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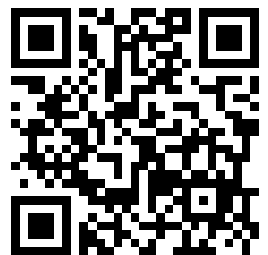
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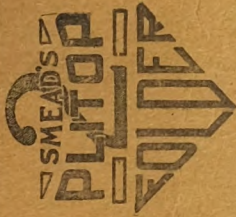
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## INFLUENZA B IN 1945-46

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THE possibility of a widespread influenza epidemic in the winter 1945-46 was a serious problem to public-health authorities in this country and on the Continent, and there was the more remote prospect of a pandemic such as broke out in 1918-19. Conferences were therefore held in 1945 under the auspices of the Medical Research Council to discuss methods of control of an epidemic, should one develop.

It was thought important that any increase in the incidence of upper respiratory infection should be detected as early as possible, and that every attempt should be made to isolate and identify any influenza virus in order to compare its antigenicity with known strains. A careful watch on the weekly influenzal deaths in the 126 great towns of England and Wales and the mortality in the younger age-groups would give additional information about the trend of the epidemic.

A circular letter from the Ministry of Health (E.M.S.I. 526) was sent to many hospitals and medical officers of this country asking them to report any increase in upper respiratory infection and in influenza, and to submit samples of serum for serological test and garglings for virus isolation. The conditions in Western Europe, particularly the shortage of food and fuel, together with the continually shifting population of displaced persons, made the spread of communicable disease a very real threat there, and all medical officers in the army of occupation and civil administration were therefore asked to coöperate in this "spotting system" by reporting the number of cases of influenza in their areas.

An epidemic did break out and was proved both serologically and by direct virus isolation to be largely due to the B virus. The first indication of influenza came in late December, 1945, from military hospitals in Brussels and Antwerp; virus B was identified serologically in several cases. Despite this and mild local epidemics in a few units of the British Army of the Rhine (B.A.O.R.), there was no general epidemic in Germany. A most careful watch for cases of influenza was kept in the U.S. zone by the medical services of the U.S. Army; and, though sporadic cases, proved to be influenza A or B, were encountered among U.S. troops, no epidemic developed either in them or in civilians.† Some displaced persons' camps, which were under special observation, did not have epidemics, though sporadic cases of influenza A and B were encountered.

## INFLUENZA OUTBREAK IN GREAT BRITAIN

The deaths from influenza reported weekly from the 126 great towns of England and Wales began to increase in the second week of December and rose in irregular fashion to a peak in the last week of January and first week in February, after which a slow decline began (table 1). However, the increase in deaths was not uniform all over the country, and some areas, including East Anglia and the West Country, did not register any considerable increase. By comparison with other recent epidemics, that of 1946 was moderately severe; but actual outbreaks or epidemics among either the population or in semi-closed communities were not encountered

\* Seconded from R.A.M.C. between November, 1945, and March, 1946.

† We are indebted to Major S. Bowditch, U.S.A.M.C., for this information.

except in the instances detailed below. Practitioners of the East Midlands, who were circularised by the Ministry of Health, recorded outbreaks in some areas but not in others. Absenteeism from the industrial areas was not regarded as unusually high.

The chief evidence which supported the statistical record of an epidemic was the reception of numbers of sera, usually from 2-5 individuals from each of numerous hospitals, from cases in patients or staff regarded as typical of influenza. The rate of reception of specimens in the various weeks rose to a peak which coincided in time with the statistical record of deaths (see figure). Notified influenza morbidity in the Army at home, though of low total incidence, also showed a rise which coincided in time with the deaths and the numbers of specimens. Similar notifications for the B.A.O.R. did not show this rise as compared with figures for December, 1945.

Epidemics encountered during this time included several sharp outbreaks at public schools and preparatory boarding-schools in the south of England. These schools reassembled about Jan. 17 and had an incidence of 20-50% of cases of influenza within the next three weeks. A small outbreak at a tuberculosis convalescent home at Harrow began on Jan. 17. An "epidemic in miniature" occurred from Jan. 25 to Feb. 9 in two companies of Army recruits at Colchester among units of infantry training centres assembled on Jan. 18. Two outbreaks of influenza in the R.A.F. among West Indian troops (see below) occurred in the early days of January and at the end of that month. The striking feature of the Service outbreaks was their localisation to a certain type of population and failure to spread to neighbouring companies or units. The absenteeism from the very large number of workers at Woolwich Arsenal reached a maximum in the third week of January. In general therefore the outbreak occurred in Great Britain in January and early February, with a peak in the week ending Feb. 2.

## SEROLOGICAL INVESTIGATIONS

From late December to the end of April, 1946, 351 pairs of sera from the United Kingdom and British

TABLE I—COURSE OF INFLUENZA-B OUTBREAK 1945-46

Week ending	Deaths in Great Britain		No. of specimens	Influenza notifications per 100,000	
	England and Wales	Scotland		Army U.K.	B.A.O.R.
Dec. 1, 1945	30	1	..	13.7	2.8
" 8, "	35	1	..	14.2	6.4
" 15, "	69	1	..	21.2	2.7
" 22, "	76	4	10	27.2	5.4
" 29, "	72	5	10	18.1	4.2
Jan. 5, 1946	123	17	9	28.1	2.2
" 12, "	165	21	14	49.9	2.5
" 19, "	174	30	24	61.2	3.5
*Jan. 26, 1946	273	43	37	78.0	1.0
*Feb. 2, "	297	40	44	95.9	3.4
" 9, "	304	36	67	76.5	3.9
Feb. 16, 1946	220	22	25	57.1	2.4
" 23, "	141	13	22	42.6	0.5
Mar. 2, "	123	12	19	36.9	} 20.5 for 5 weeks
" 9, "	112	7	2	43.8	
" 16, "	93	5	10	41.9	
" 23, "	77	7	..	34.9	
" 30, "	50	6	..	23.0	

\* Weeks when most of the inoculations with influenza vaccine were effected.

Army in Europe were examined at the National Institute for Medical Research. Serum samples were received from all Service Commands, from public-health departments of the Allied Military Government, and from hospitals and practitioners throughout the United Kingdom. The figure shows the average weekly number of pairs of sera received and indicates the trend of the epidemic.

TABLE II—ANALYSIS OF SERUM SAMPLES RECEIVED AT M.R.C.

Pairs tested in the U.K. and B.A.O.R.	Virus A					Virus B				
	Negative		Positive			Negative		Positive		
	Rise in antibody					Rise in antibody				
351	0	×2	×4	×8	×16	0	×2	×4	×8	×16
	229	104	10	7	1	135	102	40	48	26
Total	333		18			237		114		

The method used in the agglutinin-inhibition tests was that described by Hirst (1942). The following standard conditions were observed.

Both specimens of serum were tested together on the same day with the same batch of antigen and with the same batch of fowl red cells (cf. Stuart-Harris 1943).

Reconstituted dried allantoic fluid, received from the Rockefeller Foundation in 1943 and containing A (P.R.8) and B (Lee) strains, was used as antigen.

Standard immune serum against A and B virus was tested with these antigens at regular intervals as a check on the results.

Fowl red cells were obtained from Plymouth Rocks and pooled before use.

A fourfold rise or greater was taken as a positive result.

The results of testing 351 pairs of sera are shown in table II. The serological tests clearly indicate that most infections were caused by the B-virus, though some cases of A-virus infection were encountered. The most striking fact that emerges from these figures is the large number of sera that showed no rise or only a twofold rise in antibody. Many such cases occurred in closed communities, in hospitals and factories in which virus-B infection was known to be present; for example, in one London hospital, among 5 nurses whose sera were tested, 2 proved to be positive for B, 1 showed a twofold rise to B, and 2 were negative to A and B. We also encountered, as have other observers, cases from which virus B was recovered but yet no specific serological response to that virus developed during the disease. Reference is made below to tests against different serological strains of B.

In several instances sera showed a rise in both A and B antibodies. A small epidemic occurred at a tuberculosis convalescent centre in Middlesex (Grim's Dyke) in January; 3 of the cases showed a sharp rise of antibody: ×4 (A), ×8 (B); ×2 (A), ×4 (B); and ×4 (A) and ×8 (B). Several other such cases were encountered during the epidemic, but their explanation is obscure. Henle et al. (1946) have even encountered cases of experimental infection with virus A showing a serological response against B only.

Two instances of selective incidence were observed. At a R.A.F. station in Berkshire an epidemic occurred in late December and was entirely confined to the coloured West Indian population of the station, though both the coloured and white populations worked in close association. Serum analysis showed this to be a virus-B infection. A month later a further epidemic occurred among the West Indians, this time a virus-A infection. A case of virus-A infection was also identified among the white population. Further details are given in an accompanying paper (Jackson 1946).

About the same time a sudden small but sharp epidemic was reported among coloured West Indians at another R.A.F. station in the Midlands. This proved to be due to the A virus and coincided with the second wave at the other station.

#### VIRUS ISOLATION: ADAPTATION TO EGGS

Throat garglings from typical cases of influenza were collected and inoculated into ferrets and developing chick embryos. Such specimens were collected as far as possible under standard conditions by the following method.

The patient was asked to gargle 15 c.cm. of normal saline and to spit into a sterile bottle containing 5 c.cm. of horse-serum broth. The specimen was kept cold, usually at  $-76^{\circ}\text{C}$  until used. The specimens from the Continent were collected and dispatched by air in a large 'Thermos' flask, under the personal supervision of Lieut.-Colonel F. E. Buckland, R.A.M.C., of the medical directorate, B.A.O.R. The majority arrived at the National Institute in a satisfactory condition for examination. As far as possible, serum specimens for Hirst tests were obtained from all cases as a check on the presence of specific influenza infection.

The method used for virus isolation was that described by Beveridge and Burnet (1946). Garglings were not filtered but were inoculated directly into the amniotic cavity of 13-day chick embryos in the presence of penicillin and sodium sulphadiazine. Each egg before inoculation received 0.1 c.cm. of 5% sodium sulphadiazine. Sufficient penicillin to produce a final concentration of 125 units/c.cm. was mixed with the garglings before inoculation. These proved to be satisfactory bacteriostatic agents in most cases. Eggs were incubated at  $37^{\circ}\text{C}$  before and  $35^{\circ}\text{C}$  after inoculation. All inoculated embryos were incubated for a further 72 hours, after which all surviving eggs were placed in the ice-box for 2 hours before harvesting. The amniotic fluid from each egg was withdrawn into sterile tubes and tested with fowl and guinea-pig red cells for the presence of agglutination.

It was thought, in view of Burnet's work on the characteristics of recently isolated A strains (Burnet and Bull 1943), that a new virus in its first amniotic passage (O-phase) would agglutinate guinea-pig red cells to a higher titre than would fowl red cells. When later the current virus was isolated it was found to agglutinate the cells of both species to an equal titre, and the practice of using only fowl cells was followed. Burnet et al. (1946) also found no evidence of an O-phase in the B strains they isolated.

All amniotic fluids were tested for sterility; those sterile after 24 hours were passed to a further group of six eggs. Each specimen was taken through three amniotic passages; if negative at the end of this, passage was discontinued, but the gargling was retained at  $-76^{\circ}\text{C}$  for further examination later.

In all, 54 different garglings were tested, and virus was isolated in 12 cases. In 3 cases agglutination was

TABLE III—ANALYSIS OF VIRUS ISOLATION IN CHICK EMBRYO

No.	Date in 1946	Place	No. of amniotic passages			Subsequent allantoic inoc.	Rise in human antibody	Result of ferret inoc.	
			1	2	3			Pyrexia	Antibody
1	Jan.	*Berg-kirchen	-	+++	+++	+++	×8 (+)	-	+
2	Jan.	London	-	++	+++	+++	×16 (+)	-	-
3	Jan.	Surrey	-	+++	+++	+++	×2 (-)	-	+
4	Feb.	Notts	-	++	+++	+++	NT	-	+
5	Feb.	Herts	-	++	+++	+++	×2 (-)	NT	NT
6	Feb.	Herts	-	++	+++	+++	×4 (+)	-	-
7	Feb.	London	-	±	++	+++	NT	-	+
8	Feb.	Herts	-	+	++	NT	×16 (+)	-	-
9	Feb.	London	-	++	+++	+++	NT	-	-
10	Feb.	Dorset	-	±	++	NT	NT	NT	NT
11	Feb.	Dorset	-	±	++	NT	NT	NT	NT
12	Feb.	London	-	-	+	NT	×4 (+)	-	-

\* B.A.O.R. NT, not tested.

noted on the second amniotic passage but was not present on the third; these were classed as negative (see table III). The first 2 cases in which virus was isolated occurred in January, one from a patient in Germany, the other from a nurse in Surrey with a severe form of influenzal pneumonia. Specimens of amniotic fluid (second amniotic passage) were tested against specific A and B ferret antisera. The virus was inhibited by B (Lee) serum but not by A serum; the current virus was therefore a B virus.

Until the first isolation in January 18 garglings had been tested with negative results. After this, more successful results were obtained, and this increase in the number of cases in which virus was isolated coincided with the increase in the recorded number of deaths from influenza. Though several of the earlier garglings were taken from patients who were later shown serologically to have had influenza, it was impossible to isolate the virus from these garglings, and repeated attempts to isolate the virus from material stored at -76° C failed. A possible explanation is that the virus underwent some change during human passage which made its isolation easier.

All strains isolated were readily adapted to growth in the allantoic sac. Using third amniotic passage material, 0.1 c.c.m. was inoculated into the allantoic cavity of 10-day

TABLE IV—ANALYSIS OF FERRET SERA AFTER INOCULATION WITH INFECTED ALLANTOIC FLUID (TITRE 128)

Specific antigen	Specific ferret antiserum				
	LEE	CRA	LEI	CLE	CLA
LEE ..	512	64	32	32	32
CRA ..	64	2048	1024	2048	2048
LEI ..	32	2048	2048	2048	2048
CLE ..	64	1024	1024	2048	2048

chick embryos. The fluid was harvested after 48 hours and its agglutinating titre tested by Hirst's method. The twelve positive strains were regarded as distinct until they had been compared antigenically one with another and with other known strains. Owing to the number involved it was impossible to proceed with them all.

ANTIGENIC COMPARISON

An early attempt was made to compare the current strains with previously isolated B strains, the standard B (Lee) strain and the Paddington strain. Two recent strains, Eliz B and Mil B from an epidemic in Melbourne in 1945, were sent to England by air by the kindness of Dr. F. M. Burnet.

Specimens of allantoic fluid from each of the five strains—Lee, 4 current strains, Paddington, Eliz B, and Mil B—were inoculated into ferrets for the production of specific ferret antiserum. Owing to the difficulty experienced in adapting the current strains to mouse lung (see below), the only attempt at antigenic comparison was by Hirst's test. Table IV shows the comparison between the Lee and four of the current strains, CRA, LEI, CLE, CLA. These four appeared to be distinct from Lee but to be themselves closely related. There was no relation to the A virus. Table V shows a further analysis of several different B strains with their respective ferret antisera. It can be seen that the Lee and the remainder, except possibly the Paddington, are distinct; there appears to be a fairly close connexion between the CRA, Eliz B, and Mil B, though there are possibly some small antigenic differences in the remainder of the subgroup. There is some tendency, also noted by Francis et al. (1946) in the case of rabbit sera, for freshly isolated B strains to be very susceptible to agglutinin inhibition by heterologous and even normal sera.

In view of the differences between Lee and 1946 strains, human sera showing no antibody rise against

TABLE V—FURTHER ANALYSIS OF FERRET SERA

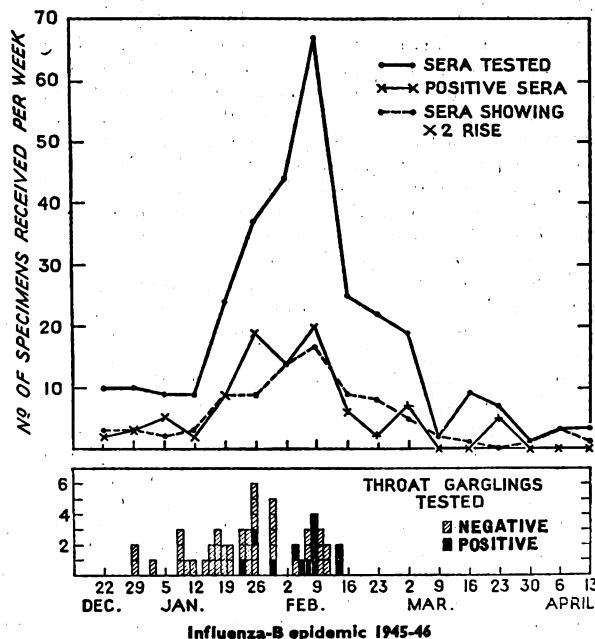
Specific antigen	Specific ferret antiserum					
	LEE	CRA	Eliz B	Mil B	Paddington	P.R.8
LEE ..	2048	64	64	64	256	8
CRA ..	256	1024	256	256	256	16
Eliz B ..	256	256 +	512	512	512	8
Mil B ..	256	256	256	512	512	8
Paddington	1024	64	256	256	2048	16
P.R.8 ..	16	8	8	8	8	4096

Lee were retested against the CRA strain. For example, of 10 sera tested from a small epidemic at a school in Dorset, 5 were positive to B (Lee) and 5 negative to A and B. When these sera were retested with the current strain (CRA), 2 of the negative sera proved to be positive, and the rise in antibody in those previously positive was greater with the CRA virus than with the Lee. Sera from several other sources which showed less than a fourfold rise in antibody to the Lee virus were then retested with the Lee and CRA strains. Of 103 pairs of sera so tested, 55 showed no rise in antibody with either strain, 25 a twofold rise with both, 17 a twofold rise with CRA only, and 6 a fourfold rise with CRA without any corresponding rise with the Lee. A further 53 pairs of positive sera were tested with both strains: 29 showed a fourfold rise with both, 14 a fourfold rise with Lee and eightfold or greater with CRA, and 10 a sixteenfold rise with Lee and only a fourfold rise with CRA.

A group of 24 persons was vaccinated with influenza-virus vaccine containing both A (P.R.8) and B (Lee) viruses through the cooperation of the medical superintendent, Darenth Park, Dartford, Kent. Serum samples were taken before and after vaccination and were tested for antibody rise by Hirst's method. The results showed an equal rise in B antibody to both Lee and CRA viruses. Such a result is encouraging, since it indicates that current vaccines, in which Lee virus is used, are likely to be as effective in protection against other strains of B as against the Lee virus.

INOCULATION OF FERRETS

Between November, 1945, and March, 1946, garglings from 45 patients and suspensions of lung from 2 fatal



cases of pneumonia were inoculated intranasally into anaesthetised ferrets. In most instances fresh material was used, but occasionally it had been stored for a short time at  $-76^{\circ}\text{C}$  before being tested. No definite symptoms or pathological changes in upper respiratory tract or lungs were produced. Only 4 ferrets showed any fever, and from these no transmissible infectious agent was recovered. Even strains well established in eggs did not produce symptoms. With 2 strains serological evidence indicated that an inapparent infection was being passed in the ferrets, but four and five passages did not enhance the virulence of the strains for ferrets; this experience resembled that of Stuart-Harris et al. (1943). Serum samples were taken three or four weeks after infection from 27 ferrets inoculated with throat garglings; of these 4 were found to have developed antibodies to virus B, as shown by the Hirst test. Of 12 ferrets inoculated later with infected allantoic fluid all showed a rise in antibody to B virus.

#### ADAPTATION TO MICE

Attempts were made to adapt to mice 6 of the 1946 B viruses which had been isolated in chick embryos. These had received two amniotic and one or two allantoic passages and had developed good agglutinating power for fowl red cells before being inoculated intranasally, in the form of undiluted allantoic fluid, into mice. Of the 6 strains so tested, 4 produced extensive consolidation in the lungs of the first mice inoculated; this was as extensive in mice killed after four days as in those killed after eight days. No mice, however, died of the infection.

Previous experience with virus A led to the expectation that no difficulty would be encountered in transferring the infection serially, and in rapidly enhancing its virulence till it would kill the mice regularly; but, on the contrary, the extensive lung-consolidation seen in the first mice was never observed again. Much smaller lung lesions, involving an eighth or less of the lung, were seen in mice of some of the following passages, but there was no tendency for them to increase as transfer was carried on. That virus was still present was shown by transfer back to chick embryos, the fluids of which promptly acquired the specific red-cell-agglutinating properties of virus B. The small areas of pneumonia were detected to a varying degree up to 6, 6, 6, 7, 12, and 16 passages for the 6 strains. In the case of 3 strains virus was finally lost altogether, as judged by inability to infect eggs any longer. Passage of the other 3 was abandoned when it no longer seemed profitable.

Several modifications in technique were used in the hope of helping the adaptation to mice. Passage was carried out at intervals of two days, of three or four days (this was the usual practice), or of seven days. Virus survived for at least three passages at two-day and at least four passages at seven-day intervals, but no exaltation of virulence developed. Mixture with normal allantoic fluid was of no avail. Swiss mice were no better than our other (Parkes) strain of white mice. Mice from two to three weeks old were little if at all more sensitive than older ones. Cotton-rats proved no more susceptible than mice. One hamster inoculated with undiluted allantoic fluid died with complete lung-consolidation three days later, but attempts to produce a transmissible pneumonia in hamsters were not successful.

