of sac—projecting widely from the chest and pressed down flat against it with absorbent wool—holds by its bipped face to the skin and, valve-like, stops an inward suction of the air.

AVOIDANCE OF CHRONICITY

This paper so far deals with ways of lowering mortality: a living patient is the first objective in any major treatment. But rapid restitution and quick discharge from hospital are also main considerations, and from this other point of view it is of interest to note the claims made in Carnazzo's paper. His 20 patients (17 children and 3 adults) did not merely live; 18 were up on the 3rd day after operation, one on the 4th, and one on the 6th; all but one patient left hospital in a week, and he was discharged on the 10th day—results in close conformity with Roeder's cases (1930). d'Abreu, Litchfield and Hodson (1944) find that a chronic empyema "is due almost always to inadequate drainage." They stress also "the unpredictable and uneven progress of lung re-expansion" in empyemata which followed thoracic war wounds, and classify resulting cavities as "hour-glass," "saddle-shaped" and "loculated." Such cavities are met with too in non-traumatic empyema, and it is most unlikely that a tube will either check their incidence, drain them as they form, or stop the sealing off of pus which simulates an early cure.

So, it would seem that in the pleura we have the chance to burke one process of chronicity, just as de Martel burked the spread of sepsis in the belly,[1] obtaining with the loose bulk of a Mikulicz (or variants) a single plain-walled cavity, lined by an effluent film of pus which lies between the massive drain and the parietes—a cavity that tends to shrink, with each reduction of the central pack, as evenly as a balloon.

SUMMARY

Successful treatment of stabilised non-tuberculous empyema depends on thorough drainage.

Tubes are a questionable means of draining cavities that shrink unevenly.

A sac of waterproof batiste, thrust into the empyema cavity and filled with bandage, on the Mikulicz principle, provides effective drainage and reduces the chances of chronicity.

My thanks are due to Dr. Grace Chadwick for her careful notes.

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CONGENITAL SUBLUXATION OF ACROMIOCLAVICULAR JOINT

J. GRIEVE, M.B., B.SC. ST. AND.
SQUADRON-LEADER R.A.F.V.R.

IN a previous paper[2] two cases of congenital dislocation of the acromioclavicular joint were described (subluxation would be a more accurate term). At that time a search revealed only Smith's[3] reference to this condition in 1870. His case was in a macerated specimen and the evidence for its being a genuine congenital dislocation was equivocal. Six further cases have been seen in the course of air-crew medical examinations, and a seventh, while not identical, throws some light on the possible origin of the condition. It was possible to examine only the last case radiologically.

The subluxations caused no disability in any of the cases.

CASE-HISTORIES

CASE 1.—Age 17½. This lad gave no history of birth injury and apart from scarlet fever had been completely healthy. He had always known that the ends of both his collar-bones were prominent. His father was said to be similar but no other deformity was known in the family. He was of rather slight build and below average development. Both clavicles were raised 0·5 cm. above the corresponding acromion and there was considerable laxity of the joints. Reduction was easy but completely unstable.

CASE 2.—Age 17½. The prominence of the clavicles had not been previously noted in this lad who had always been healthy and had suffered no birth or other injury. He was an only child and deformities were unknown in the family. He was a keen sportsman. The findings were the same as in case 1, and reduction was easy but unstable.

CASE 3.—Age 22. No deformities were known in this man's family and he had previously been unaware of any prominence of his clavicles. He had been completely free from illness or injury. Both clavicles were raised 0·5 cm. above the corresponding acromion. The joint capsules were very lax and there was a considerable degree of lateral mobility. Reduction was easy but unstable.

1. I learn from Mr. J. E. A. O'Connell that the principle of Mikulicz drainage is sometimes used for abscess in the brain.
2. Grieve, J. *Lancet*, 1942, ii, 424.
3. Smith, R. W. *Dubl. quart. J. med. Sci.* 1870, **50**, 474.

CASE 4.—Age 18½. This lad was the only child in a family said to be free from deformities. He had had no serious illness and had suffered no injury. The lateral ends of both clavicles were displaced 0·5 cm. above the corresponding acromion. The acromioclavicular joints were both very lax. Reduction was easy but unstable.

CASE 5.—Age 22½. A younger brother was known to have "similar prominent collar-bones." Otherwise no deformities were admitted in the family. The patient's personal history showed no relevant disease or injury. The lateral ends of both clavicles were displaced 1 cm. above the corresponding acromion. During deep respiration there was abnormal mobility at both acromioclavicular joints, which were unusually lax. As in the other cases reduction was easy but unstable.

CASE 6.—Age 18½. Apart from pneumonia at the age of 4 years this patient had suffered from no serious illness or injury and he did not know of any deformities in his family. The upward displacement of the lateral ends of both clavicles was 0·75 cm. Both clavicles were freely movable, and reduction was easy but unstable.

CASE 7.—Age 18. This shoe-operative had had concussion and a fracture of the left clavicle in 1938 but knew of no injury to the right shoulder. He had always known that the lateral end of his right clavicle was very prominent. His father and five paternal uncles were stated to be similar but the condition of five sibs was unknown. The lateral end of the right clavicle was very prominent and both acromioclavicular joints were lax. It was difficult to determine clinically whether the condition was due to an unusual angle of the acromion or whether there was an additional ossicle. Movements were all normal and unhindered. A radiogram showed a much enlarged acromion and some hooking of the outer third of the right clavicle. This appearance was similar to that found in one of the congenital subluxations previously X-rayed and recorded.

DISCUSSION

These six cases showed a range of clavicular displacement similar to the two cases already reported. In every instance the condition was bilateral and the evidence suggested a congenital origin. In the seventh case the displacement was slight, but the right acromion showed gross deformity, and the lateral third of the right clavicle was hooked in a manner similar to that seen in one of the cases previously reported. This suggests that some error in development is the underlying cause in all seven cases. In case 7 it was more marked on the right side and had produced considerable bony deformity.

So far it has not been possible to dissect one of these joints. It is probable that the conoid and trapezoid ligaments are hypoplastic and elongated. Whether these congenital subluxations are identical with the traumatic variety must await anatomical examination. These cases show that mere displacement of the clavicle above the acromion need produce no disability, but it was previously found that the deformity might have an undesirable emotional effect on a sensitive personality and that this might be an indication for operative reduction in the traumatic cases even if the function after reduction was no better than before.

SUMMARY

Six cases of congenital subluxation of the acromioclavicular joint are described and a seventh milder case with gross deformity of the right acromion. The exact nature of the condition is still obscure.

Even 1 cm. of displacement of the clavicle may produce no disability. The emotional effect in some cases may be important.

MEALS AND MILK IN NURSERY SCHOOLS.—In the House of Commons Mr. J. CHUTER EDE affirmed that when giving legislative effect to the scheme of family allowances children in nursery schools will receive the same benefits as those in other types of primary schools.

DYSENTERY AMONG BRITISH SOLDIERS IN INDIA.—Mr. AMERY gave the rate of admissions to Service hospitals in India for dysentery and kindred illnesses as less than 7½% in 1943–44, as compared with the pre-war annual rate of 5½%.

FLUORESCENCE MICROSCOPY IN THE DETECTION OF TUBERCLE BACILLI

HYME LEMPERT, M B, M SC MANC., A R I C
FLIGHT-LIEUTENANT RAFVR; LATE RESIDENT CLINICAL PATHOLOGIST, MANCHESTER ROYAL INFIRMARY

RAF Institute of Pathology and Tropical Medicine

IN 1881 Robert Koch [1] discovered the simple method of heat-fixing materials on microscope slides before staining and examining them microscopically for bacteria. This was to play a great rôle in the detection of micro-organisms. In 1882 Koch stained the tubercle bacillus (*My. tuberculosis*) in heat-fixed smears by means of alkaline methylene-blue. In the same year Ehrlich improved the method, using fuchsin or methyl violet in aniline-water. Ehrlich showed that the colour in the stained bacilli was "acid-fast" and could not be discharged with a strong reagent such as 30% nitric acid. Counter-staining with methylene-blue had no effect on the acid-fast bacilli except to facilitate their detection. During the next three years modifications of this method were devised by Ziehl and Neelsen, who substituted phenol for aniline and sulphuric for the nitric acid. The staining time was reduced to a matter of minutes by the well-known process of steaming. The Ziehl-Neelsen method has, until recently, been the method of choice for staining acid-fast bacilli. For the detection of these bacilli, of which the tubercle bacillus is the most important, a microscopical examination using an oil-immersion objective is essential; this gives a magnification of about 1000 ×. Since each field under observation actually only occupies a minute area on the slide—approximately 0·03 sq. mm. with an 8 × eyepiece—a painstaking examination may still leave parts unexamined, especially if the smear is large. Experience has shown that a negative report should not be given unless an intensive search has been made for at least 15 minutes. In most hospital laboratories the number of positive specimens are not more than a few per cent. of all the numerous specimens sent in for investigation. Even in dispensaries for the detection of tuberculosis suspects, the proportion of positives is not much higher than 15%. From such facts it can be seen that a busy laboratory may spend many hours daily in the examination of negative sputa. A speedier yet reliable method has been required for a long time.

Hagemann in 1937 introduced a method into bacteriology which appears to go a long way towards solving this problem. Employing the method of "secondary" fluorescence microscopy, Hagemann [2] showed that several filterable viruses could easily be made visible. When he applied this method for the study of the acid-fast bacilli *My. leprœ* and *My. tuberculosis* he found that they could be detected with magnifications as low as 200 ×. These promising results have been confirmed by other research workers on the Continent and in the USA—Hermann,[3] Keller,[4] Kuster,[5] Bogen,[6] Richards, Kline and Leach,[7] Thompson,[8] Lind and Shaughnessy,[9] Graham,[10] and Lee.[11] All these workers have modified Hagemann's method more or less, but the essentials which he devised are used by all of them. Crossman and Lowenstein,[12] Tanner,[13] Bachman and Finke,[14] Shalloch,[15] and Finke [16] have adapted the method for the detection of tubercle bacilli in tissue. Kuster [5] has also applied the method for the detection of *C. diphtheriæ*.

FLUORESCENCE IN BACTERIOLOGY

The modern conception of radiated energy is based on a wave theory. Radiated energy includes X rays, ultraviolet or U-V rays, visible light rays, infra-red rays and wireless waves. The wavelengths of these rays may be as short as 10^{-9} cm. in the case of X rays, or as long as 10^{6} cm. in wireless waves. A convenient way of expressing the size of these wavelengths is the Angstrom unit ($1A = 10^{-8}$ cm.). The rays which constitute visible light vary from about 4000 A to 7000 A; X rays 0·1 A to 1000 A; U-V rays 140 A to 4000 A. The longer waves of the U-V region, of wavelengths 3000–4000 A, are called "near U-V" rays. They have played an important part in the development of fluorescence-microscopy for the detection of tubercle bacilli.

Many chemical compounds, whether alone or in plant cells, body cells, bacteria or filterable viruses, possess the

property of absorbing U-V rays and re-emitting radiations of longer wavelength. The re-emitted rays may thus come into the range of visibility and their presence be recorded by the eye by macroscopical, microscopical or photomicrographical means. This property is known by the general term "luminescence." The mechanism of this change of wavelength, which involves an interchange of energy, has been explained by means of the electronic theory of matter. If the effect only lasts during the period of excitation it is called "fluorescence," while if it persists after the exciting agent is removed it is called "phosphorescence." There are many applications of the property of fluorescence which are ably described in textbooks on the subject.[17 18]

In bacteriology the principle of fluorescence has been applied for the detection of viruses in the unstained state during the past thirty years. Dyes called "fluorochromes," which enhance the fluorescence effect of substances they stain, have been known for some time. This enhancement has been given the name of "secondary" fluorescence. Haitinger and his co-workers [19] have made good use of this technique in many botanical and biological studies. Hagemann appears to have been the first to apply the technique to studies in bacteriology successfully. The apparatus he used was made by Zeiss and must have been very costly. Everything possible was done to obtain a high concentration of U-V rays. The source of these rays was an electric arc. Many of the lenses and the microscope slides were made of quartz glass. The heat from the lamp was so intense that it was found necessary to allow the radiations to pass through a 5–10% copper sulphate solution in a special quartz cell. The U-V rays which passed through were thus freed from heat rays. In front of the cell a special "dark glass" filter (probably similar to Wood's glass) was placed, which eliminated most of the visible rays. The issuing rays were then concentrated by means of a quartz condenser and reflected into the microscope by a quartz prism. The microscope substage condenser lenses were also made of quartz glass. On the other hand, the objectives and eyepiece lenses were no different from the lenses found in ordinary microscopes. A yellow filter on top of the eye-

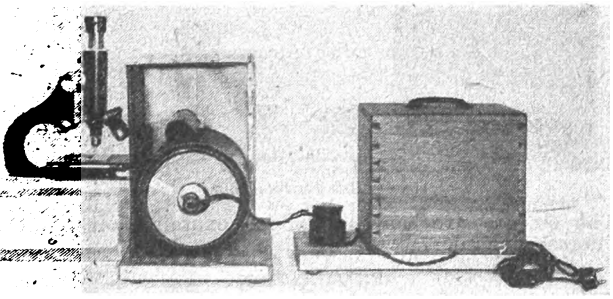

Fig. 1—Apparatus assembled for working.

iece prevented any U-V rays from entering the eye of the observer.

Workers who have followed Hagemann have shown hat such elaborate apparatus is certainly not necessary r the detection of tubercle bacilli by means of "secondy" fluorescence microscopy. U-V rays in sufficient ncentration can be obtained from a small mercury-apour lamp suitably filtered by Wood's glass or other ecial dark glass filters. It has also been shown that uartz glass lenses are not required and that the ordinary ane silvered mirror can be used to reflect the U-V rays to the microscope. With this source of U-V rays there no need for the copper-sulphate cell.

The fluorochromes used by Hagemann were: for ruses, primulin; for *My. lepræ*, berberine sulphate; *My. tuberculosis*, auramine.

The original Hagemann technique for detecting tubercle bacilli consisted of the following steps:

Thin smears of sputum, &c., were heat-fixed in the usual manner. Staining was carried out for 15 minutes at room temperature with an auramine-phenol solution (1 g. auramine, 1000 c.cm. water, 50 c.cm. liquefied phenol). The smear was then washed in water and decolorised with an acid-alcohol mixture (0·4 g. conc. HCl, 0·4 g. NaCl, 100 c.cm. 70% methylated spirits). Two lots of the decoloriser were applied, each for 1½ minutes. The smears were washed well in water and then dried. No counterstain was used. The smears were now ready for examination in the fluorescence microscope. (Hermann and Bogen warm the stain and use a counterstain of potassium permanganate and methylene-blue. The advantage of the methylene-blue is questionable.)

Hagemann stated that the tubercle bacilli appeared as tiny bright yellow rods against a dark-coloured background. The magnification required was only 180 ×. On enlargement to 600 ×, the morphological characteristics were very clearly defined. Further enlargement was not necessary, but if one wished an oil-immersion objective could be used. Glycerin was used instead of cedar-wood oil, which did not give a good contrast owing to its own fluorescence.

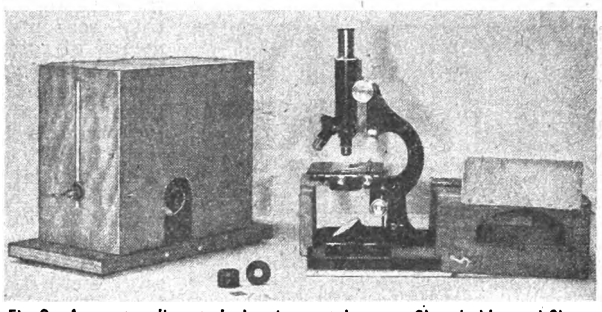

Fig. 2—Apparatus dissected, showing metal screen, filter-holder and filter, and light-tight box slid back with flaps raised.

APPARATUS

Mercury-vapour lamps and cinema projection lamps with special filters to keep back most of the visible light have been used by American and Continental workers. Apparatus of this type is manufactured by several American firms. Graham [10] constructed his own apparatus. I tried to repeat his work but had difficulty in obtaining suitable lamps. Owing to war-time conditions it was not possible to obtain factory-made apparatus and I decided to utilise existing materials. Such apparatus is set up for working as shown in fig. 1. It consists of—

(1) A microscope with a yellow filter and filter holder over the eyepiece.
(2) A light-tight box below the platform of the microscope to prevent U-V light being scattered into the room.
(3) A 'Mercra' lamp (BTH) enclosed in a housing which is carried on a wooden stand.
(4) A metal screen, which prevents any appreciable heat from the lamp reaching the operator.
(5) A choke in series with the mercury-vapour lamp. This is kept on a separate base and enclosed in a box to eliminate hum.

Microscope assembly.—The microscope shown in fig. 1 is of foreign make, but British microscopes give as good results, in fact I now use Watson objectives and eyepiece. A good substage condenser is essential. The following Watson objectives can be recommended for this work with an 8 × eyepiece: a ⅔ in., a ¼ in. NA 0·68, and a ⅛ in. NA 0·70. The U-V rays are reflected into the microscope by the plane mirror. The light-tight box seen in the illustrations was constructed to prevent U-V rays being scattered into the room and annoying nearby workers. This box is provided with two doors so that the mirror can easily be adjusted. The mirror is about 4½ in. from the U-V lamp bulb. The microscope is fixed to the base of the box. By means of pegs the box fits tightly against the lamp-housing. The holes for these pegs can be seen in fig. 2.

The yellow filter should not fluoresce in U-V light. Originally I prepared gelatin filters and enclosed them between two counting-chamber coverslips. The gelatin filters were made from a 10% solution of gelatin containing the yellow dye, tartrazine. Recently, suitable yellow-glass filters have been obtained from Messrs. Watson & Sons, Ltd., Barnet. The filter holder, which was manufactured by Messrs. Flatters & Garnett, Ltd., 309, Oxford Road, Manchester 13, from my design, is seen dismantled in fig. 2. A light green filter gives a very good contrast but there may be a little difficulty in focusing.

Source of U-V rays.—The mercra lamp, manufactured by British Thomson Houston, Ltd., Crown House, Aldwych, London, is seen in fig. 3. It is a 125 watt mercury-vapour lamp and when wired in series with a choke can be operated from the AC supply of 200–260 mains voltage. The lamp is only 7 in. long and 3½ in. wide at its widest part. The glass bulb is made of dark glass which filters off most of the visible rays. No extra filters are required; 95% of the radiation is said to be of wavelength 3650 A. I found that some parts of the glass bulb were more favourable for fluorescence microscopy than others. For this reason a means of rotating the lamp was devised and the handle for this purpose can be seen in fig. 1. When the lamp is switched off, it has to cool down before re-switching has any effect. This takes about 5–10 min. This fact should always be borne in mind before switching off the lamp. The mercra lamp used in these investigations has not deteriorated after six months frequent use. It costs about £2 10s. The choke costs about £2.

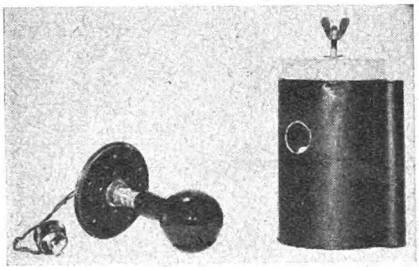

Fig. 3—Mercra lamp and housing.

The lamp-housing shown in figs. 1 and 3 was made from a 5 lb. 'Ovaltine' tin. Along one side, three 1 in. holes were punched. Diametrically opposite, another three similar holes were made. These six holes ventilate the housing effectively. The upper series of holes were covered by a cowling soldered to the housing. This prevented scattering of rays into the room. A hole, 1¾ in. diameter, was cut out in the position shown. This hole is directly in line with the mercury-vapour arc. The lamp-housing was painted dull black inside and out. The lid of the tin was made rigid by screwing on a disc of plywood, as shown. A circular piece of wood fastened to the bottom of the housing carried a bolt which enabled the housing to be fastened in a horizontal position to the stand. This piece of wood was insulated from the tin by an asbestos disc. The method of rotating the housing is thus independent of the means of rotating the lamp, described above.

The lamp-housing stand is made from two pieces of wood each ⅞ in. thick. The base is 14½ in. × 8½ in. and the upright is 10½ in. × 7 in. and contains a slot ⅜ in. wide to take the bolt of the lamp-housing. The base was placed on rubber buffers. The screen was constructed from a piece of thin sheet metal 18 in. × 12 in. It was given rigidity by steel angle brackets. The aperture for allowing the U-V rays to fall on the mirror of the microscope can be seen in fig. 2.

The choke and its mounting are seen in figs. 1 and 4. A separate mounting was found necessary because of the hum which developed when the choke was in action. The base was made of wood 12 in. × 7½ in. × ⅞ in., on rubber buffers. The choke was placed on a piece of felt about 1 in. thick. The fixing bolts were mounted in rubber. A wood cover 8½ in. × 7½ in. × 6½ in. placed over the choke eliminated the hum.

STAIN AND SOLUTIONS REQUIRED

(1) *Auramine.*—A yellow powder easily procurable and cheap. The stain sold by Messrs. G. T. Gurr, Ltd., London, was used in this investigation.

(2) *Stock 3% phenol solution.*—Made from pure phenol crystals dissolved in distilled water and kept in a well-stoppered dark bottle.

(3) *Auramine-phenol solution.*—To make this 100 c.cm. of stock 3% phenol solution is warmed to 40° C and 0·3 g. of auramine (Gurr) is added gradually with vigorous shaking. This produces a bright yellow turbid fluid with a scum. Filtration through ordinary filter-paper removes the scum. The fluid is now ready for use. It becomes much clearer on standing. Kept in a well-stoppered dark bottle it keeps for 3 weeks without any loss in staining properties. It probably keeps longer but this has not been fully investigated.

(4) *Acid-alcohol decoloriser.*

0·5 c.cm. conc. HCl.
0·5 g. NaCl.
75 c.cm. methylated spirits.
25 c.cm. distilled water.

In a well-stoppered bottle this solution does not deteriorate.

(5) 0·1% *potassium permanganate solution.*—This is prepared with distilled water. It deteriorates very slowly with the formation of a brown precipitate. When the latter becomes excessive, after many weeks, a fresh solution is prepared.

For bench work, solutions (3), (4) and (5) were kept in dropping-bottles. For staining large numbers of slides it would have been much easier to keep the solutions in staining jars with a removable holder for the slides. These are difficult to obtain at present. Four or five jars would be necessary for the whole process.

STAINING TECHNIQUE

Smears of sputum or centrifugalised urine deposits are made on 3 in. × 1 in. slides in the usual way and fixed by heat. The name of the patient is scratched on the slide with a writing diamond. This is very important as the acid-alcohol removes grease pencil markings. The smears are processed on a staining rack as follows—

(*a*) Stain with auramine-phenol solution (3) for 8–10 minutes at room temperature.
(*b*) Wash well with tap water.
(*c*) Apply acid-alcohol decoloriser (4) in two lots for 2 min. each.
(*d*) Wash well with tap water. (No trace of yellow colour is now visible.)
(*e*) Apply permanganate solution (5) for 20 sec.
(*f*) Wash well with tap water.
(*g*) Blot off excess water.
(*h*) The slides are usually left to dry at room temperature. No more than lukewarm heat is ever applied to hasten drying.

With thin smears no staining appears to have taken place but thicker smears show a light brown staining.

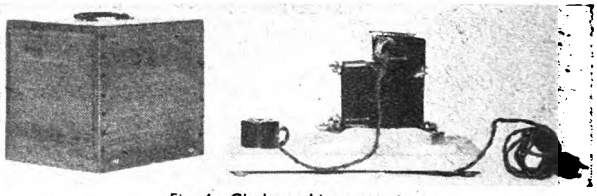

Fig. 4—Choke and its mounting.

The smears are now ready for examination in the fluorescence microscope.

EXAMINATION

The microscope assembly and lamp-housing are set up as in fig. 1. For convenience in taking the photograph the choke mounting is shown close to the lamp-housing. In actual practice the choke mounting was kept under the bench or in a cupboard, with a longer lead. There is no need for a completely darkened room. This apparatus was operated in a laboratory where there were five large windows along one wall. An end window was blacked out with a curtain and the apparatus placed opposite. The rest of the laboratory workers were not inconvenienced in any way. The amount of shading in other laboratories will be ascertained by experiment.

On connecting the apparatus to the mains, the mercra lamp lights up at once, but it takes about 4 min. to reach maximum intensity. The microscope substage condenser is racked up as high as possible, as shown in fig. 2.

The first objective to be used is the ⅔ in. The slide is not yet placed on the stage. By manipulating the reflecting mirror and the position of the objective, an image of the mercury-vapour arc is brought sharply into focus. Because the yellow filter is on top of the eyepiece the arc does not appear very bright and one can view it without any discomfort (see fig. 5*a*). This preliminary focusing of the arc saves endless trouble to the beginner when he wishes to focus the smear later.

The slide is now placed on the stage and the objective lowered very slowly until the smear comes into focus.

A known strongly positive smear should be used for this purpose at the beginning of every session of examination. If the lamp is in the correct position the tubercle bacilli appear as bright yellow tiny needles against a dark red background. Other remnants of the smear appear black or dull green. Sometimes other yellow fluorescent particles may appear. Usually they are large and amorphous and cannot possibly be mistaken for bacilli, but if they are pin-point they must be investigated further with the higher powered objectives. So far, it is assumed that the lamp is in the correct position. If the

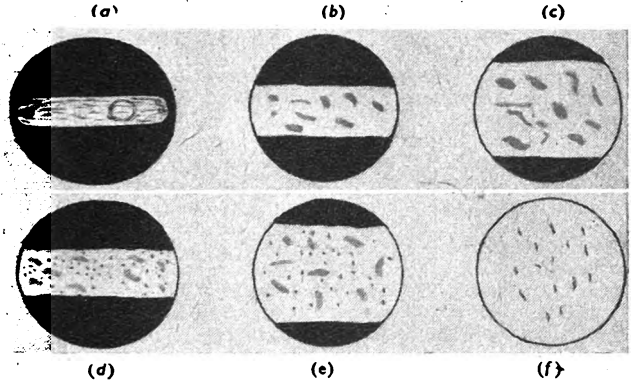

Fig. 5—Diagrams o fields of view explained in text. (*a*) Image of mercury-vapour lamp. (*b*) Negative sputum ⅔ in. objective. (*c*) Negative sputum, ⅛ in. objective. (*d*) Positive sputum, ⅔ in. objective. (*e*) Positive sputum, ⅛ in. objective. (*f*) Positive sputum, ⅛ in. objective; the bacilli are a sparkling light yellow, and not black as in the diagram.

lamp is not in the correct position the background will appear diffused and the contrast made less striking. In such cases the handle on the outside of the lamp-housing is turned slowly backwards and forwards until the optimum contrast is obtained, as in fig. 5*d*. The position of the lamp remains steady for the remainder of the session.

Any suspicious bright yellow tiny needles or points are at once examined with the ⅛ in. Switch this objective into position and re-focus. A view as in fig. 5*e* will be seen in which the tubercle bacilli appear as small bright yellow rods. Still more convincing is the view with the ⅛ in. (fig. 5*f*). The bacilli appear as large as those seen in Ziehl-Neelsen preparation with an oil-immersion objective. The background with the ⅛ in. is very dark red, which contrasts well with the clearly defined yellow bacilli. In many cases typical beading and angulation will be seen.

The beginner will want to convince himself further by using the $\frac{1}{12}$ in. oil-immersion objective. Place a drop of pure glycerin on the slide and re-focus. A striking view is obtained of the bright yellow bacilli against an almost black background. After a few of these glycerin-immersion examinations there will be no need to bother with them again except for demonstration purposes.

Negative sputa appear as shown in figs. 5*b* and 5*c*. When no bacilli have been found after a minute with the ⅔ in., it is advisable to switch over at once to the ⅛ in. and search for another 5 min. If no bacilli have been found at the end of that time the specimen is reported negative. There does not appear to be any advantage in searching for a longer time. The important thing to bear in mind is, that no fluorescent particle is taken to represent a tubercle bacillus unless it appears as a relatively bright yellow or greenish-yellow rod when viewed with the ⅛ in. objective. If the bacillus shows beading or angulation, then very little doubt remains as to its nature.

Diagrams or even photomicrographs can do little justice to the actual fields seen with the fluorescence microscope. Fig. 5 has been included merely as a guide.

SPECIFICITY

Smears from colonies of the following were made: *H. influenzæ*, Friedländer's bacillus, *Bact. coli*, *Pneumococcus*, *Staph. pyogenes aureus*, *Staph. albus*, *Strep. hæmolyticus*, *Strep. viridans*, *N. catarrhalis* and *N. meningitidis*. All these organisms were stained with auramine-phenol but could be completely decolorised with acid-alcohol. *My. tuberculosis* was the only organism which resisted decolorisation. The smegma bacillus, as is well known, is decolorised by acid-alcohol. Kuster[6] states that using the auramine-phenol method the smegma bacillus may fluoresce very weakly and cannot be confused with the brightly fluorescent tubercle bacillus; I have confirmed his findings.

COMPARISON OF THE Z-N AND F-M METHODS

For sputum.—A comparison of the Ziehl-Neelsen and fluorescence methods was made possible by the coöperation of Dr. D. P. Sutherland, senior tuberculosis medical officer for Manchester, and his staff. Miss N. E. Fowler, technician in the laboratory of the tuberculosis offices, prepared all the smears in this investigation and stained those which were intended for the Ziehl-Neelsen part of the test. At the tuberculosis offices about 300 specimens of sputum from new and old suspects are examined each month. During June and part of July this year every specimen was tested by the Ziehl-Neelsen and the fluorescence methods.

Previous workers on this type of parallel experiment have never stated the actual method of the preparation of the smears. In this experiment a small amount of sputum was placed on a slide and then covered with another slide. The sputum was then evened out and the slides separated. Two smears were thus obtained. One smear was stained by Miss Fowler, using the Ziehl-Neelsen method. Each stained smear was examined by her and also by a tuberculosis medical officer. No smear was reported negative until a thorough search had been made for at least 15 min. The other smear was stained by myself in the clinical laboratory of the Manchester Royal Infirmary, using the auramine-phenol method of staining and examination in the fluorescence microscope. No smear was reported negative until a thorough examination had been made for 6 min. Each investigator wrote down his results and they were examined side by side each morning. Dr. Sutherland acted as referee. The results were as follows:—

Series	1	2	3	Total
Number of specimens	100	100	100	300
Positive by F-M method within 6 min. search	16	13	16	45
Positive by Z-N method within 15 min. search	12	11	13	36
Positive by F-M method within 6 min. search Positive by Z-N method only after searching smear again for 15 min.	1	1	1	3
Positive by F-M method within 6 min. search Positive by Z-N method only after a repeat smear and 15 min. search	1	1	1	3
Positive by F-M method within 6 min. search Negative by Z-N method even after a repeat smear and protracted search	2	0	1	3
Negative by F-M method Positive by Z-N method	0	0	0	0

F-M = Fluorescence microscopical method.
Z-N = Ziehl-Neelsen method.

For urine deposits.—Smears of centrifugalised urine deposits in which tubercle bacilli were found with difficulty by the Z-N method were re-examined by the F-M method. The bacilli were found very quickly.

For pus from abscesses, in CSF, pleural fluid, tissue, &c.—Their suitability for F-M examination is being investigated further. The morphology of the bacilli in such materials differs somewhat from the bacilli seen in sputum and urine deposits.

DISCUSSION

The need for a more rapid and efficient method of examining smears for tubercle bacilli has been satisfied by the use of secondary fluorescence microscopy. Out of the 300 sputa examined in parallel by the old and new methods, there was not one case where the F-M method failed to confirm the positive findings of the Z-N method. On the other hand, two expert investigators using the Z-N method reported 3 specimens as negative, even after making repeat smears, when specimens from the same

bits of sputa examined by the F-M method always revealed a small number of bacilli. Admittedly only 5–12 bacilli were seen, but they were so typical that a positive report could be given with confidence. I had no knowledge of the medical histories of the cases before handing in my daily report, but I then learned that the patients in question were strongly suspect. The patients were asked to bring further specimens and these were found to be definitely positive by both methods.

Three other patients were reported positive by the F-M method but negative by the Z-N method. On the strength of this, the Z-N smears were re-examined and after an intensive search a few bacilli were found. Another three patients were found positive by the F-M method but negative by the Z-N method. Re-examination of the Z-N smears failed to reveal bacilli. Fresh smears were made, stained and examined. This time in each case a few bacilli were found.

There are two main reasons which explain the superiority of the F-M method in spotting bacilli in weakly positive sputa.

(*a*) *Increased area of smear in each field.*—With an 8 × eyepiece the areas are as follows:—

Objective	Area of slide examined	Remarks
⅔ in.	2·01 sq. mm.	With the mercra lamp only 0·67 sq. mm. available (figs. 5*b* and 5*d*).
¼ in.	0·38 sq. mm.	Practically all the field can be see clearly (figs. 5*c* and 5*e*).
⅛ in.	0·12 sq. mm.	Whole field seen clearly (fig. 5*f*).
1/12 in.	0·03 sq. mm.	Practically the whole field can be seen clearly.

Thus with a ¼ in., each field is over 12 times the area of the 1/12 in. field. The area of an average smear is about 1000 sq. mm.

(*b*) *Increased contrast between stained bacilli and background.*—This is a great advantage and allows the slide to be moved across the stage at a relatively greater speed. The eye is quickly attracted by fluorescent particles.

An increase in the number of positives by the F-M method has been shown by all other workers who have carried out parallel experiments against the Z-N method. Usually the increase has been greater than in the present investigation. This may have been because the smears were not made in the manner described above. Different loopfuls of sputum taken from the same tin contain varying numbers of bacilli. This is especially liable to occur when the specimen contains small bits of sputum together with a large amount of saliva.

Hermann [3] and other workers have recommended that for the F-M method the smears should be steamed as in the Z-N method and that a counterstain be used. I can find no advantage in these added manœuvres. The permanganate wash invented by Hermann is certainly very useful and has been incorporated in the staining technique described above. Lee [11] holds that a 25% sulphuric acid and alcohol decoloriser is superior to the weak acid-alcohol mixtures used by most workers. I cannot find any apparent advantage. Some workers say that smears stained by the auramine-phenol method soon fade. This has not been my experience. Preparations have kept well for demonstration purposes for more than two months; they probably keep much longer. The relatively weak auramine-phenol stain is pleasanter to work with than the strong carbol-fuchsin stain. The acid-alcohol decolorising time has the advantage of being fixed at 4 min. The mercra lamp has solved the problem of U-V filters, and with a yellow filter on top of the eyepiece there is no risk of ill effects to the eye.

An improvement would be a metal tunnel from the lamp-housing to the microscope, with facilities for manipulating the mirror; this would replace the light-tight box. Another improvement would be the use of staining jars with interchangeable slide-holders for staining large numbers of smears.

A complete switch-over to the F-M method is not advisable. Known positives should be examined by both methods for some time. A short parallel experiment as described in this paper should then be carried out. The results should very soon convince one of the advantages of the F-M method. The method should be especially welcomed in all laboratories connected with sanatoria, dispensaries for tuberculosis suspects and hospitals where large numbers of sputum specimens are sent in for examination daily. It will save valuable time for laboratory personnel and patient.

SUMMARY

The principles of fluorescence microscopical (F-M) examination are described.

The application of the F-M method to the detection of tubercle bacilli has been investigated.

The modified method of staining at room temperature used appears to be specific for the tubercle bacillus. The apparatus, which incorporates the BTH mercra lamp and is not expensive or difficult to construct, can be used for routine examinations of sputum and urine. Directions are given for manipulating the apparatus and searching smears for tubercle bacilli.

The method reduces the time for examination by about half. The bacilli can be "spotted" with a ⅔ in. or ¼ in. objective, using an 8 × eyepiece. The ⅛ in. is used as a "confirmatory" objective. No oil-immersion objective is required.

With one investigator using the F-M method and two investigators using the Ziehl-Neelson method, 300 sputa were examined. The reports by the F-M investigator were obtained more rapidly and showed an increase of positives over the Ziehl-Neelson method.

My thanks are due to Prof. S. L. Baker, School of Pathology, and Dr. J. M. Nuttall, School of Physics, Manchester University, and their assistants Mr. F. Ward and Mr. W. Kay; Dr. D. P. Sutherland, senior medical tuberculosis officer, Manchester, and his staff; my colleagues in the clinical laboratory, Dr. R. Herring, Dr. S. H. Jackson and Mr. J. Southall; my friends in the Infirmary workshops, Mr. Holmes, Mr. Webb and Mr. Toole; Mr. Butler of Messrs. Gaskell, Ltd., Withington, Manchester; and my wife, Dr. Susanne M. Lempert.

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DELAYED RUPTURE OF THE SPLEEN

LEON GILLIS
M B WITWATERSRAND, M CH (ORTH.) LPOOL, F R C S E
SENIOR SURGEON, QUEEN MARY'S (ROEHAMPTON) HOSPITAL

THE spleen is commonly ruptured directly by external violence, and less commonly is involved in an open wound. Indirect injuries, such as sudden rotation, flexion or extension of the trunk, rarely damage the spleen. Such splenic enlargements as those of malaria, typhoid and septicæmia predispose to easy and even spontaneous rupture, and this may also be due to perisplenic adhesions. Spontaneous rupture of the normal spleen has been described, but in most of the reported cases it has been suspected either that a history of injury has been concealed by the patient, or that at the moment of injury the spleen has been the seat of congestion. Cases of rupture of the spleen can be divided into four clinical classes (Hamilton Bailey [1]).

1. Emergency Surgery, Bristol, 1944, p. 207.

1. *Rapid death of the patient.*—Cases are recorded where the spleen has been completely evulsed by an injury, and autopsy has shown that the spleen was lying in the pelvis and the peritoneal cavity was full of blood.
2. *Shock and signs of rupture.*—The immediate traumatic shock in these cases is usually considerable, with a history of injury to the left loin and obvious bruising. There is pain in the loin and referred diaphragmatic pain in the left shoulder (Kehr's sign). Tenderness can be elicited in the flank and rigidity in the lumbar muscles. If the hæmorrhage has remained subcapsular the spleen is enlarged and sometimes palpable. Hæmorrhage into the splenic pedicle and retroperitoneum leads to fixed dullness in the left loin, and in trancapsular rupture to hæmoperitoneum, which gives shifting dullness most obvious in the right loin (Ballance's sign).
3. *Delayed symptoms.*—After the initial shock has passed off the symptoms of a serious intra-abdominal catastrophe are postponed for days or even weeks, as will be seen from the case described here.
4. *Spontaneous recovery.*—Cases have been recorded where the spleen was supposed to have been ruptured, and with rest the patient has recovered. This type of case however is not important surgically because the surgeon cannot assume that spontaneous recovery will occur.

CASE-RECORD

The patient was admitted to hospital on Sept. 24, 1941, complaining of severe pain for four hours across the upper abdomen and referred to the left shoulder. He had had similar but not so severe pains during the past week. There had been no vomiting, and his bowels had been regular during the past week. The patient said he had fallen down a shaft 10 days previously and had gone to the hospital for a contused side and been sent home. He attributed the present attack to a quarrel with his wife.

On admission the patient was shocked and pale, very restless, and dyspnœic. His pulse was good and regular, BP 110/75 mm. Hg. His lower abdomen was distended. His respiratory system showed diminished air entry and some dullness at the left base. He was placed in an oxygen tent and treated for shock. He improved sufficiently to be taken out of the oxygen tent and X rayed with the portable machine to exclude a pulmonary condition. On the 25th a diagnosis of rupture of the spleen was made. The patient was given two pints of blood before operation. The abdomen was then opened through a left paramedian incision. The peritoneal cavity was full of blood, and it was immediately evident that the spleen had been ruptured. The blood was mopped up and a splenectomy performed. Since the spleen had been ruptured for nearly a fortnight and had undergone autolysis it was very difficult to handle. The patient made an uninterrupted recovery.

Delay in serious bleeding in these cases may be explained in one of three ways. (1) The great omentum may insinuate itself into the tear and prevent further hæmorrhage by shutting off that portion of the peritoneal cavity; (2) a rent in the spleen may be sealed temporarily by blood-clot; or (3) a subcapsular hæmatoma may form and later burst. In the present case it is thought that the spleen had been ruptured on the initial injury, and that a subcapsular hæmatoma had formed which subsequently burst.

AUTOGRAFT OF AMPUTATED THUMB

STUART GORDON, M D TORONTO
LIEUT.-COLONEL RCAMC

Gillies [1] in 1940 described a suggested operation for replacement of a severed digit. Recently I have treated a patient on the lines he proposed.

At 11.30 hours a soldier suffered a traumatic amputation through the middle of the proximal phalanx of the left thumb. On his arrival at hospital about 2 hours later, one digital nerve was the only communication between the stump and the distal portion of the thumb. He was operated upon at 15.00 hours.

On removing the skin, subcutaneous tissue, nail, and nail-bed from the amputated portion it was found that the capsule of the interphalangeal joint had been torn open on its dorsal aspect, and that the fracture was a T-shaped one, with the vertical line running distally into the joint. The two distal fragments so formed were each rotated through 180°, so that their medullary surfaces pointed medially and laterally. These fragments were placed in their proper position relative to each other, and a hole was drilled through the reformed shaft. A stainless-steel wire was passed through the hole and the two fragments were wired together. On bringing the proximal and distal parts of the phalanx together it was obvious that a small portion of bone was missing from the dorsal surface. A hole was drilled through the proximal bit of phalanx, and—by utilising the hole in the distal portion—the two main fragments were wired in apposition. In view of the relatively poor fixation of the main fracture it was considered inadvisable to suture the tendons; a decision also influenced by the fracture into the joint.

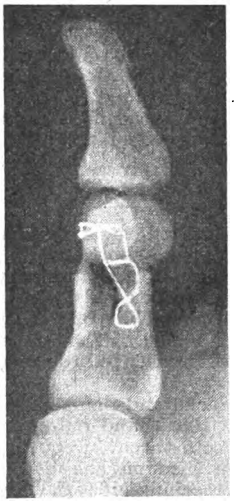

Fig. 1—Contact print of X-ray photograph taken a few days after first operation.

Fig. 3—Appearance of thumb 18 weeks after injury.