It seems possible that the lesions produced in the first mice inoculated were due to the "toxic" action of the large amount of virus present. Such an action has been produced in the rabbit's eye by Evans and Rickard (1945) and the mouse's brain by Hale and McKee (1945). The effects which these workers produced were not apparently associated with virus multiplication. Our findings recall strongly those recorded by Eaton et al. (1945) for their atypical pneumonia virus; this was transmitted as a symptomless infection in chick embryos, the fluids of

which produced in cotton-rats and hamsters a pneumonia which was not serially transmissible.

#### VACCINATION OF HUMAN BEINGS

Trials were carried out of a polyvalent A and B vaccine (P.R.8 and Lee strains) made from fluids of infected chick embryos according to the method of Francis and Salk (1942). Several thousand doses were used on the Continent, and several thousand in this country. It is not proposed to report the results in detail now, because the incidence of clinical influenza was so low in nearly all the tested groups that no assessment of the value of the vaccine was possible. It may be said, however, that in the only two considerable groups with a high incidence the vaccine apparently had some beneficial effect. Thus among medical students at Glasgow 9 of 105 controls developed influenza (8.6%); most of these were proved serologically to be influenza B; only 2 of 115 vaccinated persons (1.7%) were affected. At Woolwich Arsenal 68 of 622 controls (10.9%) and 31 of 609 vaccinated (5.1%) developed influenza. Serological tests were not carried out here. Perhaps because of the low incidence and because most inoculations were not done until the outbreak was already under way, the benefit was less striking than that lately reported by Francis et al. (1946).

#### DISCUSSION

The influenza-B outbreak now reported is the first on record for Britain caused almost wholly by the B virus; it is further worth considering in relation to the recent behaviour of virus B in the rest of the world. According to Francis et al. (1946), influenza B was endemic in 1945 in the U.S.A., giving rise to localised outbreaks in every month of 1945 from March onwards but causing more widespread trouble in November and December. Other accounts emphasised its appearance in June, 1945, in the Pacific (in Hawaii and Guam) and its apparent spread southwards to Australia in November, 1945 (cf. Burnet et al. 1946), and eastwards to the Caribbean area, the northern part of South America, Texas, and further north in the U.S.A. Burnet's account of its clinical and epidemiological behaviour is an almost exact counterpart of our own experience—particularly its mildness and apparently capricious incidence with a tendency to attack younger age-groups. This, together with the similar biological behaviour and close serological relation we have found between the Australian and British strains, suggests that virus B may in fact have been travelling round the world. The view that such may happen is not necessarily in conflict with the concept that influenza viruses—A or B—may be endemic in many countries, awaiting suitable conditions to start an epidemic. Shope (1943) has convincingly presented the arguments for such a state of affairs as regards swine influenza. But the recent world-wide occurrence of influenza B suggests that a virus—perhaps as a result of the appearance of an antigenic variant in one of its endemic foci—may at times spread very widely, as pandemic influenza certainly did in 1918. The influenza B of 1945-46 was fortunately mild and the virus certainly not widely dissimilar from other B strains.

In this laboratory we have been hitherto unsuccessful in repeating the isolation of influenza-A viruses directly from human garglings into embryonated eggs—as described by Burnet (1935) in Australia and later confirmed in America (Hirst 1945). It remains uncertain whether our success with B viruses this year is due to the inherently greater ease of isolating B viruses, as contrasted with A, or to some other factor.

#### SUMMARY

Influenza, probably due to virus B, appeared in Holland and Belgium in December, 1945, but no widespread epidemic occurred in Germany.



In Britain a moderately extensive outbreak of a mild form of influenza began in January, reaching its peak at the end of January.

Serological evidence indicated that 34% of the cases between December and March were due to influenza virus B. We know that not all the cases of B-virus infection show a specific serological response; so it is likely that virus B was the major cause of the outbreak.

Ferrets did not show a febrile reaction when inoculated with 1946 B viruses, but strains were successfully established by amniotic inoculation of fertile eggs. They were serologically rather distinct from the standard (Lee) B virus but very closely related to two strains isolated in Australia in November, 1945.

We wish to thank for their help Brigadier J. S. K. Boyd, director of pathology, War Office; Dr. G. E. Godber and other officers of the Ministry of Health; the numerous doctors, Service and civilian, who kindly provided sera or garglings for test; the professors of pathology and bacteriology and the medical officers of factories and other doctors who collaborated in trials of vaccine; Dr. Robert Cruickshank, Central Public Health Laboratory, Colindale, for his assistance in distributing the vaccine to those concerned in the trial; and our assistants, Sergeant W. A. Fitzgerald, R.A.M.C., Miss E. Brodaty, and Mr. E. E. Owen, who gave valuable technical assistance.

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## INFLUENZA B AMONG WEST INDIANS OUTBREAKS IN THE BAHAMAS AND IN ENGLAND

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THE two outbreaks of influenza described here, one on New Providence Island, Bahamas, and the other in England, were almost entirely restricted to coloured men. The attack-rate was very high, and the type of pneumonic complication was unusually uniform. In both outbreaks evidence was obtained incriminating the influenza-B virus.

### In the Bahamas

In the summer of 1945 an epidemic of an upper respiratory disease, which was almost certainly influenza, broke out on New Providence Island, Bahamas, British West Indies. No record of any previous epidemic of influenza in the Bahamas has been found, nor of any similar "reverse colour-bar" having been exerted by the influenza virus. In the pandemic of 1918-19 it was observed that non-Europeans of several races were more often and more severely attacked than Europeans (French 1920), but never was the difference so great as in the present outbreak.

The epidemic is described here as it affected Servicemen only. There was a concurrent outbreak of influenza among the civilian native population, but details are not available. British white personnel in the R.A.F. on New Providence numbered a little over 2000, divided mainly between two airfields eight miles apart. The

coloured troops included some 370 men of the Bahamas Defence Corps (B.D.C.) and 280 men of the Bahamas Air Service Squadron (B.A.S.S.). The B.D.C. were billeted in the city of Nassau, and the B.A.S.S. on an airfield four miles away. These troops would, of course, mix in the town in the evenings. At the time of the outbreak there were also some 15 coloured patients in the R.A.F. hospital, at a third separate location, drawn from either contingent. Some B.A.S.S. men worked in the hospital, and, together with the patients' visitors, provided opportunity for dissemination of infection there. There were, then, three nuclei of coloured Servicemen—B.D.C., B.A.S.S., and hospital patients—and the outbreak attacked all three simultaneously (fig. 3). (The term "coloured" is used to include half-caste mulattoes who were serving in the Forces with the pure negroes and were attacked in a proportion at least equal to them.)

### HISTORY OF OUTBREAK

The mode of entrance of the influenza virus to the island was not ascertained. The epidemic certainly involved other islands of the Bahamas group, but not the mainland of Florida, which is the nearest land to this archipelago, about sixty miles away from its tip.

Though a few cases of a febrile influenzal type of illness had been occurring in coloured Servicemen from the middle of June, the first real intimation of the epidemic was on the afternoon of June 24, when 6 men, already in the hospital for other complaints (4 in the v.d. ward), complained of malaise, feverishness, aching in the back, and headache, and all had temperatures above 101° F. Next morning 64 men appeared on sick parade with the same symptoms, which had mostly started the day before.

Three Nissen huts were taken over for emergency hospital accommodation, one for B.A.S.S. men and two for B.D.C., in their respective camps. After this extremely explosive outbreak the case-incidence diminished daily. Fig. 1 shows that there was an increase of respiratory-tract and influenzal infection in the white troops at the same time, but this was very slight. The attack-rate for the month June 15-July 14 was 1.5% of this population at risk, while the corresponding rate for native troops was 34%. The total number of coloured men attacked and admitted to the wards was 219. Moreover, most of the upper respiratory-tract infection in the whites at this time was more coryzal than influenzal, and clinically more deserving of the name "febrile catarrh" (Stuart-Harris et al. 1938) than influenza.

This case-incidence of 34% is very high, particularly for an epidemic of the single-peak type. The attack-rate in a severe epidemic is usually about 10-20% (Stuart-Harris 1945, Van Rooyen and Rhodes 1940). Stuart-Harris saw an outbreak in a boys' school in 1937 reaching 50%, but virus was not recovered; Hare et al. (1943a) reported a case-incidence of over 30% of influenza-B infection in parts of Canada in 1943. Such figures are unusually high, except in establishments in which personnel is continually changing—e.g., Coleman (1944) noted that 40% were infected in an outbreak in a R.A.F. recruit camp, or 75-80% if ambulant cases were included. The Bahamians were not recruits, and neither contingent was subject to continuous change of personnel; in fact more changes took place among the white R.A.F. troops.

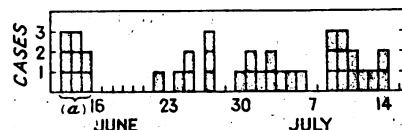


Fig. 1—Time distribution of 36 influenza cases, admitted to hospital, among 2000 white troops in the Bahamas (attack-rate 1.5% for period June 16-July 14). Each square represents a case, and the date is that of the patient's first reporting to a doctor. (a) May 1-June 15.

TABLE I—CONVALESCENT AGGLUTININ-INHIBITION TITRES

Patient	Influenza A	Influenza B	Result
1	128	512	† Positive B
2	64	128	† Positive B
3	64	512	† Positive B
4	8	128	† Positive B
5	32	1024	† Positive B
6	64	512	† Positive B
7	8	128	† Positive B
8	8	8	Negative
9	128	1024	† Positive B
10	32	512	† Positive B
11	8	256	† Positive B

In the Bahamas epidemic, only febrile patients admitted to hospital are included in the figures. Many more besides these were less severely affected, and it is almost certain that the full attack-rate of the coloured troops at risk was above 50%. Incidentally, of the British troops who did succumb a high proportion were medical staff who had been dealing with coloured influenza patients.

## CLINICAL FEATURES

The clinical features of the cases were remarkably uniform and conformed almost exactly to those described in other proved influenzal epidemics—e.g., Stuart-Harris's (1945) description of influenza-A infection. The main point of difference from his description was the type of onset often encountered in this epidemic. Thus, in about 45% of cases it was insidious, with a premonitory phase including vague feelings of malaise for two or three days, with some frontal headache, perhaps a pain in the substernal region, and a little cough. There would then be an acute exacerbation, usually in the evening, with shivering, feverishness, increased malaise, and weakness, together with other usual influenzal symptoms and a rise of temperature to perhaps 102° F. Now, an insidious onset has been described by some authors (Hare et al. 1943b, Beveridge and Williams 1944) as more characteristic of infection by influenza-B virus. However, they also describe frequent premonitory coryzal symptoms, which were very rare here, though such symptoms developed during the course of the fever in 20% of the cases. In the influenza-B outbreak described by Nigg et al. (1942) exactly the same percentage of cases developing coryzal symptoms was noted.

The fever lasted 2-6 days, and was often biphasic. There was no mental depression or debility after the attack. Total white-cell counts and chest radiography in a few cases selected at random gave results within normal limits in all uncomplicated cases.

## PNEUMONIA AS A COMPLICATION

The epidemic was complicated by pneumonia in 21 patients, all of whom came from the B.D.C. but were evenly distributed between the two emergency hospital huts in which they were housed. The proportion of pneumonia developing in all coloured patients was thus 9.6%, or in the B.D.C. contingent 13.8%. All cases started within the nine days July 1-9 (as shown in fig. 2), and there had been no pneumonia in the native troops in the previous two months. The time of onset of the pneumonia varied from 0 to 14 days after the patient's originally reporting sick with the symptoms of influenza, such intervals being similar to those described in other epidemics (French 1920, Scadding 1937, Lennette et al. 1941).

The type of pulmonary involvement was remarkably uniform and represented a fairly typical picture of

rather mild localising pneumococcal lobar pneumonia throughout, in sharp distinction to other previously recorded outbreaks of "influenzal pneumonia" (Leichtenstern 1912, Chickering and Park 1919, Stone and Swift 1919, French 1920, Scadding 1937, Maude 1918, Lennette et al. 1941). In the present series there were no necropsies, but radiographic evidence always supported the physical signs.

The onset, in all but one patient, was abrupt, with pleuritic pain and often a rigor. The temperature exceeded 104° F in every case and remained high until its defervescence, which was usually by crisis. The physical signs suggested in each case a localised area of confluent consolidation. Sputum from every patient showed considerable numbers of gram-positive cocci in pairs in the direct smear and grew pneumococci on blood-agar, usually in pure culture. Pneumococci were also grown from the blood of one patient. In every patient but one, radiography showed localised unilateral changes in one zone of the lung fields, suggesting consolidation. In the one case it seemed likely that radiographic evidence was obscured by heart shadow. All cases except four responded to sulphadiazine within forty-eight hours. The fall of temperature was more delayed in three cases, and an empyema developed in the fourth.

## SEROLOGICAL DATA

Single specimens of convalescent serum were obtained from 11 patients, in each case about fourteen days after the onset of the illness. The sera were analysed at the Army Medical School, Washington, D.C., and the results received from Colonel J. Smadel are shown in table I. The agglutinin-inhibition titres (Hirst test), in all but one case, were higher for influenza-B virus than for influenza-A virus, and afford presumptive evidence of influenza-B infection, especially where such titres as 1/1024 were recorded. Moreover, the one definitely negative serum, whose titre of 1/8 was so much lower (16 times) than the next lowest titre, makes it even more probable that the others had been recently infected with influenza-B virus.

## PNEUMONIA IN RELATION TO TYPE OF INFLUENZA

Most previous reports of post-influenzal pneumonia were probably drawn from influenza-A outbreaks. Such pneumonia seems always to have

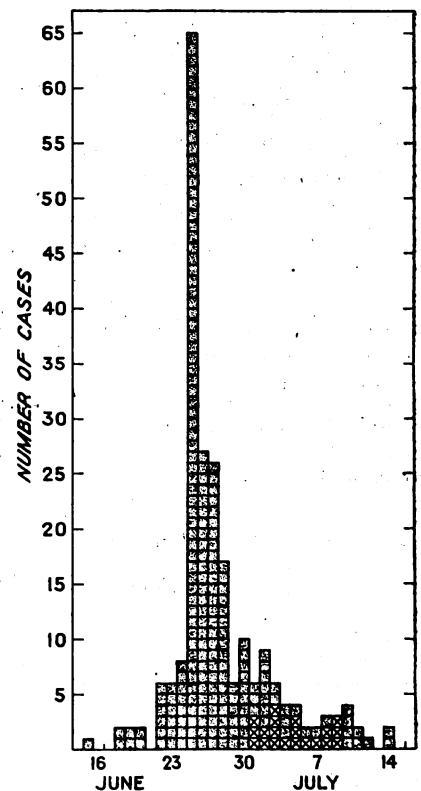


Fig. 2.—Time distribution of 219 influenzal cases, admitted to hospital, among 650 coloured troops in the Bahamas (attack-rate 34%). The date is that of the patient's first reporting to a doctor. There were no cases in the period May 1-June 14. Each cross represents onset of pneumonia as a complication.

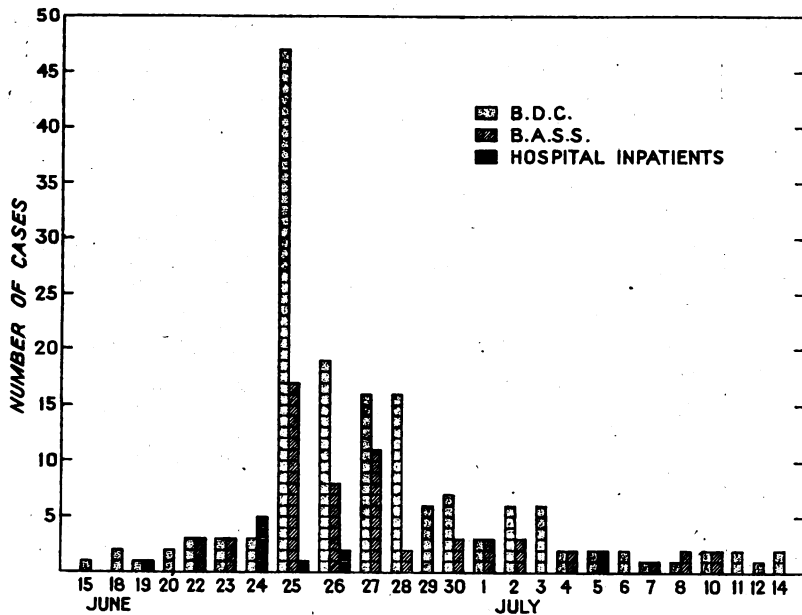


Fig. 3—Time distribution of the same influenza cases as in fig. 2, according to source, plus 8 hospital inpatients.

differed vastly from the true classical lobar type. Now, pneumonic involvement following influenza B is believed to be less common than after an influenza-A infection (Stuart-Harris 1945). Nigg et al. (1942) reported an influenza-B outbreak in 76 patients and staff of a mental hospital in Minnesota in 1942. Pathological changes were demonstrated by radiography of the chest in 8 patients, and 4 were said to have had lobar pneumonia. All these 4 patients died. Pneumococci were isolated from the sputum of all 8 patients. Otherwise little seems to have been published on influenza-B pneumonia since the discovery of the influenza-B virus by Francis (1940), though there have been reports from America of fourfold rises in B antibody serum titre in outbreaks of clinically non-influenzal true lobar pneumonia, without any concurrent influenza in the neighbourhood (*United States Army Medical Department Bulletin* 1945).

RELATION OF EPIDEMIC TO INFLUENZA ELSEWHERE

Since the middle of April, 1945, there had been small outbreaks of influenza in many parts of the world, and whenever a virus was incriminated it turned out to be the influenza-B virus. Places concerned included Colorado,\* Texas\* (June and July), Indiana,\* S. Carolina, Virginia, California,\* Washington, and Dakota\* in the United States; the Hawaiians\* (June), Guam,\* Manila (May-July), Alaska,\* Panama\* (July), and S. America (July and August). It was even recorded in other islands of the West Indian group, in Jamaica (June) and Dominica (July and August). (*United States Army Medical Department Bulletin* 1945, *Epidemiological Information Bulletin of the UNRRA Health Division* 1945).

The Bahamas epidemic thus coincided chronologically with influenzal outbreaks in other parts of the world, and it is interesting that influenza-B virus was incriminated in many of them. All these outbreaks were in general similar in that they were sharply localised (in other places to a single camp or barracks, in the Bahamas to a single race) and showed an absence of postinfective asthenia, few severe complications, and few deaths.

In England

EPIDEMIOLOGY

On the four days Dec. 27-30, 1945, 10 coloured Jamaican Servicemen contracted a disease, clinically

\* Influenza-B virus was incriminated here.

indistinguishable from influenza, on a R.A.F. station in Berkshire with a total strength of about 1000, of whom some 65 were Jamaicans. In and about the same period there was an undoubtedly increased morbidity-rate of upper respiratory-tract infection among the white troops; but, though some of this was influenzal in type, most resembled febrile catarrh or acute coryza. In figs. 4 and 5 only cases of influenzal or febrile catarrhal type occurring in the unit and necessitating admission for over forty-eight hours are included. This picture was an almost exact replica in miniature of the Bahamian epidemic.

The 10 Jamaicans who were infected worked in different sections on the same camp, the first 6 having their sleeping-quarters in the camp, whereas the other 4, taken ill on the 30th, all slept some four miles away. None of these patients were recent arrivals in the unit, and none had been on leave during the preceding week. During the same period there were several afebrile cases of upper respiratory-tract infection which may well have been influenzal, but these are not included; hence the attack-rate, among Jamaicans, of 15% in this small peak is a minimum.

Following this outbreak there were one or two scattered cases of influenzal illness, and then another peak in February, when in the five days Feb. 1-5 8 more Jamaicans were attacked. The two waves are shown in fig. 5. The outbreak then came to a close. The clinical attack-rate for Dec. 28-Feb. 14 was 32% of the coloured population at risk and 2.2% for the whites.

CLINICAL NOTES

*First Wave.*—Clinically the pictures were those of typical epidemic influenza. An insidious onset with primary coryzal symptoms, reported by some authors to characterise infection with influenza-B virus, was noted in 1 case only, though 2 patients had a previous chronic nasal catarrh, a very common complaint of West Indians in this country. The clinical picture was identical with that of the Bahamas epidemic, except that a true biphasic temperature chart was not observed and the mean duration of fever was a little less. One interesting point was

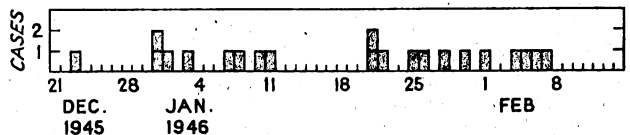


Fig. 4—Time distribution of 21 influenza cases, admitted to hospital, among 950 white troops at a R.A.F. station in Berks (attack-rate 2.2%).

that out of six differential blood films examined at the Radcliffe Infirmary, four showed atypical lymphocytes resembling Downey type 1 glandular-fever cells, and in three the mononuclear cells made up more than 50% of the total white cells (52%, 55%, 69%). On re-examina-

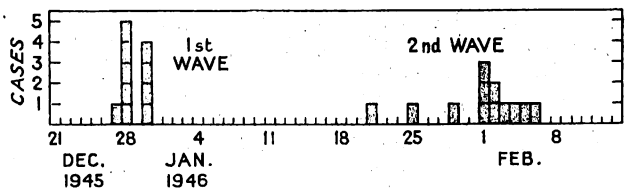


Fig. 5—Time distribution of 22 influenza cases, admitted to hospital, among 65 coloured troops at the same R.A.F. station as in fig. 4.