A flap was raised on the anterior abdominal wall, thinned and tubed; the denuded portion of the thumb was inserted into the tube, which was then sutured to the skin edge of the stump. Three weeks later the tube was opened on the palmar surface and the flexor longus pollicis tendon sutured. As the interphalangeal joint could not be moved passively it was not thought necessary to repair the extensor tendon (fig. 1). Two weeks later the tube was narrowed just beyond the tip of the distal phalanx (fig. 2). After another three weeks the tube was divided, and the end was trimmed and closed.

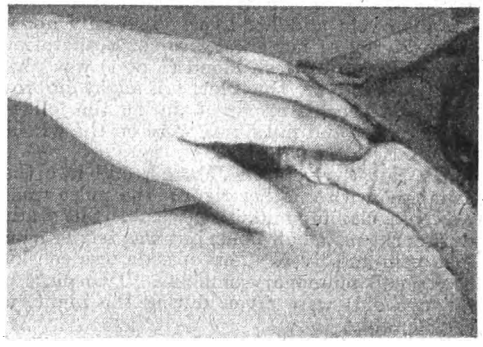

Fig. 2—Appearance of thumb three weeks after first operation.

Four months later the patient had a thumb which could be approximated to the tip of each finger, and could grip; but it did not move at the interphalangeal joint, and it was still insensitive to both epicritic and protopathic sensation (fig. 3).

The result has justified Gillies' prediction that the procedure was feasible. Complete treatment took a long time because a rather small skin attachment was made originally, and because the fixation of the fracture was somewhat insecure. A tiny ulcer persisted at the tip of the graft for some time.

If a similar opportunity presents again, I propose to dissect the digital nerves, suture them, and include them in the repair; if the fracture can be fixed more firmly, to suture the tendons at the original operation; to obtain a bigger attachment for the donor skin, even if skin of the stump has to be sacrificed; and to attach the flap so that the suture line will be to one or other side of the dorsum.

1. Gillies, H. *Lancet*, 1940, i, 1002.

SEPTICÆMIA DUE TO BACT. NECROPHORUM AND AN ANAEROBIC STREPTOCOCCUS

H. P. JONES, MB LOND.
MEDICAL OFFICER EMS, AT JOYCE GREEN HOSPITAL, DARTFORD

REVIEWING the recorded cases of necrobacillosis in man, Forbes and Goligher[1] noted that the organism had rarely been recovered from the blood. In an annotation commenting on this,[2] it is stated that cases of septicæmia due to anaerobic streptococci and *Bacterium necrophorum* occasionally recover. In the case here reported, septicæmia due to these organisms followed an abortion.

A woman, aged 29 years, was admitted to a London hospital on Dec. 14, 1943, for an incomplete abortion. She had had four previous pregnancies, all normal. On admission there she had a hæmoglobin of 66%, and white-cell count of 12,000 per c.mm. By the 20th the hæmoglobin had fallen to 50% and the white-cell count to 10,000. The uterus was evacuated on the 28th and she was transferred to Joyce Green Hospital on the 29th.

On Dec. 30 she complained of headache and pains in the back and legs; her temperature was 103° F and pulse-rate 120 per min. There was no cough, sore throat, frequency of micturition, or meningism. From then on she had a swinging temperature, occasionally reaching 105° F. She began having rigors on Jan. 1, and in spite of a course of sulphathiazole (21 g.) begun on that day, there was no improvement. The vaginal loss cleared up in a few days, and pelvic examination on Jan. 4 showed good involution. The white-cell count at this time had dropped to 7200 per c.mm. with 74% polymorphs. Blood-culture on Jan. 7 gave a good growth of anaerobic streptococci (non-hæmolytic) and, on subculture over a period of time, *Bact. necrophorum* was isolated. The former was found to be penicillin-sensitive, the latter penicillin-resistant.

Meanwhile (Jan. 14) the hæmoglobin had fallen to 34%. The total white-cell count was 11,500 (85% polymorphs). There was no urinary infection. The rigors were continuing at the rate of one or two a day, and she was tender over her left iliac vein and her liver. The only abnormality shown in an X ray of her chest was some dilatation of the heart. A transfusion of fresh blood (1 pint) was given on the 18th and repeated on the 21st. A slight improvement in her condition became apparent during the following week—her temperature and pulse-rate were on the whole lower and she had no rigor for 6 days.

She had 3 rigors on Jan. 28, and late that evening she collapsed with another rigor; the pulse was weak and she was cold, clammy and unconscious. She gradually recovered during the next half-hour, but was tender again over the left iliac vein and liver. This episode was considered to be due to a small pulmonary embolus. Two pints of stored blood (7 days old) were given during the night, and she rallied considerably.

On Jan. 31 her hæmoglobin was 62%; white cells 13,000 per c.mm. (91% polymorphs). She had 2 rigors during the next 2 days, but after that they became less frequent, and the temperature tended to settle, though she had an occasional rise to 102° F. Blood-culture on Feb. 7 revealed the same organisms as before. The hæmoglobin dropped to 56% on Feb. 14, and on the 18th another 2 pints of stored blood (3 days old) was given. After this she had no rigor and remained apyrexial. Blood-culture on Feb. 28 was sterile. Her general condition improved rapidly, the hæmoglobin being 72% on Feb. 27, red cells 4,800,000 per c.mm., white cells 10,000 (60% polymorphs).

Throughout her illness clinical and radiological examination of the chest failed to show any signs of pulmonary suppuration; on one occasion the left diaphragm was a little raised, and the heart showed some dilatation of the right and left sides throughout the illness.

She was allowed up on March 18, 7 weeks after her embolus and 4½ weeks since her last rigor. Her improvement was maintained, and on April 3 her hæmoglobin was 80%, red-cell count 4,600,000 and white-cell count 6500 per c.mm.

1. Forbes, G. B., Goligher, J. C. *Lancet*, 1944, i, 399.
2. *Ibid*, 1944, i, 409.

SUMMARY

A case of incomplete abortion was complicated by suppurative thrombophlebitis with septicæmia due to an anaerobic streptococcus and *Bact. necrophorum*. The condition failed to respond to sulphathiazole. The anaerobic streptococcus was penicillin-sensitive, but the *Bact. necrophorum* was penicillin-resistant. For this reason penicillin was not given. She was treated chiefly with blood-transfusions for the anæmia, and made an unexpected recovery.

I wish to thank Dr. Maurice Mitman, medical superintendent of this hospital, for his help and advice in preparing this case-report; Dr. Robert Cruickshank for testing the organisms for penicillin-sensitivity; and Dr. A. M. Bodoano for the other laboratory investigations.

Reviews of Books

A Handbook of Psychiatry

P. M. LICHTENSTEIN, MD, LL B; S. M. SMALL, MD. (Kegan Paul, Trench, Trübner. Pp. 330. 16*s*.)

THE demand for textbooks of psychiatry seems insatiable: more and more of these harmless humdrum works are produced, all designed not only for psychiatrists and medical students but for the general practitioner, the nurse, and the social worker, all purporting to be "written in a clear and straightforward style with a minimum of technical language," and all saying the same things. This book differs from the others in having a slight forensic bias; one of the authors is in charge of psychiatry and legal medicine in the department of the District Attorney, New York. It contains nothing startling, nothing wrong or obscure, and much that would give the medical student or mental nurse a good working notion of what psychiatry is about, assuming that the medical student or nurse had not already read one of the other excellent and equally trustworthy handbooks, and assuming that the student or nurse was not a highly intelligent and alert-minded person who wanted to hear also about the difficulties, the experimental methods, the gaps and growing points of knowledge in this territory.

Principles and Practice of Aviation Medicine

(2nd ed.) HARRY G. ARMSTRONG, MD, FACP. (Baillière. Pp. 514. 36*s*.)

THOSE interested in the care of flying personnel and the application of physiology to aviation will welcome the second edition of this book which was first published five years ago. Since the war has imposed secrecy on advances in military aviation medicine Dr. Armstrong has been unable to add much to the subject matter. The basic principles laid down still stand, and this book provides both an introduction and a reference work for those interested in how the human body adapts itself to the new environment encountered in flight. The account given in the earlier chapters of the method of examining a candidate to determine his fitness for flying conforms to standards generally adopted. The chapter on physical factors in flight has been expanded to cover dark-adaptation, and the terminology in the section on psychoneuroses in airmen has been brought into line with that used in this country. The book remains the most comprehensive work on the subject generally available.

Pye's Surgical Handicraft

(14th ed.) Editor: HAMILTON BAILEY, FRCS. (Wright. Pp. 628. 25*s*.)

IT is sixty years since the first edition was published, but the aims of "Pye" are the same now as then—to indicate and illustrate the principles of craftsmanship in minor surgical procedures. Rearrangements and additions have improved it, and bring the work thoroughly up to date. Many of the sections are written by recognised specialists, and represent the best British teaching. The critical reader will find little to challenge, though not all the methods described are in common use. An increase of nearly 200 illustrations over those in the previous edition has made it easy to display steps in various techniques.

THE LANCET

LONDON: SATURDAY, DECEMBER 23, 1944

Shock becomes "Shock"

FIVE years of war have given us plenty of chances learn more about wound shock and its treatment, nd the opportunities have not been neglected. rganised teams as well as individual workers have ot down to the job, both at home and on the battle-eld, and one result is a second edition[1] of the Medical esearch Council *War Memorandum No. 1* that differs ery extensively from the first, issued in 1940. The eneral recommendations of the first edition have erved us well; but we have learned more about ome aspects of the problem, and new information as emphasised that "shock" is at best a convenient ord for a non-specific syndrome of great complexity; ence the decision to put it in inverted commas. In he past, the term has been too freely used as though t signified a well-defined entity. Now we realise, even better than before, that the body reacts to njury in a great variety of ways, and it will help present treatment and future progress if observers break away from convenient usage and describe what they have actually seen instead of recording only that shock was present.

To take a straightforward example, one of the best understood factors in the production of shock is a diminished volume of circulating blood—oligæmic shock. Therefore one of the most useful records that can be made at the first-aid level is a note of how much blood has been shed on the stretcher, clothing, and dressings. When this evidence has been removed and free bleeding arrested at the first-aid post it is often difficult for those who take over the patient for resuscitation to assess quickly the extent of their task. Blood-volume estimations cannot normally be made, and hæmoglobin levels in the first few hours after injury are no index of the severity of the blood loss. The forward observer's estimate of the actual blood loss is thus far more valuable than his note that shock was present or absent. Clinical appearances are often deceptive, especially in the early stages when the blood-pressure, usually taken as the best single guide to treatment, may be as high as 150–170 mm. Hg in spite of considerable blood loss. It is essential to recognise shock and give adequate treatment before the condition has become so well established as to be easily recognised by the collapse, cold moist skin, and low systolic pressure. Early and sufficient measures save life, but after the blood-pressure has been low for several hours the "irreversible state" is reached when restoration of the blood-volume may not suffice to produce recovery. It comes to this, that successful treatment demands a careful and objective assessment of the severity and nature of the injury and of the patient's reaction. Successive stages of treatment are handled in different places by different doctors; therefore it is extremely important that the recorded assessments of one observer should convey something clear and definite to the next.

1. Treatment of "Wound Shock." HMSO. Pp. 32. 6*d*.

There are no rules of thumb in the treatment of shock, and no short cuts or royal roads. But this memo gives us the signposts, and the doctor who makes the journey without reading them is accepting a serious and avoidable risk on behalf of his patients.

Nutrition, War, and Poverty

DURING the war there has been a tendency to lose sight of the relation between nutritional and economic status. This is hardly surprising; for it was always uphill work to persuade people that poverty is the main cause of malnutrition. In the past five years our minds have dwelt chiefly on the effects of restriction and rationing of foodstuffs, and we have been thinking rather in terms of the whole population than of economic groups. Even so there is little substantial evidence about the extent to which wartime feeding has affected physical condition. A foreign diplomat attributes our poor vision in the blackout to shortage of "vitamins"; one local authority finds that boys of 13 are taller in 1943 than in 1939, while another reports an increase in the number of malnourished children; tailors declare in the press that many of their customers have lost girth; some doctors say that food restrictions have made their patients less resistant to colds, coughs, and other infections, while other doctors think them more resistant; and we are told that there has been an increase in anæmia, a decrease in anæmia, or no change in anæmia. Over and above all this we have repeated assurances from our Government leaders that their food policy has made us a healthier nation than we were in 1939.

It is then with keen interest that we turn to a paper by MAGEE[1] comparing the nutritional state of the population as determined by SYDENSTRICKER and observers of the Ministry of Health in 1942, 1943, and 1944. At last, we believe, we shall see what changes took place during at least two years of the war. And the changes recorded seem eminently satisfactory: the proportion of mothers in the top nutritional grade was 87% in 1942, 93% in 1943, and 98% in 1944; the proportion of children in this grade was 86%, 87%, and 98% in the three successive years. But there are two formidable objections to these figures as an index of improvement between 1942 and 1944. In the first place, the three examinations were made by three different sets of observers—in 1942 by SYDENSTRICKER, in 1943 by HAWES and STANNUS, and in 1944 by ADCOCK and FITZGERALD. The assessment of nutritional state depended largely on judgment, and although "the methods of examination were as identical as could be achieved," we know too well that different observers are apt to reach different conclusions. In the four Scottish towns included in his surveys SYDENSTRICKER[2] classified 315 out of 374 children as of "good" nutrition, 59 as "satisfactory," and none as "poor." Yet YUDKIN,[3] examining the same sort of children in three of these four towns, only a week or two later, found that 34 of 216 children had signs of past or present rickets, that about three-quarters were below the average height, weight, hæmoglobin, and grip-dynamometer values of children in Cambridge elementary schools,

1. Magee, H. E. *Monthly Bulletin of the Ministry of Health*, 1944, 3, 146.
2. Sydenstricker, V. P. *Health Bull.* (C.M.O. Dept. of Health of Scotland) 1943, 2, 143.
3. Yudkin, J. *Brit. med. J.* 1944, ii, 201.

and that the average Scottish child was about 1½ in. shorter, weighed 4 lb. less, had 4% less hæmoglobin, and had a grip 1·5 kg. less than the average Cambridge child. The second objection arises from the fact that the surveys were made in different areas. Those covered by SYDENSTRICKER in 1942 were, with one exception, selected because of their bad economic history. Several of those covered in 1943 by HAWES and STANNUS had also suffered severely from depression. On the other hand, ADCOCK and FITZGERALD in 1944 surveyed a number of places such as Kingston-on-Thames and Reading which had good economic histories, and few which had bad. These economic differences might account for the whole of the apparent improvement in nutrition; indeed they may have sufficed to mask an actual deterioration. MAGEE makes this clear: he draws attention to these economic differences and points out that the improvement must be accepted with reservations. But elsewhere the conclusion is drawn that "in spite of five years of war with its rationing, stress, and shortages the nutritional condition of the population is well maintained and may even be improving."[4] Of this we still await proof.

It is often argued, of course, that differences in economic status affect nutrition but little in war-time. They are much reduced nowadays, we are told, because earnings are so much higher; and the boy of 16 earning £8 a week (or was it £10?) is quoted. Nothing however is said of the many families in which the wages rise, if any, has not kept pace with the rise in the cost of living, or of the many more which depend on the admittedly low pay of sailors, soldiers, and airmen. It is true that rationing and food control have had a levelling influence; the well-to-do are getting less milk and the poor are getting more; but there are still many families which never claim their ration of butter or bacon, or even all their meat. In a series of recent papers YUDKIN has demonstrated a higher incidence of nutritional deficiencies in those who have less money. Thus he found[5] that the dark-adaptation of factory workers was appreciably lower than that of Cambridge students and nurses, and improved with vitamin supplements. Examining children at elementary schools in two different parts of Cambridge he noted an average difference of 0·8 in. in height, 2·6 lb. in weight, 2% hæmoglobin, and 1·25 kg. on the grip-dynamometer.[3] He demonstrated that children from smaller families were taller and heavier and had a higher hæmoglobin level and a stronger grip than children from larger families—these differences being greater in the children from the poorer area, where an increase in the size of the family would mean a heavier burden.[6] And finally, on ascertaining what sum was available each week, per member of the family, for buying food, he proved that the nutritional state of the children and mothers was better in those that had most to spend.[7] For example, where the sum available for food was between 7*s*. 3*d*. and 10*s*. 1*d*. per head per week, the children were on the average 1¼ in. taller and 6 lb. heavier than their coevals in families with a possible food expenditure between 4*s*. 7*d*. and 7*s*. 1*d*.

Money may not be the root of all evil, but its absence is the root of much. And unless we realise the extent of this evil in producing malnourished children and adults, we shall get little profit from the labours of those nutritionists who have been applying their science to everyday life.

4. *Times*, Sept. 25, 1944.
5. Yudkin, J. *Public Health*, 1944, **57**, 109.
6. Yudkin, J. *Lancet*, 1944, ii, 384.
7. Yudkin, J. *Medical Officer*, 1944, **72**, 93, 101.

Sydenham Societies Old and New

He is not dead who has given life to science.
—RICHARD DE BURY in his *Philobiblon*, quoting PTOLEMY.

As a result of a proposal originally made by a correspondent to THE LANCET a society was founded in 1843 with the object of publishing reprints of standard English medical works which had become rare and expensive; miscellaneous selections from bygone authors; digests of important matters contained in old voluminous books; translations of Greek, Latin, Arabic, and other Eastern medical writings; translations of recent foreign works of merit; and lastly, original valuable books of reference which would not otherwise be published because they had no prospect of remunerative sale. The society was originally called the Sydenham Society. Its membership was unlimited, and for a guinea a year members were entitled to a copy of all books published. In announcing its formation[1] we welcomed the society as "calculated to weaken the influence of these silly distinctions of grade which now tend to disorganise the profession."

> We are particularly delighted at seeing the name of Sir Henry Halford as president of this society, because it shows that he has at last become aware that learning, and the love of learning, may exist and be cherished without the hallowed precincts of Oxford, Cambridge, or Pall-Mall East. Only fancy the baronet regarding, with a courteous smile, a general practitioner poring over the reprint of a Greek or an Arabic author!

Among its earliest publications were several of the ancient classics, and volumes appeared at intervals for about twelve years. A decreasing roll of membership and a steadily diminishing income then ended the society's useful career.

JONATHAN HUTCHINSON wrote of it as follows:

> I remember very well all that occurred at its concluding meeting. Sir John Forbes was in the chair, and when the resolution which closed its life was proposed, I ventured to speak in opposition to this step, my chief argument being that although the society had possibly completed its work as regards classical literature, there was still a wide and useful field for it in respect of translations from modern continental works. I had, perhaps, urged my point with too much insistence, and Sir John Forbes finally closed the discussion, put the matter to vote, and, addressing himself to me pointedly, remarked that "if some young men thought the society's work was not finished, they had better form a new society for themselves." The closing resolution was carried, I believe, unanimously, with the exception of my own vote. Immediately after the conclusion of the meeting, Dr. Sedgwick Saunders, previously a stranger to me, came up to me and said that if I would take Sir John at his word and form a new society on the lines which I had indicated, he believed it would succeed, and he would be glad to help.

The result was the foundation of a New Sydenham Society, and the defunct organisation thereafter became known as the Old Sydenham Society, though this was never its official title. The new organisation had really no direct connexion with its predecessor but adopted with little alteration its laws, and when the old society wound up its affairs received its

1. *Lancet*, 1842–43, i, 908.

remaining assets as a donation. The first publication of the New Sydenham Society was Diday's *Monograph of Inherited Syphilis*, published in 1859, and its last a volume containing monographs on the recently discovered *Spirochæta pallida* in 1908. Both societies owed a great deal to a long line of distinguished editors and translators, and the books published included not only famous classics from Hippocrates to Trousseau but numerous atlases, volumes of collected essays, selected papers, clinical lectures, yearbooks, and even a lexicon of medical terms. The lexicon cost a large sum of money, absorbed a great deal of the new society's time and energy, gave much dissatisfaction, and finally lost the society many members. It had been hoped to issue an appendix every five years, but all prospect of these faded out, and as JONATHAN HUTCHINSON remarks, "a half finished dictionary is a very useless work." In a valedictory monograph entitled *Retrospective Memoranda*, JONATHAN HUTCHINSON remarked that after nearly 50 years' experience with the work of these two societies he did not believe that the field had been exhausted, and he issued some wise advice to a third generation, the gist of which was to steer a middle course between the issue of standard works which would certainly be anticipated by an enterprising publisher, and interminable lexicons, yearbooks, and expensive large-paged atlases.

A century has now elapsed since the original Sydenham Society began its work, copyright laws have been altered, and the output of medical publishing has grown beyond all knowledge. But in one respect at least the wheel has swung full circle; the need for some machinery for publishing books which are of exceptional value to medicine but which cannot command a sufficiently large circulation to encourage a publisher is as great as ever. *De Motu Cordis* has been reprinted more than once, and we are indebted to the Loeb Classical Library for new translations of Hippocrates, Galen and other masters of our craft; but the works of John Hunter are unobtainable, Hilton's *Rest and Pain* is long since out of print, and the list can easily be added to. There will be many fresh demands after this war and a new republic of letters. The time seems opportune for planning a revival of the ancient literature of our profession.

Annotations

TEACHERS WITH TUBERCULOSIS

THE elderly grandfather spreading tuberculosis from his fireside chair is almost a legendary figure, and experience of evacuation at the outbreak of the war confirmed the risks facing the child introduced to a tuberculous household. Marcia Hall[1] has instanced a family of 6 children, billeted with a householder who had tuberculosis, of whom 5 were infected and had to have institutional treatment: and she recommended greater care in evacuation and billeting as well as wider search for child contacts. In Norway, where, perhaps because of its comparatively recent introduction, problems of tuberculosis are particularly acute, the liability to infection of young people coming into massive contact with the disease—e.g., medical students and probationer nurses—has had special attention, and has encouraged the use of BCG, apparently with good effect. Lately the teachers have come under suspicion as a possible source of infection of young children. In Norway since 1935 they have had to undergo compulsory yearly examination to confirm their freedom from active tuberculosis.

The annual report for 1943 of the school medical officer for Walthamstow describes an investigation made after the discovery in November, 1942, that a teacher at one of the schools in the borough had been suffering from open tuberculosis "probably for some time." At the school in question, 125 children were examined—examination including X-ray screening, X-ray film, and patch test. Of these, 26% were found to be infected, the infection being measured by a positive patch test plus X-ray evidence of a healed primary focus, or either separately. In the class being taught by the teacher suffering from active tuberculosis 23% of the children examined were found to be infected; it would have been interesting to know whether there was evidence of greater infection in the classes previously taught by this teacher. Children were also examined from another school in the borough where none of the teachers were known to be suffering from active tuberculosis. On this occasion the percentage of children found to be infected was nearly 17: but the numbers examined were small, and in any event comparison was invalidated by the fact that the second school served an area less densely populated and with better housing than the first. As it happened, a teacher employed by the second school was examined along with her pupils and found to have early bilateral pulmonary tuberculosis; but she was not an infectious type of case "and therefore children at the school should not have suffered any risk of infection." No child in either school was found to be suffering from recognisable clinical tuberculosis. The circumstances are inconclusive, well justifying the useful Scottish verdict of "not proven," but the education committee agreed that the pre-employment examination of teachers should include radiography of the chest, and that members of the staff should be asked whether they were willing to be thus examined.

Last August the Ministry of Health issued to welfare authorities in England a circular (111/44) saying that as certain workers at residential and war-time nurseries have been found to be suffering from tuberculosis, it would be well for the authorities to arrange for examination of nurses at present employed in them and of candidates for future appointment: "any nurse suffering from active tuberculosis in an infective state should be excluded from nursery work." The corresponding Scottish circular (131/1944) goes further, urging that radiography of the chest should form a routine part of the examination and that there should be periodic X-ray re-examinations to ensure early recognition of infection subsequently acquired. The frequency of examination is not stated.

The question arises whether it is reasonable in all the circumstances to require school-teachers in Britain to be examined so as to exclude active tuberculosis? If so, should the examination be repeated at intervals? And if so, what ought the interval to be?

1. Hall, M. *Lancet*, 1943, ii, 35.

BATTLE FOR HEALTH

THERE cannot be too much sound teaching about health. In this country hitherto there has been far too little, and a fair amount of what has been published is either one-sided and ill-informed, or presented unattractively in pages of close-spaced print unrelieved by graph or illustration. A new book by Dr. Stephen Taylor[1] is a real contribution to public education in health. It is informative, and well illustrated both by photographs and by cleverly presented 'Isotype' charts. The greater part of the book is devoted to examining the facts of the nation's health and sickness, the causes of epidemic and other diseases, and the methods

1. The Battle for Health. Stephen Taylor, MD, MRCP. (Nicholson and Watson. Pp. 128. 5s.)

adopted to fight against them. There is no evasion. The truth about venereal disease, for example, is put forward with a realism that makes one ready to support total war against that terrible scourge. The study of infant and child mortality is portrayed, as it should be, against a world background—and the facts, especially in Scotland, afford no reason for complacency. A few minor errors and omissions, the most notable being in relation to pasteurisation, do not upset the balance of the book or the soundness of its teaching, though the statement that surgical science is nearing completion is surely hazardous: it reminds one of Barclay's witticism about the geese, a century ago, when he told his students that no new discoveries could be expected in the science of anatomy. In point of fact, anatomy was then hardly out of its swaddling clothes.

Taylor's last section deals with planning for health. One could wish it had been longer, because the essential conditions of good planning are summarised clearly, and the relation between health and the other social services is well presented, though with tantalising brevity. It is to be hoped that he will give us another book in which the issues of the future are discussed in greater detail, and with the same dispassionate judgment which distinguishes his present study.

RATIONS FOR ONE

PEOPLE have accepted rationing in the spirit in which it has been planned, recognising the necessity for an equitable distribution of what food is available. Considering that we all started life on a rationed basis—so much breast or bottle per twenty-four hours—and mostly concurred with the judgment of some benevolent despot as to our needs, this attitude is very satisfactory and Freudian. The real test is in the single-ration-book household. There is a sort of relativity about food rations. Two people get double the rations of one, but the food goes further. Three people fare better and can have a weekly joint, hardly possible for 2*s*. 4*d*., still less for 1*s*. 2*d*. Four manage better still, and so on, because variations in taste and appetite allow some give and take, and more scope in the menu. But the person who lives by herself (it is generally a she) has to depend on herself for everything, and has but one advantage—she can please herself what she has. Before points came in the small household gained by getting as large a share of biscuits, cereals and the like as the big family, but points have almost removed that advantage. The Ministry of Food have attempted to solve the difficulties in a set standard of menus, which are severely handled by Dr. Forster in our correspondence columns. Probably the needs of single households are too varied to be dealt with in this way.

There are two main classes of one-ration-book households. On the one hand there are the elderly and old, who live at home and mostly have their time to themselves, unless they do a few hours light daily work; and on the other hand the youngish and middle-aged, who live in rooms or small flats and work all day. This latter class has a midday meal and afternoon tea out, so the rations are used for breakfast and supper and the weekend meals; the week's meat ration makes a good Sunday dinner, with probably something over for Monday's supper. Such a person does quite well, especially where there is a canteen or restaurant providing a good meal at low cost. One of the Ministries, for instance, runs a canteen where a midday dinner costs 1*s*. 3*d*., and consists of soup, joint or fish with potatoes and some other vegetable, steamed pudding and jam, or fruit and custard; coffee or tea a penny or twopence extra. Or take another example from a very small provincial town; here there is a rough but clean little restaurant which supplies a satisfying meal of meat (joint or pie) or liver and bacon with two vegetables, followed by a substantial pudding of some sort, and a cup of tea, for 2*s*.; this caters for shop and post-office assistants, and it is frequented also by the people living alone, when they can afford it. In these ways the single ration-book persons who go out to work and have no time for cooking and contriving meals, except at week-ends, can have a sufficient and satisfying diet. The snag is possible vitamin deficiency: many cannot or do not trouble to get the extra salads they need; lettuce and watercress are not always to be had in good condition; many people dislike or cannot digest raw cabbage and carrot; and fresh fruit is usually scarce and expensive. It is consequently these lonely people who get scurvy. The position about fats is even more difficult; people long for more butter and milk, and think wistfully of the days when there will be cream again, but find the vitamin preparations or concentrates in the chemist's shop either too expensive or not procurable; more probably the majority confine themselves to wishing for more milk, &c., and never think about the chemist's shop at all. Possibly a partial deficiency of all vitamins accounts for the complaints one hears on all sides of "feeling tired."

It is the other class of single homekeepers, the ones who have all meals at home, either from choice or poverty, who know all about planning and contriving to spread their rations over the week and buying economically such unrationed food as is available. Take the elderly widow, with a total income of £1 a week for everything. This woman, like thousands of others in her position, never has a joint; when her meat ration, generally a small piece of stewing steak or a breast of lamb, is finished (perhaps shared with her small dog), she ekes out the rest of the week with her few slices of bacon, and fish when she can afford it, or she buys 2 oz. of Spam occasionally with her points. She has a small garden and cultivates a few vegetables and keeps rabbits, eating one sometimes herself and selling others to the neighbours. She complains that she misses meat more than anything and feels weak in consequence. If she and other elderly people had more milk, cheese and eggs, all foods of high protein value for their bulk and easy to digest (cheese can be grated), and more milk, they would probably benefit more than by having extra meat; but meat has a high psychological value. Other women keep hens, or hens and rabbits, but their whole time is spent in shopping, cooking, feeding and looking after livestock, with housework and perhaps gardening in the intervals. Under such circumstances the cooking is apt to be sketchy, and "I can please myself what I have" probably means a cup of tea or cocoa and a piece of bread and margarine, instead of one of those jolly little dishes involving much mincing and chopping and mixing and dropping into hot fat, which the war has brought to our attention as suitable for a single person. Most economical housewives consider frying in any case a waste of fat, and preserve theirs for pastry or cakes, and no-one is more careful in this respect than the person who never has a joint to provide a spot of dripping, which is the only way to get any extra fat. Points give variety to the diet and some choice. Golden syrup is popular at eight points a lb. for the sweet tooth or to spare sugar and allow a little jam to be made; the rest of the points go on tinned meat or fish, or condensed milk or cereals. But nearly everyone tries to keep a tin of meat or fish in the cupboard, for the instinct of hospitality is ineradicable. So is the longing for companionship, and a surprising number of these lonely souls have a cat or a dog, or both, or more, in spite of the difficulties of commissariat, and the owners would rather go short of food themselves than give up the animals. In fact they do go short, and would go shorter still if it were not for the neighbours. For there is an aspect of rationing for one which cannot be ignored, however unofficial and undefined it may be—friends and neighbours. It might be said with truth of

the British people, "Never have so many given so much to so many." There is a constant, unobtrusive flow of kindness going on all over the country, from gifts of tea to those who outrun their 2 oz. a week (and many of the aged and lonely seem almost to live on tea) and fruit and vegetables from gardens, even sharing meals, to the bestowal of waste and scraps for feeding the animals. It always has been a real problem to cater for oneself alone, but in war-time it is eased by this kindly help.

THE GUT AND NUTRITIONAL DEFICIENCY

PHYSIOLOGISTS tell us that 50% by weight of the fæces is composed of dead bacteria. The normal gut is therefore a flourishing botanical garden. Its inhabitants have sometimes been tolerated and sometimes discouraged; that they were beneficial to the cow was admitted, but they were at best regarded as harmless parasites in man. Recent work has indicated that we rely for part of our daily supply of vitamins on the synthetic activity of our intestinal flora.

Mackie [1] and others have repeatedly stressed that diarrhœa or resection of the gut can cause vitamin deficiencies. But it has usually been assumed that the deficiency arises from failure of absorption due to intestinal hurry or a diminished absorbing surface. It has now been proved that disease can arise from failure of bacteria to grow and synthesise vitamins, this failure being caused by diarrhœa, resection of the gut, unsuitable media or ingestion of sulphonamides. Such deficiencies include those of vitamin B_1 [2] and of folic acid.[3] Further, it is known that certain nutritional deficiencies, such as of niacin,[4] cause achlorhydria which is corrected when the nutrient is supplied; and achlorhydria itself tends to produce or increase nutritional deficiencies, since destruction of certain vitamins, such as B_1, readily occurs in an alkaline medium.[5]

There is another and more obscure relation between the gut and vitamin deficiencies. Sydenstricker and his colleagues,[6] Bandier,[7] and in particular Petri and associates [8] have postulated an intrinsic factor produced by the stomach which acts in preventing pellagra. Petri believes that the stomach is necessary for the synthesis of coenzymes I and II from niacin, of flavoprotein enzymes from riboflavin, and of cocarboxylase from vitamin B_1; the latter is in agreement with the suggestion of Laurent and Sinclair [5] that diminished phosphorylation of vitamin B_1 with failure of cocarboxylase formation may account for "gastrogenous" polyneuritis. Verzár [9] believed that the failure to absorb fatty acids and glucose in the sprue syndrome was due to failure of phosphorylation in the intestinal mucosa.

Since vitamin deficiencies produce disorders of the gut, and disorders of the gut produce vitamin deficiencies, it is often difficult to decide which is the cart and which the horse. For instance, Sydenstricker suggested that niacin deficiency produced atrophy of the gastric mucosa, and that a normal gastric mucosa was necessary for the conversion of niacin to niacinamide—a hypothesis, however, which does not explain why his pellagrins were rapidly cured by administration of normal gastric juice. That gastric and intestinal dysfunctions can arise from primary vitamin deficiencies has been proved, and in this issue Brown and Trowell describe cases of kwashiorkor in Africa which were accompanied by a dermatitis that responded to niacin, œdema and anorexia probably caused by deficiency of vitamin B_1, and diarrhœa with radiological evidence of diminished gut motility that responded to liver extract or yeast. These cases seem to have differed from the sprue syndrome, since, although steatorrhœa occurred if fat was given, the stools contained undigested starch and muscle-fibres whereas in sprue there is no failure of digestion of these. Brown and Trowell draw attention to the similarity of their findings with the deficiency-bowel pattern of Golden,[10] but Golden's hypothesis of "damage to the intramural nervous system of the intestine" was based on one biopsy specimen from a 61-year-old man without any controls. The changes in the radiological appearance of the gut may be secondary to the interference with absorption, the bulky intestinal contents causing diminution in motility.[11] It is clear that vitamin deficiencies can produce changes in the gut either directly by interfering with the nervous mechanism (for which there is as yet no evidence) or indirectly by causing a failure of absorption of foodstuffs and consequent distension. Conversely, changes in the gut that are not nutritional in origin can cause vitamin deficiencies, and these can also be caused by changes in the intestinal flora. Which comes first and which second is usually difficult to determine; but the recognition and treatment of the nutritional deficiency are the most important immediate objectives.

GRANTS FOR PSYCHIATRY AND NEUROLOGY

THE Nuffield Provincial Hospitals Trust has promised £15,000 to the University of Leeds to establish a whole-time chair in psychiatry and a psychiatric unit. Facilities for undergraduate and postgraduate instruction, for research, and for treatment will be provided. It is proposed that the unit should seek to promote contact between general medicine and psychiatry and to coördinate the various mental health services of the area. The Trust has also made a grant of £3000 a year for five years to help the University of Liverpool to set up a department of neurology. An anonymous donor has already promised to cover the capital expenditure, and the services of the new department will be available to voluntary and to municipal hospitals throughout the district.

RAW MATERIALS OF CANCER RESEARCH

SOME think that in medical science the season of synthesis and interpretation is long overdue. Now that the British Empire Cancer Campaign has reached maturity [1] we may hope to see more attempts towards a synthesis of the raw materials presented yearly in the form of further proof or elaboration of knowledge already gained. Cancer research makes one think of some intricate jigsaw puzzle whose pieces always retain the same shape but sometimes have one picture, sometimes another superimposed on them. Whatever the picture happens to be, no-one can put the whole together and few attempt this even in one corner. We continue to assume that some of the pieces are missing, and no doubt they are. It ought, nevertheless, to be possible to make quite a number fit.

Meanwhile we must be thankful that the present report contains new data and aids to research. Water-soluble œstrogens, made in the biochemical research laboratories of the Middlesex Hospital, provide us with another weapon for attack upon some of the problems. Dr. J. C. Mottram records that he has produced epithelial tumours in mice with a single painting of benzpyrene and subsequent painting for 20 weeks with croton oil, which is itself not carcinogenic. Dr. F. Bielchowsky has succeeded in obtaining benign and malignant tumours of the thyroid gland in rats by the combined action of acetyl aminofluorene and allyl-thiourea, both

1. Mackie, T. T., Eddie, W., Mills, M. A. *Ann. intern. Med.* 1940, **14**, 28.
2. Najjar, V. A., Holt, L. E. jun., *J. Amer. med. Ass.* 1943, **123**, 683.
3. Daft, F. S., Sebrell, W. H. *Publ. Hlth Rep., Wash.*, 1943, **58**, 1542; Higgins, G. M. *Proc. Mayo Clin.* 1944, **19**, 329.
4. Sydenstricker, V. P. *Arch. intern. Med.* 1941, **67**, 746.
5. Laurent, L. P. E., Sinclair, H. M. *Lancet*, 1938, **1**, 1045.
6. Sydenstricker, V. P., Armstrong, E. S., Derrick, C. J., Kemp, P. S. *Amer. J. med. Sci.* 1936, **192**, 1.
7. Bandier, E. *Acta med. scand.* 1939, **101**, 496.
8. Petri, S. Nørgaard, F., Bandier, E. *Ibid*, 1940, **104**, 245.
9. Verzár, F. Absorption from the Intestine, London, 1936.
10. Golden, R. *Radiology*, 1941, **36**, 262; **37**, 284.
11. Kantor, J. L. *Amer. J. Roentgenol.* 1939, **41**, 758; Stannus, H. S. *Trans. R. Soc. trop. Med. Hyg.* 1942, **36**, 123.
12. Twenty-first Annual Report of the British Empire Cancer Campaign, 11, Grosvenor Crescent, London, SW1, 1944.

given by mouth. It has always been a puzzle that coal-tar, which contains benzpyrene, is able to cause warts in rabbit skin, whereas pure synthetic benzpyrene cannot be made to do so. Dr. I. Berenblum suggests that the tar warts are due to other carcinogenic compounds, not yet identified but known to be present in tar. To test this supposition he painted rabbits with some of the other synthetic carcinogenic chemicals and found that 9 : 10-dimethyl-1 : 2-benzanthracene produced multiple papillomas in the skin of the rabbit ear in as short a time as five weeks : these papillomas grew rapidly and progressively, and 4 out of 5 rabbits developed large fungating tumours by the twenty-sixth week. Thus this compound is even more effective than tar. The finding by Dr. Berenblum and Mr. R. Schontal, PH D, that benzpyrene is present in blue shale oil which is obtained by retorting shale oil, but is absent from the original oil, may help to prevent one form of industrial cancer.

Many other observations, either puzzling or of wider interest, are to be found in this report. A strain of mice (R. III) has been bred which originally had a high mammary-cancer rate and now does not develop these tumours. This happened by chance, not by design ; nevertheless Dr. M. D. Gilmour profited by the undesired results of transferring this strain to her laboratori by discovering something very remarkable. Althou mice of this particular strain no longer develop spontaneous mammary tumours, the lactating femal were able to pass on in their milk, by suckling, t essential milk tumour factor. This was proved by t development, in 25% of fostered mice, of mamma tumours in a very low cancer strain. It is now the fashio to attribute any unexplained change in pathologic reactions to mutation, but this result appears t merit further inquiry rather than any cursory verb dismissal.

Of wider biological interest than in their relation t cancer alone are the observations by Mr. D. E. Lea, PH D, and Mrs. B. E. Holmes of the direct inactivation o enzymes in the dry state by X-radiation, and by Dr. J. S. Mitchell and Mrs. Holmes on the metabolic disturbanc in proliferating and in incompletely differentiated cell induced by X- and γ-radiation. The disturbance, trace by means of ultraviolet photomicrography, is charac terised by inhibition of synthesis of thymonucleic acid in the nucleus and accumulation of ribonucleic acid mainly in the cytoplasm. These latter observations may contain the key to an understanding of one stage in the preparation for cell division, and its inhibition.

Special Articles

LENGTH AND DEPTH OF SLEEP

E. LIPMAN COHEN, M B CAMB
CAPTAIN RAMC

INVESTIGATIONS into the length and depth of sleep and incidence of dreaming among normal people have been surprisingly few. The only thorough work on the subject is that of Heerwagen (1889). He interrogated 406 people, who were classified in three groups : 113 men, 151 students and 142 women. He confined his method to questioning the subjects. Among his many conclusions are the following :—

1. The lighter the sleep the more frequent the dreams.
2. There is a well-marked difference in the frequency of dreams between the sexes ; women dream much more often.
3. Women are lighter sleepers than men.
4. The incidence of dreams is small in childhood, increases to a maximum between the ages of 20 and 25 and then decreases progressively.
5. Sleep becomes lighter with increasing age.
6. In men the frequency of dreams and the depth of sleep have no effect on the length of sleep.
7. Women who dream more often sleep longer.
8. Women who sleep lightly sleep a shorter time than those who sleep deeply.
9. Women sleep longer than men, but this is because circumstances allow them so to do.

He gives no statistical examination of his figures but his conclusions seem justifiable except number 8 in which the difference in the figures is too small to warrant his deduction.

INVESTIGATION

A group of 500 young women was interrogated. Their ages ranged from 17 to 40, average 21 ; 485 of them (97%) were under 30. The age distribution was as follows :—

Age (yr.)	17	18	19	20	21	22	23	24	25	26
Women ..	19	34	47	127	135	57	21	4	8	10
Age (yr.)	27	28	29	30	31	32	33	34	35	40
Women ..	9	7	7	6	1	4	1	1	1	1

Each was asked four questions : 1. *How long do you like to sleep at night ?* If the answer given was in the form of "*a* or *b* hours" the average of *a* and *b* was recorded. Some had difficulty in giving an answer ; they were asked at what time they went to sleep and awoke. Answers were recorded to the nearest half hour. 2. *Are you a light, heavy or medium sleeper ?* 3. *Do you wake in the morning feeling fresh or heavy ?* Some were recorded as "variable." 4. *Do you ever dream ? If so, do you dream on most nights ?* The answers were recorded as follows : O=never, or extremely rarely; +=sometimes, but not usually ; ++=on most nights.

TABLE I

Length of sleep	Women	%
Under 8 hours ..	109	22
8 hours	208	41
Over 8 hours ..	183	37

The length of sleep (table I) varied from 5 hour (2 girls) to 12 hours (3 girls). The different lengths o sleep were put into groups and compared with depth of sleep, feeling on waking and frequency of dreams (table II A). It will be noticed that there is a progressive increase in the depth of sleep with the length of sleep. Under 8 hours and over 8 hours' sleep have been compared statistically, and the difference among the heavy sleepers is significant. The decrease in freshness and the increase in heaviness of feeling on waking with increase in length of sleep are both statistically significant, but the differences in frequency of dreams in relation to length of sleep are not significant. The average length of sleep at all age-groups was 8 hours.

TABLE II

—	Women	Depth of sleep			Condition on waking			Frequency of dreams		
		Lt	Md	Hy	Fr	Hy	Vb	O	+	++
A—*Hours of sleep*		%	%	%	%	%	%	%	%	%
Under 7 ..	16	6	69	25	75	25	0	31	38	31
7 and 7½ ..	93	8	57	35	78	11	11	46	38	16
8 and 8½ ..	271	9	53	39	69	20	11	47	43	10
9	88	6	49	46	59	25	16	50	36	14
Over 9 ..	32	6	38	56	59	28	13	47	31	22
B—*Age (yr)*										
17–18 ..	53	9	53	38	77	17	6	53	40	8
19	47	6	45	49	72	17	11	38	40	21
20	127	5	54	42	72	15	13	50	37	13
21	135	4	56	40	62	21	17	42	43	15
22	57	5	54	40	72	23	5	47	39	14
23–26 ..	43	14	60	26	60	26	14	44	42	14
Over 27 ..	38	24	37	39	68	26	5	45	47	8
C—*Depth of sleep*										
Light ..	38 (8%)	..	..	..	79	11	10	47	40	13
Medium ..	263 (52%)	..	..	..	72	18	10	42	45	13
Heavy ..	199 (40%)	..	..	..	63	24	13	53	32	15

Lt, light ; Md, medium ; Hy, heavy ; Fr, fresh ; Vb, variable.

ept at 17 when it was 8½ hours. The average age in leep-period groups was 21, except the "under 7 hour" up in which it was 22.

The ages were put into groups and compared with the th of sleep, feeling on waking and frequency of ams (table II B). The significance of the difference

TABLE III

Condition on waking	Women	%	Frequency of dreaming		
			0	+	++
Fresh	344	69	51	40	9
Heavy ..	98	20	38	37	24
Variable ..	58	11	..	..	..

as examined by the χ^2 test (Hill 1942). The increase light sleeping with age is significant, but the variations heavy sleeping are not; nor are the variations in the ndition of waking or the frequency of dreams.

TABLE IV

Frequency of dreaming	Women	%
0	230	46
+	203	41
++	67	13

Table II C shows the depth of sleep. The small ercentage of light sleepers is noteworthy. The depth f sleep was compared with the condition on waking nd with the frequency of dreaming, and these differences vere examined statistically. The decrease of freshness nd increase of heaviness of feeling on waking with eaviness of sleeping are both significant; but the differences in frequency of dreaming are not.

The condition on waking is shown in table III. Most of the girls felt fresh on waking. The condition on waking was compared with the frequency of dreaming, and the differences proved to be statistically significant. The frequency of dreaming is shown in table IV. Nearly half the girls never dreamt, or dreamt extremely rarely.

DISCUSSION

It is interesting to compare these results with those of Heerwagen (1889). His 5th and 8th conclusions are supported, whereas his 1st and 7th are not. There is no relevant material to compare with his others.

No other investigator has published such a detailed examination of the subject but some pertinent conclusions have been reached by other authorities. Kleitman and his colleagues (1937) state that the average duration of sleep is about 7¾ hours. Andress (1911) found it to be 8¾ hours in a group of 49 students aged 18 to 21. Roger (1932) and Kleitman (1939) say that women sleep longer than men, but Ladame (1923) found the reverse among 210 patients in a mental hospital. Bram (1939) sent a questionnaire to 1000 prominent men and women and recorded the percentage of them who slept different lengths of time. He found that 65·5% of them slept for 8 hours, 23·5% slept less and 11% slept more. According to de Manacéïne (1897), "Very deep sleep does not permit of dreams, while a very light sleep is usually accompanied by many dreams." Personal observation convinces me that the first part of his statement is untrue. He remarks also that those who dream sleep longer. Neither of his conclusions is supported.

It is important to stress that this investigation deals solely with the subjective aspect of the matter. Each girl was questioned once and the answers were accepted. While the feeling on waking is definite, the depth of sleep depends on the girls' opinions of what constitutes "light," "heavy" and "medium." The recollection of dreaming is an important factor in estimating the incidence. Thus of the 9 girls who volunteered the information that they talked in their sleep, 6 stated that they never dreamt.

SUMMARY

A group of 500 young women was interrogated about their sleep habits.

Their usual length of sleep varied between 5 and 12 hours with an average of 8 hours. Those who slept longer slept deeper and felt heavier on waking; the converse was also true.

There was no relation between length of sleep and frequency of dreaming.

The average length of sleep at all age-groups was 8 hours except at age 17 when it was 8½ hours.

With increased age there was a higher incidence of light sleeping.

There was no relation between age and condition on waking or frequency of dreaming.

Of the whole group only 8% said they slept lightly.

With increased heaviness of sleeping there was an increased feeling of heaviness on waking; the converse was also true.

There was no relation between depth of sleep and frequency of dreaming; 69% of the girls felt fresh on waking. There was a higher incidence of frequent dreaming among those who felt heavy on waking. Nearly half the girls said they never (or extremely rarely) dreamt. The answers are wholly subjective and "never dreams" really means "never recalls dreaming."

I wish to thank Captain M. C. Campbell, RAMC, and Captain E. J. B. Orr, RAMC, for facilities for interrogating these women.

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KING EDWARD'S HOSPITAL FUND FOR LONDON

FUTURE OF MEDICAL SERVICES

AT a meeting of the general council of the King's Fund, held in London on Dec. 11, the SPEAKER of the House of Commons presided and read a message from HM the KING expressing his continued interest in the welfare and progress of the Fund, and his admiration to all who have so willingly given their services to the hospitals during the past difficult year.

The SPEAKER said that representatives of the Fund had been taking part in discussions with the Minister of Health on the future of hospital services. "In this matter the King's Fund is in a unique position. I cannot help feeling it will be a great help to the Minister in framing his proposals to have had the various aspects of the case presented to him by those who represent the Fund, with their impartial and at the same time intimate knowledge of so many hospitals." Work on hospital diet too was very much to the fore: Sir Jack Drummond and his committee were now preparing a second memorandum offering more detailed advice.

Sir EDWARD PEACOCK as treasurer reported that in view of the heavy expenditure which would confront the hospitals after the war it had been thought wise to continue the slight reduction in the annual distribution, which was again £280,000. As a further payment on account of the bequest of the late Mr. J. R. Barber securities valued at about £40,000 were now available for transfer. Subscriptions and donations, estimated at £38,000, were about the same as last year. Income from investments, at £213,000, showed an increase of £10,000 but this included certain arrears and other non-recurring items. These figures did not include the £300,000 received from the Nuffield Trust for the Special Areas and the transfer from this amount of £250,000 to Guy's Hospital. Speaking of the plans for a National Health Service Sir Edward added:

"The proposal of the white-paper that all hospital services should be free, of necessity cuts at the roots of the contributory schemes which have become such an outstanding and valuable feature of the life of this country. The authorities are in accord with us in feeling that everything must be done to preserve as large a part of the voluntary support of hospitals through such schemes as is possible. It is a puzzling problem, but it would be almost criminal if in our endeavour

to secure another valuable thing we should destroy that unique organised contribution of millions of pounds by millions of people to their hospitals."

Sir ERNEST POOLEY, chairman of the distribution committee, presented the schedules containing the list of grants to hospitals and convalescent homes, amounting to £280,000.

Sir ALFRED WEBB-JOHNSON, PRCS, proposing a vote of thanks to the Speaker, said that the instincts of the people had been sound in the organisation of voluntary hospitals which they had gradually evolved throughout the country.

"In the first place their instinct has been sound in regard to the type of hospital which the people have built for themselves—the great general and special hospitals which act as centres for consultation, the intermediate type of hospital which serves the immediate needs of a populous area, and the home or cottage hospital which meets the needs of the general practitioners in the smaller communities.

"Their instinct has also been sound in regard to the distribution of hospitals. The great consultant hospitals are based on university centres and their influence spreads over large areas. People go to these consultation centres not because of any geographical arrangement, but because they serve natural 'catchment areas.' Even national boundaries do not count—for example, North Wales does not belong to Wales, but is served by Manchester and Liverpool. County boundaries mean nothing at all. When a man is sick and his people are anxious about him they want to go where facilities are best and where the advice they seek is accessible and available.

"In the management of the voluntary hospitals the instincts of the people have again been sound. They have given absolute freedom to the professional men who work in the hospitals. They have sought the advice of these professional men in their corporate capacity through their medical committees, and have sought their aid in the management of the hospitals."

Nevertheless, said Sir Alfred, there was need for more coördination and expansion. And here he hoped the Government would follow the example set by the King's Fund,—that they would guide and not control, that they would help the voluntary hospitals and not hinder them.

"I feel that it is important that the contributions under the National Health Insurance scheme, which are not really enough to meet the general practitioner service, should be devoted entirely to that service, and that the hospitals should be maintained by rates, taxes, and voluntary contributions. If that is done it will I think do something to preserve the voluntary contributions to the hospitals, because insured contributors will not be told that they have already subscribed directly to the voluntary hospitals.

"A man when he goes even to a great hospital feels that he goes to an individual surgeon. He expects that he will find his own surgeon, that he will be given treatment prescribed by that surgeon and that the surgeon will be provided with equipment of his own choosing. The patient will not want methods prescribed by Whitehall, County Hall, Town Hall, or any other hall; he will want the treatment of the surgeon of his choice. The people of this country must retain the advantages which they have gained for themselves and the way to retain them is for experts in hospital matters to have a responsible part in the planning and administration of the hospital services.

"When we talk about the freedom of the profession we are not talking about some vested interest. We are talking about one of the fundamental liberties of the subject—his right, within a free community, to obtain free and independent advice from professional men, whether it be in law, medicine, or any other profession. The people are entitled to a free professional opinion. This implies freedom for independent practice. In specialist work the natural place for independent practice is within the precincts of hospitals. I hope that in the future nothing will be put in the way of independent practice inside hospitals or in the precincts of hospitals. It would be a retrograde step if that independent practice were to be dispersed into separate clinics.

"We have a great national heritage to preserve, and I think we should remember Burke's words that 'a disposition to preserve and an ability to improve, taken together, would be my standard of a statesman.'"

Sir HENRY TIDY, FRCP, seconded the vote of thanks.

In England Now

A Running Commentary by Peripatetic Correspondents

WHEN I visited the military general hospital I had not been thinking of medicine as an internationalising force. But here, in the wards of the neurosurgical unit, British soldiers lay side by side with Indians, Ghurkas, Jugoslavs, Albanians, and German wounded prisoners-of-war. For some weeks they had wrestled good-humouredly with the difficulties of half a dozen languages and were already knit into some sort of brotherhood. Their common bond was a bullet in the brain and the necessary operations to extract it. Most were already out of danger with healed wounds and nothing to mark the event but pulsating depressions in the skull which would later be covered by bone-grafts. A few were still coping with residual paralysis. The Indian with the deep broad gutter in the right parietal region had not quite recovered fron his bewilderment over a helpless left arm and leg. As we studied his bed-card he kept lifting the paralysed arm with his right hand and letting it fall to the bed with a half-resigned, half-amused expression and an occasional grunt of incredulity. Another Indian with a left parietal wound who, a few weeks ago, had struggled vainly with his aphasia, was now speaking slowly but with obvious satisfaction. The little Ghurkas displayed their lesions with utter impassivity on their Mongol countenance. Nothing seems to disturb this solid Eastern calm. As one of them dragged his paralytic leg before me, I fervently hoped that a grateful Empire would not forget the small pension which he had so greatly earned. The Ghurkas have gained universal respect for their fighting qualities and they made some friends in this ward. A young Jugoslav had become so attached to them as hardly to spare time for association with his own compatriots. How they communed together was a mystery, but the fact was plain to see. Blindness was represented by two or three of the men shot through the eye, or more commonly through the occiput—pathetic cases not yet fully aware of their lot. The Jugoslavs were in a different surgical category from the rest. The others had at least been freed from the horrors of sepsis by timely surgery, penicillin, or sulphonamides. But none of these blessings had come to the Jugoslavs until three weeks or more after wounding, and so they had to contend with cerebral abscesses, meningitis, or septic tracts. Even such terrors however were being successfully overcome. Abscesses were located, tough capsule formation promoted, and then came the final operation of shelling out the abscess without spilling a drop of pus. I felt proud of the young British surgeon as he cheerily made his inquiries, "kako ste?" "thik?" and so on, in half a dozen tongues. He was but five years qualified and already doing expert work; and by the same token he was doing not a little to promote international good-feeling.

* * *

The young partisan fighters of Jugoslavia have learned their realism in a hard school, and the girls are as tough as any. We were riding home from the hospital in a truck—a motley collection of figures in uniform, male and female. Near the back a girl partisan soldier sat silently. She had a handkerchief wrapped closely round her mouth as if she had just come from the dentist. As we passed a road the silence of the night was suddenly broken by two shots fired in quick succession. We all looked up with alarm at our travelling companion. She was calmly putting back into her blouse a long rusty revolver which she had whipped out and fired in the air through the open end of the truck. But this is no murder story. It was merely her way of signalling to the driver that she had reached her destination.

* * *

Mrs. Jones has recently swum into my ken and joined my panel. She has, she says, been "on pink papers" for years, and small wonder, for she appears to be a repository for most of the chronic ills to which flesh is heir. Nevertheless I thought it worth while to send her along to the hospital for a physician's opinion because, in her present plight, she is a standing reproach to medicine. I wrote a note for Mrs. Jones to take to the physician whose opinion I wanted, and told her to

attend his OP's on Thursday. Next day I received this letter:

"Sir. I wish you had a put me a note in so that I could have seen a Dr. on a Friday so I was trying to do the Eye Infirmary as well, I have to kill two birds with one stone or try too to try and save expences, being market day any one might be able to get a bit of company to go up with the Fridays Dr. You have not to be there so early, don't you think it will be best. Can I get a reccomend from the hospital aid for the Eye Infirmary. I have not ask them for any yet. No doubt you will think I am and old fidget the Eye Dr. ask Dr. Gordon to examine me as I was under Dr. Gordon my first trip to the hospital. I had 2 months out door treatment and three months with my own Dr. before I started with the hospital that was for my throat I had medical treatment, I was 17 years old then Dr. Gordon was medical are you putting me under a medical I feel if I could get something for the kidneys I should get rid of these itchy spots they nearly drive one dotty when they itch so, it must be in the blood, because I have not always had them. I am unable to put in an envelope as cannot get them here but have put in a stamp from your's truly, Mrs. Jones.

Dr. Gordon examine me shortly after I had my operation in 1928, about 1929 or 1930 Dr. Gordon he examine me. I know it is treatment I require with taking barley water it as relieved it before I started taking barley water I did not know how to walk up as far as the farm that is the farthest I have been for 2 months. I hope you will put me under a good medical one that does not speak sharp or else I shall be done for all of a shake all day after. I hope you will forgive me for being so much trouble."

Who wouldn't? * * *

Time for contemplation has always been a characteristic of the East, and not without reason I have been pondering our sense of smell. It would be interesting to know with how many types of olfactory end-organs we are endowed and how quickly one type can accommodate itself to distinguish a new odour. It may be that there is one for each available smell, some lying latent but vigilant to seize on their respective stimulants and wax fat under their fertilising influence. Or the "smell-buds" may be versatile, each able to appreciate a variety of odours. The newcomer to the East will favour the latter theory, for rough smells jostle one another in a determination to overpower him before defensive preparations are complete. After a time however he will, I think, find his opinions veering towards the former. He will gradually notice that he can isolate different elements in what was previously merely one mighty stench. His smell-buds, tenderly nurtured in the super-sanitation of the West, begin to show, through constant exposure, a selectivity and ability to discern without effort whether there really is something the matter with the deep trench latrine, or whether it is only a relic of yesterday's visit from the locals. Whichever theory is correct, smell-buds serving in these parts are earning their keep and will have some fine tales to tell after the war. ("I remember when I was in Bagdad, my dear . . .")

There are smells here for every taste, to titivate every reflex. Smells violent and smells delicate (few of these though). Smells subtle and smells blatant in their effrontery. Smells to send one's olfactory apparatus reeling. Smells suggestive of a permanent uncinate fit. Dust and sweat, pungency and fragrance intermingle to give that quality without which East would not be East. Again, in the cool of the evening when the red and golden sun is setting behind the palm trees and one's thoughts turn westwards, nostalgic buds bring memories of English meadows and English country lanes, of Spring mornings and Autumn evenings in a pleasant land. Yes, our smell-buds are working to capacity and hoping that on their return they will not be confronted with too strong an odour of officialdom in their owners' profession, disturbing whiffs of which are already threatening to overtax their reserves.

Surgeon Rear-Admiral G. Gordon-Taylor, Mr. H. S. Souttar, Prof. R. V. Christie, Sir John Stopford, FRS, and Sir James Walton have been appointed to the Home Secretary's advisory committee on the administration of the Cruelty to Animals Act 1876.

Letters to the Editor

LORD LISTER ON NERVE REPAIR

SIR,—In an important survey of the progress of repair of nerves by F. K. Sanders from the Department of Zoology and Comparative Anatomy, Oxford (*Brain*, 1942, **65**, 281), it is stated that Assaky in 1886 was the first in experimental work upon animals to attempt to bridge a gap in a nerve by means of a framework of catgut, designed to act as a scaffolding for the down-growth of the new axons. On turning to this paper (*Arch. gén. Méd.* 1886, **2**, 529) I find that it was published in the November number of that year. The copy which I consulted was marked as received by the librarian of the Royal Medical and Chirurgical Society on Nov. 6, 1886. The letter, which is appended, from Lord Lister to my father, the late Sir Hector Cameron, of Glasgow, is dated four days earlier, Nov. 2, 1886.

12, Park Crescent, Portland Place,
2 Nov. /86.

My dear Cameron,

Mr. —— brought his son to see me today. From the history of slow growth and the perfect freedom of the skin with absence of glandular enlargement we may fairly hope that the tumour is non-malignant. From its situation and from the fact that handling it causes pain in the sole of the foot and has done so from the first when it was quite small, I fear it is a neuroma of the sciatic nerve. If this is the case, and the nerve is involved throughout its thickness for the full length of the tumour, I should greatly fear that amputation would be preferable to leaving the limb as a powerless encumbrance. If, what I fear can hardly be hoped, the nerve should be found to be merely expanded over the growth, or even if the neuroma were limited to one side of the nerve, it might be possible to dissect off the nerve and leave it. What makes me fear that this would hardly be practicable is that pressure on parts of the tumour at a considerable distance from each other in a lateral direction causes pain in the foot. Supposing that the nerve should be implicated in only a short extent of its length, say a couple of inches, it would, I think, be worth while to try whether regeneration of nerve-fibres might be brought about by connecting the ends of the nerve by means of several very fine catgut stitches applied with a sewing needle so as to form a channel along which new nerve-tissue might develope itself, see diagram.

Channel along which new nerve-tissue might develope itself, see diagram.

I enclose a hank of catgut which you would find very suitable for the

I enclose a hank of catgut which you would find very suitable for the purpose. It is prepared with tannic acid and holds perfectly as a knot, and has considerable strength although very supple when moistened, and is not absorbed for several days. It is convenient to wind it upon a cotton reel; and this is put into a bowl of 1 to 2000 Corrosive Sublimate solution a little before the operation commences, to make sure that it is perfectly aseptic. As I write I cannot help feeling that we are on somewhat new ground, and that it is somewhat difficult to draw the line as to the length of nerve removed which would make such a proceeding hopeless. I would relax the nerve by bending the knee to a certain extent and keeping it bent by a bandage connecting pelvis and foot. I would put some threads through and through the thickness of the nerve and others through corresponding parts of the circumference.

Supposing amputation should prove necessary, I do not think it would be needful to amputate very high up in the thigh. Or rather perhaps I should say, that I should hope to be able to dissect out the tumour and amputate near the knee. I told the father and also the boy that I thought it a case which ought to be operated upon, but that I felt it impossible to say, till the operation revealed the true state of matters, whether amputation would be necessary or not.

There is one thing to be said, that an endeavour to save the limb even though a large amount of nerve were removed, would do no harm beyond delaying an amputation which might ultimately prove needful.

Yours ever affectely.

JOSEPH LISTER.

I do not know how far Lord Lister's suggestion was original or how much it owed to an acquaintance with the experimental work which had just been concluded in Assaky's laboratory in the University of Paris. His words "As I write I cannot help feeling that we are on somewhat new ground" seem to suggest that he is recommending a new and original procedure, and I feel that if by some means he had knowledge of Assaky's work before publication he would not have failed to make some reference to it. It is possible that other surgeons at an even earlier date may have made similar attempts, on the human subject, to deal with the difficulty of wide separation between the ends of the divided nerve. If so I have not been able to find the reference and meanwhile this letter of Lord Lister's, so admirable in its completeness and in its clarity, not to speak of its beautiful handwriting, that it might serve as a model to consultants of the present day, may claim for him a priority in this as in so much else.

If the idea came to him from the experimental work of others, it is but another illustration of the quickness with which he was wont to see what may be called the connotation of research. As Clifford Allbutt happily put it, "Though Lister saw the vast importance of the discoveries of Pasteur, he saw it because he was watching on the heights; and he was watching there alone."

I do not know whether the operation was performed as suggested, or whether the suggestion in this case proved impracticable. I am much indebted to Mr. Bishop of the library of the Royal Society of Medicine for help in my search for references.

London, W1. H. CHARLES CAMERON.

TREATMENT OF DIPHTHERIA

SIR,—In your issue of Dec. 9, Dr. Johnstone and Dr. Fluker find fault with the recommendations made in your leading article of Nov. 11 regarding dosage of diphtheria antitoxin. They stir the ashes of an old controversy.

We consider the amounts suggested in your article to be not only adequate but ample, and certainly more nearly related to the true needs of the patient than the hundreds of thousands of units that some clinicians see fit to squander. Antitoxin will counteract toxæmia; beyond this it does nothing. Over 20 years ago W. H. Park pointed out that 50,000 antitoxic units far exceeded a neutralising dose for the greatest amount of toxin that could possibly be elaborated in the severest case. E. W. Goodall wrote (1928) "any amount over 30,000 units . . . is wasted." In our view these statements, and others to the same effect, are no less true today than when first made. It should be remembered that even a single unit of antitoxin is not a trifling amount, and that a dose of 50,000 units possesses a vast neutralising power. It will indeed protect no less than 1200 *tons* of guineapig tissue against a minimal lethal dose of diphtheria toxin, and therefore should give a very wide margin of protection to some 100 lb. of human tissue.

The dosage scale used in the Kingston-upon-Hull City Hospital is: prophylactic, 500 units; tonsillar diphtheria, 4000–8000 units; nasopharyngeal (1st-grade severity), 8000 units intramuscularly followed an hour later by 8000 units intravenously; nasopharyngeal (very severe), 20,000 units intramuscularly plus 20,000 units intravenously. Severe cases in this district have been of the most toxic and malignant variety; nevertheless we have never felt that a patient died for want of antitoxin, though some have died from delay in getting it. Conversely, several cases showing purpuric hæmorrhages into the skin and gallop cardiac rhythm—signs usually regarded as heralds of a fatal issue—have received no more than 40,000 units and recovered. Had we used 200,000 units (or a million!) it is probable that we should have attributed such remarkable recoveries to the large amount of antitoxin used.

You rightly emphasise that the time of the administration of antitoxin, relative to the onset of the disease, is vastly more important than the dose. We believe that the advantage of the intravenous route in any severe case is due to the saving of time, and suggest that it is to the more frequent use of this route, rather than the amount of antitoxin given by it, that the improved results claimed by the heavy-dose school are due. Once a reasonable amount of antitoxin is in circulation we may stand by, not with "complacence" but with the knowledge that further toxæmia is prevented and that the outcome is decided by the amount of toxin already fixed in the tissues. Spread of membrane within 24 hours of a reasonable dose is not, in itself, an indication for further antitoxin.

It is certainly true that there is considerable variation in severity in different localities and also in the same locality at different times. Our faucial diphtheria case-fatality rate here has varied from 3·6% in 1935 to 13·9% in 1936 and 1·8% in 1943. During this period the dosage and administration of antitoxin was always that indicated above. Epidemiological variations like these indicate how difficult it is to make a valid comparison between diphtheria in different localities, or to assess the relative value of two methods of treatment. But we are satisfied that we give sufficient antitoxin and have evidence that the causes of both the abnormally high and the abnormally low case-fatality rates lie elsewhere.

H. MASON LEETE.

Hull City Hospital, Cottingham. NIGEL W. ROBERTS.

PSYCHIATRIST OR MEDICAL OFFICER?

SIR,—Some concern has recently been expressed because, under the new scales of pay for mental nurses, matrons and inspectors are receiving more than assistant medical officers. I need hardly say that this concern does not emanate from the matrons and inspectors.

May I suggest that the anomalies in the present position arise from the fact that the title "assistant medical officer," with all that it implies, is as out of date as the "lunatic asylum." It is indissolubly associated with the custodial atmosphere of the Victorian mental institution.

If the psychiatrist is to make the fullest use of his special approach to medicine—if indeed he is to maintain a balanced understanding of his specialty—he must be released in part at least from his mental hospital duties and must adopt the general hospital or health centre as his headquarters. He will thus be able to contribute to the solution of the myriad psychiatric problems which arise in general medicine and other special branches. He will rub shoulders with his colleagues who are primarily interested in the maintenance of the physical aspects of health, to his and their mutual advantage.

The AMO with suitable experience and qualifications will thus be in effect a specialist in psychiatry and will be entitled to claim a salary commensurate with his status, like other specialists. The cost of these changes would be small. The gain to the patient and to psychiatry would be considerable.

St. Mary Cray, Kent. BRIAN H. KIRMAN.

SMALLPOX AMONG THE VACCINATED

SIR,—In your leader of Nov. 25 you say that "lymph should be used within a week of 'manufacture,' but if properly refrigerated can be kept for a fortnight." To avoid misunderstanding, will you permit me to amplify this statement? The provisions regarding storage before issue and the period after issue within which it must be used are fully detailed in the Therapeutic Substances Regulations No. 370, 1944, Part 1 (B) paragraphs 6 (1) and 6 (2) of the second schedule. In effect they state that the date of manufacture is the date on which the vaccine lymph is removed for issue from cold storage, after having been kept continuously at a temperature below 0° C since the date of filling into containers for issue, and if the lymph is kept below 0° C the potency can be assured for at least six months. In practice we keep the temperature of our cold-storage room round − 10° C (14° F). The lymph, after issue from cold storage, must be used by the recipient within a week of manufacture, it being understood that he keeps it at room temperature in a cool dark place. Provided that he has a domestic refrigerator working between 0° C and + 10° C (32° to 50° F) and keeps it continuously there, he can use it up to 14 days from date of manufacture.

London, NW9. W. D. H. STEVENSON.

DIAGNOSIS OF SLEEPING SICKNESS

SIR,—In your issue of Nov. 11 Dr. Grant and his colleagues recorded a case of sleeping sickness (trypanosomiasis) which was not recognised until two years after leaving Africa. Their report draws attention to the many difficulties of diagnosis which will arise among soldiers and others returning to this country after service in the tropics. In this patient the diagnosis was first made by finding trypanosomes in bone-marrow obtained by sternal puncture. Presumably ordinary blood smears had been examined on various occasions without revealing these parasites; in West African sleeping sickness, trypanosomes are scanty in the peripheral blood and difficult to demonstrate. Trypanosomiasis should always be considered as a possible diagnosis in the case of any chronic febrile condition (especially if there is any suggestion of cerebral disturbance) in a European who has been in parts of West or Central Africa where sleeping sickness occurs. In order to facilitate the confirmation or exclusion of this diagnosis, we venture to draw attention to two procedures which are often more effective than blood examinations in demonstrating the presence or absence of trypanosomes.

GLAND PUNCTURE

One of us (R. D. H.) has investigated the comparative diagnostic value of gland puncture and of stained thick blood-film examination in different sleeping sickness areas of Nigeria and Sierra Leone. As a rough general rule it has been found that of every 10 cases capable of diagnosis by these methods 3 or 4 are positive in both gland juice and blood film, 5 or 6 are positive in gland juice alone, and only one is positive in blood-film alone, on any single occasion. There are exceptions to this rule but it is of sufficiently general application to make it clear that, though both examinations should be carried out in suspected cases, gland puncture is the more valuable procedure of the two. The technique is as follows:

An enlarged soft gland is sought. The skin over it is sterilised with spirit and allowed to dry. The gland is then picked up through the skin with the thumb and first two fingers of the left hand in such a manner that the skin is stretched tightly over it. A sterile dry hypodermic needle held in the right hand is then plunged through the skin into the substance of the gland and advanced and partially withdrawn two or three times with an accompanying rotatory motion while at the same time the fingers of the left hand are applying some pressure upon the gland. A drop of fluid is thus coaxed into the lumen of the needle which is then withdrawn, and the drop is blown out on to a slide by attaching a dry syringe. A cover-slip is applied and the fluid is examined immediately under the 1/6th objective. If the room is cold the slide should be warmed. Trypanosomes when present are easy to detect by their movement and the agitation they impart to the cells lying in the preparation. The needle used for puncture should be dry, since trypanosomes are rapidly killed by plain water; and it should be of medium size—e.g., of 0·6 or 0·7 mm. diameter, rather than of fine calibre.

A posterior cervical gland is usually chosen for puncture, but if none is available an enlarged gland elsewhere in the body may be used instead. Even quite small glands of the size of a pea sometimes reveal trypanosomes and are worth puncturing in a suspected case if none larger can be found; but in cases whose infection is of long standing the glands tend to be sclerosed, and trypanosomes become very difficult to find either in gland juice or blood-film; in such cases, and in others whose glands are large but negative on puncture, blood-culture is indicated. Inoculation of blood into small laboratory animals is a very unreliable means of diagnosis, as rats, mice, and guineapigs fail to become infected by many West African strains. Monkeys are better but are usually not available.

BLOOD-CULTURE FOR TRYPANOSOMES

This procedure was perfected by Brutsaert and Henrard,[1] in the Belgian Congo, but British workers have not yet given it the attention which it deserves. One of us (F. H.)[2] has confirmed that it is a simple and practical method; in the laboratory, positive cultures can be obtained from the blood of infected guineapigs even if no trypanosomes can be found by direct microscopic examination. The procedure is as follows:

Ten tubes are taken, each containing 2 ml. of Ringer[3] or Locke's solution and 2 ml. of human (or guineapig) blood containing 1% sodium citrate. Then 5 ml. blood is withdrawn from the patient and mixed with 1 ml. of a 1% solution of 'Liquoide' (Roche) (sodium polyethanol sulphonate) or of a 0·025 solution of heparin in normal saline to prevent clotting. The use of citrate at this stage is injurious to the trypanosomes and makes their isolation much more difficult. About 0·2–0·5 ml. of infected blood is then added to each tube. If desired, anticoagulants may be omitted, and the infected blood may be inserted into the tubes before there has been time for clotting to occur. The tubes are capped and incubated at 24–30° C. All the above procedure is conducted with sterile precautions.

The tubes are examined after 10 and after 20 days by removing a small sample from the surface and from the depths of the layer of red blood corpuscles and examining microscopically under a cover slip. The distribution of trypanosomes is very uneven; many fields may be examined without finding any and then many large clumps may be encountered. They are found especially around small clots of fibrin which are seen under the low power of the microscope as clear spaces in the thick layer of erythrocytes. The trypanosomes tend to occur in rosettes; they are actively motile and once seen there is no difficulty in identifying them.

A more complicated medium has been described by Weinman[4] in which the blood of the culture medium is hæmolysed and 'Difco' agar is added. In a few trials of this method made by one of us (F. H.) growth was not more abundant than in Brutsaert and Henrard's medium and microscopical examination was rather more difficult, owing to the difficulty of focusing on an almost empty field.

We draw attention to these two procedures in the hope that they may be useful in confirming or rejecting the diagnosis of sleeping sickness in any patient who may be suspected of suffering from this infection.

R. D. HARDING,
Colonial Medical Service.
F. HAWKING,
National Institute for Medical Research, NW3.

1. Brutsaert, P., Henrard, C. *C.R. Soc. Biol., Paris*, 1938, **127**, 1469.
2. Hawking, F. *Ann. trop. Med. Parasit.* 1940, **34**, 31.
3. NaCl, 0·65 g.; KCl, 0·014 g.; $CaCl_2$, 0·012 g.; H_2O, 100 ml.
4. Weinman, D. *Proc. Soc. exp. Biol. NY*, 1944, **55** 82

THE VOLUNTARY HOSPITAL WITH AN UNDERGRADUATE SCHOOL

SIR,—I used the word "diaspora" to mean something more than mere "dispersion," for it infers an evangelistic or proselytising spirit in those that go out; and that, surely, was what happened when the great teaching hospitals became the heads of the various sectors set up under the EMS. Mr. Gibb will find the word in the *New English Dictionary* with references dating from 1876 to 1889. With regard to Mr. Gibb's first sentence no-one has suggested that the medical profession should work "without proper payment." What we are trying to evolve is a plan whereby that proper payment may be received when the magic of averages has been brought to the rescue of the millions, to quote Mr. Churchill. In all these discussions we must bear in mind that the object of the change is to lift the fear of financial distress due to illness off the shoulders of the nation.

London. T. B. LAYTON.

BEDS FOR TUBERCULOUS PATIENTS

SIR,—Taking the opportunity to disseminate his political views, Sir Waldron Smithers continues his dispute with Dr. Ponder in your issue of Dec. 9. He deduces that the inadequacy of facilities for the isolation and treatment of tuberculous patients is to be taken as a warning of what he calls "the mortal danger of State control," whereas, according to him, "in voluntary hospitals the first thought is the patient" who is never sacrificed to the system.

Sir Waldron Smithers has presumably not had the opportunity of obtaining first-hand information about the functioning of the voluntary hospitals in connexion with the accommodation of urgent cases. He therefore cannot know that the solution of this great problem

is not so simple as a choice between voluntary and municipal medical services. During my studentship at one of the larger London voluntary hospitals in 1933–36 I saw in the outpatient department the names of numerous sufferers from still operable cancer placed in an admission book to await beds—a wait that was not uncommonly protracted into weeks. And my hospital was no exception in this respect.

If Sir Waldron Smithers's implications are correct, some all-powerful medical authority would have brought about the instant admission of these patients, perhaps at the expense of less urgent or even non-urgent cases (e.g., rare or incurable diseases kept for teaching purposes), and perhaps too at the expense of the "normal procedure" whereby beds are distributed among particular specialists and for particular classes of disease.

Although Dr. Ponder has already pointed this out, Sir Waldron Smithers appears to remain unduly impressed by the prompt disposal of his constituent, forgetful that not every person in need of urgent treatment can command the influence of a Sir Waldron Smithers, MP.

Slough, Bucks. S. J. HOWARD.

RETURN TO CIVILIAN MEDICINE

SIR,—The feelings of Service doctors on post-war medical practice have been expressed in your columns on many occasions without drawing a response from the Service medical chiefs. I think it is time that a policy for our mental rehabilitation was decided. We do not see the aged, the infants, or the fair sex (in any number); consequently our home practice will be completely new. If we could look forward to an interesting few months of readjustment before demobilisation I think that the future would appear brighter and the prospect of an adequate civilian livelihood more likely.

Italy. L. P. DAVIES.

*** Proposals under consideration for the postgraduate training of Service doctors were outlined in a leading article on Oct. 7. In a parliamentary answer reported in our last issue the Minister of Health said that one of the objects was to enable released doctors, who had not previously established themselves in practice, to obtain 3 or 6 months' clinical experience in hospitals under expert guidance. As soon as the scheme is settled, particulars are to be circulated among serving medical officers.—ED. L.

MENUS FOR A PERSON LIVING ALONE

SIR,—Some time ago a newspaper advertisement of the Ministry of Food was directed to one-ration-book households and offered to send a copy of a week's menus and recipes to anyone sending a post card to the Food Advice Division. This I accordingly did, as I felt that the Ministry might be making some contribution to "bachelor" scurvy, quite apart from helping such people with suggestions to improve their diet. In due course I received two sheets of typewritten matter, one being the suggested "diet" and the other recipes for certain of the dishes. I have seen no comments on these in the medical press, no doubt because of their mode of issue. Anyone who is interested should be able to obtain copies as I did, but I would particularly like to draw attention to the following points.

The week's menu is stated to have "been approved by our dietitians as providing adequate nourishment and variety." It is doubtful whether this sweeping statement can be made of any diet composed of specific dishes repeated on the same days of each week. It is also stated that no oven is needed, but it must be difficult to make bread, cakes and scones in pans; the ministry must therefore consider these items supplementary to the one ration book and hence the title of the diet is a misnomer.

There is no provision for afternoon tea on the menu, and the butter and margarine have already been used up in the other meals and cooking according to the ministry's own figures.

The meals are in some cases original and unusual, but we are presumably dealing with healthy people and not "gastrics." I doubt if the workman would relish the "fairy toast" (i.e., wafer-thin toast) given him at supper in addition to vegetable soup, with grated cheese (½ oz.) and parsley, together with cake or biscuits, which is all the menu proposes.

The breakfasts all contain oats in one form or another, and, while there is nothing against this, the person who does not like them is left on bread and butter when fruit is not available.

This menu is an admission of the difficulties encountered by the one-ration-book household, but, per se, is an inadequate solution. I do think that the ministry, having undertaken an extensive advertising campaign and published according to the figures on the sheets some 10,000 of these leaflets, might have preached their gospel in a more attractive form, and also made suggestions encouraging the use of antiscorbutic and other foods rather than producing a fixed specific menu which (if it could be stomached by all) would probably require the whole of a day for shopping and cooking.

Seaham, co. Durham. ALBERT FORSTER.

PENICILLIN DISTRIBUTION

SIR,—I yield to none in my admiration of the men who discovered and unfolded for us penicillin. Those who have read into the recent special number of the *British Journal of Surgery* will be proud of the profession they have chosen. But I am sorely worried by the present method of penicillin distribution. Cold science from the laboratory is dictating when and how it shall be used.

I am an old and experienced surgeon; countless men and women have entrusted their lives, or those of their dear ones, to my judgment and to my hands. But now I find that I am not to be trusted with a few paltry penicillin units; I am looked on as a possible penicillin squanderbug. First I must find penicillin-sensitive organisms, wait for pus, be sure the case is of scientific interest, or be able to state that the patient has gonorrhœa, syphilis, or some other venereal disease.—Perhaps these dictators have not heard that a fence at the top of the cliff is better than a hospital down below.

Though I have treated thousands of casualties of all types, only for some dozen cases have I so far been able to get penicillin—and what a rigmarole before I got that. At times, as I operate, I say to myself here is a patient who, should infection follow, may lose her life or her future happiness; her soldier husband fighting abroad would hardly call the prophylactic use of penicillin an "extravagance" in her case. If his wife was a prostitute, loaded with gonorrhœa, she could have all the penicillin she wanted. If she was an enemy casualty with a mere scratch, she would be given it freely. What a gesture, what patriotism—when we know perfectly well that tens of thousands of such casualties have healed without the slightest incident or complication.

The reply to all this is obvious: penicillin is scarce: this method of distribution "must be so." But we have had far fewer casualties, both over here and in France, than we anticipated; so extra stocks must be available somewhere. And before long we are going to have plenty of penicillin; so let us use and not hoard what we have, for in the meantime some die and many suffer.

I must say something of another principle which this method of distribution contravenes: it strips the surgeon of liberty of action, making him obedient to the dictates of the laboratory. I know that we owe this penicillin to the laboratory, and I am indeed grateful. But their interests necessarily differ from ours. "The immediate interest of the physician is the patient, the immediate interest of the pathologist is the disease"—as a professor of pathology said in a presidential address a couple of months ago. If surgeons allow the pathological outlook to creep into their treatment, none can tell where such an attitude towards living people will end. A few weeks ago Dean Inge wrote "Liberty is endangered more by those who like to obey, than by those who wish to rule." Surgeons must not allow cold science to decide for them. If we cast out personal sympathy, we have lost our faith. I appeal to the distributors of penicillin to leave the final decision, as to whether penicillin is to be used or not, to the judgment of a patient's physician or surgeon. They may rest assured that the "scientific" criteria for its use will not be ignored.

TOMUS.

ASSOCIATION FOR SCIENTIFIC PHOTOGRAPHY.—At a meeting of the association to be held at the Caxton Hall, Westminster, SW1 on Saturday, Dec. 30 at 2.30 PM, Mr. H. Baines, D SC, and Mr. F. J. Tritton, FIC, will open a discussion on the choice of materials for scientific photography.

Obituary

EDWIN GOODALL

CBE, M D LOND., F R C P

Dr. Goodall retired from his appointment as medical superintendent of Cardiff Mental Hospital in 1929, before the Mental Treatment Act of 1930 gave psychiatrists in public mental hospitals the freedom and opportunities which are commonplace today. But his work was solid and enduring. Indeed the psychiatric outpatient department which he established at the Cardiff Royal Infirmary, and the appointment to the mental hospital of visiting specialists in medicine, surgery, gynæcology, and otology which he contrived, fulfilled the principle of close relationship between psychological and general medicine that is the theme of much present-day planning for mental health. He also founded what must have been one of the earliest psychiatric research teams. Its core was a triumvirate consisting of himself as clinician, H. A. Scholberg as pathologist, and R. V. Stanford as research chemist. Thanks to Goodall's efforts, they had the advantage of generously equipped pathological and biochemical laboratories on a scale far beyond that of most mental hospitals even today. The fruits of their activities were seen in Goodall's Croonian lectures (1914), in his presidential address to the Royal Medico-Psychological Association (1923), and in his Maudsley lecture, which all dealt with the somatic pathology of mental disorders. These, however, are only nodal points in the steady flow of psychiatric research for which Cardiff is noted, and which owes its origin and much of its course to Goodall.