TABLE II—RESULTS OF SERUM ANALYSES

Race	Date of onset of illness	A		B		Result
		Acute	Conva-lescent	Acute	Conva-lescent	
Coloured	Dec. 28	64	64	64	512	Pos. B
"	Dec. 28	128	128	128	1024	Pos. B
"	Dec. 30	64	128	128	1024	Pos. B
"	Dec. 30	64	256	128	1024	Pos. B
"	Dec. 30	64	64	256	1024	Pos. B
White	Dec. 31	..	128	..	128	† Neg.
"	Jan. 1	..	32	..	64	† Neg.
"	Jan. 3	..	64	..	64	† Neg.
"	Jan. 8	..	64	..	128	† Neg.
"	Jan. 7	..	64	..	128	† Neg.
"	Feb. 7	64	128	128	512	Pos. B
Coloured	Feb. 2	128	512	128	128	Pos. A
"	Feb. 2	128	128	128	256	Neg.
"	Feb. 7	128	512	32	64	Pos. A
White	Feb. 7	32	128	16	16	Pos. A
"	Feb. 7	64	128	32	64	Neg.
Coloured (second attack)	February	64	..	512	256	Neg. B
White	February	64	128	64	128	Neg.

tion some weeks later the abnormality was still present. The Paul-Bunnell test was negative in 5 of these cases tested once.

Later cases among the Jamaicans, including those of the second wave, were much more catarrhal and in ordinary circumstances would not clinically be considered influenzal at all. In this they were more like the cases among the whites, in whom a coryzal onset was the rule (in 67% of patients, against 36% of Jamaicans, in the whole outbreak). In general, too, the later cases had a lower and shorter fever.

Throughout the whole outbreak the onset was very variable; it might be abrupt or follow premonitory symptoms which had lasted as long as a week, catarrhal or general, highly febrile or afebrile.

There were second attacks in 4 Jamaicans, days between the two onsets being 13, 30, 35, and 50. The serum of 1 was positive for influenza-A virus in the second attack. In all 4 cases the second illness was more coryzal, without general aching in back and limbs.

In these few cases there was no clinical distinction between patients whose serum gave a negative result, was positive for influenza-A virus, or positive for influenza B, except that the first wave of influenza-B patients presented more general constitutional symptoms and fewer catarrhal symptoms than did the later mixed cases—the opposite of previously recorded differences between influenza-A and influenza-B infections (Hare et al. 1943a and b, Beveridge and Williams 1944).

#### SERUM EXAMINATIONS FOR INFLUENZA-VIRUS ANTIBODY

Specimens of serum in both acute and convalescent stages were taken from 5 patients in the first wave, and in all cases the virus-B antibody titre was at least quadrupled in the second specimen. This outbreak was therefore one of influenza B. Convalescent sera samples only were taken a little later from 5 white patients who had had a clinically similar illness, but these did not show a high titre of either A or B antibody. One of these white men had a second influenzal type of illness a week after his serum sample had been taken, and a later sample showed that his second illness had been influenza B.

The results from the second peak were less uniform. Serum from 2 Jamaicans demonstrated influenza-A infection, and from 1 other was negative. A second attack in 1 Jamaican produced no rise in A or B antibody, his first illness having been influenza B. Of the white men 1 was shown to have had influenza A, and the serum from 2 others was negative. One of the latter was an inpatient when his illness started, and so he was the subject of close observation from his first premonitory symptom. He had a fairly severe attack of absolutely characteristic clinical influenza, much more typical than that of some other patients whose sera were positive for either A or B. This second peak, therefore, was composed of a mixture of influenza A, an influenzal type of illness with negative serology, and perhaps influenza B also, as opposed to the first, apparently pure, influenza-B wave.

All sera were examined at the National Institute for Medical Research by Hirst's standard technique (Hirst 1942), and I am indebted to Captain J. A. Dudgeon for the analyses (table II).

#### COMPLICATIONS

A moderately severe follicular tonsillitis developed in 1 case about eight days after the onset of influenza and two days after the patient had been discharged from sick-bay. A lobar pneumonia developed in 1 patient just a week after his influenza started, when he appeared almost fully recovered from this. His history and appearance were identical with those of the Bahamian pneumonia patients, except that his sputum remained extremely scanty throughout and was never bloodstained.

#### COMPARISON WITH OTHER R.A.F. STATIONS

The records of five other stations in the vicinity were examined, and the doctors in charge were interviewed. It was found that there had been, at four of these, similar influenzal outbreaks, virtually confined to West Indians. The peaks in all cases coincided with the two periods Dec. 23–Jan. 5 and Jan. 27–Feb. 16. Unfortunately no serological examinations had been made, and so these records are of clinical interest only. The only station without a Jamaican influenzal wave was the nearest of all to the camp considered above, at which virus was incriminated.

At another station, in the Midlands, there was a wave among Jamaicans between Jan. 22 and Jan. 31: 64 cases occurred in some 296 West Indians (22%), but only 13 in some 2600 white personnel (0.5%) (Halson 1946). Serological investigations were positive for influenza-A virus in 3 cases and negative in 3 others, comparable to the findings in the second wave in Berkshire. Clinically the picture was typical of influenza, without any preponderance of catarrhal symptoms. There were no complications.

#### SUMMARY

Two epidemics of influenza are described showing extraordinary similarities in that the epidemic peaks were made up entirely of coloured British West Indian personnel, despite differences of season and of country. The reason for this previously unrecorded phenomenon is not known.

There is evidence that the Bahamian epidemic was one of influenza B, whereas the more recent epidemic in England was mixed but due to influenza-B virus at the start.

Epidemiologically the outbreaks differed in that the one in England consisted of two waves; but the total attack-rate (32%) over the whole period of the outbreak in England was very similar to that (34%) in the single peak in the Bahamas.

Evidence from other stations suggests that these phenomena were generalised in England in the winter 1945–46 and not isolated occurrences at one camp only.

The uniform lobar type of pneumococcal pneumonia complicating the Bahamian epidemic was very unusual

and was recalled strikingly by the single case which occurred as a complication in the outbreak in England.

I am greatly indebted to Captain J. A. Dudgeon for analyses of the 1946 sera; to Colonel J. Smadel, of the Army Medical School, Washington, D.C., by whose courtesy Dr. J. Salk kindly obtained and forwarded the results of serum analyses performed in America; to Dr. R. L. Vollum for his help in obtaining serum samples; and to Squadron-Leader H. Halson and other station medical officers for permission to use their data.

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## ICTERUS GRAVIS NEONATORUM

## END-RESULTS OF TREATMENT BY BLOOD-TRANSFUSION

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THE father of a baby with icterus gravis neonatorum asked me: "What do you promise me if you save the baby's life by blood-transfusion? A normal child? Or will it have something wrong with it?" This question prompted me to visit personally and review six babies whom I had successfully treated by blood-transfusion for this disease in 1944 and early 1945.

The average age of the babies is now eighteen months, and the accompanying table shows the genotype of the parents, the number of siblings in each family, and the end-result of survival by treatment with blood-transfusion. As most textbooks give only a short space to this grave disease of the newborn, perhaps it may serve some purpose to discuss the aetiology, diagnosis, and treatment in the light of recent research.

**CASE 1.**—The third child of the family, and the second to be affected, this baby had severe jaundice and showed signs of cerebral irritation due to affection of the nuclei of the brain by the jaundice (a true kernicterus). The Hb was never below 60% (Sahli), and there was no evidence of erythroblastæmia in the blood film. Four transfusions of 100 c.cm. of group-O Rh-negative blood were given. The end-result is an imbecile child.

**CASE 2.**—This baby was brought to hospital, thirteen days after birth, because of extreme anæmia, and was moribund. The blood-count was below 700,000, Hb 18% (Sahli), and erythroblasts and normoblasts comprised 20% of the field in the blood film. The baby was transfused once with 120 c.cm. of group-O Rh-negative blood and made a rapid recovery.

In this family the first five children were normal. After a severe miscarriage the mother was given a transfusion of an apparently homologous blood and had a most severe reaction (the blood was probably homologous within the ABO system only). The sixth child, born the following year, was extremely jaundiced and died of meningitis (kernicterus?) at four months; it was born jaundiced and remained jaundiced. The seventh child (case 2), the mother avers, was born "not yellow but pale, and grew paler." The child is now extremely healthy and robust.

**CASE 3.**—This was a second sibling, again showing erythroblastæmia, anæmia, &c. It was transfused three times with 100 c.cm. of group-O Rh-negative blood. It is now a normal healthy child.

**CASES 4 and 5.**—Twin girls with jaundice at birth and both showing erythroblastæmia, but the twin with the least evidence of erythroblastosis was the more deeply jaundiced and more gravely ill. They were each transfused with 120 c.cm. of group-O Rh-negative blood. The twin which showed the more toxic symptoms is undoubtedly by far the more backward. It is spastic and cannot walk or feed itself, whereas the other is apparently a normal healthy child.

**CASE 6.**—This is the third child of the family, and the first to be affected. It was extremely jaundiced (toxic) and showed no evidence of interference with the hæmopoietic system. It had retraction and fixation of the head and neck, and was extremely sensitive to touch and light. I am not yet prepared to say whether it is a normal child—I doubt it.

## ÆTIOLOGY

There seems now to be no doubt but that icterus gravis neonatorum is caused by the iso-immunisation of the mother, by an antigen present in the fœtus (inherited from the father) which the mother lacks, and the subsequent passage of the antibody to this antigen into the fœtal circulation; where it exerts its noxious effect in different ways. Much has been written since 1944 about the rhesus antigens; the number of different antigens seems to increase monthly. There is also no doubt but that iso-immunisation of the mother takes place outside the rhesus system—indeed within the ABO system (McCall et al. 1944). Numerous instances have been reported during the past year.

## DIAGNOSIS

A common feature of all cases of icterus gravis neonatorum is jaundice apparent at birth or appearing within a day or two of birth. The vernix caseosa may be very yellow. The typical and bizarre picture of some cases of erythroblastæmia is not always present and is not essential to the diagnosis. Investigation of the family will usually show that the first child escapes the disease, as iso-immunisation of the mother is unlikely in a first pregnancy. At the same time it has to be remembered that, in these days of multiple blood-transfusions for divers diseases, a mother may be immunised against rhesus by having had transfusions of blood homologous within the ABO system only—the rhesus factor having been ignored (Callender et al. 1945). This is undoubtedly happening. The final test in the diagnosis is the discovery of anti-rhesus or other abnormal antibody in the maternal serum; "finding anti-rhesus in the maternal serum makes the diagnosis almost certain" (Taylor and Race 1944a).

There seem to be, however, three very distinct pathological types, and these three types suggest that so far the subject is not completely investigated:

(1) *Hydrops fatalis*, where the child is usually stillborn or dies within an hour or two of birth. It is generally cedematous, usually jaundiced, with skin inclined to peel, and has all the signs of a most severe toxæmia with large effusions into the serous cavities.

(2) The *toxic jaundice* type, where clinically there is evidence of a very severe jaundice and generally symptoms of cerebral or extrapyramidal irritation. The child may show definite signs of cerebral irritation, such as the typical cry, fixed position, retraction of the head, and extreme sensitivity to touch or light. Generally there is no erythroblastosis and the jaundice is not due to hæmolytic and is the true icterus gravis neonatorum.

(3) The third type is the *true erythroblastæmia*, where the jaundice is not so severe. The child is more pale than yellow, and the jaundice seems to be due to hæmolytic. The anæmia is more evident to the eye than is the jaundice. Here the blood picture is typical of a profound

## ANALYSIS OF CASES OF ICTERUS GRAVIS NEONATORUM TREATED BY BLOOD-TRANSFUSION

Case	Parental blood-groups			Siblings	End-result
	Parent	Pheno-type	Geno-type		
1	F. M.	B, Rh +ve A, Rh -ve	B, R <sub>1</sub> R <sub>1</sub> A, rr	1st child normal 2nd child died of jaundice within a week 3rd child icterus gravis	Imbecile
2	F. M.	A, Rh +ve A, Rh -ve	A <sub>1</sub> R <sub>1</sub> R <sub>1</sub> A, rr	1st to 5th children normal 6th child died of jaundice—kernicterus at 4th month 7th child erythroblastæmia neonatorum	Normal healthy child
3	F. M.	O, Rh +ve A, Rh -ve	O, R <sub>1</sub> R <sub>1</sub> A, rr	1st child well and healthy 2nd child erythroblastæmia neonatorum	Normal healthy child
4	F. M.	A, Rh +ve O, Rh +ve	A <sub>1</sub> R <sub>1</sub> R <sub>1</sub> O, R <sub>1</sub> R <sub>1</sub>	1st child stillborn (anencephalic) 2nd child, miscarriage at 3 months 3rd and 4th sibs twins, both showing erythroblastosis	One twin normal, the other spastic and backward
5					
6	F. M.	A, Rh +ve B, Rh -ve	A, Rr B, rr	1st child normal 2nd child slight jaundice 3rd child icterus gravis	Suspected of spasticity and backwardness

All mothers except 4 and 5 (twins) had anti-rhesus antibody in varying amount in their sera. In 4 and 5 it was suggested (1944) that "some irregular agglutinin of the St type may be the culprit." One would also point to the high percentage of the homozygote father, there being one heterozygote father in this series.

F.—father; M.—mother.

disturbance of the hæmopoietic system, which seems to have taken the full brunt of the toxin. The film shows a high percentage of nucleated and immature red cells; early and late erythroblasts and normoblasts form a high percentage of the cells; and there are usually macrocytosis and polychromasia. The red-cell count is low; so also is the Hb percentage. It is undesirable to include all groups under either icterus gravis or hæmolytic disease, because not all cases are hæmolytic, nor are all cases severely jaundiced.

On the preventive side little or nothing so far has been done to prevent the occurrence of these catastrophes in the affected newborn. If, in the future, "a polysaccharide responsible for the specificity of the rhesus antigen can be isolated, its injection into the mother may neutralise the antibody and prevent or diminish its harmful effects on the foetus" (Taylor and Race 1944a). Or is the answer to prevention to come on the day when an individual will be better known by his blood type than by his fingerprints, and marriages considered in terms of compatibility of blood genotypes rather than of temperament?

## TREATMENT

So far as present knowledge is concerned, the only treatment offering survival of the affected child is transfusion with group-O rhesus-negative blood until such time as the exact nature of the offending antibody has been ascertained, which can only be done in a laboratory fully acquainted with the complex subject. Whitby (1942) has written that "the homologous blood-transfusion is the ideal tissue graft," but one has to be certain that it is homologous. "The genes for the various blood groups and secretion appear to be in different chromosomes and so provide linkage markers for five (excluding sex) of the 24 pairs of chromosomes, whilst the characters themselves permit the division into a very large number of types thus: ABO × MN × Rh × P × secretion is 6 × 3 × 11 × 2 × 2, equalling 792 types" (Taylor and Race 1944b). Though all types are not important in

deciding the appropriate blood required, it is becoming increasingly evident that the exact nature of the offending antibody has to be investigated.

So far I have used group-O rhesus-negative blood till such time as I have had an exact report, the amount of blood being 10–20 c.cm. per lb. of body-weight, varying according to the blood requirements. The affected baby is also artificially fed, as the antibody may be secreted in the mother's milk. This treatment is also recommended where hæmolytic disease is due to iso-immunisation by an antigen other than rhesus.

Finally, to revert to the question of what can be offered to the parents of the affected child. It seems to me that only the cases of true erythroblastæmia are amenable to treatment by blood-transfusion, and here it must be remembered that transfusion per se is not a cure for erythroblastæmia. "It does not prevent the hæmolysis of the child's own cells, it merely provides cells that will not be destroyed more rapidly than normal, and on which the child can live until the lytic process ends" (Taylor and Race 1944a).

And what are we to do with the child that clinically appears to be a definite candidate for the dread kernicterus, and destined to be affected one way or another, from backwardness and spasticity to imbecility?

## SUMMARY

The end-results of treatment by blood-transfusion of six infants suffering from icterus gravis neonatorum are given. It is suggested that the offending antigens and antibodies are still imperfectly understood, and more research is required.

It seems that the results are satisfactory in true erythroblastæmia only. In the "toxic jaundice" type there is grave risk that if the child recovers it will be faulty to the point of imbecility.

A fresh nomenclature and a more detailed pathology seem desirable.

## ADDENDUM

Since this article was written Coombs et al. (1946) have described a test for the detection of the in-vivo sensitisation by maternal Rh antibody of the red cells of infants with hæmolytic disease, and have found thereby an antigen and its antibody of a type previously unknown. Their case 15, where the child died of jaundice without anæmia and where the direct test was negative, seems to confirm that the true pathology of the disease or diseases has not yet been elucidated.

The blood examinations in all my cases were performed by the Galton Serum Laboratory Unit at Cambridge, and I am indebted to the late Dr. G. L. Taylor, of that laboratory, who initiated me into the intricacies of the rhesus factor and supplied me with literature on the subject, and to Dr. R. R. Race who has carried on this help.

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AFTER a lapse of six years, publication has been resumed of the Paris journal, *Annales de Médecine*. It was published regularly every month during the war of 1914–18 but the German occupation in 1940 was too much for it. The editors say that they preferred silence to servitude under an arbitrary and oppressive censorship. They are publishing four issues this year and hope to begin regular monthly publication next year.

Another journal to come to life again after six years of war is *Rivista di Medicina Aeronautica*, published in Rome. The present issue, for January–June, 1946, carries a supplement containing a list (with titles also in English, French, and Spanish) of papers on aviation medicine published in Italy in 1940–46.

## DETECTION OF AMINO-ACIDS IN URINE AND OTHER FLUIDS

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AMINO-ACIDS can be detected and identified in protein hydrolysates and other amino-acid mixtures by a method first used by Gordon et al. (1943) and further improved by Consden et al. (1944), who deal fully with the theory of their "partition chromatogram" and its application to amino-acid separations. It is only necessary to repeat here that the separation takes place owing to the different relative solubilities of each amino-acid between the water which is invariably held in the cellulose fibres of ordinary filter paper and a solvent, not miscible with water, which is allowed to creep slowly along the filter paper past a spot which contains the amino-acid mixture. The amino-acids are drawn along at definite speeds behind the moving solvent and thus arrange themselves in a characteristic order. After visible development by the ninhydrin reaction they can be provisionally identified.

In their original investigation Consden et al. (1944) took great care to avoid the presence of inorganic salts in the amino-acid mixture to be separated. They stated that "mixtures in which the ratio of soluble inorganic salts to amino-acids is high give unsatisfactory chromatograms." This, however, has not been my experience so far as concerns the inorganic salts constantly present in biological fluids, for their method has now been successfully applied to urine, protein-free blood filtrate, and other fluids, in which the ratio of inorganic salts to amino-acids may be anything up to 15 to 1. The method as now applied appears to constitute a valuable research and possibly diagnostic weapon.

### TECHNIQUE

Full details as applied to pure amino-acid mixtures can be found in the paper by Consden et al. (1944). There are two versions of the process, the one-dimensional and the two-dimensional. The one-dimensional method uses a single strip 2 cm. wide and 45 cm. long of no. 1 Whatman filter paper and one solvent. It is easy to operate and, with liquefied phenol as the solvent, is used to detect pathological amounts of amino-acids. Fig. 1 shows the apparatus used here. In the case of urines, 25 c.mm. has been used as a routine. The urine is placed evenly from a small pipette right across the strip along a pencil line drawn about 6 cm. from the end which is to be dipped into the solvent, several applications being made, and left to dry, so that the urine is confined to as narrow an area as possible. The solvent is allowed to creep about 25 cm. past the urine line. This takes about sixteen hours. The strip is then removed, dried at 100° C, sprayed with 0.1% ninhydrin in butyl alcohol, and heated for ten minutes at 100° C. The amino-acids, if any, develop as purple bands. Normal urines vary in amino-nitrogen concentration from 10-30 mg. per 100 c.cm., as determined by formol titration (Van Slyke and Kirk 1933). They usually show two faint bands which have moved about 0.37 and 0.57 of the total distance that the solvent edge has travelled from the urine line. (This fraction is called the R<sub>f</sub> value by Consden et al. (1944).) These bands are believed to be due one to glycine and the other to alanine. A further faint band is often seen at about 0.80. A urine with a total amino-nitrogen concentration of over 40 mg. per 100 c.cm. is easily distinguished. Fig. 2 shows developed strips from a normal urine and from a case showing progressive amino-aciduria, the Fanconi syndrome (see McCune et al. 1943). Fig. 3 shows the serial strips from a fatal case of

subacute necrosis of the liver. Normal urines have been found in all cases of uncomplicated infectious hepatitis so far investigated. The colours of the ninhydrin reaction fade slowly and must be compared against standards at the time of development. For the photographs the urines were stored at 5° C over thymol and later tested and developed simultaneously.

The two-dimensional technique is more tedious but makes possible the identification of the amino-acids. Its use can be restricted to those fluids already sorted out as of potential interest by the strip method. The spot of liquid to be tested is placed near one corner of a large square of no. 1 Whatman filter paper (22 in. × 18 in.), and an adjacent entire edge of the paper is dipped into the first solvent. The cabinet required for this process will take two squares at a time and is described fully in the original paper (Consden et al. 1944). It must be emphasised that the cabinet should be kept at a constant temperature as far as possible during the development of a chromatogram. A small inside room has been found suitable here. The amino-acids are thus drawn out into a row of spots exactly as in the one-dimensional method. The paper is then dried and turned through a right angle, and the other adjacent edge is dipped into the second solvent. This moves the amino-acids in a direction at right angles; and, when the two solvents have very different properties, two amino-acids moved at the same speed by the first solvent may be separated by the second. All the amino-acids are thus separated from each other on the face of the paper and are developed visibly as before.