Edwin Goodall was born in Calcutta, where his father E. B. Goodall practised as a solicitor. He was educated at Guy's Hospital and the University of Tübingen, qualifying in 1885 and taking his MB London the following year. His interest in the pathology of mental disorders was early aroused and his junior appointments included a demonstratorship of pathology at Owens College, Manchester, and a resident post at Bethlem Royal Hospital where he came under the influence of Sir George Savage. A period as pathologist and assistant medical officer at the West Riding Asylum at Wakefield followed after which he went to Wales as medical superintendent of the Joint Counties Asylum at Carmarthen. To obtain this post he learned Welsh in six months, and produced his first annual report in such classical language that his local critics, who spoke only colloquial Welsh, could not understand it. Dr. Goodall took up his post at Cardiff while the new mental hospital was still being built at Whitchurch. His work there was interrupted when it was taken over by the Army during the last war, and Goodall found himself with the rank of lieut-colonel running a large military hospital. For his services during these years he was appointed CBE in 1919. Goodall was also lecturer in psychiatry at the Welsh National School of Medicine. As a member of many foreign societies he was well known abroad, and he also served as president of the Royal Medico-Psychological Association, the psychiatric sections of the Royal Society of Medicine, and the British Medical Association. He was elected FRCP in 1903, and he was at one time a co-editor of the *Journal of Mental Science*. On his retirement he was appointed consulting physician to the Cardiff City Mental Hospital and to the Cardiff Royal Infirmary.

"As a man," I. S. writes, "Goodall was at once colourful and humorous, precise and exacting, dignified and courteous. Known affectionately as 'the Colonel' he was small and slight, almost gnome-like of countenance, meticulous in attire, combining inextricably the qualities of a scholar, a fighter, and—though he would probably deny it—an artist. Because he always demanded strict observance of rules and regulations, those who knew him only superficially were apt to be misled into attributing to him a rather bureaucratic outlook. But at heart he was a doctor, and he abhorred red tape. Of an official form, governed by numerous regulations and instructions, he once said 'As long as you've got the right date on the right and the right initials on the left, it doesn't matter much what's in between.' He affected to care little for modern dynamic psychology, in which he was, nevertheless, learned. The mere mention of it at one of his celebrated Friday afternoon sessions in the laboratory, when the progress of the week's research was reviewed, was certain to evoke a remark such as 'H'm, ... of course there's talk and there's work ...,' followed by a terse order (but with a twinkle) to read the titration. He was in fact a remarkably shrewd and skilful practical psychologist—indeed without this knowledge and the ability to apply it he could not have achieved what he did. Goodall's work was his hobby and in his retirement he continued to attend scientific meetings, to keep well abreast of medical literature—much of it foreign, for he was an accomplished linguist—and until quite lately to correspond, always wittily, refreshingly, and topically with his former colleagues, however, junior."

Dr. Goodall married in 1899 Anna Filippa Jönsson, of Halmstad, Sweden, who survives him. He died on Nov. 29 at his home at Kingsway, Hove, in his eighty-second year.

EDWARD FRETSON SKINNER

M D CAMB., F R C P

IN full and active work, Dr. Fretson Skinner of Sheffield died on Nov. 28 while seeing a patient at his consulting-room. A physician of unusually wide range, he had latterly devoted himself to psychological medicine and was developing a psychological unit at the Royal Hospital, where he had been a member of the staff since 1908.

The son and grandson of Sheffield practitioners, both of whom were honorary lecturers in anatomy in the old days of the School of Medicine, he was born in 1880 and went to school at the Wesley College. On going down from Cambridge, where he stroked the Corpus Christi boat in 1901–02, he returned to Sheffield, and after qualification in 1906 he was elected to the staff of the Children's Hospital. At the Royal Hospital he at first had charge of the skin department, and it seemed at that time that he would make dermatology his specialty. But on his return from service in France from 1914 to 1917 he was appointed assistant physician and turned his mind to general medicine, though he continued at first to look after the skin department and was also venereologist at the hospital. He was always interested in nervous diseases, and perhaps because of his experiences with "shell-shock" cases in France, he concerned himself increasingly with functional disorders. In this he found his true life-work. His enthusiasm, vigour, and thoroughness soon won recognition, and early in the present war he was given charge of the large neurosis department at the Wharncliffe Emergency Hospital. There is little doubt that the work this involved, added to his ordinary hospital and private practice, overtaxed his strength. He was ready to help his colleagues at any time and in any way.

"He was regarded with real affection by his juniors," writes one of them, "because of the warm and sympathetic understanding with which he entered into their problems. He had the knack of making the student feel he was being consulted as an equal, and he was a stimulating and refreshing teacher because he himself always remained a student. A pioneer in many forms of treatment, he encouraged his assistants to study and try new methods. He was always ready with help and advice, but once the venture was under way he would not intrude his own personal views unless these were sought. His patients found in him not only a wise physician but a kindly friend. He never troubled them with unnecessary special investigations, and day or night he was always willing to come down to the hospital and advise on a difficult case. It was this readiness to share and take responsibility which endeared him to so many residents. He lived for his work, which was mainly, perhaps the most difficult branch of pure medicine, that of dealing with and treating the functionally deranged. His tact and treatment prevented many

from becoming submerged in the morass of mental disease. Perhaps because he was a psychologist as well as a general physician, he was able to regard patients and colleagues alike from a kindly and detached viewpoint, and this helped to make him universally liked. His quiet, humorous chuckle and his courteous and kindly figure will be missed from the wards and corridors of this hospital."

Dr. Skinner was university lecturer in medicine for many years, and from 1934 onwards was lecturer in psychological medicine. He was elected FRCP in 1922 and at the time of his death was senior physician to the Royal Hospital. His son, who qualified in 1939, is serving in the East.

JOHN HENRY FRYER
M B CAMB.

Dr. J. H. Fryer, who died on Nov. 29 at Bardsey, Leeds, in his 72nd year, was eldest son of a former headmaster of Bootham School, York, and could have made much of any career where quiet observation and cool judgment count. After taking a first-class in his tripos at Christ's College, Cambridge, and holding a series of house appointments at the London Hospital, he married the nurse who had seen him through an attack of typhoid and elected for general practice. Joining Sadler in Barnsley, he spent 25 years in that mining community, broken only by a spell in France as captain RAMC, presiding over the local literary, natural history, and archæological societies, and taking a share in school management. Big and gentle in body as well as in mind, his athletic frame became more and more crippled by fibrositis, which confined him to house and garden where he remained to the last cheerfully versatile. He will be widely missed by all classes of the community which he served.

On Active Service

CASUALTIES

ACCIDENTALLY KILLED

Major PHILIP MCLEAN GUNN, MC, MB EDIN., RAMC

DIED

Captain J. PHILIP, RAMC

WOUNDED

Captain A. W. LITTLE, MB LOND., RAMC
Captain R. T. MICHAEL, LRCPI, RAMC
Captain D. R. URQUHART, MB LOND., RAMC

MEMOIR

Captain BRIAN BROWNSCOMBE, who was killed at Arnhem, was educated at Christ's College, Horsham, and at University College, London, where in 1933 he gained the medical entrance scholarship. He qualified from University College Hospital in 1938 and obtained his London MB two years later. After qualification he became resident medical officer at Wembley Hospital, and spent a few months in general practice in Wembley before he returned to UCH as house-surgeon to Mr. Gwynne Williams. At the outbreak of war he was transferred with many others to Leavesden Emergency Hospital, and in the early part of 1940 he was appointed as assistant to the neurosurgical unit. Here he gained much neurosurgical experience and proved himself a competent and careful surgeon. But he stayed in the Emergency Medical Service against his own wishes and considerable persuasion was needed before he undertook to remain there for his last year.

After joining the RAMC in 1942 Brownscombe volunteered for service with airborne troops and served in North Africa and Sicily. He was awarded the George medal for saving a soldier from drowning when a glider landed in the sea about five miles from the coast. The crew and the passengers got out on to the wings, but the glider sank in a very few minutes. One soldier was unable to swim and was in grave danger of drowning, and Brownscombe stayed with him and kept him afloat for five hours until they were both picked up by a boat. Aboard, Brownscombe insisted on helping in the treatment of the wounded, and carried on without rest until this task was completed.

F. M. R. W., who knew Brownscombe during his student years and later as a hospital resident and learned to admire his rare and serene personality, writes: "An innate and perfect sense of what was due from him and to him underlay a natural ease that made him at home with all his fellow men. Large of stature, his heart and courage matched his frame. Calm and unhurried in temper and in action, with a gentleness that sat so naturally upon him, and with a quiet competence, he was far more than the good doctor to his patients who, of all ages, learned to trust him and to take strength from him. It was characteristic of his feeling for the good life, in its highest sense, that he should have desired to serve the community and to spend his days as a country doctor, but the desire to serve his country in the field was strong in him, and he turned with eagerness to this new call, and early in his too brief service he showed a calm and unselfish courage. We may be sure that he met death with dignity and steadfastness, and with no regrets that he had been chosen for the post of extreme danger. His chosen profession of medicine has lost one who would have adorned its finest traditions."

Parliament

QUESTION TIME

Promotion of Prisoners of War

Sir GEORGE ELLISTON asked the Secretary of State for War whether the regulations now governing prisoners of war could be amended to permit the normal opportunities of promotion for medical and dental officers of the RAMC detained in enemy prisoners-of-war camps for the care of British prisoners.—Sir JAMES GRIGG replied: Time promotion is carried out under the normal rules for all officers who are prisoners of war. They also retain their paid acting and temporary ranks while they are prisoners, but the period during which they retain acting rank does not count for conversion to temporary rank. I do not consider that special arrangements should be made for medical and dental officers.

Hospital Survey Reports

Sir E. GRAHAM-LITTLE asked the Minister of Health when he proposed to allow the reports and recommendations of the surveyors appointed to ascertain the hospital facilities available in the London and other regional areas of England and Wales to be published.—Mr. H. WILLINK replied: Six of the ten reports have so far been received and three are already in the hands of the printer. They will be published as soon as the prevailing difficulties of production allow.

Malaria Control in Mauritius

Captain J. A. L. DUNCAN asked the Secretary of State for the Colonies whether any estimate had been received from the Government of Mauritius of the cost of eliminating malaria for which plans were stated to be already far advanced; and whether it would be possible to make a start on the work in advance of the report of the antimalarial engineer for whose appointment provision had already been approved under the Colonial Welfare and Development Act.—Colonel O. STANLEY replied: A scheme is now under consideration for the control of malaria in Mauritius, involving capital expenditure of £1,500,000. Antimalarial work is already being carried out in the island, and the scheme which embodies the recommendations of the antimalarial engineer referred to in the second part of the question, provides for a considerable expansion of that work.

Distribution of Midwives

Replying to a question Mr. WILLINK stated that a review of all qualified midwives already employed in industry had already taken place and those with good or recent experience were withdrawn, though there was sometimes a little delay in withdrawal where replacement is necessary. In view of operational needs and since any midwives now in the Services must have qualified some time ago, and will be scattered all over the world, he did not think he could press the Service departments to make releases at present.

CIVIL DEFENCE AWARDS: CORRECTED NOTICE.—Dr. ELSIE BOYTON, medical officer in charge of a Battersea light mobile unit, Dr. F. A. PHILLIPPS, medical officer in charge of Chelsea mobile unit, and Dr. H. F. SPARLING, medical officer at a shelter medical aid-post at East Croydon have been appointed MBE. The deeds for which these awards were made were described in our columns last week (p. 808).

Notes and News

SAFEGUARDING LONDON'S WATER

In a lecture at the Royal Institution on Dec. 8, Lieut.-Colonel E. F. W. Mackenzie explained how the gathering war clouds after Munich brought new problems for those responsible for London's water-supply. It was thought that the enemy might attack the major works of the Metropolitan Water Board, and it was realised that in the event of bomb damage and devastation chlorination might be the principal safeguard for the purity of the supply. Every practicable means was therefore taken to make chlorination both adequate and reliable. Alternative laboratories were equipped in safer areas for emergencies. Precautions against the introduction of chemical poisons and gas warfare were taken by placing special guards at the works, providing for special tests to be performed on the works, and maintaining a staff of analysts and sample collectors day and night at the laboratories. Special arrangements were set up for the repair and sterilisation of water mains, which are often contaminated by sewage from a fracture of an adjacent sewer. Over 7000 volunteers were trained to carry on emergency water supplies if the works were damaged. The waterworks have since suffered almost every conceivable form of damage from air attack, but the purity of London's drinking water has been maintained as high as ever.

CHILD HEALTH AT NEWCASTLE

The first year's work of the department of child health of Durham University, which is situated at the Royal Victoria Infirmary, Newcastle-on-Tyne, is described by Prof. J. C. Spence, the director, in the third annual report of the North-Eastern Regional Hospitals Advisory Council. He notes that the department cannot reach all its objectives till after the war, when more buildings and staff will be available; but in the meantime he can record considerable progress. The children's clinic in the grounds of the Infirmary is being used freely for consultation by doctors in the neighbourhood, and by the child-welfare and school medical services. The department takes a special pride in arranging for outpatients the same attention and privacy as they can expect in the best private practices—services so well appreciated that the clinic is in danger of being swamped by the numbers of patients attracted. Already 6000 patients are given consultations yearly: a number which taxes present staff and accommodation fully. Speech clinics and follow-up clinics have also been set up, and it is hoped in time to add a clinic for the study of deliquency and behaviour problems. In May, 1944, a child-welfare clinic was started in the department, in collaboration with the health department of the Newcastle City Council. This serves as a training centre for doctors and nurses taking up welfare work. Inpatients are received in the children's wards of the Infirmary, and of the Babies Hospital, and a study is being made of the institutional care of children. The teaching of undergraduate students in child health is now well established; each student does three months' work in the department. Research is going forward on the control of lice infestation, the treatment of burns, hæmorrhagic diseases of children, and childhood tuberculosis. Professor Spence has the help of a first assistant, a medical registrar, and two part-time assistants; all give much time to lecturing outside the department as well as to routine work and teaching, and research within it. One aim still to be realised is the provision of training posts for postgraduate workers, who will later be able to fill the posts in child care and health which we all hope to see established in growing numbers after the war.

THE APPEAL OF WAR

Arms and the man have been regarded as a noble theme by poets since the early days of history. Only lately, as Prof. J. C. Flugel [1] has pointed out, have men begun to consider seriously the ignoble aspects of war, or to talk of abolishing it. If we have any genuine intention of giving it up, he thinks we should be aware of its appeal and its moral value, as well as of its drawbacks, so that action can be rooted in understanding. Flugel suggested four ways in which war is relatively attractive: it appeals to our sense of adventure, it encourages community spirit, it offers an escape from ordinary worries and restrictions, and it provides an outlet for aggression. Risk has its pleasant side, as those who go on switchbacks at fairs or hazard their limbs on mountains are well aware. Emotionally, war has a traditional appeal; besides, the ideas of king and country are correlated, the psycho-analysts believe, with the strongly moving figures of the father and the mother. War knits us into a national group, replaces competition with coöperation, and calls out our full powers, giving a sense of fulfilment—or, as the analyst might put it, raises the ego to the level of the superego. All this is morally satisfying. Then, because people feel entitled to some recompense for the discomfort and danger, there is some slackening of customary standards, especially in sexual relationships. Moreover, despite physical danger, many people enjoy a new sense of security; all can find work, and new worries are offset by a release from old ones. Finally, war not only justifies aggression—it provides scapegoats.

1. In a public lecture on psychology and the appeal of war, delivered at University College, London, on Oct. 21.

FOUR MEDICAL FILMS FOR THE PUBLIC

Four medical films for presentation to the public have recently been put into circulation by the Central Film Library.

Conquest of a Germ is a first-class documentary film dealing in a dramatised way with the effect that the advent of sulphonamides has had on medical practice. We follow the thoughts of a young doctor as he soliloquises on the problems of infection which confront him in his hospital practice, and rejoice with him in the advances which chemotherapy brings. This sympathetic film may be offensive to some of our more phlegmatic colleagues but must be welcomed for all that; for films which present a doctor intimately and personally worried by the misfortunes of his patients are few and far between. Doctors are too often represented as callous and brusque, and this film gives the opposite impression. Directed by Donald Taylor; running time 16 minutes.

Back to Normal is designed for showing to people who have lost a limb by war injury. It presents personal interviews with various injured people who have successfully returned to active, useful life by the use of artificial limbs, and gives glimpses of the initial training they received in how to use them. Directed by Roger MacDougall; running time 15 minutes.

A Flying Start presents in a straightforward manner the currently accepted arguments in favour of breast-feeding. An expectant mother, under the impression that breast-feeding is more complicated than the bottle and "not quite nice," is persuaded to the contrary by her clinic doctor, her mother, and her friend. It can safely be shown to all shades of opinion without causing offence. Directed by Ken Annakin; running time 12 minutes.

Unwanted Guests is another simple film from the Central Council for Health Education, dealing with the control and treatment of infestation by the head louse. Designed primarily for the public, it is also suitable for showing to the medical profession and public-health workers. Running time 9 minutes.

All four of these films have sound tracks and therefore cannot be used on silent projectors.

AN M O H IN AMERICA

Dr. Arthur Massey, medical officer of health for Coventry, visited the war-time United States last spring and summer, and his committee has now published a short account which he wrote of his doings there.[1] He experienced the unequalled kindness shown by Americans to their foreign guests, was conducted on a special tour through 25 States, and spoke on the British public-health services to many audiences. He was especially struck by the illuminated traffic signs ("Walk"—"Don't Walk"), the advertisements of manufacturing towns ("Trenton makes, the world takes"), the scenery (which, true to a medical training, he classified into six categories), the fine planning of the best American cities, and the "disaster committee" at San Francisco, which is ready to cope with an earthquake at a moment's notice. He notes that the standard of public-health services varies greatly from State to State, being at a very high level indeed in New York, and much lower in some of the remote prairie States. At the universities and medical schools he was impressed by the free association of men and women students, and the ease of entry to university education.

Dr. T. Rowland Hill has been adopted as Liberal candidate for the Camborne division of Cornwall.

1. Some Impressions of the USA. Printed and circulated by request of the Public Health Committee of Coventry City Council.

University of Glasgow

Dr. D. F. CAPPELL, professor of pathology in the University of St. Andrews, has been appointed to the chair of pathology in the University of Glasgow in succession to the late Prof. J. Shaw Dunn.

Professor Cappell, who is 44 years of age, was educated at Hillhead High School, Glasgow Academy, and the University of Glasgow, where he qualified with honours in 1921. In 1923 he became assistant to Sir Robert Muir and in 1928 he was appointed lecturer in pathological histology at Glasgow. He held this post till 1931 when he was appointed to the St. Andrews chair. In 1929 he obtained his MD with honours, and the following year was awarded the Bellahouston gold medal. Since 1939 he has been dean of the faculty of medicine at St. Andrews, and in 1941 he was elected to the General Medical Council He is director of the Scottish eastern regional blood-transfusion service. He is also an examiner for the universities of Edinburgh and Birmingham.

Faculty of Radiologists

The following have satisfied the board at the examination for the fellowship of the faculty:

Radiodiagnosis.—F. R. Berridge.
Radiotherapy.—M. Lederman, R. Morrison, and J. Walter.

Medical Society of the LCC

Nearly 300 of the London County Council's medical staff applied for foundation membership, including doctors now in the Services. Sir Allen Daley, FRCP, is the president and Mr. G. F. Stebbing, FRCS, has been nominated chairman. Full membership is open to whole-time LCC medical officers; associate membership is open to medical practitioners attached to the LCC medical service; and honorary membership is open, among others, to the medical members of the Council. The inaugural meeting is to be held at the County Hall on Thursday, Jan. 11, 1945, at 4.30 PM, when Sir Allen Daley will preside. The acting hon. secretary is Dr. Eli Davis, St. Andrew's Hospital, Bow, E3.

Nutrition Society

A conference is being held on Saturday, Dec. 30, at the London School of Hygiene, Keppel Street, WC1, on the nutritional rôle of the microflora in the alimentary tract. The speakers will include Mr. A. C. Thaysen, PH D, microbiological aspect of rumen digestion; Mr. J. A. B. Smith, D SC, formation of protein; Mr. S. K. Kon, D SC, synthesis of vitamins by micro-organisms of the alimentary tract; and Mr. A. T. Phillipson, Mrs. R. A. Marshall, Mr. S. R. Elsden, and Sir Joseph Barcroft, FRS, the production of volatile acids in the rumen.

Children Go Home

Children evacuated from seven coastal towns are now to return home (Ministry of Health circular 178/44). Arrangements are to be made on lines already noted in our columns (*Lancet*, Nov. 4, p. 615). Thus, facilities for return are to be given only to children whose friends or relations have homes to which they can go—a necessary proviso, since housing difficulties in some of these towns are serious. The Ministry hopes the migration will be accomplished by the middle of February.

Grants for Uganda Health Services

Under the Colonial Development and Welfare Act, grants of over £825,000 have been made to the Uganda Protectorate for the extension of their hospital and health services. A grant of £477,500 will provide for the reconstruction and extension of Mulago Hospital, Kampala, where 1120 beds will be available. It is proposed that a consulting architect, with experience in hospital planning, should visit Uganda at an early date. A further £92,000 will be used for the training of staff; £75,000 for a malaria campaign; £63,000 for a venereal diseases campaign; £50,000 for a tuberculosis campaign; £40,000 for a nutrition survey; £30,000 for an ambulance service.

Army Medical Services

Colonel (temporary Brigadier) Edward Phillips, CBE, DSO, MC, MB, has been appointed a DMS and granted the rank of major-general. Colonel (local Major-General) Joseph Walker, CBE, MC, has been appointed a DDMS with the rank of acting major-general. Major-General J. A. Manifold, CB, DSO, KHP, has retired on reaching the age limit.

Colonel J. S. K. Boyd, OBE, and Major-General T. O. Thompson, CBE, have been appointed honorary physicians to the King in place of Major-General Sir Percy Tomlinson and Major-General Manifold who have retired. Major-General W. C. Hartgill, OBE, MC, has been appointed honorary surgeon to the King in succession to Major-General O. W. McSheehy.

British Empire Cancer Campaign

At the annual meeting held in London on Dec. 13 the prospects in cancer therapy were hopefully reviewed by Mr. F. L. Hopwood, D SC, university professor of physics at St. Bartholomew's Hospital. Another year's work, he said, had confirmed the promising results of stilbœstrol in prostatic cancer: many of those treated are now symptom-free, and the benefit in some has been maintained for long periods. Some cases of breast cancer have also responded to synthetic œstrogen treatment, and work on growth-inhibiting agents in general shows progress. Radiation therapy is producing better results as technique and equipment improve. Apparatus is being evolved which is capable of producing new types of radiation, and a cyclotron weighing 4000 tons in the United States can endow substances with radio-activity comparable with or exceeding that of radium. Professor Hopwood spoke favourably of the results to be hoped from continuing radiotherapy with treatment by œstrogens and allied substances, though he had mentioned that we must beware lest we add to the martyrs to science.

The annual report of the campaign is annotated on another page.

Hospital Services of Northern Ireland

Dr. Stanley Barnes, Lieut.-General Sir William MacArthur, and Dr. Duncan Leys have now completed their survey of the hospital services of Northern Ireland. At the suggestion of the ministry of health and local government for Northern Ireland their report has been submitted to his health advisory committee.

Reception for Soviet Surgeons

On Dec. 13 the British Council, at its house in Hanover Street, London, entertained Prof. N. PIROGOV of the Central Institute of Orthopædics and Traumatology of the USSR, and Dr. A. P. KOTOV of the Ukrainian Institute of Orthopædics and Traumatology. The medical guests included Prof. Sarkisov, Sir Henry Dale, OM, PRS, Mr. H. A. T. Fairbank, Surgeon Rear-Admiral G. Gordon-Taylor, Prof. Harry Platt, Prof. H. J. Seddon, and Lord Amulree.

Appointments

CLYNE, D. G. WILSON, B M OXFD, FRCS, MRCOG: asst. gynæcologist to Maidenhead Hospital.
IRWIN, H. F. G., MB DUBL.: examining factory surgeon for Winchcombe, Glos.
MURRAY, J. BARRIE, MD CAMB., MRCP: diagnostic physician to the Tavistock Clinic, London.
ROTH, MARTIN, MB LOND.: medical registrar at the Maida Vale Hospital for Nervous Diseases, London.
WILLIAMS, J. O., MRCS, DPH: examining factory surgeon for Clynderwen, Pemb.

Births, Marriages, and Deaths

BIRTHS

LANCASTER.—On Dec. 12, at Milford-on-Sea, the wife of Major J. S. Lancaster, MC, RAMC—a daughter.
LONG.—On Dec. 10, in London, the wife of Dr. David Long—a daughter.
PARTRIDGE.—On Dec. 12, the wife of Dr. A. J. Partridge, of Shoreham-by-Sea—a son.
RICKFORD.—On Dec. 7, at Guildford, the wife of Mr. Braithwaite Rickford, FRCS—a son.

MARRIAGES

BOOME—BAINES.—On Dec. 9, in London, Edward James Boome, MRCP, to Honor Mary Stanhope Baines.
BURKITT—BLACK.—On Dec. 9, Eric A. Burkitt, MRCS, to Beryl M. Black.
MACGREGOR—MORRIS.—On Nov. 18, in India, Malcolm Eliot MacGregor, surgeon lieutenant RN, to Marigold Ancred Morris, VAD, RN.
WILLIAMS—PATERSON.—On Dec. 11, at Newcastle-on-Tyne, John Morel Williams, surgeon lieutenant RNVR, to Katherine Lyle-Paterson, 3rd officer, WRNS.

DEATHS

ANDREWS.—On Dec. 14, Charles Andrews, MRCS, of Walton-on-the-Hill, Tadworth, Surrey, aged 83.
BLAKE.—On Nov. 27, William Henry Blake, MD BRUX., MRCS, of West Wickham, Kent, aged 81.
DUNLOP.—On Dec. 10, in London, James Dunlop, MA, MB GLASG.
HAY.—On Dec. 11, William Leslie Hay, MRCS, major RAMC retd, of Deal.
HOLROYDE.—On Dec. 10, Alfred Holroyde, LSA, of Marske-by-the-Sea, Yorks.
RUSSELL.—On Dec. 11, at Westerham, Kent, John Ronaldson Russell, MD DURH.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

EPIDEMIOLOGY OF PEPTIC ULCER

VITAL STATISTICS[1]

J. N. MORRIS, M.A. GLASG., M.R.C.P., D.C.H.
LIEUT.-COLONEL R.A.M.C.
RICHARD M. TITMUSS

In the ten years before the war more than 43,000 deaths from peptic ulceration were registered in England and Wales. Mortality among men was rising steadily, and since the outbreak of war the process has been accelerated. These facts are sufficient reason for this exercise in vital statistics. Yet, as workers in social medicine, we think it a pity that we are obliged to deal with the death-rates of a disorder whose main interest is the suffering and inefficiency it causes during life.

Peptic ulcer ranks low in the list of killing diseases, causing even now little more than 1% of all non-violent deaths; whereas it is a major preoccupation of physicians and surgeons in clinical practice.

Stewart's figures (1931) suggest that at least 10% of the population suffer, at one time or another from gastric or duodenal ulcer. The Scottish reports on incapacitating sickness (1939) and the bulletin (1941) issued by the United States Public Health Service on the incidence of sickness indicate the importance of peptic ulceration and dyspepsia in general as a cause of industrial incapacity. The British, Canadian, U.S. and German armies, and the Navy and R.A.F. all report a high proportion of discharges on account of it. Tidy (1943) has drawn attention to the fact that the *Medical History* of the 1914–18 war does not mention duodenal ulcer and that up to the end of 1915 the discharges from the Army for "inflammation and ulceration of the stomach" were 709, whereas in the present war the number discharged for peptic ulcer to December, 1941, was 23,574. On critical aspects of the problem, however, there is so far more information in the Registrar-General's reviews (1901–41) than in the voluminous case collections published.

The pattern disclosed by these mortality-rates is often at variance with clinical experience. Nevertheless, analysis of a mortality yielding around 4000–5000 units annually cannot be without interest. The tabulation of mortality statistics, however, for a disease which ranks so low as a cause of death and which ætiologically is compounded of a multiplicity of factors, may give the appearance of unduly simplifying a complex problem. Until comprehensive morbidity statistics are available, the statistics of death should be interpreted with caution.

The data here presented are for the most part new: that is, the raw material has for the first time been analysed and death-rates calculated from different standpoints. Gastric ulcer has been listed separately in the Registrar-General's tables since 1901, duodenal ulcer since 1911. Our study relates mainly to the period 1921–41. Before this statistics were less reliable though, on the whole, certified deaths from peptic ulceration are likely to be among the more dependable of the Registrar-General's figures—the mode of death is often dramatic, hospital care is usual, a long history is common. The exigencies of war make any adequate survey of the literature impossible.

Course of Mortality

Of the 43,200 deaths in 1929–38, 20,700 occurred in 1929–33, 22,500 in 1934–38.[2] There was thus a definite rise in the death-rate and it has continued. The Registrar-General in his review for 1934 analysed the trend of mortality (table I). At age 35 onwards male mortality has increased, the rise becoming greater with advancing years. After age 45 mortality almost doubled in the 20-year period. With females the trend has been quite different. At all ages under 55 there has been a decline and only a relatively small rise at ages 55–75.

Clinically there is little doubt that the recent increase in peptic ulceration among men is confined to the duodenal bulb. We thought it would be interesting to see how far this obtained at death. Table II contains the mortality-rates of gastric and duodenal ulcer separately for four 3-year periods. The striking feature again is the steep increase from middle life onwards; and this increase is as obvious in the gastric as in the duodenal rates. The importance of peptic ulcer in men is thus extending at both ends of life: clinically there is a growing awareness of the *early* onset of the disorder; the significant rise in the mortality at 45–65 has contributed to the failure of the death-rate from all diseases

TABLE I—PEPTIC ULCER: DEATH-RATES PER 100,000 LIVING

Age-groups ..	15–25	25–35	35–45	45–55	55–65	65–75	75 plus
Males 1911–20 ..	3	7	13	20	24	26	21
Males 1932–34 ..	2	7	17	38	46	50	48
Females 1911–20	4	6	8	10	12	13	12
Females 1932–34	1	1	4	9	13	19	23

for men of these ages to improve in recent years. Stocks (1943) has already drawn attention to this trend and shows that whereas mortality from all causes among females aged 50–65 fell steadily between 1921–23 and 1938 that for men of the same ages recorded hardly any reduction.

Examination of the material 1901–11–20 reveals that from the start of certification mortality in men 25 years old and over was rising; though, as we have seen, the rise at 25–45 was not sustained into the inter-war period.

TABLE II—GASTRIC AND DUODENAL ULCER: THE RECENT TREND OF MORTALITY AMONG MEN: DEATH-RATES PER 100,000 LIVING

Age-groups	15–20		20–25		25–35		35–45		45–55		55–65		65–70		70 plus	
..	G	D	G	D	G	D	G	D	G	D	G	D	G	D	G	D
1936–38	1	0	1	1	4	2	11	6	25	14	34	20	36	19	40	20
1933–35	1	0	1	1	4	3	11	6	26	13	32	17	33	17	34	17
1930–32	1	0	2	1	5	3	13	7	24	13	29	16	31	17	33	19
1921–23	1	0	2	1	4	3	11	6	14	8	18	10	20	12	18	8

G = gastric ulcer. D = duodenal ulcer.

In women the decline of gastric ulcer mortality among age-groups under 55 and the slight increase in those over 55 is noticeable from the start; the duodenal rates 1911–20 are too low to warrant any comments.

THE WAR-TIME TREND

The war produced, almost immediately, a rise in mortality from both gastric and duodenal ulcer. Table III shows the quarterly trend in the number of deaths. A substantial rise in the case of both types took place in the first quarter of 1940. The effects of heavy air attacks are apparent in the large increase at the end of the year. Duodenal mortality rose first, followed, in the last quarter of 1940, by a considerable increase for both types. This rise was maintained until the end of the June, 1941, quarter when there was a decline.

TABLE III—NUMBER OF DEATHS EACH QUARTER: CIVILIANS AND NON-CIVILIANS (ACCORDING TO CLASSIFICATION IN USE FROM 1940 ONWARDS)

—	Gastric ulcer								Duodenal ulcer							
	Males				Females				Males				Females			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1939	733	608	610	655	266	191	204	216	376	321	295	318	76	55	46	62
1940	824	616	628	818	283	222	234	268	448	375	375	441	83	57	56	96
1941	882	813	527	549	299	235	153	206	502	499	349	335	79	63	56	51
1942	721	517	456	584	254	185	152	177	457	375	314	356	63	53	33	48

Among civilian males the proportion of ulcer deaths certified as gastric has fallen slightly since 1939. Between 1927 and 1938 this index for the whole country was remarkably steady, only oscillating between 64 and 66%. In 1939 the proportion stood at 67% and during the next three years it fell steadily (for civilians) to 64, 62 and 60%. Among women no significant change has taken place. In this group the proportion of gastric ulcer deaths has varied between 78 and 84% during 1927–42.

Separate figures of duodenal and gastric ulcer deaths are not available for different parts of the country. Dr. Percy Stocks, of the Registrar-General's Office, has

1. The substance of this paper was read at a meeting of the Committee for the Study of Social Medicine.
2. All the statistics of mortality employed in this paper are for England and Wales.

kindly supplied us with the following data for table IV. These crude figures are suggestive, despite the disturbing effects of evacuation, enlistments and other population movements. It appears as though rising mortality

TABLE IV—NUMBER OF PEPTIC ULCER DEATHS, CIVILIANS ONLY (1940 CLASSIFICATION)

The percentage change (in parentheses) is calculated on the 1939 deaths

—	Administrative London		Remainder of England and Wales	
	Males	Females	Males	Females
1939 ..	483 ..	150 ..	3433 ..	966 ..
1940 ..	638 (+32)	185 (+23)	3805 (+11)	1114 (+15)
1941 ..	478 (−1)	134 (−11)	3855 (+12)	1007 (+4)
1942 ..	392 (−19)	99 (−34)	3306 (−4)	865 (−10)

accompanied the geographical changes in the distribution of air attacks—from London to the provinces during 1940–41.

Social Factors

Little appears to be established about the class and occupational incidence of peptic ulcer; still less about the relative distribution of ulcer of the stomach and duodenum. The Registrar-General in his Occupational Mortality Supplement divides the total male population aged 16 plus into five great social classes, as follows (the proportions in each class are shown in parentheses):

1. Leading professions, wealthy independents, directors, and managers in certain finance and insurance occupations (2·5%).
2. Employers and managers in mining, industry, transport, retail and wholesale trades, lower professions and commercial employees in a few occupations carrying a measure of independence (14·0%).
3. Skilled workers, salesmen, shop assistants and clerical workers (49·2%).
4. Semi-skilled workers and agricultural labourers (17·8%).
5. Unskilled workers (16·5%).

The allotment of the male population aged 16 and over to the different classes is therefore made roughly on the basis of economic status. In the Decennial Supplement statistics are provided showing the death-rates for males in various occupations. We have collected, recalculated and classified these to give a picture (table V, (A) and (B)) of the distribution of peptic-ulcer mortality in different social classes at different ages.

In classes 1 and 2 mortality from both types of ulcer increases steadily with age to 70 and over. The same is true of class 3 (skilled workers) except that the rise is much less steep after age 55 than in classes 1 and 2. A notable feature of table V, (A) and (B) is that in classes 4 and 5 the death-rate does not rise significantly after age 45. It may be noted from table V (A) that the poor, at ages 25–35, return a rate as high as the rich at ages 35–45; at 35–45 the poor experience a rate higher than the rich at 45–55 and the same is true of ages 45–55 (class 5) and ages 55–65 (classes 1 and 2).

TABLE V—THE SOCIAL FACTOR IN PEPTIC ULCER MORTALITY 1930–32

(A)—MALE MORTALITY FROM GASTRIC ULCER PER 100,000 LIVING

Class	Age-group						
	20–25	25–35	35–45	45–55	55–65	65–70	70 plus
1 & 2	1	3	8	17	24	37	39
3	2	4	12	25	31	32	36
4	2	6	15	27	29	28	29
5	2	8	19	31	31	27	31
(B)—MALE MORTALITY FROM DUODENAL ULCER							
1 & 2	1	3	6	13	19	24	35
3	1	3	7	13	15	18	18
4	2	4	8	11	13	14	13
5	1	4	9	14	14	13	15

Reading table V vertically we see that up to age 55 mortality from gastric ulcer rises in an extraordinarily regular manner with descent in the social scale. Thus at ages 25–45 gastric ulcer mortality in class 5 is more than twice as high as in classes 1 and 2 while at ages 45–55 it is nearly twice as heavy. But this distribution is not true for duodenal ulcer. Up to age 55 there is very little difference in mortality among the five classes —only a slight tendency for the rate to be higher at the bottom of the social scale. After age 55 there is, as the Registrar-General has pointed out (1921–23), a dramatic change in the picture—a change rare in the experience of class vital statistics.[3] In the gastric group, ages 55–65 seem to represent the transitional stage in the complete reversal of the social-class distribution. After age 65 mortality steadily declines with descent in the social scale. The distribution of duodenal-ulcer mortality at older ages is much more clearly concentrated among the wealthier classes. The correspondence between high mortality and high social status begins earlier in life for duodenal ulcer (at ages 55–65) than for gastric ulcer. From age 55 onwards the gap in the distribution of duodenal-ulcer mortality between rich and poor steadily widens until at 70 and over the death-rate is nearly 2½ times heavier among the rich.

In classes 1 and 2 mortality at all ages from gastric ulcer is higher than from duodenal ulcer but not outstandingly so except at ages 65–70. With the other classes the experience is notably different. The lower one descends in the social scale the more important does gastric ulcer become, relative to duodenal ulcer. In class 5 gastric ulcer mortality is twice as high as duodenal at all ages and more than double at ages 45–65.

THE TREND IN SOCIAL MORTALITY

The second stage is an attempt to estimate the social-class change between the two periods 1921–23 and 1930–32. Table VI, (A) and (B), represents the mortality-rates in the different social classes during 1921–23.

Comparing first, table V (A) and table VI (A), we find that, at ages 25–45, mortality from gastric ulcer has risen to a greater extent at the bottom than at the top of the social scale. This process was continued among ages 45–65. Between the two periods gastric-ulcer mortality among the poor at ages 35–65 rose by about half. After age 65 there was a considerable rise in all classes but the increase was much heavier at the top than at the bottom of the social scale. Mortality among classes 1 and 2 almost doubled during the ten years. Thus broadly the results of the changes between the two periods were: (1) to intensify the gap between rich and poor at ages 25–65, to the disadvantage of the poor; (2) to change, at ages 65 and over, the more or less equal distribution of mortality to one of higher mortality at the top of the social scale.

TABLE VI—MALE MORTALITY 1921–23

(A)—GASTRIC ULCER

Class	Age-group						
	20–25	25–35	35–45	45–55	55–65	65–70	70 plus
1 & 2	1	3	7	13	18	21	23
3	2	4	11	13	18	21	21
4	3	5	11	15	17	21	22
5	3	5	14	20	19	22	17
(B)—DUODENAL ULCER							
1 & 2	1	3	5	10	12	13	15
3	1	2	5	7	9	11	7
4	2	2	6	8	8	10	7
5	2	3	8	8	9	6	6

The changes registered in mortality from duodenal ulcer (tables V (B) and VI (B)) were, apart from ages 70 and over, uniform over all classes. That is to say, mortality rose more or less evenly among all classes. The rise increased with age but was much less than for gastric ulcer. At ages over 70 the death-rate in classes 1 and 2 from duodenal ulcer rose by 20 per 100,000 or by 133%. In class 5 the absolute rise was 9 per 100,000, the percentage change being 150. The correspondence between high mortality and high social status emerges clearly after the age of 55 in tables V (B) and VI (B).

We do not know what changes have taken place since 1930–32 in the social-class distribution. But we can see from table II that since 1930–32 mortality from both forms has continued to rise at ages 45 plus especially in the groups 55–65, 65–70 and 70 plus.

3. One other example that comes to mind of such class inversions is the behaviour of diabetes mortality during and after middle life. But this problem in changing social patterns deserves, not a footnote, but another story.

CLASS MORTALITY IN WOMEN

The material available on mortality among women is not so comprehensive as that for men. Table VII, taken from the Registrar-General's Decennial Supplement, depicts the mortality ratios for the different classes. It will be appreciated that the classification of married women is, broadly, an *economic* one since it is based on the occupation of the husband; that of single women is in accordance with their own occupations. Ignoring the fact that the death-rates are much heavier among men, the class distribution of peptic ulcer mortality among married women is very similar. The more pronounced gap between rich and poor married women is due to a very low rate for class 1. The incidence of mortality among single women suggests a field for speculation but in this paper we cannot do justice to all the special factors involved. For example, 74% of this group were in class 3 occupations and most of them were under 35 years of age.

TABLE VII—PEPTIC ULCER: STANDARDISED MORTALITY RATIOS (ALL CLASSES=100) AT AGES 35–65 (1930–32)

Class	Married women	Men	Single women
1	53	72	80
2	98	87	
3	99	101	123
4	99	102	96
5	118	118	

RESPONSE OF ULCER MORTALITY TO SOCIAL CHANGE

We are writing a further paper on the problem of peptic ulcer. This comprises a statistical study of the reactions of mortality to social and economic changes during the period 1927–38 in the 83 county boroughs of England and Wales. A description of the technique must be reserved until later. Briefly, our research has so far shown that:—

(*a*) At the peak of unemployment (periods 1930–32, 1933–35) there is a significant negative correlation between mortality from peptic ulcer and the unemployment index used (the correlations are −0·79 and −0·94). Since unemployment declined after 1935 this correlation remained negative, but insignificantly so.

(*b*) Correlations between the change in mortality and the change in unemployment were positive (but insignificant) when unemployment rose steeply, but increasingly negative (just below level of significance) as unemployment declined.

(*c*) With the use of a time-lag of three years, further "change" correlations showed a high and positive association between the change in mortality during 1933–38 with the change in unemployment during 1930–35.