The two-dimensional method is also applicable to biological fluids. Fig. 4 is a diagram of the position of the amino-acids on the partition chromatogram made from 25 c.mm. of urine from a case of Fanconi syndrome. The amino-acids were identified by measuring their rates of movement in each solvent, the rates being characteristic for the amino-acids in question. A rough quantitative estimate of each amino-acid can be made by matching the size and intensity of the developed ninhydrin reaction with a known amount of the same pure amino-acid, run on the two-dimensional chromatogram and otherwise treated in exactly the same way as the unknown mixture. This procedure is necessary, as the strength of the colour reaction differs widely in an unpredictable way for equimolecular amounts of different amino-acids.

### SPECIFICITY OF METHOD

The ninhydrin reaction as used above is practically specific for amino-acids and polypeptides. Some ammonium salts may give weak colours with ninhydrin (Cherbuliez and Herzenstein 1934), and where any of these are likely to be present they should be tried on the chromatogram to see how they move in the various solvents. The salts of the simpler organic acids (acetic, lactic) do not appear to interfere. Most other substances reported to react with ninhydrin (Copley 1941) are unlikely to occur in body fluids. The only serious confusion likely to

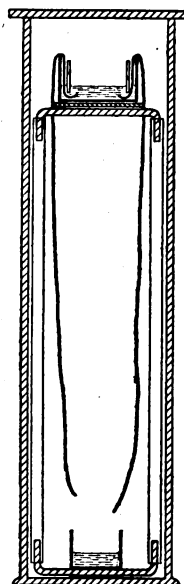


Fig. 1.—Apparatus for one-dimensional chromatogram. It is contained in a glass specimen-jar 18 in. × 5 in. × 4½ in. fitted with a close-fitting glass lid. A staining trough 3½ in. × 2½ in. × 1½ in. contains the solvent (usually phenol) and stands on a glass plate on a support made of glass rod standing on legs of glass tubing. One end of the paper strip is dipped into the trough and held in position by a glass slide. The paper hanging down cannot adhere to the side of the trough, as the glass plate juts out a little way. A beaker below contains phenol and water to keep the atmosphere saturated and prevent evaporation from the strips. The apparatus will take six strips at a time.

arise is in the case of simple di- and tri-peptides. This is a possible source of error in the identification of an amino-acid, and it should be suspected when a spot is found in an unusual position. The permanence of a spot after hydrolysis to break up the polypeptides would then have to be investigated.

Consden et al. (1944) have dealt fully with the question of the constancy of the position of the spots when pure amino-acid mixtures or protein hydrolysates are separated on the chromatogram. It only remains to illustrate how this has been confirmed for the amino-acids already identified in urines. Five separate two-dimensional chromatograms on three different urines from the same patient gave Rf values in phenol differing by not more than 5% for the amino-acids: glycine, alanine, serine, threonine, and tyrosine and for a few other spots due to amino-acids not yet finally identified. The Rf values in collidine were more variable, up to 25%, but this could be largely related to the temperature at which the chromatogram was run, faster speeds being consistently obtained with lower temperatures and vice versa. The positions of the bands on the one-dimensional chromatogram were also constant among themselves, but by following the technique described here the Rf values were not closely comparable with those on the two-dimensional method. For instance the Rf value in phenol for glycine averages 0.37 on the former and 0.42 on the latter, a difference of 12%.

As an illustration of the method of identification of amino-acids, a urine from a case of Fanconi syndrome can be mentioned. This urine gave always four strong spots on the two-dimensional chromatogram roughly appearing in the positions expected for glycine, alanine, serine, and threonine. By trial and error it was found that a synthetic mixture containing 8 µg., 6 µg., 3 µg., and 5 µg. respectively of these acids closely matched in size

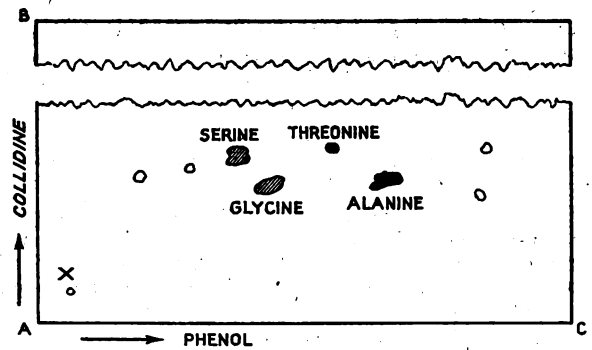


Fig. 4—Diagram of a developed two-dimensional chromatogram from the urine of a fatal case of Fanconi syndrome complicated by carcinoma of the liver with widespread secondaries. The urine was placed on the circle (x) at the left-hand corner. The edge AB was dipped in phenol and the test run for 46 hr. After drying, the edge AC was dipped in collidine and run for 53 hr. The four strongest spots have been identified as shown. The remaining weaker spots are not yet identified. The amino-nitrogen concentration in the urine was 38 mg. per 100 c.cm.

and strength the spots obtained from 25 c.mm. of the urine. This, therefore, also gave a rough estimate of the concentrations of the amino-acids in the urine. The corresponding Rf values are given below:

	Phenol	Collidine
Glycine in urine	0.43	0.22
Alanine " "	0.62	0.26
Serine " "	0.34	0.27
Threonine " "	0.53	0.30
Glycine in synthetic mixture	0.42	0.22
Alanine " "	0.62	0.25
Serine " "	0.35	0.28
Threonine " "	0.50	0.30

These figures leave little doubt about the identity of the amino-acids in the urine, nor could the other urinary constituents have interfered in any way with the development of the chromatogram. However, it must be emphasised that, in view of the temperature effect and other variables, the synthetic mixture must always be run simultaneously in the same cabinet with the unknown. Some of the Rf values in the table above do not agree closely with those quoted by Consden et al. (1944).

Many other ways of confirming the identity of a doubtful spot could be tried—e.g., the addition of known "marker" amino-acids to the urine, and the removal of a spot from the chromatogram after specific precipitation of the amino-acid from the urine or after its destruction by a specific enzyme.

OTHER USEFUL APPLICATIONS

The strip method has been used to detect casein hydrolysate in the diarrhoea stool of a patient receiving oral therapy at Belsen. It was estimated that a large proportion was passing through the gut unabsorbed.

Study of cystinuric urine (from a case of Mr. F. J. F. Barrington's) suggests that the strip method would be of diagnostic value in this condition.

Serum and ascitic fluid can be run on the two-dimensional chromatogram, provided that the proteins are precipitated by ten times the volume of alcohol, followed by final concentration on the water-bath to an amino-nitrogen content of about 50 mg. per 100 c.cm. This involves a concentration to about a tenth of the original volume of serum or ascitic fluid.

The method is particularly suitable in experimental work. Rats with acute necrosis of the liver, brought on by a diet low in

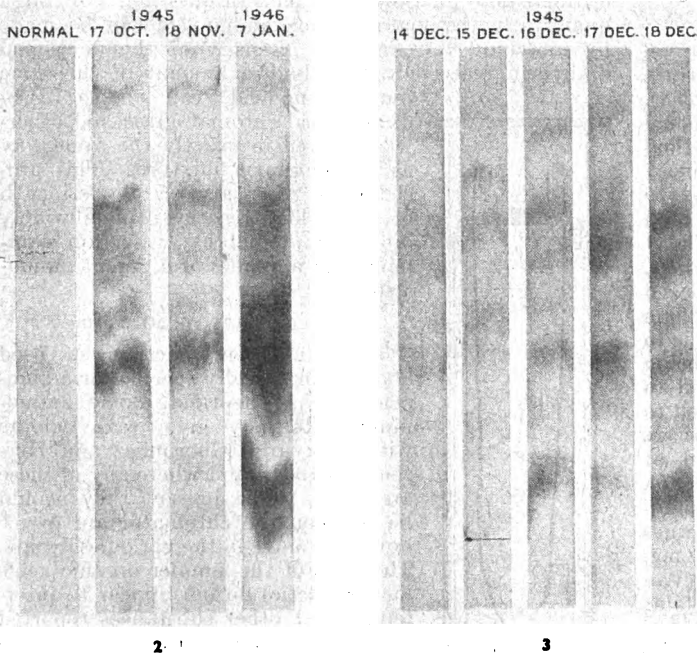


Fig. 2—Developed strips showing the amino-acids in the form of bands. The upper line shows where the urine was placed, the lower line marks the limit of phenol movement. The first strip is typical of a normal urine (amino-nitrogen concentration 13 mg. per 100 c.cm.). The next three strips are from a patient with progressive amino-aciduria (Fanconi syndrome) and were passed on the dates shown (amino-nitrogen concentration 46, 44, and 112 mg. per 100 c.cm., total 24-hr. output of amino-nitrogen 740, 910, and 1480 mg.).

Fig. 3—Developed strips from a case of subacute necrosis of the liver admitted with severe jaundice and ascites on Nov. 30, 1945. The urine then gave a normal chromatogram. On Dec. 6 the amino-acids were stronger but still judged within the normal range. The urines of last few days all containing a pathological excess of amino-acids are shown above. The patient died on Dec. 19 in coma. No tyrosine or leucine crystals were seen on microscopic examination of the urines.



cystine and methionine, have been found to excrete a large excess of amino-acids in the urine. Even if only 50 c.mm. is available from the bladder post-mortem, this is ample for both the one- and two-dimensional techniques to be applied. Bile pigments do not appear to interfere.

Many other applications to diseases of metabolic origin can be surmised. An opportunity to test the urine from a case of acute yellow atrophy has not arisen.

#### SUMMARY

A simple method is described for detecting an excess of amino-acids in various body fluids. The amino-acids can be identified with certainty by an elaboration of the method, which also allows of a rough quantitative estimate.

I thank Prof. A. C. Chibnall and his department for valuable advice, and Prof. H. P. Himsworth and Dr. D. Hunter for providing rare pathological material.

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## LEUCOTOMY TECHNIQUE

D. G. DUFF

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 LATELY CONSULTING SURGEON TO NORTH WALES  
 COUNTIES MENTAL HOSPITAL, DENBIGH

THOSE with much experience of frontal leucotomy will agree that, in well-chosen cases, the results, so far as we can see, can be remarkably good, if not easily explicable. Hopeless and miserable misfits of social life, who for years have resisted all other methods, may be made happy and useful members of the community.

Leucotomy is without doubt often performed with hesitancy and inadequacy, and without very definite knowledge of the exact plane of section or the amount of white matter cut (Meyer and Beck 1945). The immediate risk of the operation is hæmorrhage due to blindly cutting across cerebral vessels which vary in position. Examination of frontal lobe sections (fig. 1) will show the wide variation in grey-matter conformation, not only between different individuals and sexes but also between the two hemispheres of the same person.

In 1942, using the Moniz method of trephining on either side of the bregma, I found that a curved probe-pointed bistoury could section the frontal white matter very

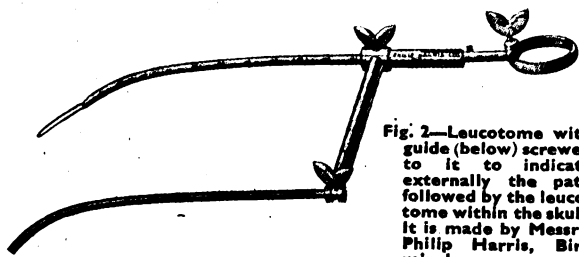


Fig. 2.—Leucotome with guide (below) screwed to it to indicate externally the path followed by the leucotome within the skull. It is made by Messrs. Philip Harris, Birmingham.

thoroughly, but there was a risk of severing branches of the anterior cerebral artery in the longitudinal fissure as well as vessels deep in the sulci on the exterior of the cerebrum.

Later, a sabre-shaped leucotome was given blunt edges which would not cut vessels, though they went easily through brain tissue. It was made as a

cannula to give information should the lateral ventricle be punctured, for the optimal plane of section is agreed to be just in front of the anterior horn. A loop of snare wire was made to project from the cannula end (fig. 2). This was meant to cut closely under, or even into, the grey matter where the risk of cutting vessels was greatest. The wire is just sufficiently resilient to be deflected on meeting the tougher resistance of vessels big enough to bleed, but to resume its cutting once the obstruction is overcome. A centimetre scale was marked on this "cannula-leucotome." Satisfactory results were obtained, and over 30 cases have since been done without the least fear of intracranial hæmorrhage.

Local anaesthesia has as a rule been used, and with suitable premedication the patients are usually coöperative and unworried about the operation. Trephining has often a soporific effect.

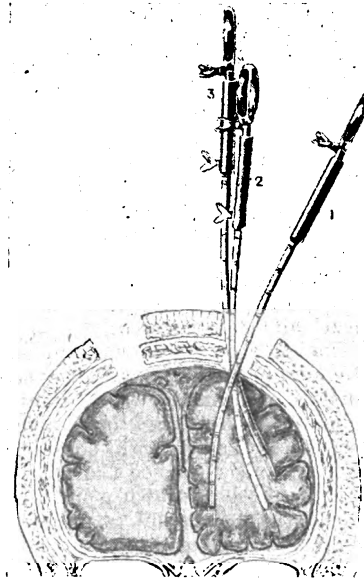


Fig. 1.—Coronal section of frontal lobes, showing wide variations in cerebral anatomy of two hemispheres (drawn from different brains) and method of using leucotome: (1), (2), and (3) indicate successive positions of leucotome cutting at the site of section. (1) Leucotome approaching the falx cerebri in the longitudinal fissure; (2) leucotome swept outwards; (3) leucotome withdrawn upwards. Some brain sections show even more intrusion of grey matter and blood-vessels than that illustrated on the left side. (For clarity the guide is omitted.)

#### TECHNIQUE

Some landmarks are marked on the shaven head with gentian violet—viz., the glabella; the midline point 13 cm. behind this (Freeman and Watts 1942), which is often the bregma; the orbital process of the frontal bone; a point a third of the way back from the nasion to the external auditory meatus (a calliper is used); and the upper margin of the zygomatic arch. To determine the mid-point of the vertex is not always easy, for even control measurements from the zygomatic arch on each side may be inaccurate owing to skull asymmetry. (A suitably nicked wire hoop is used.)

A bradawl is pushed through the anaesthetised scalp 3 cm. on either side of the bregma, and the skull thus pitted for the subsequent reception of the central pin of the 1/2-in. trephine or burr. An incision 3.5 cm. long is now made sagittally through the puncture mark, the pericranium stripped back, and the self-retaining retractor inserted. The trephine is operated with a brace; and, when the bone button is removed, a puncture place near the centre of the exposed dura is chosen which will provoke the least meningeal hæmorrhage—for this could prove more time-consuming than all the rest of the operation.

With snare wire fully retracted into the leucotome, this is pushed down through the frontal lobe till it touches the orbital plate of the frontal bone. It is kept just anterior to the plane a third of the way back from the nasion to the external auditory meatus, for this is ordinarily just in front of the anterior horn of the ventricle, which may reach forward to a plane half-way

between the nasion and the anterior clinoid processes. Should the anterior horn be punctured, fluid welling up will give the indication for reinsertion a little further forward.

The depth at which the orbital plate is reached is noted—e.g., 7–10 cm. (The bone is arched upwards.) The leucotome is withdrawn for a distance of 2 cm., and the snare wire is pushed down to project 1 cm. The leucotome is moved inwards towards the middle line, till it is judged close to the falx in the longitudinal fissure (<sup>1</sup> in fig. 1). Resistance to its blunt edge is felt which will not let it go further, and the movement is done with confidence that branches of the anterior cerebral artery, even in abnormally deep sulci, will be pushed ahead and not severed.

The leucotome is now swept outwards (<sup>2</sup> in fig. 1), the wire loop passing close to, or even cutting into, the thin, usually uniform layer of grey matter; the patient sometimes winces slightly as a sensitive area is touched. Occasionally sulci with contained vessels are present here, and resistance to the point is felt; the leucotome can then be withdrawn a little as required. When it is judged that the point is under the grey matter of the external surface of the brain, the instrument is gradually withdrawn upwards (<sup>3</sup> in fig. 1), the snare wire being kept close under the brain surface, with the expectation that, should vessels in deeper sulci be encountered, the loop will be deflected and will not damage them.

The leucotome is removed, resterilised, and reinserted on the other side, where a similar operation is performed.

Some such technique is required to allow for the great variations in cerebral structure: differences in the extent to which grey matter intrudes on white, the depth of the sulci, the position and size of vessels, and the projection of the ventricular horn. It is expected in this way to make leucotomy (provided always that aseptic technique is faultless) no more dangerous to the patient than ordinary minor cerebral diagnostic procedures, possibly as little noxious as electric-shock therapy.

#### RESULTS

Detailed results of cases done with this technique will come more reasonably from the psychiatrists responsible for the patients. Only cases adjudged otherwise hopeless, of long duration, and resistant to all other treatments were treated by leucotomy. In some cases full recovery was not looked for; we hoped only for removal of suicidal, homicidal, or otherwise dangerous, destructive, or asocial habits, so that the patients should be made manageable and useful in the institution.

With this technique no death can be attributed to the operation nor has any patient been made worse. Of my 27 patients operated on since developing this technique, 4 showed practically no change, 7 are improved but still inpatients, and 15 were recovered sufficiently to resume life, and sometimes new and more responsible work, outside.

One died six weeks after operation with signs of congestion of the lung and pulmonary collapse. Necropsy showed that the white fibres of the brain had been adequately sectioned. There was no hæmorrhage, though the cut extended below to  $\frac{1}{2}$  in. from the inferior aspect of the brain. In this case the superior frontal sulci penetrated  $1\frac{1}{4}$  in. into the cerebrum, sulci on the medial aspect  $\frac{1}{2}$  in., and those on the external aspect  $\frac{3}{4}$  in., with the result that the white matter showed very irregular projections and vessels would be easily cut by a different leucotome.

Patients with signs of postencephalitic parkinsonism not only made good psychological recoveries after years of psychosis but also showed physical improvement. One with distressing symptoms of parkinsonism, chiefly unilateral, had a contralateral hemileucotomy with most satisfactory results (Schwarz 1945).

A further point must be emphasised about an operation so comparatively easy and occasionally so dramatic in its

results, for it is a thrill (on occasion) to see the lines of anxiety disappear and the patient suddenly become extrovert and interested for the first time in his surroundings just as the second hemisphere is cut. The decision to operate must not be influenced by the enthusiasm of the surgeon and the impatience of the relatives but must be strictly controlled by the mature experience of the institutional psychiatrist.

The work here outlined is directly due to the stimulus and encouragement of Dr. J. H. O. Roberts, medical superintendent, N. Wales Counties Mental Hospital, and to the zealous cooperation of Dr. E. Schwarz and Dr. R. S. Wilson, whose craftsmanship was so valuable in making the leucotome.

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### Medical Societies

#### ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE

AT a meeting of the society on June 20, with Dr. C. M. WENYON, F.R.S., the president, in the chair, a paper on

##### Researches on 'Paludrine' in Malaria

was read by Prof. N. HAMILTON FAIRLEY, F.R.S. In the south-west Pacific, he said, mepacrine had been used successfully as a suppressive drug in malaria under conditions of jungle fighting. The annual malaria-rate in Australian troops in hyperendemic areas fell from 740 per 1000 in December, 1943, to 26 per 1000 in November, 1944. At Wewak, in New Guinea, however, a definite epidemic occurred in April–July, 1945, when 23·3% of the force had overt attacks. Here a strain of *Plasmodium falciparum* relatively resistant to mepacrine existed, requiring 2 tablets of mepacrine daily for its effective suppression, compared with the normally effective dose of 1 tablet daily; in infected volunteers this was not eradicated by the standard quinine, mepacrine, and pamaquin treatment followed by maintenance doses of mepacrine. Such resistance had very rarely been observed before. This strain was, however, responsible for only a part of the malaria at Wewak, most of the malaria casualties being caused by mepacrine-susceptible strains of *P. falciparum* and *P. vivax*, while the high rate of malaria casualties in this area was due to the failure of mepacrine discipline.

During the researches on malaria chemotherapy by the Medical Research Unit of the Australian Army, some 850 healthy volunteers had been experimentally infected with malaria, and in the experimental investigations on paludrine more than 200 volunteers had been experimentally infected, while many hundreds of troops with relapsing benign tertian malaria had been treated under controlled conditions with the drug. While taking 100 mg. of paludrine daily for three weeks after being infected with *P. falciparum* by infected mosquitoes, volunteers developed no symptoms of malaria, parasites never being demonstrated in their blood either by microscopic examination or by subinoculation from the seventh day onwards of 200-c.c.m. of blood into fresh volunteers. The negative subinoculation results on the seventh day after infection, and the subsequent failure to develop demonstrable blood parasites or attacks of malaria when drug administration ceased, indicated destruction of parasites in the pre-erythrocytic stage. In other words, the drug was acting as a causal prophylactic in falciparum infections.

While taking 100 mg. of paludrine daily for three weeks after being infected with *P. vivax* by infected mosquitoes, volunteers similarly developed no symptoms of malaria, parasites were never demonstrated in thick blood smears, and subinoculation of blood on the ninth day did not infect volunteer recipients. After ceasing paludrine, however, all these originally infected volunteers subsequently developed delayed attacks of overt vivax malaria. It was evident that paludrine was acting only as a partial prophylactic in these benign tertian infections.

Volunteers also received as many as 130 *P. falciparum* and 120 *P. vivax* infective bites while taking 100 mg. paludrine daily. During this period they were subjected to severe stresses and strains, including (1) long marches in hilly country in a tropical climate, from 30 miles in twenty-four hours to 89 miles in three days; (2) chilling by exposure in a freezing chamber; and (3) injections of adrenaline and insulin. The daily dose of paludrine was continued for two weeks after the last exposure to infection, which covered a period of two months. Throughout the three-month period no symptoms of malaria were noted and parasites were never demonstrable in thick blood smears. Some twenty-four to thirty-three days after the last dose of paludrine, overt vivax malaria developed but never falciparum malaria.