These results suggest that unemployment—or enforced leisure—led to a reduction in ulcer *mortality*: the death-rate fell in those boroughs most heavily affected by unemployment. But when unemployment declined, *after pronounced depression*, mortality rose sharply. A return to work—but perhaps very insecure re-employment—meant more ulcer deaths.

City, Town and Country

In examining the incidence of mortality in different types of communities we restrict ourselves to the rates for (1) London; (2) the 83 county boroughs; (3) other urban districts; and (4) the rural districts. Unfortunately the only statistics available date from before 1931. From that year onwards the Registrar-General only gives for separate localities in his annual reports the data for gastric and duodenal ulcer combined. As we have already seen, the sex and age incidence of the two types present sharply differing patterns in important respects. Consequently a combined index quite probably may conceal more than it discloses. In this absence of more recent data we have analysed deaths during the years 1928–30 (table VIII, (A) and (B)). Estimates of populations by age and sex for the four groups were not available and the deaths have accordingly been related to the 1931 census populations. The probable error involved by this method is very small.

Table VIII (A) suggests the importance of urban, and particularly metropolitan, life especially among men. After ages 25–35 the death-rate from gastric ulcer for London is considerably in excess of that for other groupings. Between the ages of 35 and 70 male mortality in London is over 100% higher than in the rural areas. It is instructive to note how at these ages mortality declines with decreasing population density. The gradation is clear in all four important age-groups. The point at which London mortality registers its greatest rise is at ages 45–55; a development which also applies to the other groups. It is at these ages that the curve of mortality is sharpest—to flatten out thereafter and fall after the age of 70 except in the rural areas. It should be observed that men aged 35–45 in London have a death-rate as high as that returned by men aged 20 years older living in rural areas. The number of female deaths is too low and the fluctuations are too small to warrant any interpretation apart from the fact that mortality is higher in London after age 45 than elsewhere. In the case of duodenal ulcer (table VIII (B)) the only fact that emerges clearly is that the death-rate for men aged 55 onwards is higher in London than elsewhere.

In Life and on the Death Certificates

On many of the questions which interest students of the natural history of peptic ulcer (e.g., heritable tendencies, tobacco, the bolting of meals, and changes in diet) the Registrar-General's material can at present shed little light. It is worth, however, gathering a few of the threads together and comparing briefly clinical experience and these vital statistics. The rôle of occupation will be ignored in the present study.

The two sites.—The distribution found in tables II, V and VIII is in striking contrast with the experience of the clinician. Deaths from gastric ulcer throughout are higher than those from duodenal ulcer, and the mortality of both forms is rising steadily in parallel curves. The dominance of gastric-ulcer mortality, regularly reported by the Registrar-General, is confirmed, we consider, by some further figures supplied by Dr. Stocks. These relate to ulcer deaths registered in England and Wales among men in the Armed Forces during the years 1940–42 and consequently apply, in the main, to men under middle age. There were, during this period, 290 ulcer deaths of which 163 (56%)[4] were certified as gastric. It is, we think, reasonable to state that these deaths will have been carefully investigated and that diagnosis at death of this type of disorder among non-civilians is probably 90–100% accurate. The significance of this proportion of 56 is moreover extended by the manner in which it agrees with the gastric-duodenal ratio at ages 20–45 illustrated by tables II and V. Yet the various recent military series have confirmed many previous reports in the preponderance of duodenal rather than gastric in present day practice.

Tidy (1941 and 1943), for example, concluded that the duodenal-gastric ratio is probably about 3·6 to 1. Hurst

TABLE VIII—DEATH-RATES PER 100,000 LIVING, 1928–30, BASED ON 1931 POPULATIONS

(A)—MORTALITY FROM GASTRIC ULCER

Age-groups..	20–25		25–35		35–45		45–55		55–65		65–70		70 plus	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
E & W	2	1	5	2	14	4	25	8	26	11	30	15	28	15
AL ..	1	1	6	1	19	5	38	11	42	16	48	23	40	21
CB ..	2	1	5	2	15	4	27	8	27	10	30	13	26	16
UD ..	2	1	4	1	13	3	23	7	25	10	29	15	27	14
RD ..	1	1	5	2	10	5	19	7	19	9	24	14	27	11

(B)—MORTALITY FROM DUODENAL ULCER

Age-groups..	20–25		25–35		35–45		45–55		55–65		65–70		70 plus	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
E & W	1	0	3	0	8	0	13	2	14	2	16	3	15	4
AL ..	1	0	4	0	8	0	15	4	22	1	25	5	23	5
CB ..	1	0	4	0	9	1	15	2	13	2	16	2	15	4
UD ..	1	0	4	0	8	1	12	1	14	2	14	3	14	4
RD ..	1	0	2	0	6	0	9	2	11	2	17	3	12	3

E & W = England and Wales. CB = county boroughs.
RD = rural districts. AL = Administrative London.
UD = urban districts.

4. At ages below 55 among the Armed Forces (other ranks, active), the proportion of gastric ulcer deaths was 58 during 1930–32. (Registrar-General's Occupational Supplement, part 11a.)

(1941), however, suggested that in "hospital" patients gastric ulcer is as common as duodenal ulcer. Stewart's figures occupy an intermediate place between clinical reports (e.g., Nicol 1941) and our findings though the duodenal-gastric ulcer ratio is still 1·5 to 1. The exception to the general rule is London where several observers (Burger and Hartfall 1934, Souttar 1927, Walton 1927 and Nicol 1941) have reported a high proportion of gastric cases. Daley (1942) in fact mentions that almost two patients with gastric ulcer are admitted to the acute general hospitals of the LCC to one with duodenal ulcer. Before the war the Londoner probably took more meals away from his home than workers elsewhere and this may be relevant. Daley's figures represent the nearest approach to conformity with the Registrar-General's records so far obtained. Much obviously remains to be done on this question.

The sex ratio.—Hurst reports that gastric ulcer occurs equally in men and women and both he and Ryle (1932) found duodenal ulcer four times more commonly in men. Stewart's autopsy records roughly agree. Deaths certified do not correspond as from the age of 25 upwards, gastric-ulcer rates being substantially higher in men than in women. The duodenal figures, however, compare well. The overall mortality of peptic ulcer in 1921 showed females registering more than half the number of the male deaths, in 1941 only a quarter.

Age.—Tidy (1943) reports an average age of onset for both types of approximately 32 years and duration of symptoms about 5½ years. Nicol (1941) estimates the peak age of onset of symptoms in most cases of duodenal ulcer at between 20–30, whereas the highest mortality occurs at age 55 and upwards. In gastric ulcer, says Nicol, the curve for the age of onset is spread uniformly throughout life between the third and sixth decades, the maximum incidence being distributed evenly. Peak mortality, however, occurs later in life.

Season.—The seasonal distribution of deaths illustrates that mortality, as well as attacks in life, is commoner in the colder weather. Approximately 30% of peptic ulcer deaths occur during the first quarter of the year.

Gastric Ulcer and Gastric Cancer

In view of the undoubted association between gastric ulcer and carcinoma ventriculi (and of the more debatable association of chronic gastritis with both) we have briefly examined the behaviour of the cancer death-rates (tables IX and X). The distribution of mortality for the two conditions agrees to a remarkable extent. The upward curve among men in middle life since 1911–20 is again not accompanied by a rise in women of the same

TABLE IX—CANCER OF THE STOMACH: DEATH-RATE PER MILLION

—	Ages	Under 25	25–35	35–45	45–55	55–65	65–75	75–85	85 plus	All ages standardised
M	1911–20	1	18	98	367	967	1737	1795	1017	186·4
	1921–30	1	22	116	413	1087	2074	2407	1708	221·1
	1931–5	1	22	118	432	1092	2234	2731	2055	232·1
F	1911–20	1	15	76	261	678	1296	1542	1146	139·0
	1921–30	1	15	75	259	696	1522	2027	1786	155·5
	1931–5	1	18	73	238	657	1555	2303	2120	155·2

TABLE X—SOCIAL CLASS AND CANCER OF THE STOMACH: DEATH-RATE PER MILLION, 1930–32

	Ages 45–55			Ages 55–65		
Class	Men	Married women	Single women	Men	Married women	Single women
1	254	172	203	609	475	401
2	335			950		
3	423	252	285	1076	663	742
4	456	259	271	1257	659	782
5	536	299		1324	767	1051

age. It may be, as the Registrar-General points out, that the rise in the toll of cancer of the stomach is partly explicable by a transfer from cancer of the liver and by improved diagnosis and certification, but this does not explain why the rate fell among women 45–65, and rose among men of the same ages. The social-class distribution (table X) strikingly resembles that found in gastric ulcer but is more sharply drawn and there is no switch over of the classes most affected. Heavier mortality with descent in the social scale is as clear at 55–65 as at 45–55 and there is no inversion in old age. Cancers deriving from simple ulcer are lost in the total and cannot be separated at this stage. In any case the proportion is so small that it cannot, in itself, be responsible for the very pronounced class bias. It is possible, too, that some malignant degenerations may still be certified as simple ulceration.

Discussion

Stewart (1923) obtained evidence of peptic ulcer in 10% of his 4000 autopsies. Deaths registered have more than doubled in the past twenty years and it would be interesting to compare the findings of a more recent and equally comprehensive series. It is clear, however, that few of those who suffer from peptic ulcer die of it. The figures now analysed are in several respects surprising, and obviously the utmost caution is necessary in drawing any conclusions on the natural history of the condition from them. But the pattern of mortality is so well defined, and so consistent from year to year, that it obviously demands analysis. At present, it must be admitted, such study does little to clarify the existing confusion. It is impossible even to guess how much mistaken certification there is, though certification in the case of non-civilians is likely to be very accurate. In practice there is a growing appreciation of these disorders; but this has not been accompanied by any change of consequence in the pattern of the death-rates. In this connexion the decline in mortality in the county boroughs heavily affected by unemployment is interesting.

The distribution of deaths between the two sites of ulceration is unexpected. In practice duodenal ulcer is much the commoner condition, and the graver complications all commoner with it. Gastric ulcer mortality, however, is uniformly heavier at all ages in both sexes. This is only a little less incomprehensible at later than earlier age-groups. Cases diagnosed "ulcer-cancer" will naturally be assigned to "cancer" in the Registrar-General's tables. The fact that duodenal ulcer has the longer span in life further emphasises its relative benignity. The rise in mortality of both forms is disquieting. Changing fashions in surgery may be influencing the duodenal rate; there is no very apparent increase in the incidence of gastric ulceration to account for the increase in its mortality. The upward trend in mortality of both forms with middle age is not surprising in view of the concentration of perforation for the middle years, and the deterioration in the prognosis of hæmorrhage that sets in with the forties. It may even with some justice be used as further evidence, if such were needed, of continuing medicosurgical doubts in the management of bleeding ulcer.

The social behaviour of the death-rates is quite unusual. In gastric ulcer of young and middle life there is a clear correlation with poverty. But this does not explain or simplify the problem; there are many factors implicated in low economic status. In duodenal ulcer at these ages mortality is fairly evenly spread among all classes. It is attractive to suppose that the manifold and chronic irritants, such as are likelier among the poor, matter more in gastric ulcer; and that psychosomatic influences, such as may disturb individuals of any class, matter more in duodenal ulcer. That the excess of gastric-ulcer over duodenal-ulcer mortality does increase with descent in the social scale may thus be relevant. We cannot recall any convincing work on this possibility; though, of course, the "hypothalamic" type that immediately springs to mind is the now classical duodenal-ulcer personality. Further gastroscopic studies on the lines of those made by Morton Gill et al. (1942) would be interesting. Both gastric and duodenal ulcer in old age show a higher death-rate among the better-off classes, because the absolute rate continues to rise in classes 1 and 2 while it remains stationary in classes 4 and 5. In the case of gastric ulcer this may be evidence that among the more prosperous death is delayed, and maybe, the onset also. The establishment of a class tendency for the first time in duodenal ulcer may simply be due to a greater frequency of the disease among the professional and upper strata generally. Possibly over-indulgence of the "arrived" plays a part in both types. Moreover, the male climacteric may be involved and it

would be interesting to know if this manifests itself differently in distinctive social strata.

The urbanisation tables clearly demonstrate the importance of metropolitan life. This is in harmony with the modern picture of peptic ulcer as being often a psychosomatic disorder. The treatment of perforation, massive and recurrent hæmorrhage or obstruction of the pylorus is unlikely to be inferior in the cities. And if, as social physicians, we keep a weather eye open for new nervous strains and stresses that may be contributing to the obstinate increase of this disorder, the most glaring, it must be admitted, are associated with urban and industrial life. The managerial revolution, speed-up in the factory and on the road, the fungus growth of examinations, the squeezing out of the small shopkeepers all assist in making up what Ryle calls "the mental and physical fret and stress of civilised city life." In the background, too, throughout the inter-war period there was a pronounced and general atmosphere of insecurity. This pervaded urban life and there was, no doubt, a greater awareness of its existence in London than in the rural areas.

The problem is complex: the restless, energetic and the ambitious types who make up a substantial fraction of the ulcer population will be attracted to the cities and the cities will drive them relentlessly. A good deal of sense and a great deal of nonsense is written these days on the distempers of our civilisation, but it is hard to resist the conclusion that urban life nowadays is an ideal soil for the flowering of the ulcer temperament. There is room for much clinicosocial investigation of such interplay of constitutional and environmental forces.

A comparison of the class and urbanisation tables (in terms of absolute death-rates) permits the interesting conclusion that, as far as these figures go for men over 45 years with gastric ulcer, living in London is more dangerous than subsistence in class 5, and for men at ages 45–70 with duodenal ulcer London life is more precarious than the enjoyment of the privileges of classes 1 and 2. Superimposed on this pattern of relationships we have the behaviour of mortality from peptic ulcer under the stresses of unemployment, re-employment and the air assaults of 1940–41.

This investigation asks more questions than it answers. About much concerning peptic ulcer we still can only speculate. Geographical studies have not simplified the issues. The widely prevalent ulcer of the poverty-stricken Ryots of South India, for example, is almost exclusively duodenal (Dogra 1940, Somervell 1936, Somervell and Orr 1942). If any conclusion at all can be drawn it is that we are dealing, not only with multiple factors in ætiology (which clinically is self-evident), but with a group of merely coincidental responses in pathology—with a whole series of conditions rather than a single disease. An inquiry such as this is an oblique and unsatisfactory method of attempting to lighten the general obscurity. With the advance of social medicine and new techniques of experiment, as well as observation, at its disposal there is no reason why properly organised field studies should not replace much that is at present largely guesswork.

Summary

An analysis has been made of the mortality of peptic ulcer as revealed in the reports of the Registrar-General. The pattern of mortality differs in several respects from clinical and autopsy experience and is sharply at variance with the distribution of Service cases. It is changing little with the growing appreciation of these disorders in medical practice.

In men mortality from peptic ulcer is rising steadily. In 1939–41 this process was accelerated. In women, except in old age, mortality has been falling; in 1939–41 there was some reversal of this trend. The important increase is in the death-rate of both gastric and duodenal ulcer in men over 45. The death-rate in young women has now almost reached zero. In both men and women at all ages mortality from gastric ulcer is heavier than from duodenal ulcer.

The mortality in men at the two sites of ulceration differs widely in different social classes. Under the age of 55 mortality from gastric ulcer appears to be associated with the manifold factors implicated in low economic status. At the same ages in the case of duodenal ulcer there is no significant class bias. In old age, deaths from both gastric and duodenal ulcer are heavier among the well-to-do.

Mortality is higher in the Greater London area than in the rest of England and Wales. In general, the death-rate is lower in rural areas than in the rest of the country. The pattern of gastric-ulcer mortality strongly resembles that of gastric-cancer mortality.

The acute depression of the 1930's, followed by re-employment, is reflected in the behaviour of peptic-ulcer mortality. The effects of heavy air attacks during 1940–41 resulted in, first, a sharp rise in mortality from duodenal ulcer which was closely followed by a similar movement in mortality from gastric ulcer.

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TREATMENT OF EARLY SYPHILIS WITH PENICILLIN

A. O. F. ROSS
M D EDIN.
CLINICAL VD OFFICER

RACHEL B. NELSON
M B EDIN.
ASSISTANT VD OFFICER

CITY OF LIVERPOOL

E. M. LOURIE
M B LOND.
DIRECTOR, DEPT. OF CHEMOTHERAPY, LIVERPOOL SCHOOL OF TROPICAL MEDICINE

H. O. J. COLLIER
PH D CAMB.
PARASITOLOGIST, I C (PHARMACEUTICALS) LTD., ATTACHED TO THE SCHOOL

PENICILLIN was found to be highly effective against *Spirochæta recurrentis* and *Spirillum minus* infections in mice, and since these spirochætoses are also amenable to standard antisyphilitic remedies, it was suggested that syphilis likewise might respond to penicillin (Lourie and Collier 1943). We arranged accordingly to put this to the test, and our first trials had scarcely begun when the announcement was made in the United States that penicillin is in fact active against syphilis (Mahoney, Arnold, and Harris 1943). Large-scale trials have since been organised in specially selected centres throughout the United States, and interim results covering about 1500 cases of early and nearly 200 of late syphilis have recently been published (Mahoney et al. 1944, Moore et al. 1944, Stokes et al. 1944). Our own investigations, confined to early syphilis, have been on a much more limited scale, and this paper is a report on the preliminary results obtained in the first 5 patients treated. Their further history, together with the findings in subsequent cases of this series, will be reported in due course.

Our investigations have been carried out with penicillin allocated for this purpose by the Penicillin Clinical Trials Committee of the Medical Research Council, and the number of cases treated was rigorously limited. The work was begun at a time when supplies in England were considerably less than at present, and when, furthermore, grave consideration had to be given to the possibility of a sudden enormously increased demand for the substance, in connexion with the expected landings in Europe.

For our first trials, which include those described in the present paper, we selected only strongly seropositive cases with well-marked secondary lesions, so as to afford a good opportunity of making a clear-cut appraisal of the immediate response to treatment.

It was regarded as important to make frequent assays of penicillin in the serum during treatment, in case it might become possible to correlate these serum-penicillin levels with the therapeutic results obtained. The conclusions arising from such estimations, which we are still accumulating as new cases come under treatment, will be presented in a later contribution.

DOSAGE

Penicillin was used as the sodium salt, two batches (TRC 15 and TRC G84) being used for the cases of the present report, containing 364 and 220 Oxford units per mg. respectively. The patients were adults, and the individual dose at each injection throughout treatment in all cases was 30,000 units in 2 c.cm. saline intramuscularly. The first 4 patients were each treated three-hourly, day and night, for 80 injections—a total of 2,400,000 units over a period of 10 days.

As detailed in the case-notes, one patient (case 4) developed, about 10 weeks after treatment, a condition somewhat difficult to differentiate as between chancriform relapse and reinfection, but which for reasons stated below we are inclined to regard as a reinfection. He was then given another course of 40 injections, this time at hourly intervals—a total of 1,200,000 units over a period of 40 hours—this regimen being used also for the initial treatment of case 5. The latter patient also developed, about 8 weeks after treatment, a condition which again might have been either relapse or reinfection, but which, in this case, we regard as a relapse. He also was given another course of penicillin treatment, to be described in a later contribution.

All injections were made in the gluteal region, and no particular soreness or induration arose. The arduous courses were borne with remarkable cheerfulness, and there were no complaints of disturbed rest. There were no toxic effects of treatment, except perhaps in one patient (case 3) who had slight fever (maximum 101·4° F) during the first 5 days of the course, followed by swelling of the labia majora and a condition resembling erythema nodosum, both of which cleared up in a few days, while treatment was continuing. These effects might however be attributable, at least in part, to a mild Herxheimer reaction, to which must also be attributed a noticeable tendency in all these cases for syphiloderms to flare up for some hours after the beginning of treatment. Blood-counts and blood-urea estimations were normal before, during, immediately after, and a month after the end of treatment. The overall results to date are summarised in table I, and details of the blood Wassermann reactions are shown in table II.

TABLE I—TREATMENT COURSES, BLOOD WASSERMANN RESULTS, AND CLINICAL PROGRESS (TO LIMIT OF OBSERVATION PERIODS)

Course	Case	Results *	
		Blood WR	Clinical
30,000 units three-hourly (80 doses)	1	Neg. 7 months, then occasionally doubtful to 9 months	Well 9 months
	2	Consistently neg. 3–9 months	Well 9 months
	3	Neg. 2–3½ months, then pos. for several months. Neg. 9 months	Well 9 months (but 12–14 weeks miscarriage at 8 months)
	4 (i)	Neg. 1½–2½ months, then pos.	Probably reinfected about 2 months; treated again (see 4 ii)
30,000 units hourly (40 doses)	4 (ii)	Consistently neg. 2–4½ months	No evidence of syphilis 4½ months, but jaundiced
	5	Occasionally neg. 2–3 months, then strong pos.	Relapsed 2 months

* Times stated are since treatment.

TABLE II—CHANGES IN BLOOD WASSERMANN REACTION

Case	Weeks after treatment —																																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
1	++	40	20	20	10		+	5	5	5	5	10	20	10	5	±	±	±	−	−	±	±	±	5	2½	±	±	±	−	−	−	±	−	−		−	±
2	80	40	40	10	+	+	+							−	−	−	−	−	−	−	−									−					−	
3	160	80	80		2½				−	−	−	−	−	5					±		20	10	5	2½											−
4	++	++	+	−	±	−	−	→	−	−*	20	240	300	200	260	160	60	70	70†	70	60	15	5	±	±		−					−	−	−	−	−
5	20	++				±		−*	2½	−	2½		2½	20	30	50†																				

* Clinical signs reappeared.

† Treated with penicillin a second time.

++ = strongly positive, + = positive, ± = doubtful, − = negative } Tests made with a constant amount of serum and varying dilutions of complement.

Figures show highest dilution giving a positive reaction. { Tests made with varying dilutions of serum and a constant amount of complement.

CASE-NOTES

The patients all had primary ulcers, together with well-marked secondary lesions. Their cerebrospinal fluids were examined immediately before and about a month after treatment, but revealed no abnormalities. The following is an account of their condition at the start of treatment and subsequently.

CASE 1.—Female, aged 24, unmarried. Primary ulcers of vulva, with condylomata lata; mucous patch on under surface of tongue. *Spirochæta pallida* present in serum from ulcers and from condylomata. Blood WR strongly positive.

Immediate progress.—Primary ulcers: spirochætes present 3 and 6 hours after start of treatment; no serum obtainable at 9 hours or subsequently; ulcers epithelialised within 24 hours of start of treatment. Condylomata: spirochætes present 3, 6 and 9 hours after treatment; negative at 24 hours and at 3-hourly intervals on the 2nd day up to 33 hours, after which no further serum was available; lesions resolved by 7th day. Mucous patch: disappeared by 3rd day.

Later progress.—Clinically well 9 months after start of treatment.

Blood WR.—Not repeatedly negative till 7 months; then occasionally doubtful for remaining 2½ months of observation (see tables I and II).

CASE 2.—Female, aged 20, unmarried. Primary ulcer of vulva. Rash mostly on trunk, comprising macular, papular, and papulosquamous lesions. *Sp. pallida* present in serum from ulcer. Blood WR strongly positive.

Immediate progress.—Primary ulcer: spirochætes present 3 and 6 hours after start of treatment; negative at 9 hours and at 3-hourly intervals for next 3 days, after which no further serum available; ulcer healed by 5th day. Rash faded during treatment, only a trace of the maculopapular lesions remaining by 10th day.

Later progress.—Clinically well 9 months after start of treatment; married 4 months after start of treatment (not to previous consort); husband not infected within 5 months' subsequent observation.

Blood WR consistently negative within 4 months of treatment (see tables I and II).

CASE 3.—Female, aged 22, married, 1 child. Infected by husband. Primary ulcer around introitus vaginæ, with superficial erosions of mucous surfaces of labia majora which coalesced giving rise to weeping vulvitis. *Sp. pallida* present in serum from ulcer. Blood WR strongly positive.

Immediate progress.—Primary ulcer and associated lesions: spirochætes present 3 and 6 hours after start of treatment; negative at 9 hours and at 3-hourly intervals for next 3 days; erosions disappeared in a few days, and ulcer healed by 10th day. On 4th day labia majora became œdematous but gradually subsided during the next few days. (Menstruation began on 4th day and continued till last day of treatment.)

Also on the 4th day there appeared along both tibial regions a few slightly tender lesions resembling an early erythema nodosum. These did not progress and had disappeared entirely by the 10th day. Slight fever (maximum 101·4° F) for 5 days from start of treatment.

Later progress.—Clinically well 9 months after start of treatment, but miscarriage previous month, 14 weeks after husband's return on leave.

Blood WR negative about 2 months since treatment, but became positive again about 6 weeks later. Remained positive for several months, but negative 9 months after treatment (see tables I and II).

CASE 4.—Male, aged 38, married. Phimosis and balanitis with traumatic fissuring of free border of prepuce, primary ulcer being implanted on the fissure. Generalised papular rash. *Sp. pallida* present in serum from fissure-ulcer. Blood WR strongly positive.

Immediate progress.—Primary ulcer: spirochætes present 6 hours after start of treatment, but absent at 9 hours and at 3-hourly intervals for next 6 days. Fissure-ulcer improved considerably during treatment, but healing probably delayed by mechanical interference, in the course of cleaning up and obtaining specimens for microscopical examination. Completely healed about a week after end of treatment. Rash faded rapidly during treatment, being considerably less by the 4th day and only just visible by end of treatment.

Later progress and blood WR changes (see tables I and II).—Blood WR negative from April 20 to May 17 (6–10 weeks since treatment). Ulcer with dirty base developed on inner right ventral aspect of prepuce immediately proximal to original primary on May 17. *Sp. pallida* found on May 19. Inguinal lymphadenopathy; no other signs of syphilis. WR positive on May 25 and subsequently.

History of marital exposure on April 22. Wife under observation showed negative WR on April 10, but on May 10 report was strongly positive. Primary of vulva with *Sp. pallida* found. No treatment given to the male, but no secondary signs appeared although positivity of the blood reached a high titre. Absolute proof of reinfection was therefore lacking, and further treatment with penicillin was given. Signs of active syphilis retrogressed normally, blood WR became negative, and further history has been uneventful except for an attack of jaundice with an icteric index of 50 in late October (14 weeks after second treatment).

CASE 5.—Male, aged 44, married. Phimosis, balanitis, œdema of penis with multiple primary ulceration of the shaft. Rash general, maculopapular in type; ulceration at angles of mouth. *Sp. pallida* present in serum from primary ulcers. Blood WR strongly positive.

Immediate progress.—Spirochætes present till 8 hours after start of treatment; negative thereafter. Ulcers healed by 16th day. Rash, except for subcuticular mottling, disappeared by 7th day.

Later progress and blood WR changes (see tables I and II).—Eight weeks after treatment a circular ulcer with a clean base, not indurated and about 2 cm. in diameter appeared on the ventrum of the shaft of the penis. No spirochætes were found on 4 examinations. The Wassermann reaction had become negative by this time. Antiseptic dressings soon healed the lesion.

At the 13th week undoubted syphilitic papules appeared on the palms and soles, and these were swiftly followed by œdema of the penis, condylomata of penis and scrotum, papulosquamous lesions of the limbs, face, and scalp, a follicular syphiloderm of the trunk and a moist papule on the tongue. The positivity of the blood increased rapidly, and further penicillin treatment was given (to be reported in a later paper). The patient's assurance that he did not expose himself to the risk of reinfection since treatment is probably reliable, and his wife has been free from evidence of infection and Wassermann-negative throughout. We are inclined to regard the case as one of relapse.

DISCUSSION

The case-notes and tables I and II present two main features. First, the immediate response to treatment was strikingly favourable in all cases, and secondly, the later effects were such that there must be considerable doubt whether the penicillin was as beneficial as arsenicals and bismuth might have been.

The immediate response could not have been bettered by any known form of treatment. Spirochætes were no longer found in the primary ulcers 6–9 hours, or in condylomata lata 9–24 hours, after the start of treatment, and all lesions and rashes cleared up within a week or two.

As for the later effects, it may be seen that there was only one case (no. 2) in which the initial treatment was unequivocally successful, in that the blood WR quickly became negative and remained so, while the patient continued to be free of symptoms during the 9 months of observation. The curative effect in case 1 remains in doubt, since the blood, examined at weekly intervals, is still not regularly Wassermann-negative 9 months after treatment. Case 3 appears to have relapsed serologically some 3½ months after treatment, and her subsequent miscarriage is in keeping with a diagnosis of continued infection. Case 4 may well have been cured by the first course of treatment. The circumstances under which his symptoms reappeared—the chancre on a site other than that of the earlier one, and antedating the return of the blood WR to positive, together with the fact that his wife was proved to be infectious at the critical time—make a strong, though not a conclusive, argument for regarding him as having been cured and subsequently reinfected. The second course of treatment in this case, by 30,000 units hourly for 40 doses, has proved adequate up to the 4½ months of observation, in that symptoms of syphilis disappeared rapidly (though a jaundice of undetermined ætiology has developed), and the blood WR became and remained negative. If he continues to be free of indications of syphilis this will lend further weight to the view that he had been cured by the first treatment-course, and that the reappearance of symptoms was due to reinfection rather than to a relapse, since if this was a relapse it is perhaps unlikely that he would subsequently be cured by a course which seems to have failed in the other patient (no. 5) treated in this way. The improvement in case 5, although rapid and unmistakable, appears to have been only temporary, and he is regarded as having relapsed.

TABLE III—REVERSAL OF BLOOD WR AFTER TREATMENT OF SECONDARY SYPHILIS WITH MAPHARSIDE OR NEOARSPHENAMINE, AND BISMUTH

—	Time since start of treatment		
	8 weeks	12 weeks	18 weeks
Total cases ..	13	39	51
Sero-negative ..	6 (46%)	31 (79%)	51 (100%)

Since these patients were all in the secondary stage, the trial treatments were put to a more severe test than if cases in the primary stage had been chosen. Nevertheless we feel that the results have fallen short of what might have been achieved by standard treatment with 'Mapharside' or neoarsphenamine, and bismuth (Ross 1943). Cases in the secondary stage, treated by these standard methods, have become sero-negative at the rate indicated in table III. In 18 weeks all of 51 cases so treated became negative, but at the same time after treatment with penicillin the blood was negative in only 2 instances out of 6 (case 2, and after second treatment of case 4) as shown in table II, although it is true that the positive result in 1, and possibly 2 of these 6 instances may have been due to reinfection.

We deliberately chose the high total dosage of 2,400,000 units, at the risk of some criticism, in the first cases treated, with the idea that if penicillin were to prove of slight value at this dosage level, both time and penicillin would in the long run be economised in the evaluation of this substance against syphilis. If lower dosages were employed and the results were unsuccessful it would naturally be asked, and remain to be proved, whether higher dosages would not be effective. In the event, we are now in doubt whether a total of even 2,400,000 units over a period of 10 days is adequate for secondary syphilis. The large-scale trials against early syphilis conducted in the United States were with total dosages of 60,000, 300,000, 600,000, and 1,200,000 units respectively, and the conclusion was reached that "certainly the minimum dose, especially in secondary syphilis, should not be less than 1,200,000 units; probably it should be more" (Moore et al. 1944). Our second dosage scheme, of hourly

injections for 40 hours, involved a total of 1,200,000 units. We had reduced the total with some misgivings, while we had only a small amount of penicillin available for these trials, and while somewhat doubtful whether more would be forthcoming. We have since returned to a higher aggregate dosage.

In making a trial of hourly dosage, over the relatively short period of 40 hours, we were guided by two considerations. First, for reasons to be elaborated in a later paper, we wished to try the effect of high penicillin levels consistently maintained for a short time (without resorting to continuous drip procedures), as contrasted with high levels intermittently produced at 3-hour intervals over a longer period. Secondly, we regard it as important to develop a form of treatment which will be suitable for civilian practice on a large scale. A treatment course which requires repeated injections day and night for more than a few days may be unobjectionable for cases under military control, and for a limited quota of hospitalised civilian patients, but for normal and routine practice it is necessary to devise a form of treatment which subjects the patient to considerably less inconvenience. A reduction of the total time covered by the course of repeated injections, from 10 days to 40 hours, is a step in this direction, though still far from the ideal. An obvious advantage, which we are in fact now examining, would be to eliminate the night-time injections.

It is fortunate that penicillin should be so remarkably free from toxic properties. Because of this, however disappointing may be the eventual results of such dosage schemes as we have so far tested, there remains the possibility that better results will be obtained with courses involving considerably larger dosage and prolonged treatment.

SUMMARY

The demonstration that penicillin is therapeutically active against *Spirochæta recurrentis* and *Spirillum minus* infections in mice, and the fact that these spirochætoses are also amenable to treatment with standard antisyphilitic remedies, led us to make a trial of penicillin in human syphilis. Patients with well-marked secondary lesions were treated, and this paper records preliminary results in the first 5 of these cases.

The treatment-courses were as follows: (*a*) 30,000 units intramuscularly every 3 hours for 80 injections (i.e., 2,400,000 units in 10 days); or (*b*) 30,000 units intramuscularly every hour for 40 injections (i.e., 1,200,000 units in 40 hours).

The immediate response in all cases was excellent. Spirochætes and lesions disappeared at least as rapidly as is usual under suitable treatment with arsenicals and bismuth.

Judged by the later effects it is doubtful whether the penicillin was as beneficial as arsenicals and bismuth might have been. (*a*) Of the 4 cases receiving 2,400,000 units in 10 days, only 1 was an unequivocal success in an observation period of 9 months. Another was probably but not certainly cured. The verdict remains open on the remaining 2, since the blood Wassermann reaction in one became negative very tardily, and is still not consistently negative 9 months after treatment, while there was a serological relapse in the other some 3½ months after treatment. (*b*) Of the 2 cases (these include the patient referred to above as probably cured, treated again on becoming reinfected) receiving 1,200,000 units in 40 hours, 1 is still free from evidence of syphilis 4½ months after treatment but the other relapsed in about 2 months.

The freedom of penicillin from toxic properties will enable trials to be undertaken at even higher dosage levels and with longer courses of treatment.

Penicillin treatment for syphilis will not become suitable for routine civilian practice until frequently repeated injections day and night can be avoided.

Invaluable assistance has been provided by the following: Penicillin Clinical Trials Committee (secretary, Prof. R. V. Christie) of the Medical Research Council, through whom supplies of penicillin were received from the Therapeutic Research Corporation, Ltd.; Dr. F. Glyn-Hughes, MO in charge VD Wards, and Dr. C. McGibbon, assistant VD officer, Belmont Road Emergency Hospital, Liverpool; Prof. T. B. Davie, Prof. A. W. Downie, Prof. D. T. Robinson, and Dr. R. T. Chadwick, who arranged for pathological examinations; Mr. R. Ousby, SRN, and Sister Fryer, Belmont Road Emergency Hospital.

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OCTYL NITRITE IN ACHALASIA OF THE CARDIA

C. ELAINE FIELD, MD LOND., MRCP
FIRST ASSISTANT, CHILDREN'S DEPARTMENT, UNIVERSITY COLLEGE HOSPITAL

IN 1928 Holmes and Dresser used amyl nitrite as an antispasmodic in X-ray examination of the gastro-intestinal tract; this fact was noted by Ritvo and McDonald (1940), who tested its efficacy in cases of "achalasia of the œsophagus." They recorded an immediate relaxation of the cardia after inhalation with amyl nitrite but considered that the disadvantages of unpleasant side-effects, such as odour and fainting, contra-indicated its general use in treatment. However, they considered it useful for X-ray purposes as well as in acute emergency conditions arising from the obstruction.

In 1943 Douthwaite compared the effect of amyl nitrite and glyceryl trinitrate tablets with other drug treatments and the mercury bougie on achalasia of the cardia. He concluded that the best results were obtained with nitrites and recommended amyl nitrite inhalations for acute cases (symptoms of less than a year's duration) and glyceryl trinitrate tablets for more chronic cases.

After these preliminary reports, the effect of amyl nitrite was tried on three children suffering from cardiac achalasia. Undoubtedly, as seen on the X-ray screen, the cardia opened shortly after inhalation, but the drug had disadvantages which made it of little use practically. The pungent odour produced nausea, and if given at the beginning or during a meal put the patient off his food, and if given at the end of the meal made him vomit. The capsules were not too easy to manipulate by children, and when they were broken the unpleasant odour infiltrated the room, making the drug undesirable to use in the presence of others. Glyceryl trinitrate tablets *BP* were therefore tried, one being given sublingually before each meal, and later liquor glyceryl trinitrate 3 minims was tried. Observed on the X-ray screen, these drugs acted more slowly and less dramatically and clinically only partially relieved one of the patients, the other two being unaffected. It was therefore concluded that a substance acting as effectively as amyl nitrite but without its disadvantages would be the drug of choice. Octyl nitrite has these properties, and it was therefore tested in five children thought to be suffering from cardiac achalasia. In four it gave complete relief; in the fifth it failed and this child was then found to be suffering not from cardiac achalasia but from œsophageal stricture.

In America, Krantz, Carr and Forman (1938) had been studying a new series of aliphatic nitrites and chose a liquid nitrite, 2-ethyl-n-hexylnitrite (octyl nitrite) for experimental trial on dogs and rats. They compared its effect with amyl nitrite and came to the following conclusions. (1) The depressor effect on the blood-pressure was equal to that of amyl nitrite but lasted seven times longer. (2) The production of methæmoglobin in the blood was negligible. (3) The acute toxic effects were much less. (4) The odour was more pleasant and less pungent than amyl nitrite. (5) It has a lower vapour pressure and thus lends itself to medication in an inhaler. Freedberg, Spiegl and Riseman (1941) tested the efficacy of such an inhaler on cases of angina pectoris. They concluded that "its action is similar to that of nitroglycerin and amyl nitrite in both its beneficial and untoward effects." They found the optimum dosage was one deep inhalation.

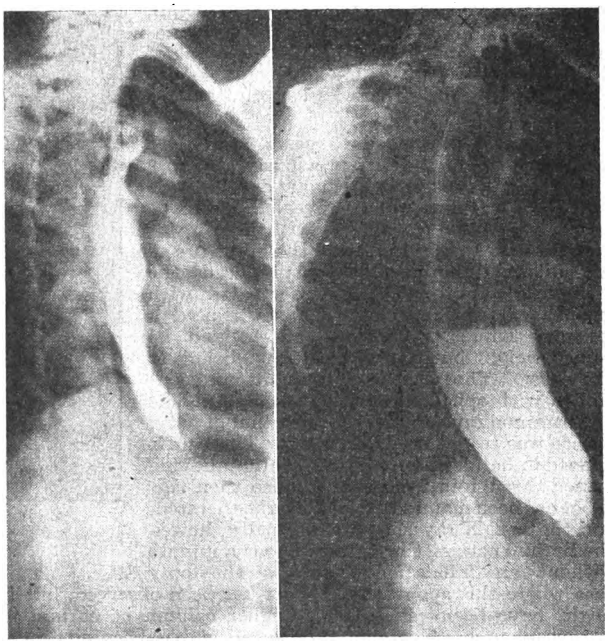
The Octrite Inhaler (Hynson, Westcott and Dunning, Inc.) is a glass tube with vulcanite caps at each end, and contains cellulose pellets impregnated with octyl nitrite. During use both caps are removed and the inhaler applied to one nostril, the other being closed. The Medical Research Council kindly procured from America some octrite inhalers for trial in this country.

CASE-REPORTS

CASE 1.—A boy, aged 12 years, first noticed increasing difficulty in keeping food down at the age of 4 years and complained that he felt it stick behind the sternum. He was first seen in August, 1938; his weight was then 37½ lb. —7½ lb. underweight. He was thin, with a hollow appearance around the eyes suggesting dehydration. A barium swallow (fig. 1*a*) showed slight dilatation of the œsophagus with hold-up of barium at the cardia. Œsophagoscopy by Prof. R. S. Pilcher showed no abnormality, and bougies in increasing sizes were not gripped by the cardia. Ten c.cm. of a 1 in 10,000 solution of 'Eumydrin' before each meal had no effect, but passing a mercury bougie before each meal relieved the symptoms temporarily so that he was able to take solid food without excessive vomiting. For five years he struggled along, being admitted to hospital four times for vomiting and loss of weight. On the fifth admission, in August, 1943, his weight was 48 lb., now 22 lb. underweight, and he still retained the hollow-eyed, wasted appearance. A barium swallow (fig. 1*b*) now showed considerable dilatation of the œsophagus. Three breaths from an amyl nitrite capsule produced immediate relaxation of the cardia and 5 oz. of barium had passed through in one minute. A tablet of glyceryl trinitrate *BP* sublingually had an effect after 5 minutes, and 5 oz. of barium had passed through in the next 15 minutes. Finally, liquor glyceryl trinitrate min. 3 produced an effect after 4 minutes and all the barium was through in 8 minutes. In spite of the promising results on the X-ray screen, clinically the drugs were disappointing; the boy continued to vomit and finally had to resort to passing a mercury bougie again, with immediate relief of symptoms.

In March, 1944, the octyl nitrite inhaler had arrived from America and was tested. A minute after a single inhalation he noticed a sensation of fullness in the head and ½ minute later the cardia opened. The effect slowed down after 5 minutes, leaving half of a 3 oz. barium swallow in the œsophagus and only after a third inhalation did all finally pass. However, clinically the inhaler was effective; vomiting ceased and the child felt more active and less heavy in the chest. One deep inhalation at the end of a meal, or one small one in the middle and one at the end, produced relief, the patient being conscious of the cardia opening and the œsophagus emptying. He did not mind the smell of the drug nor complain of the full sensation in the head. A week after starting the inhalation treatment he developed a hæmolytic streptococcal sore throat with a scarlatiniform rash while in hospital. Within a month his facial appearance changed; he lost the sunken-eyed appearance, filled out considerably and looked more robust. His weight on Aug. 16 was 60½ lb., a gain of 5 lb. in 5 months since the commencement of treatment with octyl nitrite.

The effect of the inhalation now appears more quickly, the cardia opening half a minute later and all the barium passes through in 1–2 minutes (fig. 2*a–e*). As yet, no spontaneous relaxation of the cardia has been observed in this boy without the use of the inhaler. At no time has methæmoglobin been detected in the blood and there is no significant change in the blood-count.