A single dose of 50-100 mg. of paludrine, given at 48, 72, 96, and 120 hours after exposure to heavy falciparum infection, acted as a complete causal prophylactic, but 100 mg., given three hours before or 144 hours or more after exposure to infection, did not prevent overt malaria, indicating that the pre-erythrocytic parasites were much more susceptible to paludrine than were either the sporozoites or the asexual erythrocytic parasites. In larger doses the erythrocytic parasites could be destroyed by the schizonticidal action, but it is doubtful whether paludrine exerts any lethal action on the sporozoite.

The practical conclusion reached from this and other experiments is that paludrine in a dosage of 1 tablet (100 mg.) twice weekly, given at three or four days' interval, will entirely prevent falciparum malaria and will effectively suppress vivax malaria throughout the period of drug administration.

Normally *P. falciparum* appears in submicroscopic quantity in the blood from the seventh day after infection by mosquito, but three or four days usually elapse before parasites are demonstrable in thick blood films. Volunteers exposed to heavy biting with falciparum-infected mosquitoes and given 100-200 mg. of paludrine from the seventh to the twenty-first day were completely cured by the schizonticidal action of the drug; sub-inoculation of blood on the seventh day was positive and produced in the recipients attacks of malignant tertian malaria.

When hospital patients suffering from overt attacks of falciparum malaria received a course of 100 mg. of paludrine twice daily for ten days, the clinical response was satisfactory, parasites disappeared within two days from the blood, and 104 out of 105 patients were radically cured. No other drug is as effective as paludrine in the radical cure of malignant tertian malaria.

In relapsing vivax malaria the clinical response was in no way superior to that obtained with quinine or mepacrine. Insufficient time has elapsed to assess the proportion of radical cures. A three weeks' course of the drug followed by a maintenance dose of 100 mg. twice weekly for six months is regarded as holding out the best prospect of cure.

The outstanding quality of paludrine as a schizonticide is the smallness of the dose required to resolve a clinical attack of malaria. A single tablet (100 mg.) will lead to disappearance of symptoms and to disappearance of parasites from blood smears in overt attacks of malaria caused by either *P. vivax* or *P. falciparum*.

Though clinical cure is regularly attained with 100 mg., radical cure is not to be expected and recrudescence or relapse follows in a few weeks. The possibilities of this single-dose régime, however, open up an entirely new field in the chemotherapeutic control of malaria in hyper-endemic areas, not only on account of its schizonticidal effect but also because of its extraordinary potency as a causal prophylactic in single doses of 100 mg. or less, given two to six days after infection.

Gametocyte production was not primarily affected by the drug. Provided the primary wave of asexual parasites was not terminated early, the secondary gametocyte wave followed its normal curve, but if asexual parasites were eliminated in the first day or two of fever, minimal gametocyte production resulted. In other words, in both *P. falciparum* and *P. vivax* infections, paludrine acts as a secondary and not as a primary gametocide. Gametocytes taken into the stomach of a mosquito

from a carrier on the first day of paludrine therapy underwent normal exflagellation and fertilisation, with the formation of travelling vermicles which penetrated the gut wall and formed oöcysts. These oöcysts, however, did not grow normally, and they degenerated. Complete sterilisation of the infection resulted in mosquitoes fed on a carrier an hour after the first dose of paludrine had been administered. When mosquitoes were fed on a carrier on the second day of paludrine administration, gametocytes failed to develop as far as the oöcyst stage; this effect continued until paludrine administration ceased and the drug was completely eliminated from the blood of the carrier. Though paludrine does not directly inhibit the formation of gametocytes or modify the microscopical appearance of those already formed, complete sterilisation of the gut infection in mosquitoes (*P. falciparum* or *P. vivax*) results when 100-150 mg. has been administered to a carrier; this effect is not irreversible but persists as long as paludrine is present in the blood.

Paludrine *in vitro* acts on *P. falciparum* in the pre-schizont or schizont stage, inhibiting nuclear division and producing degenerative changes in the chromatin and cytoplasm. Similar changes were found in blood smears from patients infected with *P. vivax* and treated with paludrine. Interference with some enzyme or coenzyme system controlling nuclear division may be the method by which the drug adversely affects the multiplication of asexual parasites. A similar action on early exoerythrocytic forms would explain the negative subinoculation results and failure of the erythrocytic forms to appear in the blood at the normal time in volunteers infected with sporozoite-transmitted malaria while taking paludrine.

The difference between the effective therapeutic dose and the toxic dose is very considerable. Minor and transient toxic effects have followed the administration of 1 g. daily. These consisted of troublesome vomiting, which was common, and signs of irritation of the renal tract, which was rare. A transient increase in myelocytes with a maximal rise on the seventh to ninth day was often observed with this large dose. With lower doses, such as 300 mg. daily for fourteen days, no significant toxic symptoms were observed.

#### DISCUSSION

The PRESIDENT said that the evidence brought forward strongly suggested that the difference between *P. falciparum* and *P. vivax*, from the point of view of persistence of infection, lay in differences in their respective endothelial development, the first parasite passing through only 2 or 3 endothelial cycles occupying six or seven days, whereas the second had an endothelial stage persisting for several months with an indefinite number of cycles.

Brigadier J. A. SINTON, F.R.S., emphasised the potential importance of paludrine as a suppressive antimalarial drug among indigenous semi-immune populations, in whom probably relatively small doses at weekly intervals would be efficient.

Dr. D. G. DAVEY felt that the chemotherapy of the exoerythrocytic forms would give the answer to the problems of malaria therapy. Experiments on these lines, however, would require an organisation such as had existed at Cairns, but this centre had now shut down. Much human suffering could be relieved if a means could be found to continue such an organisation. Paludrine was only eighteen months old and more had been discovered about it than was known about mepacrine, although the latter drug was already ten years old at the beginning of the war.

Dr. C. C. CHESTERMAN, pointing out the importance of children as reservoirs of infection, speculated on the effect of paludrine given from birth onwards. Would such a procedure be of ultimate benefit, or might it not, through inhibiting the acquisition of individual immunity, prove just the reverse? It was proposed to examine this question in a mission in Africa.

Dr. F. MURGATROYD wondered whether combining pamaquin with paludrine had any effect on lowering the incidence of relapse in benign tertian infections, as did pamaquin combined with quinine.

Dr. H. S. STANNUS remarked that the evidence that paludrine acted by interfering with the normal nuclear

division of the malaria parasite might have wider implications in cancer research.

Dr. J. D. KING asked about the toxic effects of paludrine.

Professor FAIRLEY, in reply, thought it possible that in the presence of premunity the suppressive and curative dosage of paludrine might be considerably reduced and the intervals between doses increased. Premunity was bought, however, at a great price with high infant mortality, while chronic malaria in the older age-groups produced widespread ill health. If these grave effects could not be averted while at the same time retaining the advantages of allowing premunity to develop, it might be necessary to aim at complete causal prophylaxis and radical cure of overt malaria. As regards toxicity of paludrine he said there was a remarkable latitude between the optimal dose and the toxic dose. In benign tertian infections there was evidence that pamaquin and paludrine combined were more efficacious than paludrine alone, though delayed relapses still occur after a single short course of the combined drugs.

## Reviews of Books

### Diagnosis and Management of the Thoracic Patient

Editor: C. P. BAILEY, M.D. London: J. B. Lippincott. Pp. 334. 24s.

THIS symposium of articles which is published in the "American Practitioner" series serves a useful purpose in giving a clear exposition of some of the less-known facets of chest surgery, and an interesting and up-to-date account of American practice. In the surgery of pulmonary tuberculosis the chapter on resection gives the indications and potential complications of this adventurous undertaking. The technique of bronchial closure and the after-treatment of lobectomy and pneumonectomy are well discussed. The results in 32 cases were not uniformly successful, but as this form of surgery passes from the experimental to more experienced stages improved results may be expected. Another relatively novel procedure—cavernostomy—is also discussed as a useful operation in certain forms of tuberculous cavitation. The statistical section on carcinoma of the lung contains figures on incidence, metastasis, and morbidity; in a limited number of cases treatment by extirpation gives a hope of cure.

Transthoracic approach to the upper end of the stomach has certain advantages, and the possibility of maintaining an effective anastomosis between oesophagus and stomach or intestine has now made resection of lower oesophageal or gastric growths practicable. The results show that there is a considerable future in this branch of surgery. Among the commoner forms of chest disease, more space might have been spared to the suppurative conditions. Bronchiectasis, lung abscess, and chronic empyema are considered in some of their aspects, but the deliberate omission of acute empyema presupposes a standard of treatment that is rarely achieved in practice.

### A Future for Preventive Medicine

EDWARD J. STIEGLITZ, M.S., M.D., F.A.C.P. London: Oxford University Press. Pp. 73. 6s.

In this provocative book Dr. Stieglitz asks for a broad conception of the scope of preventive, or constructive, medicine, and regrets that the reciprocal effects of medicine and the technical, social, economic, and political changes in American life have not been appreciated. He recognises that perfect health is an abstraction, that the benefits of purely preventive measures are demonstrable only statistically, not individually, and that statistics have little or no emotional appeal. Almost all our public-health activity has been directed to obstetrics, child health, and the prevention of epidemic disease; now it is imperative to cultivate the fitness of the adult population and to reduce so far as possible incapacity due to such things as nervous and mental disease, cardiovascular disease, and the arthropathies. Many causative agencies are usually at work, and he divides these into predisposing, provoking, and perpetuating. He argues that attention must not be solely concentrated on provoking factors, as in the past. Since improvements depend on the coöperation of the individual, there is

ample scope for enlightened health education. Research and education are, indeed, fundamental in the new conception of preventive medicine, for health can never become a matter of inalienable right. Dr. Stieglitz is under no delusions about the limitations of a State service designed to "give" health to the people by means of legislation. The focus of attention is usually upon the administrative machinery, and any attempt to set up a super-plan to dominate the future of preventive or curative medicine en masse becomes, in his view, simply a vicious impertinence. The true responsibility of society is to make available the means by which health may be pursued and conserved, remembering that each citizen must accept considerable personal responsibility.

### An Introduction to Clinical Perimetry

(5th ed.) H. M. TRAUQUAIR, M.D., F.R.C.S.E., consulting ophthalmic surgeon, Royal Infirmary, Edinburgh. London: H. Kimpton. Pp. 330. 36s.

IN spite of its title this book is a fairly complete guide to the subject. From the retina to the occipital cortex, the author gives an excellent account of those lesions, whether due to injury, disease, or abnormal metabolism, which affect the visual nerve paths, and therefore produce a visual field defect which can be recorded on a perimeter or Bjerrum screen. The subject matter is non-controversial, and has hardly been altered at all in this edition, but the anatomical terminology has been brought into line with modern usage. The production of the book has been much improved since its last war-time publication, and now its lucid print and wealth of illustrations leave nothing to be desired. One would have liked to hear Mr. Traquair's views on the nutritional amblyopia seen in large numbers in prisoners from Japan and the Far East; but the author has confined himself to accepted fact, and the exact lesion in nutritional amblyopia is still in dispute.

### The American Pocket Medical Dictionary

(18th ed.) W. A. NEWMAN DORLAND, A.M., M.D. Philadelphia and London: W. B. Saunders. Pp. 1061. 10s.

"Big Dorland" is a well-tryed companion of all who need to keep abreast of technical medical language. "Little Dorland," its junior by two editions as well as in size, is a plump convenient volume which will stand comfortably on the doctor's desk beside Martindale and *Clinical Methods*. It manages, by dint of smaller type and an absence of pictures, to be nearly as informative as its senior; but it must have been intended for a capacious American pocket measuring more than 6½ in. deep and 4 in. wide, able to take a book at least 1¼ in. thick.

### The Modern Treatment of Diabetes Mellitus

WILLIAM S. COLLENS, M.D., chief of the diabetic clinic, Israel Zion Hospital, Brooklyn; LOUIS C. BOAS, M.D., assistant in the clinic. Springfield, Ill.: Charles C. Thomas. Pp. 514. \$8.50.

IN this year of insulin's 25th anniversary the historical introduction to this book makes delightful reading. The authors classify diabetic patients, according to the severity of their disease, into nine groups, beginning with the obese mild diabetic and ending with the diabetic in coma. The doctor is shown how to calculate a diet for each type, and the insulin dosage for each of six types of case requiring this treatment is deduced from an appropriate glucose-insulin ratio. Not all will accept the usefulness of a single theoretical criterion of this kind—particularly for the child, the insulin-resistant case, and the case in diabetic coma—and at other points in the book theoretical considerations seem to outweigh clinical observation. The traditional stomach lavage for the vomiting of diabetic ketosis is, for example, condemned; the separate injection of soluble and protamine insulin in place of the mixed daily dose is advocated; and the pregnant diabetic is allowed to go to term. The authors believe that, with modern management, no uncomplicated case of diabetic coma should be fatal.

While the English diabetic may note with envy the detailed analysis of foods which have long been absent from his diet, his doctor may well be thankful that a national diabetic association has secured for his patients planned rations of protein and fat which usually make it unnecessary to calculate the proportions of these and of the total calorie requirements.

# THE LANCET

LONDON: SATURDAY, NOV. 2, 1946

## The Basic Salary

THE House of Lords has fulfilled its function admirably in its review of the National Health Service Bill. Some had expected the course of the Bill through the Upper House to be little more than a formality; but even our abridged reports suffice to show that all the many points at issue were carefully re-examined. On those chiefly concerning doctors the views of the profession were ably presented and carried proper weight. The Government were persuaded to adopt a number of useful alterations in the Bill, and by several other amendments carried against the Government's wishes the House of Lords has compelled the Minister of Health and the House of Commons to think again. The Bill as now modified will shortly go back to the Commons, and if the changes made are not accepted there a further interchange of views will take place between the two Houses. In this the Government would have reason to be conciliatory; for unless an agreed text can go for Royal Assent before the prorogation of Parliament in about a week's time, the Bill will be lost for this session. Which would almost certainly mean that the introduction of the National Health Service was postponed.

The anxiety felt so widely about the responsibilities and powers of the hospital management committees<sup>1</sup> found formal expression—somewhat oddly—in an amendment declaring that these committees shall have the privilege of suing and being sued in respect of contracts into which they enter. The indignation of the metropolitan boroughs of London at the transfer of so many of their functions to the local health authority (the London County Council) was endorsed by an amendment obliging the L.C.C. to delegate these functions back to the boroughs. But the Government reverse that is of greatest interest to the medical profession was on the question whether general practitioners in the new service should receive part of their income in the form of a basic salary. Accepting the advice of Lord MORAN and Lord HORDER, and rejecting that of Lord ADDISON, the House of Lords in committee decided by 53 votes to 37 that “the remuneration to medical practitioners undertaking to provide general medical service . . . shall be fixed by the capitation method except in any cases where the Minister on the recommendation of the Medical Practices Committee considers that exceptional circumstances necessitate remuneration on a different basis.”

Though the payment of doctors is one of the subjects still awaiting negotiation, Mr. BEVAN has made it plain that he likes the “ingenious compromise” by which every practitioner would receive (1) a basic salary and (2) a capitation fee for each patient on his list. This arrangement, which was in fact much favoured among those doctors who replied to the British Medical Association's questionnaire

two years ago,<sup>2</sup> has several conspicuous advantages: it is an attempt, as the Minister put it, “to introduce into the system two desirable elements—the element of security for the individual, and the element of competition in order to sweeten and refresh the service.” The basic salary would give confidence and support to the young man in the difficult days before he has enough capitation fees to provide a livelihood, and by varying its amount those responsible for the service could attract practitioners to unpopular areas, could compensate them for particularly hard conditions of work, and could recognise special experience or outstanding merit. The basic salary would bring in what Lord ADDISON called “a better way of paying people” which does not depend on the (not always edifying) competition for patients; but it would still leave the practitioner with a strong financial incentive to succeed in that competition—to remain, as Lord MORAN puts it, on his toes. Thus the Minister's compromise is, as he claims, ingenious. Lord HORDER was quite right, however, in saying that the arguments in its favour have made no impression on the profession as a whole, who “have got it firmly fixed in their minds that this is the most vital spot at which the Government can attack the independence of the doctor.” The call to resist conscription into a “State salaried service” is one which rightly evokes a powerful response in medical hearts, and a major cause of resistance to the present Bill is that it empowers the Minister (if Parliament will consent to his regulations) to decide whenever he likes that all practitioners in the service shall henceforth be paid by salary alone. Moreover, though much can be said for diminishing, or even abolishing, competition for patients as well as for fees, it is not really essential to the establishment of the new service that practitioners should be paid partly by salary. Alternative expedients serving the necessary purposes could be devised, even if they proved a little inconvenient: for example, entrants to practice could be given maintenance grants; and a special bonus, or a higher capitation fee, could be paid for disagreeable work, and perhaps for special experience. Meanwhile, under the Lords' amendment, the effect of basic salaries, or even the abolition of capitation fees, could be further studied in areas such as the Highlands and Islands, where exceptional conditions clearly call for exceptional treatment. The profession can be convinced only by further evidence.

Very shortly, perhaps at the end of this month, the British Medical Association will ask each one of us whether we do or do not want our representatives to enter discussions on the regulations to be made under the Bill. If those who have to answer this question had heard the debates in the House of Lords they would hesitate long before replying in the negative; for they could scarcely fail to see that the vast and complicated project in which their help is invited is based rather on recognised necessities than on the political aims of the party now in power. The principal changes made in the scheme by Mr. BEVAN when he succeeded Mr. WILLINK as Minister of Health concern the hospital services; and it is remarkable how much support these bold changes now receive from the hospital world. Apart perhaps from the embargo on the sale of practices, about which

1. See *Lancet*, July 20, p. 103; Oct. 5, p. 493.

2. *Brit. med. J.*, 1944, ii (Suppl., p. 25); see *Lancet*, 1944, ii, 213, 222.

opinions differ, the only feature of the proposed general-practitioner services on which Mr. BEVAN can fairly be accused of being doctrinaire is his inclusion of a basic salary in the remuneration of all practitioners, whether they need it or not. He has now been given an opportunity to withdraw gracefully from this position, and for the sake of unity we hope he will take it. We agree with Lord HORDER that, when it comes to the point, the profession will do their utmost to work this Bill "be it good or bad." But they have yet to reach that point; and their utmost will be far more valuable if, before they reach it, every removable misgiving is removed.

### Influenza B

IN 1940 FRANCIS and MAGILL independently described an influenza virus antigenically distinct from those encountered before. This has been christened influenza virus B—the original virus of SMITH, ANDREWES, and LAIDLAW being virus A. By retrospective examination of stored sera FRANCIS found evidence that virus B was concerned in an extensive influenza outbreak in California in 1936. Similar serological studies showed that some of the influenza present in England in the early months of 1939 was due to the same virus. Virus B has since been recognised as the cause of numerous outbreaks in North America, the West Indies, Argentine, Australia, and Britain. Clinically, influenza B seems to be indistinguishable from its fellow, influenza A. Earlier reports suggested that it had a more insidious onset and rather more catarrhal symptoms; but these differences have not proved to be constant. The disease has a more endemic character than A, turning up in minor local outbreaks but rarely causing major conflagrations. The larger mortality peaks in this country seem always to have been due to A. The Americans<sup>1</sup> have attempted to analyse curves of influenza periodicity on the assumption that two viruses, A and B, were responsible, A having a 2–3 year periodicity and B one of 4–6 years. There is likely to be a longer period between B outbreaks, because virus B is apparently a better antigen than A and gives a more durable immunity. In the laboratory, B viruses have hitherto been harder to isolate than A, since they do not readily produce symptoms in ferrets, and, as Dr. DUDGEON and his colleagues report on another page, may not be easily adapted to infect mice. Fortunately they can be persuaded, perhaps more easily than A viruses, to infect eggs; and Hirst's hæmagglutinin test can be readily applied to their recognition and study in the embryonic fluids of those eggs. As with virus A, there are serological varieties of virus B; but the importance of these races in epidemiology is still obscure.

The two papers in this issue should be read with this background of knowledge in mind. For the first time that we know of—and almost certainly for the first time in the last 15 years—virus B has been the main cause of a flu outbreak in this country. But, as both the papers show, its incidence has been capricious. The predilection for coloured victims, reported by Flight-Lieutenant JACKSON, is curious in view of the absence of reports from the U.S.A. of any specially heavy incidence among the negro population there. This tendency to hit part of a

community heavily and another part hardly at all suggests that the conditions for its epidemic onslaught may be highly critical. If so, we may hope for much from preventive measures, whether these involve aerial hygiene or specific prophylaxis. Indeed, FRANCIS and colleagues<sup>2</sup> have lately reported results from vaccination which are more promising than any hitherto recorded, and the experience of others in America is said to be equally encouraging. We cannot tell yet whether such success against influenza B is due to greater antigenic potency of B vaccines or to the critical conditions necessary for its activity or to other circumstances in this particular trial.

The relation between influenza and pneumococcal pneumonia was much discussed<sup>3</sup> during the epidemics of 1917–18, when a purulent bronchitis sometimes leading to bronchopneumonia was the usual picture, though a frank lobar pneumonia was occasionally seen. JACKSON encountered a high incidence of a mild localising pneumococcal lobar pneumonia among his influenza patients in one unit in the Bahamas. The U.S. commission on acute respiratory diseases<sup>4</sup> has also recorded an epidemic of type I pneumococcal pneumonia in which many patients showed serological evidence of concurrent infection with virus B.

To the doctor seeing cases of influenza it does not immediately and obviously matter whether he is faced with virus A or B, or with "clinical influenza" due to neither. But to one who is studying epidemiology or attempting prevention the differentiation of this disease may be highly important.

### Q Fever in Europe

THE observations made among Brisbane slaughterhouse workers by DERRICK<sup>1</sup> in 1937 have now helped to reveal yet another cause of atypical pneumonia. He described 9 cases of a hitherto undescribed pyrexial illness in these men, and BURNET and FREEMAN<sup>2</sup> isolated the causative rickettsia, since known as *R. burneti*, from their blood and urine. DERRICK called this illness "Q fever," and its subsequent history has justified its intriguing name, though "Q" in fact merely stood for Queensland. In 1938 DAVIS and COX<sup>3</sup> in the United States reported the isolation three years previously of a filter-passing infective agent derived from the American wood-tick *Dermacentor andersoni*, in which it was hereditary. This organism was shown to be one of the rickettsias, and a case of laboratory infection with it in America ran a similar course to the Australian cases of Q fever. Careful comparison of the Australian and American strains of the rickettsia did not show any important difference between them, and accordingly the American name *R. diaporica*, given in allusion to the filtrability of the organism, was dropped in favour of *R. burneti*. Until recently the number of published cases was less than two hundred, of which the bulk came from Queensland, and apart from laboratory infections only one proved case had been reported in America.

In the original Brisbane outbreak the disease resembled mild typhus. The onset was sudden, with

2. Francis, T. jun., Salk, J. E., Brace, W. M. *J. Amer. med. Ass.* 1946, 131, 275.

3. Abrahams, A., Hallows, N. F., Eyre, J. W. H., French, H. *Lancet*, 1917, ii, 377.

4. *Science*, 1945, 102, 561.

1. Derrick, E. H. *Med. J. Aust.* 1937, ii, 281.

2. Burnet, F. M., Freeman, M. *Ibid.* p. 299.

3. Davis, G. E., Cox, H. R. *Publ. Hlth Rep., Wash.* 1938, 53, 2259.

1. *Amer. J. Hyg.* 1946, 43, 29; see *Lancet*, 1946, i, 539.

headache, malaise, fever, and pains in the limbs and back. Headache was a constant and troublesome symptom, often interfering with sleep. The fever was remittent, usually ranging between 102° and 104° F, sometimes ending by crisis between the sixth and ninth days and sometimes by lysis after a fortnight or longer. The pulse-rate was relatively slow. Minor chest signs were noted in some cases. The Weil-Felix reaction was negative throughout the disease, nor was there any significant change in the blood picture. In a laboratory outbreak at the National Institute of Health, Bethesda, Maryland, patchy consolidation of the lungs, out of proportion to the physical signs, was shown to be a feature of the disease. Accordingly *R. burneti* became recognised as an additional member of the group of agents, including various bacteria, the viruses of influenza and psittacosis, and the fungus *Coccidioides immitis*, capable of producing an "atypical pneumonia."

Now this disease has been reported in Europe,<sup>4</sup> for several outbreaks of atypical pneumonia among Allied troops in Italy and Greece, as well as in Panama, were established to be Q fever. The first outbreak to be investigated was in a British paratroop regiment early in 1945, during and after their departure from Greece; the remainder were in units of the U.S. Army. Several strains of rickettsia were isolated and compared with each other and with the original Australian and American strains. Complete cross-immunity existed between all of them, and, though considerable variation in sensitivity was observed in antigens prepared from the different strains, all were believed to be examples of *R. burneti*. The epidemiology of the disease remains somewhat obscure. In Australia bandicoots form the natural reservoir of the disease, which is spread among them by ticks. That cattle may acquire a natural infection has been shown by complement-fixation tests, and DERRICK suggested that the slaughter-house workmen had been infected by the inhalation of dust containing dried tick excreta brought in on the hides of cattle. No reservoir of infection or arthropod vector was discovered in the Mediterranean outbreaks. The evidence there was that the disease was a "place infection" and that case-to-case spread did not occur. The affected troops for the most part occupied billets, such as farmhouses and barns, where they were in close contact with cattle, rats, mice, and pigeons and with the accumulated dust of attics and haylofts. The hypothesis that the disease was acquired by the inhalation of the dried infective excreta of arthropods was consistent with the observed facts but awaits proof. Very few of the infected men complained of bites, which is evidence against, but by no means excludes, an arthropod vector.

Thus Q fever has a much wider distribution than was previously supposed. The possibility of cases being encountered in the British Isles should be borne in mind, since the incubation period (fourteen to twenty-six days) allows ample time for the journey from the Mediterranean to England before symptoms appear;

one of the outbreaks reported by the Americans occurred in troops newly arrived in Virginia after a nine days' voyage from Naples. Imported hides might also be a source of infection. Laboratory tests for Q fever should therefore be considered in obscure pyrexias and pneumonias. The final diagnosis of the disease rests in the isolation of the rickettsias by guinea-pig inoculation with 5 ml. of venous blood taken in the first ten days of the illness. Affected animals develop a transient pyrexia after one to two weeks. They show little change at necropsy apart from an enlargement of the spleen. The rickettsias are sought for in smears made from the cut surface of this organ, but may not be found until several animal passages have been made. The organisms grow well in the yolk-sacs of chick embryos and can be readily demonstrated there after the inoculation of infected material.

## Annotations

### SIR HENRY DALE ON SECRECY

In his valedictory address as president of the Royal Society, Sir Henry Dale, O.M., a year ago spoke of the dangers arising from "security" regulations.<sup>1</sup> Last week he returned to the subject in a speech to the National Academy of Medical Science at Philadelphia,<sup>2</sup> when he suggested that war could be prevented by an international agreement not to carry on research under military secrecy. Nobody, he said, can guess how future discovery may increase the use of science as an agent of wholesale massacre; and nobody can predict what may be the result of committing the resources which produced the atom bomb to exploit other possibilities of scientific destruction. "National leaders," he continued, "may tell scientists that they must work in secrecy. We may be warned that its abandonment would make military secrets impossible and thus compromise the rights of national sovereignty. But a national sovereignty which means the right of any nation to secretly prepare the destruction of others also means the destruction of civilisation. We must tell our leaders that as scientists we are concerned not with the maintenance of military security or national sovereignty but with scientists' freedom. The universities of the world must unite in banning secrecy from their scientific work. I suggest that each nation's universities, and then the universities of all nations, should bind themselves never to accept contracts for research, from the State or from industry, unless they are allowed to tell the results to the world. To the politicians I give this warning: if you insist on secrecy, many scientists will refuse to do the work involved."

### CAPILLARY MICROSCOPY

PATHOLOGICAL conditions in living capillaries were first directly observed in 1879,<sup>1</sup> and much has since been written on the subject, but capillary microscopy of the nail-bed is still little used by clinicians, though Davis<sup>2</sup> points out that the technique is easy and gives no trouble or pain to the patient. Twenty-five years ago Jaensch<sup>3</sup> recommended that observation of the capillaries in early childhood should be a State measure, like vaccination, so convinced was he of the correlation between capillary pattern and mental development or physical disease. The government of Meresburg, Germany, was sufficiently impressed to make its school medical officers fill in a

4. Robbins, F. C., Ragan, C. A. *Amer. J. Hyg.* 1946, **44**, 6. Robbins, F. C., Gauld, R. L., Warner, F. B. *Ibid.*, p. 23. Robbins, F. C., Rustigian, R., Snyder, M. J., Smadel, J. E. *Ibid.*, p. 51. Robbins, F. C., Rustigian, R. *Ibid.*, p. 64. Feinstein, M., Yesner, R., Marks, J. L. *Ibid.*, p. 72. Commission on Acute Respiratory Diseases, Fort Bragg, North Carolina, *Ibid.*, pp. 88, 103, 110, 123. Cheney, G., Geib, W. A. *Ibid.*, p. 158. Topping, N. H., Shepard, C. C., Huebner, R. J. *Ibid.*, p. 173.

1. See *Lancet*, 1945, ii, 748.

2. Reported in the *Daily Express*, Oct. 23.

3. Hueter, C. *Zbl. dtsh. med. Wiss.* 1879, **13**, 225.

2. Davis, E. *Amer. J. med. Sci.* 1946, **212**, 192.

3. Jaensch, W., in Brugsch and Lewy's *Die Biologie der Person*, Berlin, 1931.

questionary on the capillary findings, psychophysical condition, and past and family histories of the pupils.

The procedure has suffered from difficulty in interpreting the microscopical appearances of the nail capillaries, especially, as Leader<sup>4</sup> remarks, for those of imaginative disposition. There is a very wide and varied range of the normal. Leader, and Wright and Duryee,<sup>5</sup> quote stunted mental and physical development, Raynaud's and Buerger's diseases, erythromelalgia, and other conditions as giving typical pictures, but such findings must still be suspected to vary with the observer. Davis emphasises the use of capillary microscopy in the discovery of petechiæ. Leader found no petechiæ in the nail-bed in patients with purpura and blood diseases, and some of the petechiæ illustrated by Davis would have been described by Wright and Duryee as mere dilatations of one or both arms of the capillary loop, but there can be little doubt that they were in fact extravasations of blood. Davis says that "petechiæ when first shed were obvious collections of red blood cells, later they became darker, and appeared as a rather homogeneous mass of pigment. If examined daily the petechiæ moved further and further away from the capillaries, and faded." In a previous paper Davis<sup>6</sup> gave an imposing list of conditions in which purpura had been noted. Of his 500 cases, 63% were symptomatic purpuras, and the largest categories were benign purpuras, cardiovascular diseases including congestive failure, rheumatic diseases, and bacterial infections. The degree of purpura was often very slight. In his present paper, 533 unselected patients suffering from a variety of medical conditions were examined by capillary microscopy, and 100 of them (18.4%) showed petechiæ in the nail-bed. It would be interesting to know what percentage of these petechiæ were in the arteriovenous type of capillary and what percentage in the arterial type.

More use could certainly be made of this simple investigation. Many of Davis's patients showed petechiæ in the nail-bed when no skin petechiæ were visible at any time, and in any of the numerous conditions in which purpura may be suspected the nail-bed should certainly be examined. The characteristic capillary pictures in vasomotor conditions, in preclubbing of the fingers, and in mental and physical retardation are easily memorised and sufficiently gross at times to rule out the need for imagination in their appreciation. Larger numbers of carefully observed cases must however be reported before the capillary pattern can provide a diagnosis without other stronger evidence.

#### FROSTED WARES

How to spread the surplus of foods during gluts over periods of famine has been mankind's problem from time immemorial. He has tried salting, pickling, smoking, drying, canning, cold storage, gas storage, and intense refrigeration, but all these processes are apt to affect both flavour and food value. Sometimes the flavour is improved, as in the canning of sardines. Usually it is changed, and even to some extent spoilt (e.g., canned apples). Rarely is the food value improved, though canners reasonably claim that the amount of vitamin C left in, say, canned asparagus or loganberries compares favourably with that of the raw materials bought on the open market and cooked at home. The ideal method of food preservation would deliver the food to the table in a state looking and tasting like the fresh material and with its food values unimpaired. The modern technique of "frosting" comes near to that ideal.

In England the technique had made some progress before the late war, when quick-frozen peas and fruits were already on the market. The impact of war brought quick freezing to a standstill, but operations were

resumed in the spring of this year. In the United States the process has gone so far ahead that the housewife who likes to bake her own bread but hates the preliminaries can buy frozen dough from the "stores" and only has to thaw it and put it in the oven. The American mother,<sup>1</sup> mustering her family for the midday meal, now calls: "Get ready, everybody. Dinner's almost thawed out." Before, however, we can all enjoy the luxury of frosted foods the special refrigerators must be installed by distributors. None the less, one British firm<sup>2</sup> is going ahead and soon will be offering us french beans, runner beans, garden peas, and sliced cucumbers out of season in much the same appearance and flavour as they would have in season. When restrictions are removed, frosted strawberries, raspberries, blackberries, and currants will be offered to the purchaser in much the same way.

The method for peas is to shell, blanch, and grade them. The blanching (which consists in heating them for 1½ minutes to a temperature of 185° F) is necessary to destroy enzymes, particularly the oxidases. The graded peas are weighed into cartons, and the wrapped cartons are then passed to the air blast tunnel, where they meet a current of air cooled to -35° F. On emerging from the tunnel they are stored at 0° F. Months afterwards the peas when thawed are difficult to distinguish from fresh garden peas. Moreover their vitamin A is unimpaired, and their vitamin C, when cooked, is much the same as that of home-cooked or of canned peas. The technique is young in this country and must make its way against formidable obstacles; but in the United States, where it is older and has been encouraged rather than discouraged by war conditions, some say that it will not be long before the consumer's choice will be about equally divided between fresh, canned, and quick-frozen (i.e., frosted) foods.

#### FIELD MARSHAL MONTGOMERY ON MORALE

In his Lloyd Roberts lecture at the Royal Society of Medicine last Monday Lord Montgomery spoke on Morale, with Particular Reference to the British Soldier. Training, he said, must from the first be directed to the selection of leaders and the infusion of discipline. In battle, the characters of some grow firmer, while the characters of others are disintegrated by fear or fatigue. Morale is a mental quality which maintains human dignity and develops latent heroism; high morale draws a man forward against his own desires. It is not toughness, though tough men may occasionally perform isolated acts of bravery.

Four basic factors are essential to high morale: leadership, discipline, comradeship, and self-respect. Good morale is impossible without good leaders; all men are frightened at one time or another, and then they band themselves together and seek a leader. Fear makes men sluggish and indecisive, and the leader's power depends on his capacity to cut through this fear paralysis by decision; the nature of the decision is less important than the fact that it is made and announced with confidence; the junior leader's greatest asset is an ability to act normally in abnormal conditions, and to think rationally when his men have ceased to think. The object of discipline is the conquest of fear, whether fear attacking through the imagination—as by the sight of a corpse at the roadside—or fear promoted by periods of inaction. The awareness of danger, which is the basis of fear, can be partly overcome by teaching the soldier to lose his individuality and to think of himself as a member of a large body of men, such as a battalion. To give of their best men must be united; and obedience is essential so that they comply with orders which run counter to their instincts. Discipline implies, too, a sense of duty which, for the soldier in battle, extends only to the men around

4. Leader, S. D. *Amer. J. Dis. Child.* 1932, **44**, 403.

5. Wright, I. S., Duryee, A. W. *Arch. intern. Med.* 1933, **52**, 315.

6. Davis, E. *Lancet*, 1943, *ii*, 160.

1. *New Yorker*, August 10, 1946, p. 20.

2. Crosbie-Walsh, T. *Food Manufacture*, 1946, **21**, 417.



him. From discipline is bred comradeship; war is a rough and dirty game, but not necessarily grim. Comradeship, which is based on affection and trust, fosters good will; it is a great antidote to fear. All men have a touch of nobility, and friendship causes them to give of their best; it fills a man with warmth and strength when he feels cold and weak. The fourth essential—self-respect—may grow out of the first three. It implies an attempt to maintain personal standards. Efficiency is inseparable from self-respect; and confidence grows in the man who feels he is trusted.

Devotion to a cause is not, in Field Marshal Montgomery's view, essential to high morale. "I don't believe most soldiers are influenced by causes. I think soldiers fight for reasons which have little connexion with abstract ideas." It is true, he said, that no nation can fight an unpopular war; the soldier must be convinced of the rightness of the cause, and sometimes passive acquiescence must be altered to enthusiasm by encouragement of morale. To this rule there are some exceptions; a few officers and men are deeply moved and sustained by a cause which is, for them, more important than the ordinary components of morale.

It is possible, but difficult, to have high morale without one or more contributory factors, such as success; high morale is possible in defeat but not in long periods of defeat, while success enhances confidence in leaders and the high command. Regimental tradition may help, though in battle the soldier is concerned essentially with the present rather than with the glories of the past. Domestic worries can lower morale by making a soldier think of home and all it implies. Good administration and propaganda can also help to increase morale.

There are dangers in deliberately fostering a superb morale, because the soldier comes to think not only that he can do no wrong but that his leaders also can do no wrong; but "if the British soldier's heart is steeled, there is nothing you cannot do."

#### CANCER OF THE CORPUS UTERI

On Oct. 25 at a joint meeting in London of the British Institute of Radiology, the Faculty of Radiologists, and the radiological section of the Royal Society of Medicine, Prof. J. Heyman, of Stockholm, described the radium "packing" technique used for cancer of the corpus at the Radiumhemmet since 1934. The cavity of the uterus is packed with multiple small tubes containing 8 mg. of radium element enclosed in additional filters which are cylindrical in shape and of varying sizes and thicknesses. The number of radium tubes used and the size of the filters depends on the size of the uterine cavity, while the time varies according to the amount of radium used. The method is designed to deliver approximately the same dose of radiation to the uterine muscle in all cases, irrespective of the number of applicators required to pack the cavity. Two treatments are given at an interval of three weeks, and in addition one vaginal dose of radium is applied on one of these occasions.

Professor Heyman said that of every 100 cases of uterine cancer seen at the Radiumhemmet 20-25 may be cases of cancer of the corpus. When concentration of cancer cases at large centres, as is the rule in Sweden, becomes general in other countries, this greater incidence of cancer of the corpus is likely to become more apparent, and in all probability the number of technically inoperable cases presenting themselves for treatment will form a larger proportion of the whole. Formerly hysterectomy was the treatment of choice for all but very advanced cases, but treatment is now primarily by radiotherapy. When operation is combined with radiotherapy it is the radiotherapy which plays the most important part. Only in certain cases, such as cancer of the corpus associated with large uterine fibroids, is hyster-

ectomy the primary treatment. The operation is also performed where radiotherapy has failed, and in these it is found that there is no difficulty in removing the irradiated uterus and that a subtotal hysterectomy is sufficient.

Hysterectomy, in Heyman's view, is by no means a harmless procedure in patients over fifty years of age. In all the world literature he has found only 4 reports which include as many as 100 cases treated by hysterectomy over five years ago. Among these there is a relative five-year survival-rate of 40 to 50%, the absolute five-year survival-rate not being given. From these figures it appears that hysterectomy in the treatment of cancer of the corpus is less successful than is generally taught. At the Radiumhemmet radiotherapy is established as the primary method. The packing technique has been in use since 1934 and a five-year survival-rate of 64.9% has been obtained in cases so treated. No comparison has been possible with cases treated by hysterectomy followed by deep X-ray therapy because of the lack of significant figures published. Indeed comparable groups of cases treated primarily by hysterectomy or by radiotherapy are difficult to obtain. For example, many cases thought to be operable are found to be inoperable. Similarly some of the cases regarded as inoperable and treated by radiotherapy may in fact have been operable. The position appears to be that in the early operable cases no firm conclusion as between primary radiotherapy and primary hysterectomy can be drawn. But in groups comprising cases of cancer of the corpus in various stages of the disease, the results of radiotherapy show, in Professor Heyman's opinion, a definite superiority over those of hysterectomy alone.

#### RHEUMATISM IN SWEDEN

Prof. J. Axel Höjer, chief medical officer to the Royal Swedish ministry of health, addressing the Heberden Society in London on Oct. 26, said that up to 1925 the policy in Sweden was to treat rheumatism at isolated units. From 1925 onwards this policy had been reversed, with increasing concentration on centres, and latterly on university centres. In 1943 15% of the population had sought medical advice for rheumatic complaints. An additional 3000 beds were needed for the treatment of rheumatism and 2000 were to be set up at once. The proposal was to allot 500 beds for acute cases and 500 for chronic cases. The other 1000 beds would be in institutions for the chronic sick and in aftercare institutions; and about 20% of the beds would be in simple buildings, designed for patients not requiring much nursing attention. These could be built at half the cost of ordinary hospitals, and would be cheaper to operate. In another ten years, altogether 14,000-20,000 beds would be needed for the treatment of chronic diseases of old age, including rheumatism; at the moment only a third of this number was available. For outpatients, the country needed additional social workers, and more rural doctors and nurses to care for patients in their homes; at present Sweden had one doctor for every 1600 of the population. He hoped that the dearth of doctors and nurses would be corrected in another 10-15 years. In Stockholm a new rheumatism research institute was to be opened soon, and a further research centre was planned for Upsala.

Sir Wilson Jameson, chief medical officer of the Ministry of Health, said that news of experience and plans in Sweden was particularly welcome here at the present time. The Empire Rheumatism Council had had a difficult, and often thankless, task. The Ministry of Health could, he suggested, contribute much to further progress, since the best hope lay in an epidemiological and clinical approach.

THE next session of the General Medical Council will open on Tuesday, Nov. 26, at 2 P.M., under the chairmanship of the president, Sir HERBERT LEASON, who will deliver an address.

## Special Articles

## CARE OF CHILDREN

## THE CURTIS REPORT

SOME 125,000 children, being deprived of a normal home life, have come within the terms of reference of the Curtis Committee.<sup>1</sup> This great company of children are provided for in many ways, and—in the usual British manner—according to widely differing standards. As it is with convalescent homes, with nurses in training, with hospital food, with treatment in sanatoria, so it is with children: those in authority are willing to do their best according to local custom and their own lights; but where lights are dim there are few precedents and no enthusiasm for borrowing a drop of oil from a neighbour. Thus Miss Myra Curtis and her colleagues found some children well placed and happy in good foster homes, and some cheerful and comfortable in homes, schools, and institutions; but they also found many living a dreary and stultifying life in “drab and scoured” surroundings, others overworked and weary in the service of the “home,” and, worst of all, some neglected, dirty, ill-clad, and underfed, sharing workhouse wards with senile and mentally affected patients.