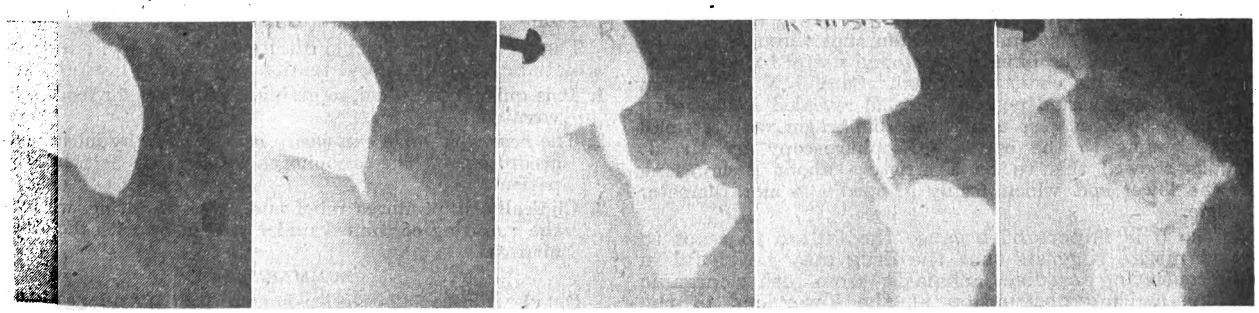


(*a*) (*b*)

Fig. 1—Œsophagus in case 1. (*a*) 1938. (*b*) 1943. Note increase in size.

CASE 2.—A boy, aged 8 years, first started vomiting at the age of 5 years. There was no nausea but he complained of pain in the upper part of the chest. A barium swallow showed moderate dilatation of the œsophagus with hold-up at the cardia. Œsophagoscopy by Professor Pilcher revealed no stricture. Passing a mercury bougie before meals relieved the pain in the chest but he still continued to vomit. Under the X-ray screen inhalation of amyl nitrite produced immediate relaxation of the cardia, and a tablet of glyceryl trinitrate *BP* sublingually produced an effect in about 4 minutes, lasting about 20 minutes. Because of the nauseating effect of amyl nitrite, a glyceryl trinitrate tablet was given before each meal. The pain disappeared and vomiting improved, but this appeared to be only temporary since he returned later vomiting repeatedly.

In April, 1944, a single inhalation of octyl nitrite was tested. The cardia relaxed in half a minute, the barium emptying completely into the stomach in 5 minutes. Clinically, the use of the octrite inhaler has stopped all vomiting and feelings of discomfort in the chest and his mother states he is much more lively. However, he has not gained weight appreciably, weighing 41 lb. in April, before the octrite inhaler was used, and in August only 41 lb. 10 oz. Two weeks after commencing this treatment he developed a cold. No methæmoglobin has been detected in the blood. A blood-count in January, 1944, showed: Hb. 94%; red cells 5,000,000 per c.mm.; colour-index 0·94; leucocytes 7000 per c.mm. (polymorphs 62%, lymphocytes 30%, monocytes 3%); and in June, after two months on octyl nitrite inhalations: Hb. 72%; red cells 3,700,000 per c.mm.; colour-



(*a*) (*b*) (*c*) (*d*) (*e*)

Fig. 2—Case 1. Effect of octyl nitrite inhalation on cardiac achalasia. (*a*) Before inhalation. (*b*) Immediately after a single inhalation; cardia still closed. (*c*) Cardia open. (*d*) Stomach filling. (*e*) 1½ minutes after inhalation; œsophagus nearly empty.

index 0·97; leucocytes 9500 per c.mm. (polymorphs 60%, lymphocytes 33%, monocytes 5%, eosinophils 2%). The cause of this anæmia is as yet unexplained; it did not develop in other cases under this treatment.

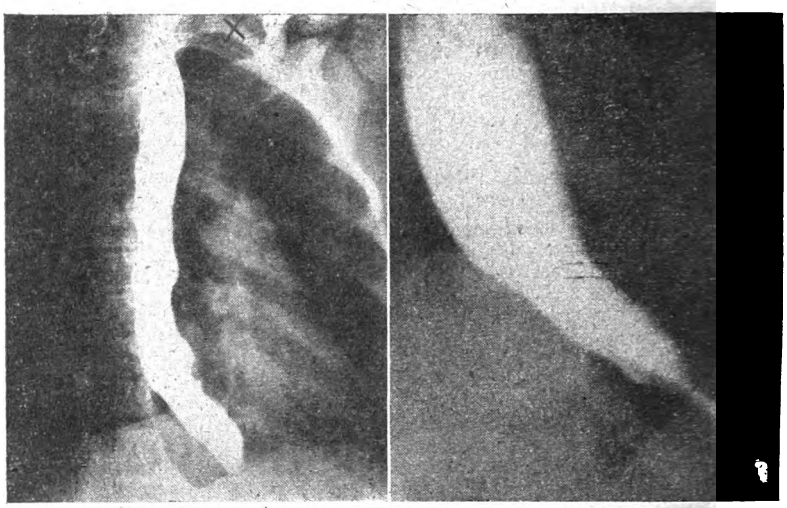
CASE 3.—A boy, aged 13 years, started to be sick at night 2 years previously; he lost weight and started to cough and wheeze badly. A barium swallow revealed enormous dilatation of the œsophagus with hold-up at the cardia. It was suggested that pressure of the dilated œsophagus had produced the asthmatic symptoms. He was treated with œsophageal washouts but has never used a mercury bougie. Vomiting ceased and he gained weight but still had a heavy feeling in the chest. The wheezing at night was controlled with ephedrine and a potassium iodide and stramonium mixture. Inhalation of octyl nitrite was tested in April, 1944. The cardia opened in half a minute, all the barium having passed through in 2 minutes. Since then this effect has been maintained and even accelerated, and the last X-ray screening actually showed the barium passing through for about a minute without an inhalation. This is the only case where this spontaneous effect has been observed, but it might have been caused by a higher column of barium in the œsophagus. The chief clinical effect has been the relief of the heavy feeling in his chest. He no longer washes out his œsophagus, yet remains free from vomiting. About 2 weeks after using the inhaler he caught a severe cold. At first he gained weight but after 2 months his asthmatic symptoms returned, since when he has lost 7 lb. in spite of having a "marvellous appetite" and not vomiting. Octyl nitrite appears to have no beneficial effect on the asthmatic symptoms. No methæmoglobin has been detected in the blood and there has been no change in his blood-count.

CASE 4.—A boy, aged 14 years, first complained of difficulty in swallowing at the age of 10¾ years. He found that food stuck in his "throat" and later vomited once or twice a day. He was 11 lb. underweight when first seen at 12 years. Barium swallow showed only slight dilatation of the œsophagus with some hold-up of barium at the cardia but not complete. Œsophagoscopy by Professor Pilcher revealed no stricture. He was treated with a mercury bougie with some improvement, gaining 6 lb. in 18 months.

In April, 1944, octyl nitrite inhalations were tested. The effect was less dramatic in this boy than with the first three children, but the cardia relaxed in a minute and all barium had passed in 7 minutes. This effect has since increased, the whole barium column now passing through into the stomach in 3 minutes. A fortnight after using the inhaler he developed a severe cold. At no time has methæmoglobin been detected in the blood and there is no appreciable change in blood-counts since starting the octyl nitrite treatment. He has gained 1 lb. 5 oz. in 4 months. During the last month he has developed symptoms suggestive of asthma.

CASE 5.—A boy, aged 11 years, gave a different history. He had vomited periodically since mixed feeding commenced at the age of 6 months and was now 14 lb. underweight. A barium meal (fig. 3*a*) showed only slight dilatation of the œsophagus with a hold-up at the level of the diaphragm. After the inhalation of octyl nitrite there was no relaxation of the obstruction and no barium passed through into the stomach. However, when he closed his glottis and forcibly expired the whole column of barium shot through into the stomach—a trick he himself had found useful to relieve the discomfort in his chest after food. Careful X rays taken after this in inverted posture (fig. 3*b*) revealed a narrowing of the œsophagus just above the diaphragm with a small canal leading to the cardia. Œsophagoscopy by Mr. J. Crooks showed this to be a stricture about 2 cm. long at the lower end which firmly gripped a 4 mm. diameter bougie.

Case 5 is important because the failure to react to octyl nitrite suggests that the drug may be useful in differentiating cardiac achalasia from other organic lesions causing obstruction at the lower end of the œsophagus. Further trials on other children with stricture of the œsophagus and superadded spasm showed that the drug failed to relax the spasm.



(*a*) (*b*)

Fig. 3—Œsophagus in case 5. (*a*) No stricture visible. (*b*) Film taken with child inverted to show stricture at the lower end of œsophagus.

Octyl nitrite inhalation tested on adults suffering from cardiac achalasia produced relaxation of the cardia.

DISCUSSION

From the case-reports on the four cases of achalasia of the cardia it will be seen that octyl nitrite is an effective, and practical, symptomatic treatment in this condition. The increase in well-being is striking in all cases. The child now approaches his meals with the certainty that he can take them. No longer is he in fear that a heavy discomfort in the chest will bring eating to a stop, for he knows that this can be relieved without fuss by a sniff from the inhaler. The psychological value of this approximation to normal eating is obvious. The physical effects of the treatment are shown by a gain in weight, although this is not as striking as might have been expected from the increased ease of eating. So far no toxic symptoms have been observed but it is perhaps relevant that all cases developed a sore throat or a cold 1–2 weeks after commencing treatment. So far no cases have shown any signs of developing a tolerance to the drug and so becoming resistant to treatment. The life of the inhaler varies from 7 to 28 days. Its exhaustion is readily detected, for, the emptying of the dilated œsophagus being appreciable subjectively, the children soon recognise when the power of the inhaler is waning. In the same way they readily learn to regulate the strength of sniff required to the minimum necessary to produce the desired effect, at the same time avoiding as far as possible symptoms such as pounding of the heart and fullness in the head.

The advantages of octyl nitrite over amyl nitrite are as follows:

1. Its odour is more pleasant and less pungent than amyl nitrite and is not noticeable by others in the room.
2. Since it is less volatile it can be administered in an inhaler, which is a much more convenient form.
3. Clinically, it produces relief and stops vomiting, whereas amyl nitrite often produces nausea and vomiting.

The advantages of octyl nitrite over glyceryl trinitrate tablets or liquor glyceryl trinitrate are:

1. It is quicker in action, so giving less chance for food to be vomited.
2. The necessary relief can easily be regulated by inhalations according to the œsophageal sensations felt by the patient.
3. Clinically, it produces relief and stops vomiting, whereas the vomiting continued under treatment with the other nitrites.

SUMMARY

Octyl nitrite (2-ethyl-n-hexyl-nitrite) relaxed the cardia and produced clinical improvement in four children suffering from achalasia of the cardia. A fifth case failed to react favourably to the drug and on further

investigation was found to be suffering from congenital stricture of the lower end of the œsophagus.

I am indebted to the Medical Research Council for procuring samples of the octrite inhaler from America; also to Dr. W. Sheldon for permission to test and publish the results of the drug on two of his cases. I also wish to thank those members of the staff of University College Hospital who have helped me and those who have permitted me to publish their cases. In particular, I would like to thank Prof. H. P. Himsworth for his advice and encouragement and Dr. M. Grossman for the remarkable radiological films showing twenty consecutive pictures in 1¾ minutes.

British Drug Houses Ltd. now manufacture an inhaler containing octyl nitrite.

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FRACTURE OF THE ODONTOID PROCESS
A METHOD OF FIXATION

E. H. T. HAMBLY, MB LOND., FRCS
SURGEON EMS, ROYAL NATIONAL ORTHOPÆDIC HOSPITAL

FRACTURES and fracture-dislocations of the odontoid process, with dislocation of the atlas, are not so deadly as was formerly supposed. The chances of survival after dislocations of the atlas are increased if the dislocation is associated with a fracture of the odontoid.

Fractures of the odontoid may be classified into:

(1) Simple fissure fractures of the base of the odontoid with minimal displacement. These may be treated in a removable collar for some weeks, or in a plaster spica if necessary.

(2) Flexion fracture-dislocations of the odontoid and atlas. These must be reduced under anæsthesia and a plaster applied with the head in extension. Bony union occurs in three months.

(3) Hyperextension fracture-dislocation of the odontoid and atlas (fig. 1). This has to be reduced under anæsthesia and a plaster applied in flexion. After the plaster is removed in three months a leather collar should be worn for a month.

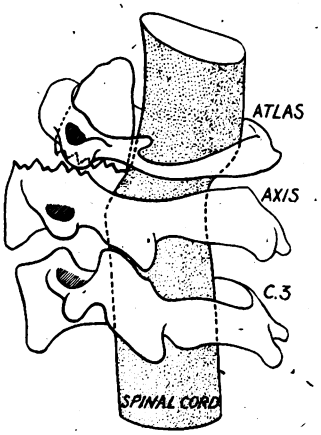

Fig. 1—Hyperextension fracture-dislocation of the odontoid process.

In some patients who are thin and in poor condition even a well-moulded padded plaster will cause pressure sores. Especially is this so when the injury is associated with paraplegia or quadriplegia with trophic pressure sores.

A case is described below in which a hyperextension fracture-dislocation of the base of the odontoid was associated with paralysis of all limbs. In addition, the plaster spica, which had been applied with the head in flexion, had resulted in large pressure sores over both scapulæ. It thus became necessary to adopt another method of fixing the head in flexion. This was carried out by attaching the head and neck plaster with struts to a short double hip spica. The paralysis slowly improved but the patient died four months after the accident as a result of senility, toxic absorption, bronchopneumonia and a severe duodenal ulcer.

CASE-HISTORY

A labourer, aged 62, had fallen off a load of hay from a height of 10 feet and landed on his face. He was in poor condition and was old for his years. He lay on his face with his neck rigidly hyperextended. He was unable to move his neck, and was tender over his upper cervical spinous processes. Hyperæsthesia was present over both posterior triangles. There was no voluntary power in his arms, although the reflexes were normal. Respiration was chiefly costal; there was no apparent diaphragmatic breathing. Abdominal reflexes were absent. He could flex both hips weakly but otherwise his legs were paralysed. Knee- and ankle-jerks were normal. He had a bilateral Babinski response. The muscle tone and sensation of all limbs were

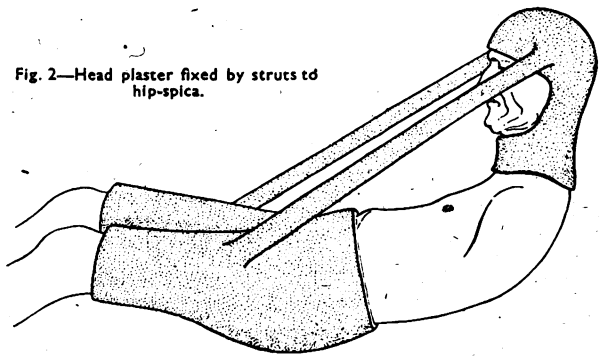
Fig. 2—Head plaster fixed by struts to hip-spica.

normal. The posterior wall of the pharynx could be seen to be further forward than normal. There was also a visible and palpable angular lordosis at the level of the tonsils. The uvula was swollen. There was no history of concussion nor of bleeding from the mouth, nose or ears. X ray showed a hyperextension fracture-dislocation of the odontoid process, carrying the atlas with it (fig. 1).

The cervical spine was manipulated under 'Pentothal' and a plaster spica applied with the head in flexion. A second X ray showed good reduction. Four days after the accident diaphragmatic breathing returned and bladder control became normal. By six days later however he had developed a flaccid paralysis. This was associated with absence of biceps and supinator reflexes, but the triceps reflexes were present. There was also absence of knee reflexes and the Babinski response was positive. The ankle reflexes were present.

Pressure trophic sores soon developed over both scapulæ in spite of padding and windows in the plaster. It was then decided to apply a plaster as shown in fig. 2, thus maintaining the head in flexion.

The patient made good progress from the quadriplegia, but the pressure sores, which were deep and extensive, were slow to heal; 2½ months after the injury he could move his feet well and his wrists and thumbs were recovering. The biceps muscles were beginning to move again. The plaster was removed after 7 weeks and he was sat up out of bed for 3 weeks. He then began to decline and died 4 months after the injury. Autopsy revealed bronchopneumonia and a large duodenal ulcer.

TYPHOID SEPTICÆMIA
REPORT OF A CASE

JOHN F. GOODALL, MD CAMB.
CAPTAIN RAMC; PATHOLOGIST TO A BRITISH GENERAL HOSPITAL

A BRITISH sergeant, aged 44, had been in India for 19 months. He contracted syphilis in August, 1942, for which he was treated, but had otherwise been fit until May, 1943, when he developed amœbic dysentery, and he was subsequently in four different hospitals, having in all four courses of emetine, two of acetarsol, and two of carbarsone. He was admitted to this hospital on Oct. 19, 1943, with a diagnosis of amœbic dysentery and septicæmia of enteric type, having had fever for two days. His temperature on admission was 102° F, his pulse-rate 100 per min. and irregular. This irregularity persisted throughout his illness and was ascribed to a myocarditis resulting from emetine. He was cyanosed and had a dry furred tongue. There were some râles in both lungs. The abdomen was distended and tender in the right loin and iliac fossa; there was no rigidity but the pain increased on inspiration. The spleen was not palpable but a tumour thought to be the liver was felt under the right costal margin.

His deterioration was rapid, with increasing cyanosis and bradycardia, and with dulling and finally loss of

consciousness. Other signs were a single rigor, profuse sweating, occasional vomiting, irregularity of bowel action with occasional severe diarrhœa, and a rising respiratory rate. He died on Oct. 27, eight days after admission, having been ill for ten days.

Repeated blood slides had not revealed any malarial infection. No exudate was present in the fæces, and no pathogenic organisms were isolated from either fæces or urine. The blood-count showed Hb 13 g. %, red cells about 3·5 million, and white cells 9400 per c.mm. (4700 polymorphs, 3572 lymphocytes). Later in the illness the white-cell count rose to 16,000 per c.mm. On the fourth day of the illness his serum failed to agglutinate *Bact. typhosum* (O) and Vi, and *Bact. paratyphosum* (O) suspensions, but from blood taken the same day an organism was grown exactly resembling *Bact. typhosum* except that it was non-motile and was not agglutinated by either "O" or "H" serum to full titre.

Autopsy, performed 7 hours after death, showed a purulent meningitis, toxic myocarditis, bronchitis with pulmonary œdema, catarrhal cholecystitis with gross distension of the gall-bladder, old amœbic ulceration of the large gut, and changes in the kidneys which were subsequently proved histologically to be the results of bacterial embolism of the interlobar and efferent glomerular arterioles with the production of a suppurative nephritis. The spleen was not enlarged but was diffluent. The main negative finding was a completely normal intestinal mucosa, except for the ulcers noted above, with no involvement of Peyer's patches or the mesenteric glands. Cultures taken fron the spleen and small intestine produced no pathogen, but from the CSF an organism identical with that grown from the blood in life was grown. These organisms were proved to be *Bact. typhosum* in the pure Vi form, since from each a motile strain agglutinated by "H" serum to full titre was obtained. The "O" serum (titre 1/1280) agglutinated the Vi form in dilution of 1/10, and to full titre after disappearance of the Vi antigen during subculture.

This case is reported because of the rarity of typhoid meningitis and the extreme rarity of typhoid septicæmia without a local lesion in the ileum. An explanation of these unusual factors may be found in the antigenic structure of the organism.

I am indebted to the Director of Medical Services in India, and to my commanding officer, Colonel H. F. Humphreys, for permission to publish this case, and to Major MacDonald for his opinion on the histology.

Medical Societies

SOCIETY OF MEDICAL OFFICERS OF HEALTH

ON Nov. 24 Dr. M. MITMAN delivered to the fever group of this society a presidential address on

Aerial Infection

Plant pathogens, he said, are carried through the air for long distances and there is no physical reason why human pathogens should not be carried over great distances and up to considerable heights. But in fact human pathogens have never been recovered from the upper air or from marine air. The inferences are that they do not long survive exposure, and that most human respiratory infections are acquired indoors. The theory of airborne infection, an old conception, was almost abandoned in the first 40 years of this century, between the times of Flugge's description of droplet infection and Wells's account of droplet nuclei. The term "aerial infection" should include all those modes of transmission in which the path of the infective agent lies through the air.

The degree of aerial contamination by sneezing is high, said Dr. Mitman; compared with the gentle showers caused by coughing, talking, or laughing, sneezing contributes intramural storms. Of the tens of thousands of droplets expelled from the mouth (not, be it noted, from the nose) during a sneeze, about two-thirds become small enough, after evaporation, to remain airborne. It has been suggested that only droplet nuclei and the finest dust particles are small enough to penetrate to the lungs, droplets and raised dust being caught in the upper respiratory tract. Contamination of air in overcrowded rooms cannot be so effectively countered as contamination in rooms with fewer occupants. Overcrowded public transport vehicles are the worst places for the interchange of nasopharyngeal flora, and when housing becomes more closely linked with industry many of these dangerous journeys will be unnecessary. The Ministry of Health's campaign for respiratory hygiene has already influenced considerably the amount of respiratory disease.

Dr. Mitman regards the hospital blanket as an abomination and looks forward to its abolition; nor is he impressed with the results of oiling bedclothes and floors. Air-conditioning does not ensure the degree of disinfection of the atmosphere which might be expected. The use of masks should be extended, but a comfortable and efficient mask had not yet been devised. He considers that reports on experimental and clinical trials with germicidal ultraviolet light for air purification in children's homes, nurseries, hospital wards, and operating theatres are impressive, though ultraviolet radiation has poor penetrating power and its effectiveness is reduced by the presence of dust. The new knowledge of the control of aerial infection should be familiar to architects and engineers, so that it can be applied in new hospitals built after the war.

Reviews of Books

Medical Radiographic Technique

G. W. FILES, General Electric X-ray Corporation. (Thomas. Pp. 365. 33*s*.)

THIS volume began as an interdepartmental notebook for instructors in a large firm manufacturing X-ray apparatus. As it increased in size the contributors decided it would be worth while to make their information available to all, and now call it "a book written by technicians for technicians." The work has not been done in a hospital, however, and this is unfortunate, since the book could be considerably improved by collaboration or consultation with a radiologist. The physics section is too advanced for a beginner in radiography or radiology, and the apparatus section, while adequately covering the basic principles of apparatus construction, is somewhat coloured by descriptions of the firm's particular machines. The section dealing with factors affecting radiographic quality and dark-room technique is well worth close study by experienced radiographers and radiologists. The anatomical drawings are simple and clear and will be a boon to junior radiographers. The technique section is accurate and liberally illustrated, but the various positions shown in the photographs are not designed to promote the comfort of the patient—a vital factor in the production of first-class radiograms.

Office Treatment of the Nose, Throat, and Ear

ABRAHAM R. HOLLENDER, M SC, MD, FACS, associate professor of laryngology, rhinology, and otology, University of Illinois. (Year Book Publishers. Pp. 480. $5.)

THIS book deals mainly with a type of practice which finds little favour in this country, though a few examples of treatment not carried out in the consulting-room are included. The initial chapters on general methods of treatment are good; the remaining chapters are on individual portions of the upper respiratory tract, and discuss the commoner disease conditions and their treatment. In the nose, chief emphasis is on displacement therapy and short-wave diathermy, and the author advises radium for recurrent nasal polyposis. Conservative treatment of chronically infected tonsils is somewhat laboured—there can be few general contra-indications to tonsillectomy if the operation itself is considered necessary. The various measures advised for external otitis, chronic deafness, chronic middle-ear suppuration, and Menière's disease and syndrome are in common use, and follow generally accepted principles. Whether it is desirable for patients to attend repeatedly at the consulting-room of the specialist for treatment which could often as readily be given by his family doctor would be questioned by many in this country, though it is customary in the United States. However, the book is well written and produced.

THE LANCET

LONDON: SATURDAY, DECEMBER 30, 1944

Penicillin's Threat to Syphilis

ONE of the most striking and least expected developments in the unravelling of penicillin's potentialities is the demonstration of its therapeutic effect on human syphilis. This was foreshadowed, both in the United States and in Great Britain, by studies on experimental infections in animals. In the United States the preliminary work (unpublished) was done on rabbits infected with syphilis, and was referred to in the first account of the use of penicillin in human syphilis by MAHONEY, ARNOLD, and HARRIS.[1] In Britain the lead was given at the Liverpool School of Tropical Medicine, where LOURIE and COLLIER,[2] having shown that penicillin would cure infections with *Spirochæta recurrentis* and *Spirillum minus*, pointed out that since these infections were eminently susceptible to the action of standard antisyphilitic remedies the possibility naturally arose that penicillin would be effective against syphilis. They have followed up this suggestion, with ROSS and NELSON, in trials against early syphilis in man, and the first report on their work appears in this issue. Meanwhile, in the United States investigations on the use of penicillin in all forms of human syphilis have been continuing on the scale and with the vigour and purposiveness we have come to expect of our transatlantic friends, once they set themselves to a task. The work was organised on a nation-wide basis by the Committee on Medical Research of the Office of Scientific Research and Development, together with the National Research Council[3]; and arrangements were made for trials against early syphilis in 23 centres, and against late syphilis in 8 centres, in different parts of the country. Results of these trials have recently been published in three papers, comprising the later history of the 4 original patients of MAHONEY and his associates, together with reports on further cases treated by this group,[4] and on 1418 cases of early syphilis[5] and 182 cases of late syphilis[6] treated in all the centres to which the work was allocated. More recently still, there has appeared a preliminary evaluation of penicillin in the treatment of syphilis during pregnancy, and in the congenitally infected infant.[7]

We in Britain have become so accustomed to the idea that, quite apart from limitations naturally imposed by the properties of penicillin, the supply position denies its use to civilians except as a life-saving remedy where no substitute exists, and in a few other strictly defined circumstances, that we look with some wonder at the amounts released for these American syphilis trials. The penicillin used would probably suffice for the treatment of somewhere between a quarter and half a million septic hands.[8] The fact that so much penicillin could have been set aside for these specific trials is in itself a commentary on the vastly increased quantities which must now be available for more immediately pressing purposes. This aspect is well illustrated in the recent statement of Major-General L. T. POOLE[9] that the penicillin team which went to North Africa in May, 1943,[10] was provided with only 10 million units, whereas later it was possible to send to Italy alone 20 million units per day. By April of this year tentative production programmes of the United States and Canada were stated by COGHILL[11] to be of the order of 200,000 mega units[12] per month, and it is no secret that in Britain also, crippled though we have been by the drainage of man-power in five long years of war, as the Government white-paper[13] of Nov. 28 has eloquently revealed, production capacity is nevertheless steadily and considerably on the increase. All this is the result of what must be accounted one of the most remarkable coöperative achievements of the war, involving the closest integration of international effort on the part of governmental agencies, academic bodies, and private enterprises on both sides of the Atlantic. There is something almost symbolic—an undertone of the war, reflecting in a minor key one of its major themes—in the story of FLOREY and his fellow pioneers treating their first few cases during the height of the London blitz of 1940–41; his visit to the United States in 1941 to stimulate American enthusiasm for penicillin production; the small beginnings of large-scale production in this country at the laboratories of Oxford University and of Imperial Chemical Industries, resulting in the erection of enormous production units by a number of industrial concerns in this country, and a massive output in the United States and Canada, whence large supplies now flow across the Atlantic.

Apart from the improving supply position (though we are still far from having all the penicillin we really need), there is ample justification for a large expenditure of the substance in exploring its powers against syphilis, the treatment of which has long stood badly in need of improvement. Not only is arsenotherapy relatively toxic, but it is far from infallible; MOORE and his associates[5] quote 5–15%, a very disquieting proportion, of primary syphilitics as resistant to arsenic and heavy metal therapy. Furthermore, no treatment can be regarded as entirely satisfactory which involves frequent injections and surveillance for periods of a year and longer, more often than not under peculiar conditions of secrecy. It is small wonder that an alarmingly high proportion of patients fail to complete their treatment. MARSHALL[14] has stated that, by reason of default, less than half of the patients receive enough treatment to

1. Mahoney, J. F., Arnold, R. C., Harris, A. *Ven. Dis. Inform.* 1943, **24**, 355.
2. Lourie, E. M., Collier, H. O. J. *Ann. trop. Med. Parasit.* 1943, **37**, 200.
3. The organisation and functions of these bodies were described in *The Lancet*, 1944, i, 159.
4. Mahoney, J. F., Arnold, R. C., Sterner, B. L., Harris, A., Zwally, M. R. *J. Amer. med. Ass.* 1944, **126**, 63.
5. Moore, J. E., Mahoney, J. F., Schwartz, W., Sternberg, T., Wood, W. B. *Ibid*, p. 67.
6. Stokes, J. H., Sternberg, T. H., Schwartz, W. H., Mahoney, J. F., Moore, J. E., Wood, W. B. *Ibid*, p. 73.
7. Lentz, J. W., Ingraham, N. R., Beerman, H., Stokes, J. H. *Ibid*, p. 408.
8. Calculated from Florey, M. E., Williams, R. E. O. *Lancet*, 1944, i, 73.
9. Poole, L. T. *Brit. J. Surg.* 1944, **32**, 110.
10. *Lancet*, 1943, ii, 742.
11. Coghill, R. D. *Chem. Engin. News*, 1944, **22**, 588.
12. Mega unit = 1,000,000 units. See *Lancet*, 1944, ii, 522.
13. Cmd. 6564.
14. Marshall, J. *Nature, Lond.* 1944, **153**, 187.

ensure a cure-rate of 80%. Standard courses of treatment by arsenicals are indeed a long way removed from EHRLICH'S dream of *therapia sterilisans magna*, the single dose which would at one stroke clear up the trouble once and for all. Modern attempts at intensive arsenotherapy reach out towards EHRLICH'S ideal, by crowding as much of the drug as possible into as short a time as possible, but the increased toxicity and mortality associated with these procedures have frightened many a competent syphilologist. It is here that penicillin has held out a specially bright promise, fulfilment of which cannot however yet be unreservedly acclaimed, although the immediate effects of treatment are brilliant. We await with keen interest news of the results obtained by the medical services of the British Army, which were quick to appreciate the advantages of penicillin therapy for syphilis and for some time have used it in all early cases.

The treatment courses so far described for early syphilis in America and England have not exceeded 8 and 10 days. The Americans tried aggregate doses ranging from 60,000 to 1,200,000 units, but after due observation concluded that, although high therapeutic powers must be credited to penicillin, the minimum total dosage, especially in secondary syphilis, should probably be more than 1,200,000 units. The Liverpool workers began their trials, all so far in secondary cases, with an aggregate of 2,400,000 units, and even with this dosage they express doubts whether better results might not have been achieved by conventional remedies. But, as they point out, the possibility remains of exploring even higher dosage and longer treatment. If penicillin is to be suitable for large-scale civilian practice, an effective form of treatment must be devised which does not necessitate frequent injections throughout day and night. We are therefore far from having heard the last word about time-dose relationships in the penicillin treatment of syphilis. One of the most significant and most hopeful of the many important observations made by the Americans is that the best results, in their early cases, were achieved in cases treated with the otherwise inadequate dosage of 60,000 or 300,000 units, plus a known subcurative dosage of arsphenoxide, and this combination will no doubt receive full attention in future.

The remarkable fact that the gonococcus and the spirochæte are both sensitive to penicillin, and the former so much more so than the latter, involves a special danger which has been referred to by ELLIS [15] and by WISE and PILLSBURY.[16] This is that in treating gonorrhœa, for which a total dosage of about 100,000 units would be given, a coincident syphilitic infection may be overlooked, particularly if the only manifestation be such a lesion as an intra-urethral chancre. The effect would of course be a disastrous clouding of the subsequent diagnostic evidence. It becomes especially necessary therefore to search carefully for lesions of syphilis before treating cases of gonorrhœa with penicillin, and to follow up this treatment, say six months later, by serological tests for syphilis.

In brief, we are justified in feeling that, even though disappointments, disadvantages, and pitfalls are already apparent and will certainly increase as time goes on, yet penicillin has proved itself a formidable antagonist of syphilis, and its threat remains a very real one.

15. Ellis, F. A. *J. Amer. med. Ass.* 1944, **126**, 80.
16. Wise, C. R., Pillsbury, D. M. *Brit. J. Surg.* 1944, **32**, 214.

Synthesis of Vitamins in the Bowel

THE rôle of the intestinal flora in health and disease, which we briefly discussed last week, has long been the subject of speculation. The commensal micro-organisms of the bowel, as well as their various mutants, have often been blamed in a vague way for this or the other malady, an example being HUNTER'S theory about pernicious anæmia. In recent times, however, stimulated by our increasing knowledge about vitamins and still more by the introduction of the "sterilising" sulphonamides, discoveries have been made which throw fresh light on the intricate functions of the intestinal flora in the nutrition of animals and man. The first suggestion that a vitamin can be synthesised by micro-organisms in the bowel of cattle came from THEILER, GREEN, and VILJOEN [1] in 1915, and such synthesis was experimentally demonstrated by BECHDEL, ECKLES, and PALMER [2] in 1926. A similar observation was later made in pigeons.[3] This phenomenon, termed "refection," was ascribed by SCHIEBLICH and RODENKIRCHEN [4] to the presence of vibrio-like organisms with distinct morphological characteristics, thriving on the undigested starch grains in the gut. Considerable bacterial synthesis of various B vitamins, as well as of protein from inorganic nitrogen, has since been demonstrated in ruminant animals.[5] This is to be expected, since these animals are better suited than others to benefit from the activities of symbiotic micro-organisms, such as the cellulose-splitting bacteria, because they possess a veritable bacterial workshop in their first stomach, the rumen.

During the last two years the poorly absorbed sulphonamides, sulphaguanidine and succinylsulphathiazole,[6] have been used extensively for the elucidation of the various factors which can be synthesised by the intestinal flora. By the inclusion of these sulphonamides in purified diets, the synthesis of a series of B vitamins has been demonstrated in the rat.[7] Various symptoms have been observed—e.g., retarded growth, granulocytopenia, and even necrosis, liver damage, hæmorrhages, and calcification of voluntary muscle and blood-vessels. Biotin, pyridoxine, folic acid, pantothenic acid, aneurine, riboflavine, nicotinic acid, and inositol have all been shown to be synthesised in the rat's cæcum.[8] The extent of the synthesis is greatly influenced by the diet. The cæcum seems to be the principal site of vitamin synthesis, which is borne out by the observation that cæcectomy facilitates the development of vitamin

1. Theiler, A., Green, H. H., Viljoen, P. R. *Rep. vet. Res. S. Afr.* 1915, **3** and **4**, 9.
2. Bechdel, S. I., Eckles, C. H., Palmer, L. S. *J. Dairy Sci.* 1926, **9**, 409.
3. Taylor, J., Thant, U. *Ind. J. med. Res.* 1929, **16**, 747.
4. Schieblich, M., Rodenkirchen, J. *Biochem. Z.* 1929, **213**, 234.
5. Wegner, M. I., Booth, A. N., Elvehjem, C. A., Hart, E. B. *Proc. Soc. exp. Biol. NY*, 1941, **47**, 90. Owen, E. C., Smith, J. A. B., Wright, N. C. *Biochem. J.* 1943, **37**, 44.
6. Marshall, E. K., jun., Bratton, A. C., White, H. J., Litchfield, J. T., jun. *Bull. Johns Hopk. Hosp.* 1940, **67**, 163. Poth, E. J., Knotts, L. F. *Proc. Soc. exp. Biol. NY*, 1941, **48**, 129.
7. Daft, F. S., Ashburn, L. L., Sebrell, W. H. *Science*, 1942, **96**, 321. Nielsen, E., Black, A. *Proc. Soc. exp. Biol. NY*, 1944, **55**, 14. Daft, F. S., Sebrell, W. H. *Publ. Hlth Rep., Wash.* 1943, **58**, 1542. West, H. D., Jefferson, N. C., Rivera, R. E. *J. Nutr.* 1943, **25**, 471.
8. Mitchell, H. K., Isbell, E. R. *Univ. Texas Pub.* 1942, **4237**, 125.

deficiencies.[9] The synthesis of vitamin E[10] and vitamin K[11] in the gut has also been demonstrated with the aid of the "sterilising" sulphonamides. MARTIN[12] claims that even some amino-acids, classed as non-essential by ROSE, are provided to the host organism by the synthetic action of the intestinal bacteria. The observations in vivo are confirmed by the study of intestinal bacteria in vitro. Thus BURKHOLDER and MCVEIGH[13] found that six different intestinal bacteria, including *Bact. coli*, are able, with few exceptions, to produce thiamine, riboflavine, nicotinic acid, and biotin. Moreover, considerable amounts of these factors (up to 40%) could leak from the bacteria into the filtrate. GANT and his colleagues,[14] having studied the bacteriological changes of the intestinal microflora in rats on a purified diet containing sulphaguanidine and succinylsulphathiazole, report a decrease of *Bact. coli* with a corresponding increase in the enterococci, the total bacterial count of the fæces remaining remarkably constant. The usual growth inhibition was observed, even when the number of *Bact. coli* returned to normal. This fact was interpreted as demonstrating that, as a consequence of the treatment, the bacteria lost their ability to synthesise the vitamin.

The first application of these findings to man was reported by NAJJAR and HOLT,[15] who kept nine adolescent men on a completely synthetic diet, consisting of vitamin-free casein, 'Crisco' (a vegetable fat), 'Dextri-Maltose,' a vitamin mixture, and a mineral mixture, for many months. This diet was baked into a granular dough and given in equal amounts three times a day. The subjects are said to have relished this diet after about a week. They remained perfectly healthy for several months, and their intake of aneurine was then gradually reduced to zero. In the course of 3–5 weeks four subjects developed clinical beri-beri, one had slight symptoms of beri-beri, and the rest were symptom-free. The fæces of the healthy subjects showed significant amounts of free aneurine (in spite of the zero intake), while no free aneurine was found in the fæces of the men with beri-beri. One of the subjects whose fæces contained free aneurine was then given succinylsulphathiazole, and within a week his fæcal aneurine elimination fell to zero. Absorption of the vitamin from the intestine was proved by the administration of vitamin B_1 enemas, which greatly raised the urinary elimination of this compound. These experiments seem, therefore, to prove that vitamin B_1 can be synthesised in the human bowel. NAJJAR and his collaborators[16] have also presented evidence for the biosynthesis of riboflavine in man by the same technique. None of their twelve experimental subjects developed any signs of riboflavine deficiency during the 12 weeks of the experiment. The men excreted amounts of riboflavine, both in the fæces and the urine, which were far in excess of the minimal riboflavine intake in the synthetic diet. Absorption of riboflavine was proved by the urinary response to riboflavine enemas. The possibility that riboflavine is excreted from the body stores into the fæces was excluded by giving the substance by intravenous injection, which caused no increase in the fæcal riboflavine. The expected fall in the fæcal riboflavine did not occur when succinylsulphathiazole was given, from which it is concluded that biosynthesis of riboflavine in the human intestinal tract must be ascribed to organisms which are not susceptible to the drug.

In this country ELLINGER, COULSON, and BENESCH[17] have reported the biosynthesis of nicotinamide by the intestinal flora in man: They investigated the nicotinamide methochloride (the main end-product of nicotinamide metabolism in man) eliminations of normal and pellagrous persons before, during, and after dosing with succinylsulphathiazole. A sharp drop in the nicotinamide methochloride elimination, varying from person to person but amounting on the average to about 60%, was observed during the dosing period. Subjects in the control group who received sulphathiazole showed no significant change, in spite of the fact that their blood and urinary levels were higher than those of the subjects receiving succinylsulphathiazole. These findings certainly suggest that the poorly absorbed succinylsulphathiazole inhibits the production of nicotinamide by the bowel organisms, which can normally provide the body with a considerable part of its nicotinamide requirement.

A striking fact is the enormous variation in the extent of biosynthesis in different people, even on the same diet, varying from 0 to 100% of the requirement. Clearly a lot more information will have to be gathered before general conclusions can be reached. Nevertheless, it seems justifiable to expect these results to revolutionise our outlook on vitamins and vitamin-deficiency syndromes. They can, for instance, suggest answers for the old questions, why people on diets low in some vitamins remain healthy, why agreement cannot be reached on the human requirements of B vitamins, why studies on the effect of B vitamins on various body functions have produced such contradictory evidence,[18] why maize, which is the staple food of pellagra districts, is not particularly deficient in nicotinic acid, while milk, which contains negligible quantities of this vitamin, has a pellagra-curative effect. All these apparent paradoxes yield to the interpretation that the B-vitamin content of the diet is sometimes of less consequence than a diet capable of maintaining adequate vitamin synthesis by the intestinal flora. It seems no longer permissible to adopt WILLIAMS'S[19] practice of equating the B-vitamin requirements of man to the B-vitamin content of an average diet of about 2500 calories.

The physician will ask how the interference of the "sterilising" sulphonamides with vitamin biosynthesis affects the therapeutic use of these drugs.

9. Taylor, A., Pennington, D., Thacker, J. *Ibid*, p. 134.
10. Daft, F. S., Endicott, K. M., Ashburn, L. L., Sebrell, W. H. *Proc. Soc. exp. Biol., NY*, 1943, **53**, 130.
11. Black, S., Overman, R. S., Elvehjem, C. A., Link, K. P. *J. biol. Chem.* 1942, **145**, 137.
12. Martin, G. J. *Proc. Soc. exp. Biol., NY*, 1944, **55**, 182.
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BENESCH [20] first pointed out, in connexion with confusional psychoses following sulphaguanidine therapy in the Middle East, that an acute aneurine or more likely a nicotinamide deficiency [17] may have been responsible for the mental symptoms as a result of the antagonistic effect of this drug on the vitamin-synthesising microflora of the gut. This hypothesis is borne out by HOWAT'S [21] observation that the onset of steatorrhœa, a vitamin-B deficiency syndrome, seemed to be correlated with sulphaguanidine therapy in the Middle East. The question arises whether a course of sulphaguanidine or sulphasuxidine, given over 7–10 days, can materially affect the aneurine or nicotinamide status of the body. This will, of course, depend on the previous vitamin-B status of the patient, on the type and severity of the disease treated, and on other factors. Two points should, however, be borne in mind. First, sulphonamides exert, when absorbed, a direct antagonistic effect on the intracellular enzyme systems, into the composition of which some of the B vitamins enter. Succinylsulphathiazole is therefore preferable to the better-absorbed sulphaguanidine in the treatment of dysentery. Secondly, GANT and others [14] observed that *Bact. coli* loses its vitamin-synthesising power after the administration of "sterilising" sulphonamides, even when the counts have returned to normal. A more protracted effect on the vitamin-B status of the body must therefore be expected from the use of these sulphonamides. Incidentally, the observation that *Bact. coli* which appear morphologically and bacteriologically similar may be metabolically quite different throws an interesting sidelight on the old hypotheses about colitis and the like, that *Bact. coli* may under certain conditions become pathogenic.