## FORMS OF NEGLECT

If the overall picture is not as bad as it would have been a hundred years ago, yet it is a great deal worse than most of us have been complacently assuming; and it is right to repeat here some of the forms of neglect to which children are subject, including some of the worst examples, because the best safeguard against their perpetuation is well-informed public opinion.

The committee found that though nurseries for small children are often—perhaps usually—well run and well equipped, older children are likely to live in comfortless surroundings, with nothing to delight the eye, often with no convenient place to play, and with no toys or play materials, such as sand or clay. Their clothes are sometimes pleasant and individual (the sort of uniform which afflicted Rob when Mr. Dombey made a “Charitable Grinder” of him seems to have gone at last) but sometimes scanty or ugly. Their food is usually, but not always, adequate. They may be given no choice in their final career, being made, perhaps, into farm hands if they are boys, and almost inevitably into domestic workers if they are girls. Though it is often claimed that girls are “trained” in this work, in fact they may be given nothing but the dull chores, without training or responsibility in cooking or other skilled work. Owing to lack of domestic staff children in some homes are doing daily as much as four hours’ domestic charring in addition to school work.

In some homes run by religious bodies the need for relaxation is scarcely recognised, and children rise at six and go to bed at eight, spending the intervening hours in a solid round of domestic duties, school work, and religious exercises. In some girls’ homes administered by a religious order 14-year-olds on leaving school are employed in the homes as laundry hands. In one case the laundry earned £85 a week by work for outside customers, while the girls seemed to be getting 2s. 6d. a week—“five shillings if they are very good.”

The committee name the means of providing normal children with a home, in order of preference, as adoption, boarding-out, and institutional care. Yet one large voluntary body discourages adoption and insists on children who have been boarded out returning to the home for training in their teens—a rule naturally objectionable to good foster-parents who wish to take a share in settling “their” child in life.

Inspection should prevent serious abuses of children in homes, but the committee found repeatedly that the recommendations of inspectors had not been followed, and moreover that during the war inspection had often been desultory, years lapsing between visits.

## WORKHOUSES AND HOMES

The worst examples of neglect were found among children in workhouses, taken there as a temporary measure, but kept there because no better quarters could be—or had been—found for them.

In one century-old poor-law institution a family of five normal children were sleeping on the same corridor as senile men and women and sharing a room with an unsightly hydrocephalic idiot. “They had been admitted in the middle of the night, when their mother had left them under a hedge after eviction from their house. No plan appeared to have been made for them.”

In a nursery (noted as exceptionally bad), linked with a public-assistance institution, eight sick children were being nursed in a ward adjacent to the adult sick ward which contained, among other chronic sick, a woman with advanced cancer of the face and also a child with chickenpox. Among the sick children was a low-grade mentally defective girl, who spent most of the day on a chair commode, and two babies with rickets. The children wore cotton frocks, cotton vests, and dilapidated napkins. The room smelt foul. A premature baby had been isolated in a large very cold ward opposite. Some 16 healthy children in the same institution were living in a corrugated hutment, feeding, playing, and using their pots in a bare day-room devoid of toys. They wore dirty cotton or flannel frocks and no knickers, and most of them had lost their shoes; their faces, but not their bodies, were clean.

Under the present law, healthy children over the age of 3 should only be received temporarily, or as an emergency measure, in public-assistance institutions; but the committee found many who had been there longer than the permitted 6 weeks, and some who had been there for months at a time. These children were not attending school. The committee formed the opinion that in most such institutions the general care of children was poor; the excuse offered was that good foster homes are hard to find. But “the worst feature was often the complete failure to provide any kind of individual interest or notice.”

The same weakness is found in some children’s homes, whether provided by voluntary or municipal bodies. Homes are of various kinds: large barrack institutions left over from the last century; grouped “cottage” homes; small homes in ordinary dwelling-houses, scattered through a district; and receiving homes, usually small, where children stay while permanent arrangements are being made for them. Some of the children in them are (like the children in workhouses) destitute and maintained under the poor-law, some are homeless children from evacuation areas, some physically or mentally handicapped, some in need of care or protection. Besides these children there are some, including war orphans, in foster homes and some in approved schools and remand homes. The ultimate responsibility for these children lies in several different departments: war orphans are the concern of the Ministry of Pensions; children cared for by local authorities come under the Ministry of Health; approved schools and remand homes, and also voluntary homes receiving public grants, are inspected by the Home Office; and voluntary homes certified as suitable for poor-law children are inspected by the Ministry of Health as well; mental defectives, most of whom are cared for by local authorities, come under the Board of Control.

## REFORMS

Thus “the problem of providing for children deprived of a normal home life has not hitherto been dealt with as a single one.” The committee have given much thought to devising means of simplifying and unifying the exercise of public responsibility. Such central control should apply, they think, not only to the classes of deprived children already recognised but to some groups who now fall outside the range of public care. These include children over 9 who have been taken

1. Report of the Care of Children Committee. Cmd. 6922. H.M. Stationery Office. Pp. 195. 3s.

under care by foster-parents for reward, children taken by foster-parents without reward, whether with a view to adoption or not, and children in voluntary homes not now inspected by any public department. They think, moreover, that when a child is found by a juvenile court to be in need of care or protection, from a local authority, that authority should be obliged to accept the responsibility without having, as at present, the opportunity of refusal.

Responsibility at the departmental level, they suggest, should lie with a children's branch of whatever department undertakes the work. This single central authority should have "an inspectorate able to judge whether the conditions of the child's total welfare as a human being exist in a particular case." At the local-authority level the present defect is that no-one feels actively and personally responsible for the welfare of any individual child. The report proposes that a single ad-hoc committee should be formed with power to make recommendations and submit estimates direct to the council. Probably it would contain members experienced in public assistance, public health, and education, but it would not be subordinate to the committees in these subjects, or represent them. It would take over all the responsibilities which now fall to the councils under the poor-law, the Public Health Act, the Children and Young Persons Act, and the Adoption of Children Acts.

The welfare of the children would be directly in the hands of a specially chosen children's officer. "This," the committee affirm, "may indeed be said to be our solution of the problem referred to us." Usually, they think, this officer will be a woman, a specialist in child care, with high standing and qualifications, especially those of temperament, and with no other duties to distract her interests. Working with her should be an able staff, to each of whom she would allocate a group of children; they would be expected to act as the personal friends of these children, thus compensating them to some extent for the loss of direct parental interest and care.

It is interesting to compare this solution with that of Lady Allen of Hurtwood, made in her evidence to the committee<sup>2</sup> and again in the *Times* of Oct. 21. She points out that the children's officer (an unfortunate name, she considers) would be concerned only with the children—perhaps half the total number—who come under the care of the local authorities: children cared for by voluntary societies would be outside her scope. For such children the report suggests that "the head of an approved voluntary home" should be a suitable legal guardian; yet some voluntary homes, Lady Allen reminds us, discourage adoption and refuse to allow their children to be boarded out, though these are recognised as "the two most satisfactory methods of providing a substitute home for the majority of children." She wishes every child without a legal guardian, wherever placed, to become a ward of State by order of a court; and the State, working through local authorities or voluntary organisations, to be responsible for his proper care and upbringing.

The subject is intricate: where practice is so uneven, it is hard to see at once what should be the guiding principle. Possibly the recommendations of the Curtis Committee, if carried out, will help to prepare the way for Lady Allen's more comprehensive plan, in which the care of these children by the nation for the nation is recognised as a State rather than a local responsibility. Yet there is much in Mr. Kenneth Lindsay's view<sup>3</sup> that local care for local children comes nearer to the "parent" ideal which we all have in mind. In any case the issue is now clear, thanks to the painstaking work of the committee. Children are being deprived of the opportunity of normal mental, and in some cases of normal physical, growth; an immediate remedy is proposed, and should be tried.

## THE PANEL CONFERENCE

THE annual conference of representatives of local medical and panel committees, held in London on Oct. 24 under the chairmanship of Dr. J. A. BROWN (Birmingham), discussed negotiations for a higher capitation fee.

### MINISTER'S OFFER

Dr. E. A. GREGG, chairman of the Insurance Acts Committee, said that the committee, when it had asked for the Spens report to be implemented, had been met not with a refusal but with a proposal that discussion should include consideration of pay in another service not yet passed into law or approved by the profession. The Minister had been unwilling to listen to the argument that the I.A.C. was in no position to discuss this wider question. Finally the I.A.C., owing to the Minister's neglect to apply the terms of the report and in view of the grave inadequacy of the new 12s. 6d. capitation fee, had recommended insurance practitioners to place their resignation from the National Health Insurance service in the I.A.C.'s hands, and to authorise the I.A.C. to put in these resignations unless the Minister either applied the terms of the Spens report to the current capitation fee or referred the I.A.C.'s application to an independent body. This recommendation had been endorsed throughout the country. [Of those who replied, 95% were in favour.]

"I think," said Dr. Gregg, "that there must have been echoes of these things reaching Whitehall." The I.A.C. had received from the Ministry a further invitation, in which "some misunderstanding" was suggested. The misunderstanding, said Dr. Gregg, had been of the profession's temper. From the ensuing meeting the I.A.C.'s representatives had returned with a form of words they considered unsatisfactory; this included an offer of discussion on the factors common to current insurance remuneration and to remuneration in any future service, so as to apply the Spens Committee report to insurance remuneration. At the I.A.C.'s suggestion, the Ministry had issued another form of words:

"The Minister is willing fully to apply the Spens report to the current capitation fee, with effect from Jan. 1, 1946, the increase of 2s. being regarded as a payment on account. To this end, he invites the Insurance Acts Committee to enter into discussions on the report forthwith, with special reference to the current capitation fee. The discussions will be conducted expeditiously."

Dr. R. W. COCKSHUT (London) claimed that a great victory had been won. "My only regret," he said, "is that it has taken place rather in private. Some say we must not kick a man when he's down. Why not? He's still breathing." The victory, he added, had been won not by the colleges but by the panel doctors; it was a victory for the British Medical Association.

The view of several subsequent speakers was rather that the first round had been won on points. Dr. GORDON WARD (Kent) confined his estimate of Dr. Cockshut's speech to an expression of relief that the general press was not represented at the conference. Had the I.A.C. any figure in mind for the forthcoming negotiations? The capitation fee of 15s. had been proposed only for a 100% service. "I should like the I.A.C. to say: 'Fifteen shillings or we go back to a special conference.'" (Cries of No!)

Dr. J. A. IRELAND (Shrewsbury) said that the 15s. mentioned in the Spens report did not apply at the present time; it had been based on the assumption of a 100% service and on 1939 figures, so that allowance must be made for betterment. There was no victory yet; but the Minister was in an awkward position. Speed in negotiation was vital; the profession was in a temper to resign.

Dr. GREGG said that the figure had not yet been determined; the I.A.C. was not tied to 15s. It was

2. See *Lancet*, July 27, p. 129. 3. *Times*, Oct. 23.

necessary to consider not only betterment but the addition, in 1942, of people with incomes up to £420 a year who normally could afford fees. He put a motion accepting the Minister's proposals, and a rider was added that it should be made clear that the words in the Minister's invitation "with special reference to the current capitation fee" must not be construed as suggesting that the negotiators had any mandate to discuss anything relating to the future National Health Service. Rider and motion were carried without dissent.

He then moved—

that this conference authorises the Insurance Acts Committee to take any necessary action to secure the full and expeditious application of the Spens report to the current insurance capitation fee, such action to include, if the committee considers it necessary, the collection and use of the resignations of insurance practitioners,

and this was carried unanimously.

A Swansea motion seeking to impose a time-limit on the negotiations was defeated; and a proposal from Kent that withdrawal from the service, should it be deemed necessary, should be undertaken by national rather than by regional action was referred to the I.A.C. The conference agreed to seek the widest possible publicity for the reasons underlying its action, if withdrawal were decided on. Representatives congratulated the I.A.C. on its success so far.

#### THE REFERENDUM

Dr. A. BEAUCHAMP (Birmingham) asked the conference to reaffirm its decision not to tolerate interference with the buying or selling of practices. Dr. GUY DAIN, chairman of the B.M.A. council, said: "We are in a strong position. If you want to stand by your principles, you will vote [in the forthcoming referendum] against discussion of regulations with the Minister." The important simple principles were that any practitioner who wished should be able to enter the service, and that the right of appeal to the courts should be granted to doctors taken off the list. Dr. Dain quoted the example of Australia, where a Socialist design for a medical service had become a dead letter because the profession had refused to work it; but he did not want that to happen in this country. The council had decided to base the referendum on the single question, "Do you want the Negotiating Committee to discuss regulations with the Minister?" If the reply were no, the implication would be that the committee should take no further action to set up the new service until the principles had been conceded. At least two-thirds of the average doctor's income was derived from private practice; it should not be difficult, if the need arose, to maintain a reasonable standard of livelihood without the public service.

Dr. J. C. DIXEY (Devonshire) suggested that the danger underlying a refusal to negotiate regulations was that the profession might eventually find itself in the same difficult position as that in which the Minister was now. The Birmingham motion was, however, carried unanimously.

Dr. Brown was re-elected chairman of the conference.

#### A SURGICAL OCCASION

##### CENTENARY OF THE ACADEMIE DE CHIRURGIE

THE Académie de Chirurgie of Paris, which celebrated its centenary on Oct. 9, is the successor of the Société de Chirurgie, founded in 1843, which itself succeeded the Académie Royale de Chirurgie, founded by Louis xv in 1731. Ten British surgeons, representing the Royal College of Surgeons of England, the Royal College of Surgeons of Edinburgh, and the Association of Surgeons of Great Britain and Ireland, attended the celebrations in Paris, where they were the guests of the French government.

The centenary coincided with the 49th meeting of the Congrès Français de Chirurgie, which corresponds to the

Association of Surgeons in this country, and on Oct. 7 this opened at the faculty of medicine with a presidential address by de Fourmestraux (Chartres), followed later by a discussion on Pulmonary Embolism, led by Fontaine (Strasbourg) and Redon (Paris). In the evening the British representatives were entertained to a government banquet in the magnificent rooms of the Maison des Alliés, formerly the house of Henri de Rothschild. Sir Max Page replied in French to a speech of welcome by M. Joxe, director-general of cultural relations in the ministry of foreign affairs, and two members of the delegation were presented with the honorary medal of the Académie.

On Oct. 8 a discussion at the faculty of medicine on conservation of the sphincters in operations for cancer of the rectum was opened by d'Allaines (Paris) and de Vernejoul (Marseilles), and in the evening the whole congress joined in a banquet at the Maison des Alliés. Next day the chief subject was the repair of peripheral nerves, with opening papers by Wertheimer (Lyons) and Merle d'Aubigne (Paris), and a contribution from H. J. Seddon (Oxford) and Ruth Bowden. In the afternoon the British party were received at the hôtel-de-ville by the municipal council of Paris under the presidency of Professor Basset, president of the Académie de Chirurgie, who reviewed the medical services of France and their possible developments in the future, dwelling particularly on their relations with the government. Addresses of congratulation were presented from the many countries joining in the congress, and afterwards the visitors went, as guests of the government, to the opera, where they were delighted by a superb ballet.

On Oct. 10 a sword of honour was presented to Prof. René Leriche on his admission as a member of the Institute of France. It was a happy ending to a great occasion, and all were glad to see this honour paid to one of the leaders of modern surgery. Throughout their visit the British delegation were deeply touched by the reception accorded them by their surgical colleagues in Paris, by their generous hospitality, both public and private, and by the feeling of friendship they conveyed.

#### CAMPAIGN AGAINST RHEUMATISM

##### THE NEW DEVELOPMENTS

AT a reception held at Apothecaries' Hall last Monday to celebrate the tenth anniversary of the Empire Rheumatism Council, Sir WILSON JAMESON, chief medical officer of the Ministry of Health, called on young doctors trained as general physicians to come forward and join with social workers and physiotherapists in tackling the medical, social, and economic problems of rheumatism. In the ten years since its birth the council had, he said, often and very properly been a thorn in the official flesh; it had done much to stimulate public interest and to guide medical opinion on rheumatism. Its plan for diagnostic and treatment centres, closely linked to the universities, was to be followed in general outline in the National Health Service. Centres were already functioning in London and various provincial towns, and the Nuffield trustees had made a generous grant towards putting the plan into effect. At present we did not know the causes of rheumatism and so could not classify cases properly; treatment was often of the hit-or-miss variety. The real aim was prevention, but the difficulties were too great to be overcome without Government help. Rheumatism was one of the big problems that the Government were to tackle in the new service. Sir Wilson Jameson deplored the lack of teaching on rheumatism in the medical schools.

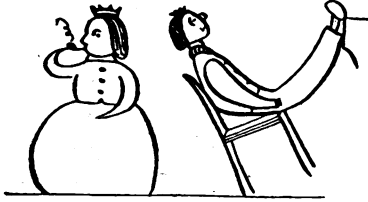
In welcoming the council's guests of honour, Lord HORDER said that its ten years of work was at last bearing fruit. Dr. LORING SWAIM brought greetings from the Pan-American Rheumatism Association, and Prof. J. A. HÖJER and Dr. B. STRANDELL from the Royal Swedish ministry of health. Professor Höjer emphasised that institutes and beds were of little use in a campaign against rheumatism without the interest and coöperation of profession and public.

MINISTRY OF EDUCATION.—Dr. J. E. A. Underwood now ranks as a principal medical officer, and Dr. R. Weaver as a senior medical officer.

## In England Now

### A Running Commentary by Peripatetic Correspondents

I AM preparing a thesis on "Character as Revealed by Pipe Posture." It is not an ambitious project. To begin with, it covers only the male segment of the



"... when Albert wasn't looking ..."

population, with a few courageous exceptions, such as George Sand (when she ran out of cigars), Boadicea (in battle), Cleopatra (hookah), and Victoria (when Albert wasn't looking). Furthermore, it excludes the age-group 0-10, since correlation of soap-bubble-pipe activity with the later and less mature fumigenetic pursuit is low. (Bubbles, after all, are much more beautiful and much more exciting than is smoke, while tobacco is considerably dearer than soap.) My three character types, which correspond vaguely with the introvert-extrovert categories, are as follows:



(a) The Drooper. (b) The Jutter. (c) The Tilter.

First, the drooper. This is a poor specimen who attempts to rationalise his feeble masseters by claiming that it is easier to tell when one's pipe is out because one has only to glance down into the bowl to see. This is a fallacy, as a comparison of diagrams (a) and (c) will show. A subgroup of this species smokes the pipe upside down. This is called over-compensation, a misguided endeavour to convince the world that drooping is very difficult. In a way, they are quite correct, but, as Voltaire sagely pointed out, "C'est difficile, mais ce n'est pas fumer!" referring, of course, to the fact that the tobacco was never in the bowl of the pipe but was usually enjoying an autonomous and smouldering existence on the front of the waistcoat. Burns of the tum would be very common were it not for the fact that the drooper is usually also a drooler, a steady drip off the stem keeping the conflagration within modest limits. The mechanism is briefly this: the unconscious (by kind permission of C. G. Jung) neutralises the failure of the conscious via the salivary glands (by kind permission of I. P. Pavlov).

Now the jutter. This is usually a transition type: either a drooper who is slowly integrating his personality or a tilter who is dementing.

The tilter. This posture comes easily to acromegalics and to rear-admirals, particularly acromegalic rear-admirals. The more erudite of my readers will have come across the prototype of this class, one Popeye. This gentleman exemplifies in full the character traits of the group—doggedly determined in the face of overwhelming odds and underhand methods, staunchly loyal, and commonly edentulous. Drooling is out of the question as all distillation and drainage is centripetal (by kind permission of Sir Isaac Newton). There is only one thing to do when face to face with a foe of this description. A sharp tap under the bowl of the pipe will deposit a glowing wad in the conjunctival sac of the opponent. Even should this be without effect on his composure, the nicotine will play havoc with his autonomic nerve-endings and seriously impair his power of focusing.

Periarthritis nodosa, life-long jaundice, and leprosy were just three of the conditions seen on a morning round of an old poor-law infirmary which, since 1929, has been a L.C.C. hospital; but it is not only in clinical material that municipal and county-council hospitals are approaching teaching-hospital standard. This round was attended by six students, seconded for clinical training; their coming has been acclaimed as a stimulus to thoughtful work. The staff is also well pleased to have

two supernumerary ex-Service registrars—indeed, the wonder is that the work was ever done in this 500-bed institution with the normal establishment of 7 doctors, including the superintendent. But this plethora can be only transitory. Perhaps when it has passed, part-time clinical assistantships will be offered to general practitioners; their appointment would benefit the practitioner as much as the hospital; and why not give the local doctors a chance to attend clinical meetings? One complaint against the county council is the pay: an initial salary of under £800 for a resident deputy superintendent and of under £500 for a highly qualified A.M.O. cannot be counted as princely. Perhaps the council has been lucky in recruiting those who happen to believe in the form of service it offers; but even the faithful find that once married they must either quit or starve. This has resulted in a constant turnover of staff which has not made for smooth organisation; it has not been experienced in adjacent counties, where the value of professional services is assessed more generously.

This new system of medical grading in the Army is causing a lot of bother. The "good-enough-for-my-father" types are asking what was wrong with the old one. ("We won the war with it, didn't we?") The series of initial letters, each one neatly grading a bodily function, from feet (L) to eyes (EE—one for each eye), proves very confusing to those who can't remember whether L stands for Locomotion or Liver and S for Spleen or Stability. Our chief trouble has been naming the business of doing it all. Shall it be *pulheemising* or just plain (very plain) *pulheeming*. Neither is very euphonic, but *pulheemising* seems to have won. It sounds more distinguished to have been *pulheemised* than merely *pulheemed*. (The *s* is dropped by tacit agreement; there must be no suggestion of instability about the method even if there is about the subject.)