The main conclusion to be drawn from the evidence available is that the accepted definition of a vitamin as an exogenous cell catalyst which must be provided by the diet, since it cannot be produced by the body, has broken down, because under certain conditions B vitamins can be synthesised in the bowel by the micro-organisms which inhabit it. Moreover, the intestinal microflora will have to be regarded as a major part of what is tellingly termed "the constitution of the individual."

20. Benesch, R. *Lancet*, 1944, i, 453.
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Annotations

HOSTELS FOR DIFFICULT CHILDREN

"All . . . need careful handling, individual understanding, and an environment and routine designed to give a period of constructive help rather than long term institutional care."

THIS plain statement of the needs of the difficult child indicates the spirit in which a survey [1] of war-time hostels for such children has been undertaken by the Ministry of Health. In all, 48 hostels were surveyed, and an analysis was made of detailed reports on 486 children from 23 of the hostels. The account given is on the whole reassuring, even encouraging. Evidently those appointed to look after these children have had good understanding of their needs. There is little evidence that the children are ever coerced or regimented into good behaviour:

"In practically all the hostels included in the survey discipline is very free and the one in which it is stated that, by reason of a fairly rigid timetable, there is 'little opportunity for mischief' is quite exceptional."

In one hostel for 26 boys between 9 and 14 experience has shown the advantages of easy discipline. For a time liberty was restricted and the boys were segregated from other children in the village. Under this stigma they quickly got a bad name for themselves. A new warden, who gave as much freedom as possible, allowed them to mix freely in village activities They now visit local boys in their homes and invite them back to the hostel. Many of them have joined the local scout troop and the choir, and they are all free to attend village concerts and plays, and to take part when asked. In reason they can go where they will in the neighbourhood, and have all been taught to use the telephone so that they can report to the hostel if they miss a bus. In practice they take little advantage of this freedom because so much of interest is going on at the hostel that they like to be there. In nearly all hostels children take part in household tasks, and it is noteworthy that such a sharing of responsibility is easier to arrange in the small hostel than the large one. Indeed the hostel which to some extent mimics the large family often seems to give the best results. At one hostel taking 16 children there are boys and girls under nine and a small group of girls of twelve and over. Here, the older girls take responsibility for the younger children and enjoy it. The survey made it clear that "it is not easy to provide the right environment in a hostel which contains more than about 25 children."

Among the reasons for sending children to such hostels stealing, enuresis, and unruly behaviour head the list. An analysis of intelligence quotients in 251 children—216 boys and 35 girls—showed the largest number (75) to be in the IQ 80–89 group, and the next largest number (63) in the IQ 90–99 group. Only 36 fell into the IQ 100–109 group, where the peak figure might be expected in a group of normal children. Thus, though there was a fair proportion of highly intelligent children (40) these difficult children on the whole were backward, the average range being between IQ 80 and IQ 99, instead of between IQ 90 and IQ 109. Unsatisfactory or broken homes do not seem to have been as common in the family history as might be expected. In a group of 332, both parents of 217 were living and not separated; the homes of 119 of these were satisfactory, of 98 unsatisfactory. In 115 cases where either one parent or both had died, or the parents were separated, or the child was illegitimate, the home was regarded as satisfactory in 71, and as unsatisfactory in only 44.

Of the 486 children covered in the survey 215 were much improved by their stay in a hostel, 233 improved, and only 32 not improved; 6 had been in for too short a time for an opinion to be given on them. The report concludes that though these hostels were devised in connexion with the evacuation scheme, the experience gained in them should be of service to bodies which provide similar care for difficult children in normal times.

1. Hostels for 'Difficult' Children. HM Stationary Office. Pp. 23. 6*d*.

THE INVISIBLE COLLEGE

OUR civilisation owes much to the men who established the Royal Society, in an age when the scientific outlook was unorthodox and suspect, and to those who guided it through three centuries of varying fortune. The late Sir Henry Lyons has left behind him a work [1] which forms a memorial to their foresight. Starting with the group who, inspired by the writings of Bacon, held meetings somewhat unobtrusively during the Commonwealth —"the invisible college"—and who took advantage of the Restoration to achieve the security of a royal charter, he presents the evolution of the society in a succession

1. The Royal Society 1660–1940. Sir Henry Lyons, FRS. (Cambridge University Press. Pp. 354. 25*s*.).

of phases. The latter half of the 17th century, during which it was directed mainly by men of affairs, was followed by the long presidencies of Isaac Newton and Sir Hans Sloane; under the leadership of Sir Joseph Banks it increased in prestige and scope, but the non-scientific element remained in a majority; in the years 1820–60 the scientists acquired control of the administration; and for the last 80 years it has functioned as a purely scientific body of which the fellowship has come to be a much-coveted honour.

The society in its early years had need of protection, and soon afterwards of money; hence it took in influential and wealthy men as well as scientists. In unsettled times it was no small advantage to have as president such men as Halifax and Somers; and incidentally the society's historian owes much to the circumstance that among its active members were the two greatest of diarists, Evelyn and Pepys. But the second object, according to Sir Henry, met with complete failure. The non-scientific fellows gave scarcely any financial support but maintained a majority on the council and hampered the promotion of scientific aims. The development of the society is viewed to a large extent as the gradual acquisition of administrative control by men engaged in experimental work. A table of the occupations of the scientific fellows at various dates shows that the medical profession provided over half throughout the 17th and 18th centuries, but by 1860 the percentage had fallen to 35.

IDENTIFICATION OF THE TYPHOID-SALMONELLA FAMILY

IF typhoid fever is nowadays a rare experience in the life of the general practitioner, its near relations, paratyphoid and the salmonella food-poisonings, are sufficiently common to warrant a sharp lookout for them. These infections do not necessarily come in well-defined outbreaks; apparently sporadic cases occur, and clinical diagnosis is not always easy. Paratyphoid has in recent years appeared in a mild form, often ushered in by vomiting and diarrhœa followed by fever lasting 7–10 days. The salmonella organisms, while typically associated with acute gastro-enteritis, may cause a continued type of fever without intestinal symptoms. Diagnosis will often depend on an early blood-culture in the systemic infections or bacteriological examination of fæces in both systemic and local intestinal infections. Many doctors do not yet realise that the causal organism in typhoid or paratyphoid may usually be isolated from the fæces within the first week of illness, or, per contra, that in bacterial food-poisoning the salmonella organism may persist in the bowel for days or weeks after the acute attack. Selective culture-media—Wilson and Blair's bismuth sulphite medium, desoxycholate-citrate agar, brilliant green and tetrathionate broth—enable the bacteriologist to isolate intestinal pathogens even when they are scantily present, and the slide-agglutination technique in conjunction with a wide range of diagnostic sera often allows a presumptive diagnosis to be made within 24 hours. But the inexperienced laboratory worker must beware of pitfalls. Slide-agglutination may give false positive reactions, particularly if the sera are used undiluted, and the suspected organism should therefore always be tested for its characteristic biochemical reactions. Or agglutination may not occur with colonies picked directly from the selective media—for example, *Bact. typhosum* may not be agglutinated by either H or O antiserum on first isolation because the H flagellar antigen is suppressed or undeveloped and the O antigen is masked by predominance of the Vi antigen. This is the obvious explanation for the inagglutinability of the strain recovered from the patient with typhoid septicæmia reported on another page by Goodall. A Vi antiserum, obtainable from the Oxford Standards Laboratory, is therefore essential for early identification of the typhoid bacillus. To confirm the diagnosis—for the typhoid Vi antigen is shared by a few other non-lactose-fermenters—the organism must be tested for its fermentation reactions and cultured on moist agar to develop the H flagellar antigen (Vi and H antigens are not mutually exclusive). Whether the prominence of the Vi antigen was responsible for the septicæmia without bowel lesions is more doubtful, for while this antigen is associated with invasiveness, it is demonstrable in most freshly isolated strains from typical typhoid fever, and even from carriers.

The final identification of the salmonella food-poisoning organisms, of which there are now over 140 types, is much more complex, and should be largely left to a central reference laboratory. This has the additional advantage of encouraging the collection of epidemiological data over a wide area. Thus, while the clinician is content to know that the patient with acute gastro-enteritis has been infected by *some* salmonella organism, the epidemiologist wants to know the source of the infection, and to be sure he must prove that the organism isolated from an article of food is identical with that recovered from the patient's fæces. The broad recognition of salmonella organisms, comparable with Lancefield grouping of the streptococci, is within the competence of most laboratories, and Bridges and Taylor[1] give sound advice about procedure and antisera. Salmonella typing, like Griffith streptococcal typing, is a specialised job, and it is good to know that its practical application, inaugurated in this country by Bruce White and Savage and Scott, is being continued at centres like the Salmonella Reference Laboratory, Oxford.

THE BATTLE AMPUTATION WOUND

THE amputation wound needs the same attention as the lacerating battle wound. This simple fact we are inclined to forget. In treatment of the battle wound, according to Colonel R. Zollinger, of Harvard, speaking at the British Orthopædic Association meeting on Dec. 15, the outstanding message from surgeons on the Western Front is that "the application of sound surgical principles is still of greater importance than chemotherapy." The battle wound needs a proper excision; into devitalised and mangled tissues penicillin and sulphonamides seep but slowly, and in the core of such tissue organisms will still proliferate and flourish. Efficient surgery plus antibacterial therapy has made possible the closing of such wounds by delayed suture on the fourth or fifth day—undoubtedly one of the most important advances in wound treatment of 1944. To close the skin is once and for all to seal the wound against secondary infection from without. This is now usually possible, for the importance of conserving skin during excision is recognised, and we must pay tribute to early workers who wrote and preached this. Such "delayed" skin closures have been successfully employed in a large number of compound fractures; the future will tell how many men have been spared the misery of repeated abscesses and multiple operations for recurring osteitis. One "compound fracture" has, however, been troublesome—the amputation stump. Sepsis, often severe, has come to be accepted as almost inevitable after the battle amputation. At the BOA discussion Colonel Stout, of the New Zealand Army, laid his finger on what seems to be the real cause of the trouble. We have been neglecting our first principles of surgery. Confronted with a mangled often avascular limb, we amputate it either just above the wound site or with suitable flaps, but usually overlook the need for the fullest and most careful excision, as in any compound fracture. If this is done, suture of the skin on the fourth or fifth day will usually be possible. These facts, Stout declared, were stressed to surgeons in the New Zealand Army

1. *Mon. Bull. Min. Hlth EPH Lab. Serv.* Oct. 1944, p. 177.

with consequent great improvement in results. Mr. St. Clair Strange of the Ministry of Pensions warned surgeons against the temptation to re-amputate early at the site of election, when the wound is still unhealed and infection, even though apparently mild, remains. "It is like doing a bone operation in the presence of sepsis." Every attempt must be made to get such a stump wound healed before re-amputation—sequestra and foreign bodies should be removed and the skin defect closed by cutting flaps or skin-grafting. Only when the wound has been well healed for at least six weeks—preferably longer—should deliberate definitive re-amputation be undertaken. In his experience it is untrue to say that the patient cannot be persuaded to wait. The surgeon must learn the same patience.

SOCIAL FACTORS IN PEPTIC ULCERATION

REFINEMENTS in clinical investigation, however useful in the individual case, have proved of limited value in unravelling the basic causes of peptic ulceration. The methods of vital statistics seem more likely to provide the answers, and they are being increasingly applied to the study of digestive disorders in different social classes under the various stresses of modern life. For their analysis in this issue Morris and Titmuss take as a basis the Registrar-General's mortality figures for 1901–41. They recognise the limitations imposed by such data and are cautious in the interpretation of their findings, particularly where they diverge from clinical experience. Perhaps the most striking divergence is in the suggestion, based on their relative importance as causes of death, that gastric ulcers are more common than duodenal. At first sight this seems completely at variance with the clinical observation of Illingworth and his colleagues [1] in Western Scotland, where duodenal perforation was far more common than gastric. A clear distinction must however be drawn between mortality and morbidity. The mortality may be gauged fairly accurately, within the limits of certification, from the R-G's returns. The incidence of perforation is a less satisfactory measure of the morbidity, since perforation is only one of the types of ulcer morbidity and only one of the causes of death from these disorders. It is, nevertheless, the most important cause of death, particularly if ulcer-cancers are excluded, as in the R-G's reports. Moreover, gastric perforation, particularly in women, has a much higher fatality than duodenal, and the gastric-duodenal ratio found at operation varies considerably in different parts of the country.[2] Mortality-rates for all types of peptic ulceration, and perforation-rates, must therefore give two different but not necessarily incompatible estimates of the total disability.

In men, Morris and Titmuss find that mortality from peptic ulcer rose steadily in the 20 years before the present war, particularly in people over 40. Women showed the reverse trend, except possibly those over 55. The difference between the sexes is most apparent in the rising death-rate from both gastric and duodenal ulcer in men over 45 and the reduction to negligible proportions of the rates in young women. When the mortality-rates are split up according to age and social class, a curious deviation appears in the incidence of gastric and duodenal ulcer. In those under 55, death from gastric ulcer grows more frequent as one passes down the social scale, whereas duodenal ulcer exhibits no such class differentiation. In those over 55, deaths due to both gastric and duodenal ulcer are more common in the wealthier classes. The ill effects of city life are brought out by the rise in ulcer mortality with increasing degrees of urbanisation from rural district to metropolitan London. During the years of depression and unemployment the mortality from peptic ulcer was low, but it rose again quickly as men returned to work. War and the blitz seem to have accelerated the rise in the death-rate, particularly from duodenal ulcer in men, and to have halted the downward trend in women—a finding which recalls the observation by Stewart and Winser [3] that there were more perforated ulcers in London during the period of intense bombing.

Morris and Titmuss suggest that the social class behaviour of ulcer mortalities indicates that gastric ulcer is a result of such "manifold and chronic irritants as are likely among the poor," while duodenal ulcer is a psychosomatic disorder appearing under stress in the individual endowed (or cursed) with the appropriate personality. There are objections to even this judicious blend of the emotional and nutritional views of causation. Among the chronic irritants of poverty, malnutrition would figure largely; yet the mortality from peptic ulcer was low during the depression when inadequate diet would be common. Further, the peptic ulceration found among impoverished peasants of Southern India is duodenal, not gastric.[4] Nutritional factors may well be important in India, but the results of dietetic surveys there can hardly be applied to Britain. Despite the geographical differences noted by Nicol,[2] the Scottish figures for the incidence of perforation are probably representative of an urban population. Illingworth and his co-workers have shown that ulcers most often perforate towards the end of the day or week, when people are tired, and in winter. In both London and Western Scotland there was a significant rise in the incidence of perforation during the autumn and winter of 1940–41, but in Scotland this rise anticipated rather than coincided with the bombing of Clydeside, which may mean that the rise is due rather to the heightened tension general at a critical stage of the war than specifically to air bombardment. Alongside this can be set the high ulcer mortality among social groups likely to be affected by the raised tempo of modern life—the unemployed returning to work, the single woman typist or secretary, the man or woman who works in London, and the older professional man. Such differential incidence-rates emphasise the importance of anxiety and fatigue, as opposed to nutritional factors, in precipitating death and perforation. This is not to deny that nutrition and constitution must also play a part as basal causes of peptic ulceration. The difficulty lies in determining the relative importance of the many likely factors. But, as Morris and Titmuss conclude, "with properly organised field studies there is no reason why exact observation should not replace much that is at present guesswork."

HOME HELP

THE Government have rightly decided that though the healthy must go on bearing their own domestic burdens there are some people who really cannot get along without an extra pair of hands in the house. The housewife who falls sick or must have an operation; the wife who is suddenly called away to see a sick husband in hospital, and has no-one to leave with the children; the old man or woman who is infirm, or who suddenly falls ill; the entire household stricken down with influenza—all these are proper candidates for special consideration. So the Ministry of Health, the Ministry of Labour, and the local authorities will henceforth endeavour to provide the help they need. There is of course nothing new in the idea; many authorities already supply home helps for women during their lying-in, and an extension of this service has often been advocated in our columns.[5] But the Government have now given local authorities fuller powers enabling them to provide home helps for all the types of case

1. Illingworth, C. F. W., Scott, L. D. W., Jamieson, R. A. *Brit. med. J.* 1944, ii, 617.
2. Nicol, B. M. *Ibid*, 1941, ii, 780.
3. Stewart, D. N., Winser, D. M. de R. *Lancet*, 1942, i, 259.
4. Dogra, J. R. *Ind. J. med. Res.* 1940, 28, 145 and 481.
5. See *Lancet*, 1943, i, 307.

already mentioned; a call for volunteers is to be issued on a national scale; and the Ministry of Labour will encourage suitable people to undertake the work. According to the labour correspondent of the *Times*, women will be allowed to leave even munition-making to take up full-time work as home helps. Many women, however, will probably prefer to give part-time assistance—e.g., by cleaning a house for an hour or two daily, or doing the shopping for an old person. The home helps are to receive not less than 1*s*. 2*d*. an hour, and the local authorities will recover all or part of the fee from the householder; but any expenses they incur will be paid by the Ministry of Health. This is a service which, well begun now, may remain as a benefit in time of peace.

The *Oxford University Gazette* announces that on Jan. 23 a decree will be promoted conferring the title of professor on Miss IDA MANN for as long as she remains Margaret Ogilvie's reader in ophthalmology. Miss Mann will be Oxford's first woman professor, and her appointment will be part of the university's plans to promote research into problems affecting vision. During the last 18 months the university has raised through private appeals some £100,000 of the £240,000 needed for this purpose.

Dr. C. FRASER BROCKINGTON, MOH and SMO for Warwickshire, has been appointed a member of the Minister of Education's central advisory council for England, which has been set up under the new Education Act.

Mr. I. W. BREBNER, professor of surgery in the University of Witwatersrand, has been admitted to the honorary fellowship of the Royal College of Surgeons of England.

Special Articles

SHARKS: VICIOUS AND VENOMOUS

H. MUIR EVANS, MD LOND., FRCS

IN recent years a wave of unscientific scepticism has flooded the press on the subject of man-eating sharks. This must astonish those who have travelled East, and seen natives who dive for coins exhibiting limbs mutilated, they say, by attacks from sharks. Any who want circumstantial evidence of the truth of these tales may care to examine a list, drawn up by Mr. Gilbert Whitley of the Australian Museum, recording attacks made by sharks in Australian waters.[1] The following are a few examples:

March 8, 1920: young man, Cleveland Bay.
Feb. 3, 1924: woman, at Bronte, NSW.
June, 1925: human arm found in shark, Princes Royal Harbour, WA.
1920: head of native found in shark's mouth, Thursday Island.

These extracts are taken at random from a list of some 80 cases. There are 40 records from New South Wales alone and about half the attacks seem to have been fatal.

The modes of attack may be classified as follows: (1) surfers taken on ocean beaches; (2) bathers taken in harbours or well up rivers; (3) bumping of boats often viciously attacked; (4) hands, legs and bodies of bathers bitten; (5) net-fishermen bitten when hauling in their catch. Mr. Whitley observes that the worst months of the year are from October to April, the time most favourable for bathing in that part of the world.

The presence of the Great White Shark or man-eater (genus *Carcharodon*) off the US coast was noted by Professor Jordan; the specimen he recorded was caught at Soquel, California, and had a sea-lion in its stomach. Mr. Coles, a noted authority, describes how he was fishing off North Carolina when his skiff was struck by a man-eater 20 feet in length. The shark swam away some distance and returned to the attack; he was about to shoot at it when the shark caught sight of a loggerhead turtle and went for it. The shark seized the turtle and both sank, but the next day the turtle was harpooned with the marks of the shark's teeth across its upper shell; its right flipper had been bitten, and only a fragment remained. The teeth of this shark are large, flat and triangular with a saw-like edge. It has a bluish-grey back, with a white belly, and is found in all warm seas. In being swift and fierce it resembles the Porbeagle; this and the Mako shark (genus *Lamna*) have pointed snouts overhanging a crescentic mouth armed with large slender teeth, smooth-edged and set in three or four rows. The common Porbeagle is found in the Mediterranean, North Atlantic and North Pacific. The blue pointer or Mako shark inhabits the seas of Australia and New Zealand and the Mediterranean, while the Mackerel shark (*L. oxyrhinchus*) is found in that sea and the adjacent parts of the Atlantic. Most species are savage and dangerous to man, but those found inshore around the British Isles are too small to do much harm.

The Blue sharks (genus *Carcharinus*) are to be found in all tropical and subtropical waters and have streamline bodies with obliterative shading of the body tints; they are constantly seen following ships, and so are familiar to travellers. The Blue shark has a third eyelid which it uses to protect itself from glare when hunting. Some species enter the Ganges, Tigris, and other large rivers. The Zambesi shark has been captured over a hundred miles from the river mouth. All these sharks are fierce and voracious; their appetites are insatiable and they eat anything, alive or dead. The Cub shark is a regular scavenger.

The Seven-gilled shark or Perlon is found in the Mediterranean, the Atlantic, round the North Island of New Zealand, and in the neighbourhood of Japan; it is a fish-feeder, but in South Australia it is also considered to be dangerous to man—though they think it harmless in New Zealand. In Japan it is known as "aburazane" on account of the oil yielded by its liver.

Australian sand sharks are usually small; two species are known: the grey Nurse and the blue Nurse; they are reputed to be very dangerous to bathers. Nurse is an old word sometimes spelt "nusse" and we find it used in the British term "Nurse Hound." When bread is thrown to a Nurse shark from a ship its head shoots out of the sea and it catches the food in its mouth. The idea that a shark must turn over to feed is a fallacy.

The Tiger shark is a slender active graceful-looking fish. Dr. Coles says it preys on other sharks, but it is well known to attack men as well and is much dreaded in the West Indies.

It is quite certain, then, that many sharks are dangerous to man in tropical and subtropical regions, though attacks are not common in temperate climates.

STINGING SHARKS

Sharks with venomous spines have recently been described.[2] Three families are known—the Spiny Dogfish or spurdog (*Squalidæ*), the Port Jackson shark (*Heterodontidæ*), and the Chimæras (*Chimæridæ*). The spiny dog-fish is a common cause of injuries to drift-fishermen, since the "dogs" attack the herring shoals and are hauled on board in the dark, before they are seen. The wounds are very painful and accompanied by much local inflammation which may detain the victim a week in hospital. The weapon that does the damage is the dorsal spine, of which there are two, the anterior being the larger. This spine lies in front of the fin, and is roughly triangular in section; with a groove lying against the anterior margin of the fin. This groove is occupied by a secreting gland, which appears as a glistening substance with a small slit-like orifice, from which the poison exudes. Sections of the gland show a number of acini with secreting cells directed towards the centre. The venom has been investigated by experiments on animals, which confirm the clinical findings.

Many species of the Port Jackson shark are found in the Pacific and along the coasts of Australia and New Zealand, and in the Mediterranean. The dorsal spine is the same in general character as that of the Spiny Dogfish, but the spines are stouter and the secretion is

1. An authoritative account of sharks for the ordinary reader will be found in Norman and Fraser's *Giant Fishes, Whales and Dolphins*, from which much of the information in this paper, including Mr. Whitley's list, has been drawn.

2. See Stingfish and Seafarer, by H. Muir Evans. London, 1943.

discharged laterally instead of in the central furrow. The *Chimæridæ* are represented in the Atlantic by *Chimæra monstrosa* but there are two other species. The anterior fin-spine of the Chimæra is movable and has a row of denticles on each side of the posterior aspect; when at rest these lie on the anterior margin of the fin in two grooves lined with the venom-producing epithelium. The poison is very virulent and the chimæras are dreaded by fishermen since the wounds are dangerous, sometimes even fatal.

THE LCC ON THE WHITE-PAPER

ON Dec. 19 the London County Council decided to send the Minister of Health its observations on the proposed National Health Service. These assume that the Council would be the "joint authority" for London, which would prepare the area plan, administer all the publicly provided hospitals, and make contracts with the voluntary hospitals for services within the plan.

The Council disapproves of the proposal for direct Exchequer payments to voluntary hospitals, and the suggestion that these payments could perhaps be pooled, because "such an arrangement might tend to encourage the collective organisation of the voluntary hospitals in a body separate from, and independent of, the municipal hospitals." If the Government nevertheless decide to pay voluntary hospitals directly, the payments to each hospital "should be related solely to the particular service rendered."

The Council also raises the question whether national insurance will confer on each individual the right to demand free treatment at any hospital or clinic which can admit him. What limits must be set to the free choice of consultant and of hospital? Many people living outside the county boundary, and their doctors, have more faith in the hospitals of London than in hospitals nearer home.

"Special contractual arrangements will therefore be needed for many years for out-county patients, as the joint authorities concerned will probably be unable for some time to come to provide accommodation for the 40% of out-county patients hitherto using the central voluntary hospitals in London—and it may be that some out-county authorities will always prefer to send certain of their patients to London. The question will therefore arise whether the out-county authorities should make direct arrangements with individual London voluntary hospitals or whether, as would appear preferable, the Council should do it on their behalf and charge them. The latter method would seem to follow the line indicated in the white-paper. This will apply particularly to cases requiring specialised treatment—e.g., to cancer cases needing radiotherapy. As mentioned later, a similar problem is involved in the venereal disease scheme. A small committee containing representatives of the Council and of the hospital authorities in the metropolitan area could usefully consider broad questions of policy relating to hospital problems in the 'catchment' area of the London voluntary hospitals. A lead as to the areas from which hospitals should draw their patients will no doubt be given in the report of the hospital surveyors. In the absence of collaboration, individual authorities might have an undue share of London beds."

On the subject of general practice, the Council says that "apart from the need for a new trend in undergraduate medical education, what has held back the development of a 'health' service and provided instead a service for sickness is that most doctors have had too many patients. The work of getting them better has left insufficient time to go into why they were ill and what they should do to prevent a recurrence of the illness." If the health centre idea is to be a success, the premises must be really suitable and not makeshift.

"If the dual system under which general practitioners will be engaged partly in group practice and partly in private practice is to be permitted, steps should be taken to ensure that patients using the public service are not at a disadvantage compared with private patients."

The Council wants to see one fully integrated health service for the county, planned and controlled by itself, but it favours delegation to the metropolitan boroughs of (*a*) the maternity and child welfare work (non-institutional) which they now undertake, (*b*) the administration of tuberculosis dispensaries, and (*c*) epidemiological inquiries, "subject to a closer link with the Council's laboratory services and its fever hospitals."

Early revision of the laws relating to lunacy and mental deficiency is recommended so that detailed proposals may be made for including mental health services in the comprehensive scheme.

The figures given in an appendix to the white-paper are thought to understate the probable cost of a comprehensive service. The Council holds that local authorities administering health services should receive a share of the money derived from national insurance contributions, and that after allowing for this share, not less than half their net expenditure on these services should come from the Exchequer. Special financial assistance needed by any local authority with low resources should be the subject of a separate financing grant which should not be related to individual services.

"Unit grants of fixed annual amount per bed are inappropriate for a continuously expanding hospital service. The grant from the Government should be a uniform percentage of the whole expenditure by local authorities on all branches of the new health service, including 'standard payments' to voluntary hospitals and administrative costs, to ensure, inter alia, that the cost of the expanding service may be reasonably shared by central and local funds at every stage of the growing burden."

The Council, while remarking that "the original conception of large authorities for all medical purposes would have been much easier to administer," welcomes the proposals as a considerable advance towards the establishment of a full health service for the people, which can, over a period of years, be built up, improved and developed. It hopes that the scheme will be ready before demobilisation takes place. "The returning men and women from the Forces would then feel that something had been done to provide a better England. The returning doctor who had been called up before he had settled in practice could be offered a post in the new service and would not be called upon to find capital to purchase a practice." There is, however, a grave shortage of administrative staff capable of tackling a problem of this magnitude, and "it might be advisable, therefore, to operate the scheme in stages."

Meanwhile the Council asks that it should be included as a party to any negotiations between the Minister of Health and the voluntary hospitals and the medical profession on matters likely to throw financial obligations on it.

BARCLAY'S GEESE

WE have been asked to recall "Barclay's witticism about the geese," mentioned in our columns last week (*Lancet*, Dec. 23, p. 828).

Dr. John Barclay, famous for his lectures on anatomy, delivered at Edinburgh at the beginning of the nineteenth century, spoke to his class as follows:

"Gentlemen, while carrying on your work in the dissecting-room, beware of making anatomical discoveries; and above all beware of rushing with them into print. Our precursors have left us little to discover. You may, perhaps, fall in with a supernumerary muscle or tendon, a slight deviation or extra branchlet of an artery, or, perhaps, a minute stray twig of a nerve—that will be all. But beware! Publish the fact, and ten chances to one you will have it shown that you have been forestalled long ago. Anatomy may be likened to a harvest-field. First come the reapers, who, entering upon the untrodden ground, cut down great store of corn from all sides of them. These are the early anatomists of modern Europe, such as Vesalius, Fallopius, Malpighi, and Harvey. Then come the gleaners, who gather up ears enough from the bare ridges to make a few loaves of bread. Such were the anatomists of last century—Valsalva, Cotunnius, Haller, Winslow, Vicq d'Azyr, Camper, Hunter, and the two Monros. Last of all come the geese, who still contrive to pick up a few grains scattered here and there among the stubble, and waddle home in the evening, poor things, cackling with joy because of their success. Gentlemen, we are the geese."

Colonel J. W. VANREENEN, OBE, FRCSE, IMS, has been appointed honorary physician to the King in succession to Colonel R. V. Martin.

In England Now

A Running Commentary by Peripatetic Correspondents

WHILE in Bagdad I accepted the invitation of the professor of therapeutics (Trinity and St. Thomas's) to attend a teaching round at the Royal Hospital of Iraq. Some veterans of the last Mesopotamian campaign will no doubt remember this as the Turkish Hospital, although much excellent extension has taken place since then, especially in the medical school. The wards, which are large, are arranged round a courtyard and are similar to those of a European hospital except for the big revolving fans hanging from the ceiling, and the colour of the exotic and variegated head-dresses of the patients. They seldom sit up in their beds, but squat on them, or if allowed to do so they prefer to sit cross-legged on the floor beside them. The nurses are all trained in the new college which is attached, and are mostly Jewish, Assyrian, or Armenian by birth, owing to the reluctance of the Mahommedans to allow their own womenfolk to appear in any public capacity. They all seemed to be very young, and some were rather beautiful. We found the students assembled in the corridor, and after much hand-shaking—a ritual to which much importance is attached in most countries outside Britain—they followed us into the ward. Each case was demonstrated by the clinical clerk in charge, and his findings were carefully checked and commented upon by the professor. All teaching is in English and the clinical standard of the work seemed to be high. The Arab is however congenitally lazy and I was told that only in a very few cases was this standard maintained outside the walls of the hospitals. Physical signs tended to be florid, and late syphilis, nephritis, malaria, and cardiovascular disorders seemed to be common, while rheumatism is not rare, living as they do in mud houses in a country which possesses a very definite rainy season but no domestic fuel. In the surgical wards gunshot wounds appeared to top the list owing to the tribal habit of settling their quarrels, even the more domestic ones, by direct action!

One of the more enterprising of the British universities or schools of tropical medicine should arrange for the reciprocal exchange of postgraduate students at intervals. It would pay both parties.

* * *

I can add a few footnotes to your annotation of Dec. 23 on rations for one. The person living alone enjoys none of the advantages of give and take of food in a family, if we ignore the ones who score by having a number of meals out. And even for them the tea practically never lasts the week. A large number of people, however, either from choice or poverty, have all their meals at home, and here the rations must make do; this is the real test of rationing. Yet the inequality of human beings makes itself felt; the healthy who can eat anything, and the intelligent who can plan, fare better than the delicate and feckless, irrespective of income. Fortunately most of them are rather proud of the way they manage. For instance, a doctor's widow says emphatically that she finds the rations ample. She has a large garden and plenty of vegetables and fruit and she keeps hens; moreover, she is an excellent cook. She lives largely on vegetables. She prides herself on never having stood in a queue since the war began, and for this reason she never has fish. Points are useful for golden syrup to spare sugar for jam, and for tins of meat in case of an unexpected visitor. She gives delightful parties. At the other end of the scale is Mrs. X, a peppery old woman with a round rosy face giving the impression at first sight that she is the soul of jollity and good humour. She is, if you get on her right side, but only if. She used to take in washing, but as she quarrelled with all her customers and the supply of new ones gave out she changed to a little daily cleaning. Not much, I think. She owns a magnificent Pekingese, whose well-brushed coat is in marked contrast to his mistress's toilet; and when she and the peke return from their shopping and are met at the end of the road by a large Persian tabby, and all return home together, they make a pleasant picture. I have won favour, incidentally, by admiring the procession. The peke, "being a delicate little creature" as she says, gets most of Mrs. X's meat ration, while she eats the gravy. She says sadly that she misses meat more than anything. What the cat lives on I can't imagine. Mrs. X keeps rabbits: she eats some herself and the neighbours buy some, and a large part of her time is spent in collecting grass. She has a small garden and grows enough vegetables for her own use. She has a total income of £1 a week, out of which she pays off a mortgage on her three-roomed bungalow, buys coal, pays rates and feeds herself and her pets. She hopes to retire in a year or two to an excellent Salvation Army home in the village. And here is the incongruity found in so many lives when one peeps below the surface—she has a highly educated daughter, who teaches, lectures and writes. "We don't live together," said Mrs. X, "because you see, I am a Salvationist and so are my friends. They're what you might call common, while hers are, well, superior, and she didn't feel comfortable with mine nor I with hers. So we didn't fall out, but I agreed to her taking a flat in B——. It was a wrench, but she's a good daughter, and she writes or comes to see me every week." She sighed. I read today in the local paper that Miss X had given a most interesting lecture on the modern novel.

The Ministry of Food has made a laudable attempt to provide recipes for one person, but it is difficult to see what sort of a person they are planned for. Individualists such as I have described above, and taken at random, one well-to-do and one poor, would have none of these recipes. Take the salads; some women will, of course, eat lettuce like their own rabbits, but few, especially away from the admiring eye of the world, will eat raw cabbage and grated carrot; in fact, in my experience, few can digest it. Vitamins are so necessary, a dietitian should remember, that it is important that they should be absorbed. Fats are better taken any other way than as fried food, and frying, which is wasteful too, might be kept for an occasional treat, for variety, since it is tasty. As for the minces recommended—if the mincing machine goes out of order it cannot be repaired, new machines are unobtainable, and the housewife hesitates to buy meat ready minced, since she likes to know what she is getting. It would be instructive for the Ministry of Food expert to attend a few private tea-parties (himself disguised as a housewife) anywhere in the country. It would be equivalent to a woman overhearing a meeting of Freemasons. But our expert would acquire enough well-tried recipes to fill several leaflets, or to make him wonder whether it is really necessary to issue any leaflets at all.

* * *

The people of the village do not appreciate the behaviour of the old campaigner when the children point toy guns at him. The women, especially, seem to think he is interfering with their prerogatives when he goes up to their child, places a hand on his shoulder and says, very quietly and slow: "Sonny, never point a toy gun at any human being, and then when you grow up and have a real gun in your hands you will not point that at anyone even if you think it is not loaded. Because if it were loaded, and it went off, you might kill that man at whom you had pointed it. There are so many other things at which you can point it—the chimney pots, and the birds in the sky, and those little white bits of china on the telegraph posts. I've often wished I could hit one of those with a gun." This upsets the village policeman. He seems to think that, if pointing toy guns at human beings may lead to death in the dim future, an admission on the part of an elderly gentleman that he would in the dim past have liked to break china knobs on telephone posts may lead to an epidemic of breakages of these articles in the present. Perhaps it will, but the old campaigner claims that he is more likely to cure the child of his urge to point toy guns at human beings if he admits to having done so at bits of china when himself was a boy. On the last occasion when this little comedy was acted the boy ran back smiling to his mother who stood scowling at her cottage window, while the family next door, who were all busy in their garden, stopped and stood and stared as though the old campaigner were quite mad.

Perhaps he is; but then when he got to France in 1916 the first casualty he had to care for was a sergeant of infantry shot through the head by his best pal.

Parliament

ON THE FLOOR OF THE HOUSE

MEDICUS MP

AT long last supplies are being sent to the Channel Islands—medicines, food, and soap, on the basis of parcels supplied to prisoners of war. Members have long had a sense of frustration in this matter. These citizens of our country who are still under the German yoke, although so near to our own shores, have been and are a cause of serious heartburning. It will be well when we can know to what extent they have suffered, and are able to send full relief. Another relief activity the House has been called on to perform is the repair of the ravages of a very severe hurricane in the Island of Jamaica: 80% of the banana plantations and 1½ million coconut trees were destroyed, and much damage was done to ordinary farming, to citrus fruit orchards, and to fishermen's gear. Important assistance is being given by grant and issue of interest-free loans. On all sides in the House it was agreed that we are in this case shouldering our colonial responsibilities.

On the main problem of the work of relief and rehabilitation in Europe there has been a growing feeling of concern. This has been expressed by Lord Huntingdon in the House of Lords, who asked that "the veil of secrecy" should be drawn aside. From unofficial reports we know that malnutrition is a very big problem in Western Europe, particularly as regards children. But information is patchy. Lord Huntingdon drew attention especially to conditions in Greece and Italy. UNRRA was rightly described as the first great attempt to establish a world-wide international scheme of coöperation, and it is vital that this first attempt should succeed. But the very size of the machine seems to make it slow in getting down to the actual relief work, and members of the House are being approached by emissaries of various countries in Europe with the complaint that they cannot get the help they need.

The change from war to peace—or armistice conditions—is not easy. Military, political, geographical, and transport difficulties stand in the way. But the thoroughly British idea—now put forward by some impatient people—that relief and rehabilitation should be handed over to the British Government is not the method of international coöperation, and won't do. UNRRA is an autonomous international organisation whose funds are derived from the contributions of members of the United Nations, and to them it is responsible. Members of the House feel it is of the first importance to keep this international coöperation to the forefront in all our commitments. UNRRA should be a pattern of things to come.

So the House adjourned for Christmas with perhaps a heavy heart, viewing the vast problems of a world emerging from the wrecking activities of war, and needing, everywhere, alterations, rebuilding, and rehabilitation. We hope that when we reassemble some progress will have been made in the immediate relief activities of UNRRA in western Europe and the Balkans.

FROM THE PRESS GALLERY

The Job and the Tools

IN the House of Lords on Dec. 14 the Earl of HUNTINGDON called the attention of the Government to the proceedings of the UNRRA conference at Montreal and to the urgency of relief. The war, he said, must still be our first priority, but other problems were beginning to loom in Europe and might soon assume titanic proportions. Medical statistics were needed and full investigations into the condition of the peoples of Europe. This could be done both through SHAEF and through UNRRA. Unofficial reports showed that in Western Europe malnutrition and undernourishment affected the whole population, particularly the children. Among the working classes, who could not afford black market prices, tuberculosis, rickets, and infant mortality were said to be on a tremendous and increasing scale. It was said that in Belgium at least 40% of the infantile population was now much under weight. Malnutrition in a hard winter might be fatal if supplies of food could not be made available. In Greece the problem was not only to bring relief, food, clothing, and medical supplies: it was even more important to rehabilitate her industry and her economy. Yet he understood that UNRRA could bring food and medical supplies but nothing like machinery. Another concern of UNRRA was the repatriation of refugees and displaced people. At the Montreal conference it was stated that in Rome there were over 300,000 persons who did not normally belong there, that the infant-mortality rate was 50%, and adult mortality 10%. Crowds of homeless and starving refugees were wandering about liberated territory. What was UNRRA, he asked, doing for these people? It was no use sending thousands of refugees back to the countries from which they came if those countries could not provide for them. Lord Huntingdon did not want to criticise UNRRA or its officials, but there was a feeling that UNRRA had not had the support it should have received from the member nations, and that it had been working under a terrible handicap. In a resolution passed at the Montreal conference the delegates confessed that it was impossible for them to cope with their gigantic tasks with their present powers, and there was confusion in the public mind how far UNRRA could deal with its own problems. He therefore asked for information about its powers and resources. Lord Huntingdon was also disturbed at the apparent reluctance of some countries to ask for UNRRA's help. Yet UNRRA was probably the first great attempt to establish a world-wide international scheme of coöperation on which our future hopes of peace depended. It was of vital importance that this attempt should succeed, and this country, as one of the greatest and most powerful member nations, should set the first example of wholehearted support.

The Marquess of READING said there was a suspicion that in the huge UNRRA organisation there had been created a colossus so vast that it had been from the outset muscle-bound and paralysed by its own weight. And there was a further suspicion that those who were responsible for its creation had not hitherto made very vehement efforts to stimulate it into activity. It was the common opinion that UNRRA as a matter of settled policy was not prepared to send into a country even the most urgently required stores unless at the same time it could send in its own agents to supervise their distribution. And a further clogging provision was the rule that six months must expire after the end of military occupation before UNRRA was able to function in a country. If these were the obstacles they must be broken down. It was indeed a poor augury for the regeneration of the world if national prestige on the one hand and international rigidity on the other were to be allowed to defeat these first concerted steps in applying first-aid to Europe's wounds. It would be tragic if UNRRA were to be found to lag behind the need and to earn in the minds of the public, however unjustly, the title of "UNRRA, the Unready." The Bishop of CHICHESTER said that in the liberation of Europe, freedom, order, and food must be linked together as closely as possible. The military administration and the relief administration must work on the common task with the smallest possible interval between them.

Lord RENNELL asked if UNRRA was a principal in transactions for the supply of foodstuffs, medicines, and so forth, or was only an agent acting on behalf of the governments associated with it? Until that point was cleared up it was difficult to say what that organisation should have done or had not done. Lord STRABOLGI suggested that there had been too much bally-hoo about UNRRA. People had been led to believe that as soon as the Germans had been driven back food, clothing, and medicines and other necessary things would be immediately available. Of course that could not be. It would be poetic justice if the machinery built up to blockade Germany and German-occupied territory now were used in reverse, and Lord Selbourne put at its head as the minister for the relief of Europe.

The Earl of SELBORNE, Minister of Economic Warfare, thanked Lord Strabolgi for the compliment he had paid him in suggesting that this difficult and important task should be handed over to him and his staff. He thought, however, that this work was already in competent hands. It was not in any sense wrong that UNRRA should function only when invited to do so by the government concerned. It was an autonomous

rnational body and the policy having been decided the council on which all the member governments, e represented the executive authority lay in the ctor-general. It might be found desirable on asions to consult a conference of the governments, the last word rested with UNRRA within its terms of rence and within the means at its disposal. He ongly subscribed to what had been said about the vity of the problem, and since June the ravages of r had immensely complicated and magnified the uation. He denied that the Government had raised e hopes. On the contrary, Ministers, and certainly e Prime Minister, had warned the public that rehabilitan in Europe after the war would be difficult and the st amount of distress could not be remedied quickly. hen the allied armies liberated a country they imediately brought food to the people. At present ey were bringing food to the peoples of Holland and elgium. They had done the same in Italy, and if in y part of France it was necessary they would do it ere also. The idea that there was a gap of six months as entirely mistaken. UNRRA could follow the Army stantaneously, if it was invited to do so by the military thorities and by the government of the country. hat was exactly what had happened in Greece and taly. Neither Belgium nor France had invited UNRRA o function because, he thought, the governments of hose countries felt that they could handle the problem hemselves. The real bottle-neck was transport; xcept for milk there were comparatively few world hortages of food. In Greece, in spite of the recent amentable occurrences, the work had gone on, sometimes under a hail of bullets. The Government attached he greatest importance to the work of UNRRA, not only because they felt that it was the proper instrument to bring relief and rehabilitation to many nations that were not so well organised as France and Belgium, but also because it was the first great practical experiment in international coöperation. Its success or failure might do a great deal to make or mar the future, and any help that the Government could give UNRRA they would give.

Election of the GMC

In the House of Commons on Dec. 14 Sir HAROLD WEBBE moved

> "That an humble Address be presented to His Majesty, praying that the General Medical Council (Temporary Provisions) Order, 1944, a copy of which was presented on 5th December, be annulled."

He said that he was told that the register of practitioners who were the constituents of the GMC might well contain as many as 44,000 names. But he contended that an election in war-time was not impossible; it was certainly not much more difficult than holding an ordinary by-election. It might be argued that in this case the Council could not get a proper election because so many of the electors were now serving in the Forces, but he hoped that the Government would not bring forward that argument because the House of Commons had already decided that the absence of doctors on military service was no valid reason for postponing legislation which affected the whole medical service, and the future of every medical practitioner.

Mr. C. ATTLEE, Lord President of the Council, agreed that wherever it was feasible the right of elections should be restored. But these postponements of elections were not imposed by the Government; the request came from the bodies themselves. Of course it was necessary to watch to see that bodies did not perpetuate themselves unnecessarily, and these orders were not granted as a matter of course but were examined carefully. The General Medical Council consisted of 39 members, of whom 32 were nominated with the advice of the Privy Council or chosen by colleges or universities, which might be held to be mainly indirect representatives of the medical profession. Seven were elected by medical practitioners. The latest available figures showed that the electorate numbered somewhere about 65,000. The strain on the medical profession at present was immense and the strain on the GMC had been heavy. It was not known where a large proportion of the electors were at this moment. Many were overseas, others had been moved about the country. Even in normal times a single GMC election cost about £500, and sometimes there had to be two or three a year. The staff of the council had been greatly reduced. It would be difficult and take a long time for an election to be held if the papers were to reach all members of the medical profession. On its merits he thought this order should go forward.

Dr. RUSSELL THOMAS asked the House to take particular note that Mr. Attlee, on behalf of the Government, had made it clear that the medical profession could not be expected to come to any decision on any matter at the present time. Sir H. WEBBE, while disappointed that Mr. Attlee was so alarmed at the difficulties, withdrew the motion.

Disabled Men and Street Begging

On the motion for the adjournment in the House of Commons on Dec. 14 Major H. G. STUDHOLME drew attention to street begging which he said was not only undesirable but unnecessary. For those in need there were ample means of assistance through voluntary societies or the State. Mr. G. STRAUSS said that when Americans, who did not know our ways, our administrative machinery, and our social services, saw people begging in the street, they thought this must be a dreadful country to let its ex-Servicemen live in such poverty. Personally he thought that the pensions given to men who were wholly or partially disabled were too low; but that was no excuse for this type of action on the part of alleged ex-Servicemen. He believed that the vast majority of these street mendicants were bogus. Mr. R. C. MORRISON knew of men being discharged from the Army with physical disabilities who came under the classification of epileptics. They had no claim to pension having been epileptics before entering the Army. When it was discovered they were discharged. He did not know any class for whom it was so difficult to do anything. He agreed that begging was undesirable, and asked the Minister of Pensions to consider whether he had gone as far as he could in regard to these unfortunate people. Mr. EDMUND HARVEY proposed that a small interdepartmental committee of the Home Office, the Ministry of Pensions, and possibly the Ministry of Health, should investigate the problem.

Dr. H. B. MORGAN said the Minister of Pensions knew that he disagreed to a great extent with the medical aspects of his pension policy. Some of the remarks in the debate about these beggars were unfair. These people had to provide for themselves somehow or other. An epileptic man was not normal. He had the epileptic side and the intermediate side between the attacks of epilepsy, which was abnormal. He had a disability and could not get a pension. Such a man must necessarily be given something, even if it was public assistance. But people had a hatred of submitting themselves to official cross-examination. He urged the Minister to consider with his professional advisers these cases with a pre-war history of disability caused by epilepsy or nervous disease to see whether he could not put them in a separate category with a view to admitting that their disability had been considerably aggravated by service.

Sir WALTER WOMERSLEY, Minister of Pensions, said that the debate had assumed a different aspect from what he had expected. Had he thought that it would travel over such a wide field he would have requested a Home Office representative to be present. But he would convey to the Home Secretary the sentiments that had been expressed and also the suggestion for an inquiry, which he agreed was desirable. What happened during and after the last war, and in the early days of this war, was entirely different from what was happening today. It had now been decided that aggravation should not have to be "material" and where it was attributable it should not be "directly" attributable. Today there were few tuberculosis cases who were not receiving pensions for aggravation. He did not say that it was a general rule to grant a pension for cancer, because it was difficult to show that there had been any cause and effect by service, but a pension had been granted where a man serving abroad had not been able to get the right medical attention. The Ministry considered epileptic cases favourably if a man's condition had been aggravated by a recent accident

while serving in the Forces. Even where diseases had been scheduled as non-attributable to service the Ministry examined the whole history of the patient. They were trying to carry out not only the letter of the law but also its spirit. It was no part of the Government's policy, Sir Walter continued, to allow a situation in which a disabled ex-Service man had to play upon the feelings of the public in the streets. Whatever might be said about the bad old days, the present arrangements for pension and resettlement were such that every man with a war disability could either be restored to a state in which he could earn normal wages or be otherwise cared for. The Government's scheme of rehabilitation was designed to cover the whole period from the injury until the disabled man was restored to useful life. Some 80,000 discharged men had been dealt with by the Ministry, and fewer than 3000 had shown any difficulty. The scheme was working successfully, and he wanted it to be even more successful, but they must have coöperation from the men themselves.

QUESTION TIME

Priority Supples of Milk

Mr. A. J. BARNES asked the Minister of Food whether, having regard to the necessity of ensuring adequate nutrition, the Government proposed to continue priority supplies of milk to expectant mothers and children after the war; and, if so, what steps was it proposed to take to allocate supplies to dairymen and to be assured that dairymen delivered the priority milk as authorised.—Colonel J. LLEWELLIN replied: No change is contemplated in the present priority arrangements so long as consumption of milk by the general public has to be restricted. It is as yet too early to say what changes, if any, may later be made in regard to milk distribution.—Mr. BARNES: Will the Minister give an assurance that this matter will be reviewed at the earliest opportunity?—Colonel LLEWELLIN: Before we can get over this difficult milk-supply question I need some 3½ million gallons of additional liquid milk per annum. I do not say that we shall not make some alteration in distribution arrangements before we reach that figure, but it will be quite a considerable time.

Viscountess ASTOR: Is it not true that milk-supply to soldiers in hospitals is already being cut down and that tuberculous cases cannot get enough milk? Does not the Minister think it is about time that he seriously considered putting more grain into cows and less into beer?—Colonel LLEWELLIN: Cows are the first priority for any feeding-stuffs, and the full amount of feeding-stuffs are provided, so that we can get the maximum amount of liquid milk in this country. I have no information whatever that there is a shortage of milk in hospitals. In fact, the latest returns show that hospitals are getting more than they have ever had before.

INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED DEC. 9

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 2005; whooping-cough, 1465; diphtheria, 613; paratyphoid, 0; typhoid, 2; measles (excluding rubella), 8906; pneumonia (primary or influenzal), 715; puerperal pyrexia, 138; cerebrospinal fever, 44; poliomyelitis, 5; polio-encephalitis, 0; encephalitis lethargica, 4; dysentery, 254; ophthalmia neonatorum, 61. No case of cholera, plague, or typhus fever was notified during the week.

The number of service and civilian sick in the Infectious Hospitals of the London County Council on Dec. 6 was 854. During the previous week the following cases were admitted: scarlet fever, 56; diphtheria, 24; measles, 34; whooping-cough, 13.

Deaths.—In 126 great towns there were no deaths from enteric fever, 13 (0) from measles, 2 (0) from scarlet fever, 14 (0) from whooping-cough, 10 (0) from diphtheria, 35 (4) from diarrhœa and enteritis under two years, and 20 (1) from influenza. The figures in parentheses are those for London itself.

Liverpool reported 4 deaths from measles.

The number of stillbirths notified during the week was 197 (corresponding to a rate of 28 per thousand total births), including 19 in London.

Letters to the Editor

NICOTINIC ACID IN ANGINA PECTORIS

SIR,—In the last few years there has been a well-marked increase in cardiovascular disease among the age-groups usually affected—i.e., males of 45 and over. The probable reasons are many, among which late reactions of the last war, and the physical and emotional stresses of this war, rank as primary causes.

The relief of angina with nicotinic acid given by intravenous drip was described by Neuwahl (*Lancet*, 1942, ii, 419) but this is only possible in hospital. The following modification has given successful results in a series of 15 cases with one failure where there was a strongly positive Wassermann. Both private and hospital patients are included. Improvement was most rapid when the retinal arteries showed the least arteriosclerotic changes.

Neuwahl pointed out that administration by mouth in whatever dosage seems to produce little or no effect, but as Moncrieff noted (*Ibid*, 1942, i, 633) the earliest symptoms may in some cases be controlled by oral medication, 50 mg. being taken twice a day immediately after a meal to reduce the liability to produce flushing. Thus a middle-aged man with persistent substernal discomfort, not necessarily associated with effort, may obtain immediate relief and the condition will not progress towards true angina.

Treatment in the earlier cases was started in July, 1943, and all have been moderately severe. Few reactions have been observed except blanching of the face and a temporary slowing of the pulse. Most patients have felt generally improved, but there is one very real danger, for if anginal attacks do occur they are likely to be severe, although the effect of nitroglycerin seems to be more rapid and prolonged after nicotinic acid treatment. The attack is usually precipitated as a result of over-confidence, when the patient in spite of warning persists in continued effort, as in one moderately severe case when after digging in heavy soil a farmer had a sharp attack.

Six daily doses of intravenous nicotinic acid amide are given in 2–5 ml. of sterile water, starting with one dose of 25 mg., the remaining five being 50 mg. each. These can be obtained in ampoules ready for use. For the next 2 weeks six doses are given on alternate days, and subsequently at gradually increasing intervals until a maintenance dose is reached at 4–8 week intervals, which is usually sufficient to keep the symptoms in check.

This treatment may be carried out in the consulting-room or at outpatients. The injections are administered slowly, using either the sitting or lying position, and the patient is kept quiet for a few minutes afterwards. No other medication of any sort has been given except that patients are advised to keep nitroglycerin at hand and are instructed to increase steady walking exercise up to a point where symptoms show signs of returning. This gives an indication of the rate of improvement.

Four cases of coronary thrombosis have also been treated but it is too early to assess results, although they appear encouraging. In this condition as well as in angina I am of the opinion that the body has lost its capacity to absorb the necessary quantity of vitamin taken by mouth. This is most marked in alcoholics and even moderate indulgence appears in some patients to have the same effect.

Worcester. H. C. ROOK.

MECHANICAL RESPIRATORS

SIR,—In your issue of Nov. 25, Dr. Mushin and Dr. Faux have recorded a lowered incidence of chest complications in 24 patients treated postoperatively in a Both respirator, compared with a similar series not so treated; they claim that the disinclination to breathe deeply in patients with a painful abdominal wound was counteracted and that full respiratory movements were secured. To substantiate such a claim, details of the respiratory tidal exchange are necessary, since it is difficult to understand why a conscious patient should relax his protective muscular guarding when subjected to such treatment. It would also be of interest to know if the rhythm of the machine was followed by the patients while asleep and awake, as it is my experience

that patients with full respiratory muscle control and not suffering from oxygen insufficiency do not readily synchronise with the machine; they may even synchronise with the mechanism in the wrong phase of respiration, so that when the action of the machine is expiration they may be inspiring.

With regard to Mr. Marshall's article, *Pulsator Treatment of Crush Injury*, in your issue of Oct. 28, it should be pointed out that the Both respirator in which he treated his cases is designed only to give a negative pressure. It is difficult, therefore, to see how he could get a "pulsator" action, or how this form of treatment could have improved the local circulation, since the pressure exerted by the sponge rubber seal around the proximal end of the limb must have been greater than, or equal to, the maximum pressure in the cabinet.

Southern Hospital, Dartford, Kent. R. G. HENDERSON.

EXUDATIVE TONSILLITIS

SIR,—An observation in your annotation of Dec. 2 calls for comment. You say, "... and faucial diphtheria, particularly in the adult or immunised child, often appears as a follicular tonsillitis or pharyngitis." On what facts is this observation based? Why should the diphtheritic faucial lesion in an immunised child or adult assume a pathology entirely at variance with the generally recognised features of the disease?

Diphtheria is characterised by the formation of a membrane firmly adherent by a fibrin network to the superficial layers of the mucosa, and this I take to be the essential lesion of diphtheria, wherever it may occur. One sees nowadays a number of immunised children admitted to the isolation hospital on a positive swab and with a faucial lesion superficially resembling diphtheria. It is my practice to examine these cases very carefully, using a headlamp, and by means of a probe to explore the material on the fauces. Where, as frequently happens, this can be wiped off, leaving red oozing follicles, I am accustomed to treat as follicular tonsillitis and to withhold serum. I have as yet had no cause to vary this procedure.

Surely, in these days, when we are endeavouring to achieve as high an immunisation rate as possible among the susceptible age-groups, we should try to evaluate our clinical findings on a sound pathological basis in order that the results of immunisation may be truly assessed. What then is the basis for the statement that in immunised individuals diphtheria often manifests itself as a follicular tonsillitis? Unless incontrovertible evidence exists to support this claim, I would suggest that a follicular tonsillitis occurring in a child who has been immunised against diphtheria should be treated as such, and not as diphtheria.

Health Department, Burton-upon-Trent. W. ALCOCK.

BACTERIOPHAGE IN BACILLARY DYSENTERY

SIR,—Colonel J. S. K. Boyd (Oct. 7) has written two paragraphs around the adjective "ineffective" used in my letter of August 5. It is clear that he has misunderstood my use of the word. I might have qualified it by some such adverbial expression as "more or less" or "at times." If I did not do so, it was because I knew the disfavour with which you look upon any word-redundancy in letters for publication. It appeared to me perfectly obvious that the word was being used comparatively, and therefore relatively. Degrees of ineffectiveness can surely be conceived and understood, even if not stated, as much as degrees of effectiveness, when referring to any particular therapy. It was in such sense that I used the word—not in the absolute and literal sense in which Colonel Boyd has seized upon it. His interpretation is the less excusable in that, as I pointed out, analysis of his figures showed the German phage used to be "*not altogether* ineffective" (italics are mine).

Colonel Boyd expresses surprise at my tentative classification for practical purposes of "*B. asiaticus*, *Proteus vulgaris*, various 'paracolons,' *P. morgani* 1, *B. dysent.* Newcastle . . ." in the salmonella group. Nevertheless, biochemically they belong there, just as much as *B. typhosus* is biochemically a dysentery-group organism, *V. choleræ* a metadysentery-group organism, and *B. cloacæ* a coliform-group organism.

I am pleased to be reminded by Colonel Boyd, however contentiously, of the Army's purchase of "quantities" of phage on my recommendation. That to me is an almost forgotten incident, wherein I tried, unsuccessfully I fear, to put the RAMC on a sound path in pre-sulphaguanidine days. I am much tempted to follow up this trail; and would do so, but that I consider it "not worthy of a man's hearing, nay, not to be heard without heavy fault"—certainly not mine. So I desist.

The "outstanding results" based on an "insecure foundation," which, in his last two sentences, Colonel Boyd attributes to the writer "before adding 'salmonella coliform' bacteriophage to his armamentarium," have been shown elsewhere to be actually of the *same* order as those obtained with sulphaguanidine by himself with Fairley (*Brit. med. J.* 1943, ii, 178). That, then, is the measure of security of the "foundation" on which my results rest: a little better, certainly no worse, than his own. The addition of co-dysentery elements to classical dysentery elements, in the phage therapy of dysentery, has simply for effect to make the foundation more secure—in the sense of achieving success more rapidly and more often.

I note that in his reply (Oct. 21) to Lieut.-Colonel J. G. Scadding, Colonel Boyd regrets not to have known in the early days of the war of the beneficent action of sulphonamides other than sulphaguanidine in bacillary dysentery. It is likewise a profound regret to me that the great occasion provided by the war out here has not been utilised by our Service authorities to establish once and for all the merits of good phage preparations. It is possible that Colonel Boyd, and others, may yet have cause to regret the sulphonamide sensitisation which may have occurred from the dosing of so many bacillary dysentery and enteritis cases with sulphonamides, when the same end could have been equally well achieved with phage—non-toxic and harmless. Phage therapy can be repeated with impunity throughout life.

Alexandria. ARTHUR COMPTON.

DIRECT LARYNGOSCOPY AND TRACHEAL INTUBATION

SIR,—I was very glad to read in your issue of Nov. 18 the excellent paper by Major Bannister and Mr. Macbeth on the correct position of the head and shoulders in exposure of the larynx for intubation. It is remarkable how rarely one sees even a skilled anæsthetist place the head in the correct position. A simple test is that the plane of the face should be parallel with the plane of the body and *as much above the body as possible*. This is shown very well in the X-ray photograph of their fig. 3, but unfortunately in the explanatory diagram attached to fig. 3 the head is shown so much hyper-extended that the plane of the face points upwards at 45° to that of the body. It is not possible to extend the head thus far if the lower cervical spine is fully flexed.

Guy's Hospital, SE1. R. C. BROCK.

TRACHOMA AND SULPHONAMIDES

SIR,—Your annotation on canavalin (Dec. 9) states that the virus of trachoma is susceptible to sulphonamide medication. According to my experience this is untrue. I am supported by similar evidence given by L. A. Julianelle, formerly chairman of the Trachoma Commission, Washington University, St. Louis, and author of *The Etiology of Trachoma* (1938), in a recent discussion reported in the *American Journal of Ophthalmology* for May, 1944 (p. 540). I have no experience of the therapeutic value of penicillin.

Westminster Hospital Medical School, London. A. F. MACCALLAN.

TREATMENT OF DIPHTHERIA

SIR,—We strongly support the views expressed by Dr. Johnstone and Dr. Fluker in their letter of Dec. 9. In your leading article of Nov. 11 on diphtheria in Germany you seem to have overlooked the experimental work carried out by Madsen, Arrhenius, and Morch some twenty years ago on diphtheria toxin-antitoxin fixation and the clinical research on antitoxin dosage conducted by Bie of Copenhagen and Banks of Leicester during the

period 1920–28. Detailed mention of the clinical aspect is made in your leading article of July 7, 1928 (p. 21), arising out of the paper by Banks and McCracken published in the same issue.

Madsen and Arrhenius originally expressed the view that diphtheria toxin and antitoxin combined with one another in a similar way to two substances possessing a weak chemical affinity for each other, and the combination may be split up again during the initial stage of contact. It has also been demonstrated that diphtheria toxin has a strong specific affinity for the tissues. As a result it is necessary for the dosage of antitoxin to be sufficient overwhelmingly to neutralise the toxin and to maintain an adequate antitoxin concentration to overcome any incoming toxin.

The practical application of these principles was amply and successfully demonstrated by Bje and Banks in their massive intravenous treatment of diphtheria, and in the intervening years many clinicians in this field have substantiated their claims.

In case your recent leading article may convey erroneous impressions regarding the management of diphtheria and the dosage of antitoxin to those who see few cases of the disease, we feel that the above principles should be emphasised.

A. H. G. BURTON.
Ilford. J. H. WEIR.

SEX EDUCATION

SIR,—Your annotation of Dec. 16, entitled Sex Education and the Practitioner, appears to approve of some very dubious propositions. After the true remark that the medical practitioner is not, by virtue of his professional knowledge alone, competent to advise on social, psychological, and moral issues, there follows: "Teaching is a skilled job . . . and it is proper that the imparting of information about sex should be included in the ordinary routine of school education, though of course parents and doctors will on appropriate occasions need to anticipate or amplify the teaching thus provided." Clearly, the function of parents in the matter is regarded as of quite secondary importance.

Yet whence, if not from the parents, by implied delegation of their rights, do teachers derive their authority over children? Where questions of moral and social import are concerned, it is surely theirs to take the secondary rôle of supplementing and amplifying what has already been learned in outline at home, and it is quite futile to separate sex from its moral and social context; nor do you suggest that it should or could be done. If it be agreed that the State comes first, having the prior claim over all children born into it, to educate them as it thinks fit, we have reached the condition of totalitarianism, against which we are supposed to be fighting. The State is, after all, no more than the society formed by the aggregate of the families that compose it, and when it is invested with quasi-personal attributes, they are no more than the disguised whims and desires of the particular clique at that moment in control or setting the ideological fashion. The Family comes before the State.

Sex education properly belongs to the home. It is the right of the parents and it is also their duty. Because it is the former, it cannot be undertaken at school without their consent; because it is the latter it may be carried out by someone else in default of the parents. But this is only a recognisedly second-best alternative, and as such cannot be the legitimate aim of a truly constructive policy.

Surely the aim should not be to train teachers but to train parents to fulfil their duties in this respect. As I have found by personal experience here in Ramsgate, it is a disappointing and arduous task; but I am sure that it is the rational way of facing the problem, safeguarding as it does the inalienable human rights both of parents and children.

JOSEPH V. WALKER,
Medical Officer of Health and School Medical Officer
Ramsgate.

BLA PUBLIC HEALTH APPOINTMENT.—At the request of the Ministry of Health, Dr. E. J. Gordon Wallace has been released from his post as MOH for Weymouth, to serve as an expert hygienist in the civil affairs branch of the Army in liberated Europe.

Obituary

HERBERT THOMLINSON NIXON

MBE, M D VICT., M D LPOOL, F R C S E

Dr. Nixon, who died last month, was a Liverpool man by birth and by choice, and was the last survivor of four medical brothers. He was educated at the Royal Institution School, and at University College, Liverpool, where he was senior Lyon Jones scholar in 1891. He qualified in 1893 and was surgical registrar and tutor at the Royal Infirmary for two years, taking his FRCSE in 1898. Meanwhile he had settled in practice at Anfield, where he remained till the end of his life. "He was a fine general practitioner," writes R. H.—"highly qualified, cultured, practical, authoritative in his own chosen sphere. It was a delight to meet him in consultation: he was full of quiet good-humoured wisdom, and many a younger consultant must have been grateful for the opportunity of drawing upon his informed common sense and his long experience of practice. He was in active work until shortly before his death. He was 74 when he died, but his small stocky figure, his alert eyes twinkling humorously above a walrus moustache, and his keen and direct mind, all belied his years. He was kind, with a natural dignity: courteous and never thrustful: a man apt to be taken at his own modest valuation until his passing makes us realise, almost with a shock, what we have lost."

Dr. Nixon was appointed MBE in recognition of his work in the last war as medical officer of the auxiliary military hospital in Venice Street, Liverpool, and the 1st Western General Hospital. He was unmarried.

EDMUND CAUTLEY

M D CAMB., F R C P

Dr. Cautley, consulting physician to the Metropolitan Hospital and the Belgrave Hospital for Children, and author of textbooks of pædiatrics, died at Bournemouth on Dec. 1 at the age of 80.

The son of Henry Cautley, he was born at Morley near Leeds and educated at Charterhouse and King's College, Cambridge. He qualified in 1888 from St. Bartholomew's Hospital, where he was president of the Abernethian Society and spent several years in junior appointments. His special interest in children was soon evident; he became clinical assistant at Great Ormond Street, and wrote especially on problems of feeding. But his range was wide, and his early papers include bacteriological studies of the bowel, the bronchial and mesenteric glands, and of food, as well as clinical reports on empyema, pneumonia, and heart disease. He had taken his MRCP in 1890, and in due course joined the staff of the Belgrave Hospital and the Metropolitan Hospital. His *Natural and Artificial Methods of Feeding Infants and Children*, which first appeared in 1897, won some success, and his *Diseases of Infants and Children* was published in 1910, in which year he was president of the Royal Society of Medicine's section for diseases in children. He was elected FRCP in 1903 and presided over the British Pædiatric Association in 1929. In the later years of his active life he published little and did not often take part in discussions at the medical societies: so he was not as widely known as his attainments merited; but all who worked with him were impressed by his abilities as a physician and teacher.

"He was," writes a colleague, "a remarkable clinician of the older school; he was accurate in his diagnosis but rarely used complicated investigations, though he was perfectly familiar with them, as he was, from his careful reading, with all recent work; his house-physicians used to discover this when, tempted by his apparently conservative methods, they tried to catch him out on newly described methods of diagnosis or treatment. His sound judgment, based on long experience, common sense, and study of recent developments, caused his opinion to be sought and valued. He had, as a young man, considered being a surgeon, and his opinion in a surgical case was such that his surgical colleagues were always glad of his help.

"Dr. Cautley's best known and favourite work was with children, especially infants, and his handling of questions of feeding and management of delicate babies

was of the highest order. His housemen used to say that in a difficult case he would, without hesitation, indicate the one method of treatment which they had not thought of and which would prove to be the right one. As an indication of his enterprise and clear thinking it is interesting to know that more than ten years before Rammstedt published his operation for congenital pyloric stenosis Dr. Cautley thought it out in all its details and asked surgical colleagues to perform it; he was however before his time, for no-one would then undertake it.

"As a man, he was a charming companion with a wide field of interests and delightful conversation. His sense of fun kept him gay, and he used to be the delight of his friends on committees because of his dry and appropriate remarks. He did not suffer fools gladly, but his kindly advice and practical help were always available to anyone. Letters received from him within a few weeks of his death show the same unchanged writing and the same clear expression on many subjects, including the future of the voluntary hospitals and the new health schemes. He had lost none of his shrewdness and mental alertness, and it is good to know that to the end of a full life he remained a thoughtful and interesting man."

Outside his professional work Dr. Cautley enjoyed fishing and shooting and was a good bridge-player. He was twice married but leaves no children.

JAMES DAVID SPEID SINCLAIR

M B GLASG.

Dr. Speid Sinclair, who died on Dec. 6, graduated at Glasgow in 1910. He held several resident posts of increasing seniority at various hospitals, and during the last war served in the RAMC. After demobilisation he was for a time on the staff of the Ministry of Pensions before deciding to specialise in anæsthetics. Formerly he was attached as honorary anæsthetist to Charing Cross, the Homœpathic, and St. Peter's Hospitals. He was also anæsthetist to the Hendon Memorial Hospital where he served in the EMS. Although well-versed in modern methods of anæsthesia he always retained a great liking for chloroform, which he administered with skill and safety. His attractive personality brought him many friends.

On Active Service

CASUALTIES

ACCIDENTALLY KILLED

Flight-Lieutenant ARCHIBALD NORMAN CAMPBELL, MB BELF., RAFVR

DIED

Surgeon Rear-Admiral THOMAS CREASER, MD DUBL., RN
Flight-Lieutenant IVOR MAZURE, MRCS, RAFVR

MISSING, PRESUMED KILLED

Surgeon Lieutenant RICHARD LESLIE HALL, MRCS, RNVR, HM sloop *Kite*.

AWARDS

MBE

Major W. N. CROWE, MM, MB DURH., 9th battalion West Riding Home Guard.
Major W. C. LOWRY, MD MCGILL, 14th battalion Northumberland Home Guard

MENTION IN DESPATCHES

Surgeon Lieutenant J. F. HANRATTY, MB LEEDS, RNVR
Surgeon Lieutenant L. A. H. WILSON, MRCS, RNVR

MEMOIRS

Flight-Lieutenant CAMPBELL was born in 1918, and studied medicine at Queen's University, Belfast, where he graduated MB in 1942. After holding a house-appointment at Belfast City Hospital for a year he was commissioned as flying-officer in the medical branch of the RAF Volunteer Reserve. When he died he was serving as medical officer at a RAF, station at home.

Flight-Lieutenant MAZURE was born in 1914, studied medicine at Charing Cross Hospital, and qualified MRCS in 1939. After several appointments as assistant in general practice he was commissioned as flying-officer in the medical branch of the RAFVR in 1940. At his death he was serving as medical officer at a RAF unit overseas.

Notes and News

EARLY MEDICAL BOOKS AT GLASGOW

To illustrate a current series of lectures on the evolution of social medicine, by Dr. Douglas Guthrie, there have been placed on view in the Hunterian library of Glasgow University some notable works from the Hunterian and the Ferguson collections, and from the library of the Royal Faculty of Physicians and Surgeons. William Hunter bequeathed his library and museum to Glasgow University. Besides his own magnificent atlas, *The Anatomy of the Gravid Uterus* (1774), the books selected from his library include some of the earliest works on midwifery. There is a copy of Roesslin's (Rhodion's) *De Partu Hominis* (1532) the Latin version of the earliest printed book on midwifery. The English translation, *The Byrth of Mankynde*, is shown in several editions, including the first, by Richard Jonas (1540), of which the only other copy known to exist is in the British Museum. In the same case is shown a collection of tracts relating to Mary Toft of Godalming, who claimed in 1726 to have given birth to 17 rabbits, and who gained some sympathy and assistance from the public before Sir Richard Manningham, the Queen's physician, exposed the hoax.

Among the medical classics in the exhibition are the first edition of the works of Hippocrates, printed in Greek by Aldus of Venice in 1526. There are also copies of Vesalius's *Fabrica* (1543), Harvey's *de Motu Cordis* (1628), and *Cerebri Anatome* by Thomas Willis (1664), illustrated by Christopher Wren who was associated with Willis and others in the founding of the Royal Society.

From the Ferguson collection come two of the finest works of Paracelsus, *Grosse Wundarztney* (1536) and *Paramirum* (1565), and David Laing's copy of one of the rarest medical books—Michael Scot's *Liber phisionomie* (1477). Another rare work is *An Account of the Foxglove* (1785) in which William Withering of Birmingham introduced the use of digitalis in heart disease, having learned of its use as a "folk remedy" from his country patients. Medical journalism is traced in the first medical periodical, *Nouvelles Descouvertes sur toutes les parties de la médicine*, edited by Nicolas de Blegny, and dated 1679. The author of *The Whole Art of Chirurgerie* (1597) was Peter Lowe, who after study abroad returned to his native city of Glasgow, there to found the Royal Faculty of Physicians and Surgeons in 1599. The discovery of vaccination is described in Edward Jenner's rare little book, *An inquiry into the causes and effects of variolæ vaccine* (1798), reporting the first 23 cases of successful vaccination.

Although the valuable university manuscripts have been stored away for safety, it has been possible to show from the faculty library a volume of letters of advice, or *consilia*, written and signed by Herman Boerhaave of Leyden (1668–1738), the earliest minute-book of Glasgow Medical Society (1815), and a manuscript diary of the Crimean war, written by George Buchanan, the first professor of clinical surgery at Glasgow.

The exhibition, which has been arranged with the coöperation of Dr. W. R. Cunningham, university librarian, and Dr. W. R. Snodgrass, librarian of the Royal Faculty of Physicians and Surgeons, will remain open until the end of January.

BENIGN TUMOURS OF THE STOMACH

THE various uncommon non-malignant tumours of the stomach may continue to grow for years without giving trouble. But as appears from the histories of 24 Argentine cases collected by Rodriguez,[1] they may produce pain, bleeding, malnutrition, and anæmia or may undergo cancerous change. The cases include adenomas, adenomyomas, fibromas, and lipomas. The only effective treatment is surgical, since these growths are not sensitive to radiotherapy. Removal of single polypoid growths or of tumours involving only a small area of stomach wall is a simple matter. For endogastric tumours preliminary gastrotomy is necessary. Diffuse polyposis of the stomach and large tumours such as fibromas or myomas involving a large proportion of the stomach wall require more or less extensive gastrectomy. The immediate mortality of this operation is much less than that of gastrectomy for cancer and the end-results are said to be excellent. The series included 14 gastrectomies without a death, and the only fatal case was that of an emaciated patient with a lipoma obstructing the pylorus, who died without treatment.

1. Rodriguez, J. V. *Rev. Cirug., Buenos Aires*, 1943, **22**, 444.

DEBUNKING THE HOUSEMAN

THE young doctor with charm and a smattering of Freud is a fairly common object in our teaching hospitals. Miss Renault makes quiet fun of him all through her new book (*The Friendly Young Ladies*. Longmans. 9*s*. 6*d*.), in which she implies that the near-Lesbians, whom he would like, out of the joint goodness and vanity of his heart, to treat as patients, are to their own minds fully responsible people, a good deal more mature than he is. Her scene is pleasantly laid in a house-boat, and she writes with insight and a light touch; but this particular story is poorly integrated. She loses interest too soon in the nebulous Elsie—whose pangs her reader shares at the start—and ends by throwing her back in the box almost as good as new. Perhaps she never really cared for her: and in that case it seems unnecessary to have invented her at all. There was plenty going on without Elsie. For a nurse, Miss Renault harbours too many superstitions about menstruation; and as a novelist she is perhaps a little too partial to similes. But she never churns out stock characters, she knows the people she writes about, and her books are hard to put down.

QUINIDINE SUPPLIES

QUINIDINE is becoming increasingly scarce both here and in the USA. For some time past it has been impossible to meet all the demands, and total stocks are insufficient to cover the anticipated requirements for 1945, while the possibilities of adding to them are remote. It is therefore imperative that quinidine should be used with the strictest economy. This can be done first by prescribing it only where there is need to restore the normal heart rhythm in auricular fibrillation, auricular flutter, and paroxysmal tachycardia, and secondly by restricting the dosage to the minimum necessary to control the disorder. Many patients take the drug over too long periods and in unnecessarily large doses.

THE ACTIVE FOOT

THE Foot Health Educational Bureau have produced, on stout varnished paper, a chart for the use of schools, athletic clubs, and youth organisations, showing clearly some exercises for the feet and for the maintenance of correct posture. Suitable incentives—play for children and sport for adolescents—are suggested to make them attractive enough for constant repetition. The exercises are not strenuous: they are intended simply to maintain the normal supple feet, erect posture and proper gait lost—often with crippling results—by so many young people in industry and the Services. Moreover the chart provides just the right kind of prophylactic teaching for schools: even visiting parents may pick up some useful hints from it. The chart will also serve to demonstrate exercises to outpatients in orthopædic clinics. Copies may be had for 12*s*. 6*d*. from the Secretary of the Bureau, 7, Park Lane, London, W1.

University of Cambridge

On Dec. 16 the degree of MD was conferred by proxy on P. L. Mollison.

University of Manchester

At recent examinations the following were successful:

FINAL EXAMINATION FOR MB, CH B

H. W. Ashworth, W. C. Astley, D. J. Atherton, George Bennett, Ethel F. Caplan, Dorothy I. Elkin, G. V. Feldman, Doreen H. Hayes, Margaret Laycock, H. B. Marsden, Joan E. Nuttall, M. G. Saunders, Leslie Shuck, Cecilia M. Smellie, Margaret M. Tutton, and P. O. Yates.

National University of Ireland

At recent examinations at University College, Cork, the following were successful:

M CH—M. J. Kelleher.

FINAL EXAMINATION FOR MB, B CH, BAO

Margaret Barry, Geraldine Casey, Christopher Conran, Peter Conran, J. F. Cox, J. J. F. Donworth, M. D. Doyle, D. W. Harvey, J. A. Jervois, Patrick Kelly, Patrick O'Donovan, Margaret P. O'Sullivan, Noel G. Roche, and J. C. Symons.

DPH—John Russell.

Bethlem Royal Hospital

Dr. J. G. Porter Phillips is retiring from the post of physician superintendent of the hospital which he has held for 30 years and will be succeeded by Dr. J. G. Hamilton. Dr. Porter Phillips has been elected a member of the governing body.

Royal College of Surgeons of England

A meeting of the council was held on Dec. 14, with Sir Alfred Webb-Johnson, the president, in the chair. Prof. F. L. Hopwood, D SC, and Mr. J. L. A. Grant, FRCSE, were appointed examiners for the new diploma in medical radiodiagnosis and Professor Hopwood and Mr. G. F. Stebbing, FRCS, for the new diploma in medical radiotherapy for the rest of 1944–45. Mr. Seymour Barling was re-elected representative on the court of governors of Birmingham University for a further three years. Mr. C. Max Page was appointed Bradshaw lecturer, and Air Vice-Marshal Geoffrey Keynes and Mr. R. Watson-Jones Hunterian professors for 1945.

Diplomas of fellowship were granted to the following:

L. W. Hefferman, Isidore Spiro, W. T. Ross, J. D. Raftery, H. A. McDonald, S. K. Nag, F. R. Hurford, P. R. Stringer, Harold Petty, R. L. Canney, G. N. Taylor, H. G. Korvin, D. I. Williams, R. B. W. A. Cole, P. B. Ryan, Arthur Naylor, and R. D. Richards.

A diploma of membership was granted to James Sharp of Manchester, and the following diplomas were granted jointly with the Royal College of Physicians;

DA—J. D. Blair, Victoria M. Brown, J. S. Calnan, M. V. H. Denton, Cecile P. Fellows, E. K. Gardner, Marion W. S. Green, J. L. Griffin, Ronald Peters, Edith Rhodes, Martin Rushton, T. A. Turnbull, Douglas Wilson, Edith Winternitz, Violet B. Young, and A. H. Zair.

DCH—A. D. Barlow, T. E. D. Beavan, Joyce L. Chamberlain, Helen Davidson, Mary D. Dixon, Margaret Edge, Agnes J. M. Gilruth, Muriel C. Goodchild, Jean L. Hallum, Elizabeth Hoffa, R. F. Hollick, G. A. James, P. A. Jennings, L. S. Leveson, R. I. Mackay, H. E. Pollak, Millicent M. Rogerson, Leonard Sagorin, Sheila F. Schofield, D. J. Thomas, C. D. Thornley, P. G. Todd, H. G. Triay, Peggy O. M. Tyson, and David Weiner.

Prof. I. W. Brebner was lately admitted to the honorary fellowship of the college by Major-General P. H. Mitchiner. The ceremony took place at Witwatersrand University after Major-General Mitchiner had delivered the Beyers lecture. Professor Brebner expressed his appreciation of the honour conferred on him by the college, and the Chancellor of the University, Mr. J. H. Hofmeyr, who is also vice-premier of the Union of South Africa, expressed his regret at the damage suffered by the college, and added that the Witwatersrand University was doing all it could to help in the replacement of pathological specimens lost in the destruction of the college museum.

Appointments

HAMILTON, J. G., MD LOND., DPM: physician superintendent of Bethlem Royal Hospital.

MACKENZIE, JOAN, MB, B SC. SHEFF.: temp. asst. school MO for Derbyshire.

WHITTAKER, DUNCAN, MA CAMB., MRCS, DPM: senior asst. physician, Bethlem Royal Hospital.

WILSON, DAVID, LRCPE: examining factory surgeon for Brigstock, Northants.

Births, Marriages, and Deaths

BIRTHS

PERCY.—On Dec. 17, at Birmingham, the wife of Major H. Gordon Percy, RAMC—a daughter.

PERKINS.—On Dec. 17, at Chesham Bois, the wife of Major Hugh Perkins, RAMC—a daughter.

ROBINSON.—On Dec. 6, at Oxford, the wife of Squadron-Leader R. G. Robinson, GM, MB, RAFVR—a daughter.

MARRIAGES

FORSTER—COOKSON.—On Dec. 15, in London, John Anning Forster, MBE, major IMS, to Margaret Cookson.

MACGREGOR—MORRIS.—On Nov. 18, in Madras, Malcolm Eliot Macgregor, surgeon lieutenant RN, to Marigold Ancred Morris, RN VAD.

RIDOUT—KEELAN.—On Dec. 18, in London, Douglas Lyon Ridout, surgeon lieutenant RN, to Carolyn Dorothy Keelan, second officer, WRNS.

SOMERSET—TIMINS.—On Dec. 16, at Bishop's Stortford, Geoffrey Somerset, captain RAMC, to Thyrza Timins.

DEATHS

BOYLAN SMITH.—On Dec. 13, at Prestwick, Ayrshire, Samuel Boylan Smith, DSO, OBE, MD DUBL., lieut.-colonel late RAMC.

DAWSON.—On Dec. 15, at Darlington, George Alexander Dawson, MD BELF., DPH.

FAWCETT.—On Dec. 13, at Guildford, Charles Ernest White Spunner Fawcett, MB DUBL., lieut.-colonel late RAMC.

HAYES.—On Dec. 11, Sydney Nuttall Hayes, OBE, FRCS, FRCOG, lieut.-colonel IMS, professor of obstetrics and gynæcology, King Edward Medical College, Lahore.

MITCHELL.—On Dec. 19, at Fordcombe, near Tunbridge Wells, Thomas Walker Mitchell, MD EDIN., aged 75.

PICKLES.—On Dec. 16, at Harrogate, Harold Dobson Pickles, MC, MRCS, of Masham, Yorks, aged 53.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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