Like many other innovations this one has altered the meanings of a number of words. Thus a handsome profile no longer refers to a Barrymore physiognomy but rather to an unbroken series of 1's. The symbols largely remain a mystery to the uninitiated. A senior officer inquired whether it was the P or the U which recorded the results of his urine examination. Perhaps our saddest case was the Pioneer found waiting outside the M.I. room carrying a large envelope who, when asked his business, plaintively told us that he had "come to be pulverised"!

Our sub-chief is quite the most economical customer I have ever come across. It wasn't so bad when he confined himself to sticking up posters for the Ministers of Food and Fuel, but when he observed that, every time we gave a patient an electrical convulsion, some 100 volts were diverted for at least 0.3 of a second from our vital industries, I knew he wouldn't be content to leave it at that. And sure enough, the very next day he came out with his plan. We were to connect up the patient to the accompaniment of Liszt's E flat piano concerto on records. When it came to the bit where the triangle goes "ting-ting," we would press the button on the Cox-Cavendish. Next day no volts would be required. The records and Pavlov would do it all. The triangle would go "ting-ting," and, as a straightforward conditioned reflex, the patient would go tonic and clonic. The suggestion that we condition every patient in this way seemed feasible at first, till it was pointed out that the bells on our tramcars go "ting-ting" too. And before he got round to considering some other stimulus I had exposed the fallacy of the whole argument: if it were so easy to condition a reflex to the last stimulus experienced before Faraday, Galvani, and Co. asserted themselves, then all our edentulous patients should have had fits every night their wives said, "Have you taken your teeth out?" Such an incident has never come to my ears, and the whole thing provides, in my opinion, an excellent example of a theory based on a false premise. We still use the old-fashioned electrical method.

Neurosurgeon, after 6 hours of a craniotomy, "Sister, where's the clock?"

Theatre sister, "It's gone for repair, sir."

Analæsthetist, fairly sotto voce, "I shouldn't bother, Sister, stick up a calendar instead."

## Letters to the Editor

### THE BILL IN THE LORDS

SIR,—Few of your readers can have had the opportunity of hearing the committee stage on the Bill in the Lords; some comments from an eye-witness may therefore be of interest.

Considerable debate occurred on the relative powers of the regional hospital board and hospital management committee. Whilst it was abundantly clear that it is the wish of all parties, and the Government's intention, to decentralise to a great degree, the debate was at times quite unreal. A few clear words from the Government benches as to what was intended would have done much to disperse the miasma which continues to surround this important subject. Whilst everything reasonable should be decentralised to hospital committees, certain vital functions can only be carried out at regional level if we are to get the coördinated system we have been promised and not an anarchy of completely independent hospitals. Nor were Government speakers in possession yet of anything useful they could tell their Lordships about the delimitation of the regions. Even when the Health Bill becomes law we cannot know how the hospital service will work until these fundamentals of geography and function are made known.

The Leader of the Opposition indicated clearly that the House could only concern itself with revision—where revision was wise. It was necessary to make the Bill a better Bill. And at the committee stage some important revision was carried out. The vexed question of taking over the endowments was at last settled satisfactorily, the Government agreeing to take steps to allow the "sacred trusts" referred to by Lord Samuel to continue, and only to place endowments in a general fund when they had been given for the general upkeep of hospitals.

An important amendment that payment to practitioners should be by capitation fee only, and not partly by basic salary, was carried against the Government on the intervention of the president of the Royal College of Physicians. The persuasive and measured advocacy of Lord Moran, who was supported by Lord Horder, undoubtedly carried very great weight. Possibly not all doctors will be pleased with this amendment, but there will be complete unanimity at the stress laid by Lord Moran on the need to safeguard teaching and research in the teaching hospitals. In accepting this amendment the Lord Chancellor referred to the great authority which Lord Moran carried. Whatever be the fate of the various amendments before the Bill finally passes on to the statute-book it is clear that the Royal College of Physicians has been very worthily represented in this Council of State. By their policy of wisdom and moderation the college and its president, Lord Moran, have earned the gratitude of both the Government and the profession.

London, N.W.11.

F. J. BENTLEY.

### PERIODICITY OF INFLUENZA

SIR,—Last year we were warned that there was likely to be an epidemic of influenza in the winter of 1945-46. This forecast, which proved to be wrong, was no doubt based, in part at least, on the belief that the almost world-wide food scarcities and restrictions would favour such an outbreak. But was this belief justified? According to Dr. Kenneth M. Smith, of the Plant Virus Research Station at Cambridge (*Times*, June 1, 1944), "the rule that healthy organisms are more likely to stand infection than unhealthy organisms does not apply very strongly to plants and viruses." My studies of the periodicity of influenza lead me to believe that this "rule" may not apply to man and viruses either.

For the last seven years I have graphically recorded the incidence of all types of ailments among the patients in a large panel practice and I have found that every well-marked rise in the incidence of influenza is immediately preceded by a rising incidence of the common cold. This "common cold—influenza" sequence is the most striking feature of my records. Indeed so close are the two waves and so definite is their time relationship that I have come to regard them as parts of the same epidemic.

I have made another suggestive observation: the well-favoured predominate among the patients seen in the first (common cold) phase of an epidemic, the lean in the second (influenza) phase. Some years ago Sir William Hamer<sup>1</sup> observed that during epidemics the stout members of a family circle contracted colds and later the slim developed influenza. But the important point seems to be not merely whether patients are stout or slim but whether their weight is increasing, stationary, or decreasing. My clinical observations—as free from bias as I can make them—suggest that in the main it is the "thrivers" who catch cold, the "strivers" who develop influenza.

I have formed the hypothesis that the state of thriving favours the multiplication of organisms living in the respiratory tract, thus producing the symptoms of an endogenous infection, the common cold: the resulting infection is spread as an exogenous infection which produces a more vigorous reaction labelled "influenza." If many people are thriving, and if enough of them develop an endogenous infection at the same time, the weight of infection may be heavy enough to create an epidemic of influenza among the strivers.

World experience of influenza during the late war supports my hypothesis. As you pointed out in your leading article of April 13, 1946, influenza periodicity was fairly stable up to 1941—the year when the world began to tighten its belt—but since then it has been less stable.

Famine may prevail in Europe this winter. Certainly few will be well fed. In my view, however, the danger of serious epidemics of influenza is not now; it will come when the world enters the promised period of freedom from want. My observations suggest that it is in times of plenty, not during periods of privation, that pandemics of influenza will occur and its periodicity be again stabilised.

If my hypothesis is true—and my own carefully collected data support it—many social scientists will have to review their premises. There is need, and opportunity, for parallel investigations by other observers. To those interested I recommend the study of sequences.

Halifax.

ANDREW GARVIE.

### FOLIC ACID IN CÆLIAC DISEASE

SIR,—We can confirm the finding of Dr. Brody and Dr. Gore (Oct. 26) regarding the treatment of coeliac disease with folic acid. So far we have treated two cases, and in both there has been a striking clinical improvement and a reticulocyte response of over 25% on a daily dose of only 5 mg. of folic acid. Both children, in addition to the typical clinical features, had "flat" glucose-tolerance curves and megaloblastic sternal marrows.

It is hoped to publish full details of these and other cases later; meanwhile, in view of the relative scarcity and high cost of folic acid, we feel that the efficacy of the smaller dose should be known.

H. W. DALTON.

M. L. THOMSON.

V. K. WILSON.

Royal Manchester Children's Hospital.

### CONVALESCENT HOMES

SIR,—May I, as an almoner, welcome your suggestion of Oct. 19 that there is need for a central agency to help and advise those who are concerned with the care of the convalescent patient? The needs of the convalescent have in this country never received the degree of study and attention that they require, and, though every almoner knows of a few excellent homes, the number is totally inadequate for the need. The regulation of vacancies through a central agency is by no means the only service that such a body could offer. Much work needs to be done in thinking out questions of feeding, furnishing, occupation, medical and social records, methods of sending reports back to the source of referral—to name only a few of the questions involved. The establishment of a clearing-house for information and advice would remove much of the confusion, duplication of effort, and misunderstanding that so often arises between the management of the homes and the referring agencies. To quote from a report recently published on

1. *Proc. R. Soc. Med.* 1931, 24 (Sect. *Epidem.*), 53.

this subject by the Hospital Council of Greater New York: "The red tape, the variations in restrictions, and the failure to exchange medical and social data all redound to the discomfort and sometimes the neglect of the patient."<sup>1</sup> I venture to believe that there are many, both among those who send patients to homes and those who receive them there, who would agree with that statement and would warmly welcome a lead towards solving their many problems.

M. J. ROXBURGH.

Almoner's Office, Middlesex Hospital, London, W.1.

### PSYCHONEUROSIS TREATED WITH ELECTRICAL CONVULSIONS

SIR,—In order that this correspondence may not be sidetracked by criticisms regarding data, I should like to make the following comments. Owing to the exigency of space my paper had to be severely limited, and, in particular, tables giving in every case age, occupation, duration of symptoms, time in hospital, diagnosis, result of treatment, and period of follow-up had to be omitted.

I should also like to point out that, in this hospital, every case is subjected to an extensive examination, and treatment is decided upon at a staff conference, when the reports of the psychiatric social workers, the psychologist, and if necessary the consulting physician, are considered in relation to the psychiatrist's findings. I would stress the fact that we are not dealing with isolated cases, referred merely for an opinion, but that we are endeavouring to cope with the vast problem of treating those unfortunate members of a community of some 300,000, who are completely crippled by psychoneurotic illness. If any beneficial alterations can be effected in the home environment, these are carried out through the agency of our mental treatment department. We are completely responsible for every patient long after he leaves hospital, and no case is allowed to drift through lack of accurate follow-up reports. I may add that my statements concerning the absence of prolonged memory defects or intellectual deterioration are based on the follow-up records of over 2500 cases.

In conclusion, it may be of interest to note that, as six months have elapsed since I wrote my paper, the most recent case has now been followed up for at least fourteen months.

W. LIDDELL MILLIGAN.

St. James Hospital, Milton, Portsmouth.

SIR,—I have just been studying the history of psychiatry from Zilboorg's book, and I have come to the conclusion that should the value of the "intensive-electrical-convulsive" treatment of the psychoneuroses as sponsored by the Portsmouth school be confirmed, we shall have attained one of the very greatest advances in our specialty. For here were we old stagers plodding along painfully, treating our neurotics by teasing out conflicts, frustrations, and aggressions, by altering occupations or modifying environments, when—lo and behold—we find that we have been wool-gathering, tilting at windmills, mystifying ourselves and our patients!

Apparently the difficulty of the psychoneurotic is a simple affair after all. It is merely another example of an electrical pattern in the brain gone askew; switch on the machine, change the brain-currents from anti-clockwise to clockwise, and—hey presto!—the unfortunate sufferer becomes happy. And what a great saving of time—ten sessions of five minutes each, as against perhaps fifty of one hour each. Instead of doubling or trebling the number of psychiatric outpatient clinics, as recommended by Dr. C. P. Blacker in his recent review (*Neurosis and the Mental Health Services*), we can safely halve them; for analytic psychotherapy will soon become redundant, and neurotics will be admitted direct to mental hospitals to have "all that nonsense knocked out of their heads."

And yet, is all this too good to be true? I feel that such a radical discovery should be carefully verified in the very best research units of London, New York, and Moscow before we adopt it as a routine in all British mental hospitals.

I share Dr. J. Glaister's suspicion that we are dealing with a serious regression in the history of the therapy of mental disorders. The fear I expressed early this year

(*Brit. med. J.* 1946, i, 328) that an attempt will be made to replace long sessions of psychotherapy by short sessions of button-pressing is, alas, being fulfilled. I would stress again that the urgent social problem behind this trend is the scarcity of experienced psychotherapists.

Park Prewett Hospital, Basingstoke, Hants. I. ATKIN.

### EPIDEMIOLOGY OF INFECTIOUS DISEASES

SIR,—One of the great problems in the epidemiology of infectious diseases is the mechanism by which infection survives through long inter-epidemic periods. Based on recent knowledge of the variability of the molecular structure of viruses the solution of this problem is here suggested.

It is noteworthy that human epidemics usually occur during a particular season of the year and that epidemic foci often arise simultaneously and apparently independently, suggesting some activation of previously acquired infection rather than direct case-to-case transmission. Shope (1943) has demonstrated that swine influenza virus, while in the lungworm, exists in a masked form and is totally non-infective until awakened to activity by some provoking stimulus. Furthermore, he maintains that the onset of a swine epizootic is determined not by the acquisition of the causative virus but by meteorological or physical conditions which favour its activation. A similar conclusion was also arrived at many years ago by Tomb and Maitra (1926) regarding the relationship of "non-agglutinating" intestinal vibrios to epidemic cholera. In an article entitled "A New Conception of the Epidemiology and Endemiology of Cholera" (1927) they wrote as follows:

"We have therefore been driven to the unavoidable conclusion that the non-agglutinating (non-epidemic) vibrio takes on the agglutinating (epidemic) characteristic under certain biochemical-physical conditions [often seasonal] in the human intestine, the nature of which are at present unknown, and in this mutation or epidemic form is the cause of epidemic cholera. Non-agglutinating (non-epidemic) intestinal vibrios therefore in our opinion constitute the reservoir of cholera both epidemic and endemic."

In a previous article (1926) they also wrote:

"During our investigations in the Asansol Mining Settlement (Bengal), we have met with several outbreaks of epidemic cholera in distant and isolated villages, the inhabitants of which had not been in contact either recently or remotely with any case of epidemic cholera. Spontaneous outbreaks of epidemic cholera have also been noted by other observers in other localities. Hitherto the explanation of such outbreaks has been that they owed their origin to some carrier of Koch's (infective) vibrio who existed unknown in the community. Our suggested explanation of such outbreaks now is that owing to favouring circumstances [often seasonal] the non-agglutinating (non-epidemic) vibrio changes into the agglutinating or epidemic form in one of the numerous chronic carriers of non-agglutinating vibrios in endemic areas [such as the Mining Settlement], the epidemic spreading in the usual manner by contamination of water and by contact."

The mechanism by which infectivity is increased or diminished in a virus (and by inference in bacteria also) is thus described by Fenton (1945):

"Our best clue to the nature of gene mutations is furnished by viruses, those submicroscopic germs that cause colds, influenza, yellow fever, and a number of diseases in plants. They, too, are giant molecules containing hundreds of thousands of atoms that are linked in complex groups and series. For generations these molecules may be stable; then they abruptly change. Thus the virus which normally causes tobacco mosaic may add a few thousand atoms and become a variety that produces the much more virulent ailment known as acuba. Other modifications may cause a disease that kills the affected plant or make the virus so weak that its effects can barely be detected. Apparently a single virus strain may appear in any or all of these forms, shifting from one to another as atoms are gained or lost."

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Sydney, N.S.W.

J. WALKER TOMB.

1. *The Road to Recovery from Illness. A Study of Convalescent Homes Serving New York City.* Prepared by Elizabeth G. Gardner and Francisca K. Thomas. Published by Hospital Council of Greater New York, 1945.

## Parliament

## THE BILL IN THE LORDS

## Committee Stage Concluded

[ON Oct. 22 Lord AMULREE moved an amendment to clause 28 in the National Health Service Bill providing that the care of old people should be placed directly under the control of the health authority. The Bill provided that all sick old people should be so cared for, and he feared that if we tried to separate old people who are sick from those who are healthy we should get into difficulties. In age the dividing line between sickness and health was small, and if there were to be any barrier between the two he thought the care of the older people would suffer. Today more and more old people had to live in institutions, and these did not come under a health authority. If, as was possible, it was found necessary to add some kind of sick quarters to these institutions there would be a danger that old people might tend to be kept there rather than removed to hospital. The Earl of LISTOWEL said that the care of the aged who were not sick did not come within the scope of the Bill, but he assured Lord Amulree that it would be dealt with in forthcoming legislation which the Government intended to introduce for the abolition of the poor-law. They regarded that as among the most important social reforms which they hoped to carry out. The amendment was withdrawn.

Lord LLEWELLIN moved an amendment to provide that medical practitioners who had to decide before the appointed day for the Bill to come into force whether they would enter the service should be given not less than three months' notice of the terms and conditions of the service. But Lord JOWITT, though in sympathy with the amendment, did not want to tie himself down in the Bill because difficulties might arise. The terms would be negotiated with representatives of the medical profession, who no doubt would keep their constituents acquainted with the matter as it proceeded. He hoped that it might be possible to give doctors more than three months' notice. Viscount CRANBORNE thought it difficult to leave the matter as it was in view of its extreme importance to the medical profession. The decision which doctors would have to make would affect the whole of their future lives, and it was only fair that Parliament should allow them adequate time for consideration. It would be an insult to the medical profession and to the skilful officials of the Ministry of Health to suggest that they could not devise terms and conditions of service in the period which would elapse before the appointed day. Lord JOWITT agreed that they ought to aim at six months' notice as a minimum, but he asked their Lordships not to put anything binding in the Bill in case there might be unexpected difficulties. He would, however, undertake to consult the Minister of Health and look at the matter again. The amendment was withdrawn.

## BASIC SALARY AND CAPITATION FEE

Lord LLEWELLIN moved to add the following subsection to clause 33 :

The remuneration to medical practitioners undertaking to provide general medical services in pursuance of the provisions of this Act shall be fixed by the capitation method except in any cases where the Minister on the recommendation of the Medical Practices Committee considers that exceptional circumstances necessitate remuneration on a different basis.

As yet, he pointed out, no indication had been given of what proportion of the doctor's remuneration was to be by salary and what by capitation fee. He believed that the right way to remunerate the doctors was by capitation fee, though he realised there were areas where this would not be possible.

Lord MORAN said that this matter had aroused the misgivings of many doctors who, like himself, were satisfied, generally speaking, with the hospital pro-

visions of the Bill. The proposal to pay a doctor a basic salary required more justification than had hitherto been given. There could only be two reasons. One, it had been suggested, was that the Socialist party before it came into office had seriously considered a whole-time medical service with a basic salary, and that the method proposed in this Bill had been adopted as a concession. If this was true it was not a good reason. The other was a better one. It was said that any practitioner entering medicine might in his first year or two have financial difficulties, and that a basic salary of £300-£400 a year might supply some measure of security. But was it proposed that the Ministry of Health should go on paying doctors a basic salary if they did not get any patients in their first year or two? On the other hand, if the doctor got patients to the equivalent amount of the basic salary, then this measure of security was no longer necessary. Not only was there very little to be said for a basic salary, but there was a good deal to be said for a capitation fee. In past years Lord Moran had been asked to advise the medical service of the Navy and the Royal Army Medical Corps how to obtain keen men, and the result of his investigations had shown that it was impossible, with many brilliant exceptions, to keep men as keen in whole-time salaried service of that nature as in general practice where the competitive stimulant was present all the time. He was convinced that if there was anything approximating to a whole-time service great attention must be paid to incentive, and that was why he would like to see the whole of the remuneration paid by capitation fee and the basic salary dropped. It had been said there was something derogatory in competing for patients, but was this true? Would the Noble Lord on the Woolsack be demonstrating the development of his forensic skill, if instead of competing for briefs in his earlier years he had been the salaried servant of a corporation?

Lord HORDER suggested that Mr. Bevan could do nothing more salutary, or more likely to further his happier relations with the B.M.A., than to accept this amendment. Several times during the committee stage the Government had given an assurance that there was no intention to nationalise the medical profession. But those statements might be made ad nauseam and there would still be firmly fixed in the minds of the medical profession the idea that that was the final intention of the Government and of the Ministry of Health. The doctors had not been impressed by the reasons given for part payment by a basic salary. They believed this to be the most vital spot at which the Government could attack the independence of the doctor, whether as a practitioner of medicine or as a man earning his living in a reputable fashion. To accept this amendment would assure those in charge of the Bill of a big element of extra confidence in the mind of the medical profession, and the Minister had admitted that without the coöperation of the doctors the scheme must fail. Lord Beveridge had said that the Bill was a good one and he wanted to make it better. Lord Horder thought the Bill was a bad one, but he would like to make it less bad. The doctors would do their best to work the Bill, good or bad; they could not strike. They must continue their work, and they must have State support in doing so. The doctor was not an altruist when he started in his profession; he became an altruist in proportion as he succeeded. The medical services in this country had a great deal in their favour, and though it was the duty of the State to improve the machine, it was for the doctor to work the machine. A willing worker would go a long way, an unwilling worker would go only a short way, and would not even give to this health scheme the trial which it deserved.

Viscount ADDISON, who had been largely in charge of the negotiations relating to the original capitation



allowance 30 years ago, admitted that he had been disappointed at the way in which it had worked. The whole tradition and practice of medicine was to frown on any unnecessary competition for patients, and he thought that was right; and the list system of payment had by no means been beyond criticism, for inflated lists made detailed attention to patients difficult. It was because of the faults of the capitation system that the Government had adopted the plan in this Bill, and not because they had any sinister designs. The method of payment could not be prescribed in the Act; it must be left to negotiations, and he did not think it was possible to devise a system whereby payment could be standardised. In remote districts the basic salary would probably have to be higher than in other places. The Government were also convinced that some stability was necessary for the young doctor entering the service. Therefore he could not accept the amendment.

Viscount CRANBORNE, in announcing that the Opposition peers intended to press the matter to a division, said they felt that the balance of the argument was in favour of Lord Moran. He assured the Government that in this question there was no element of political bias. They were trying to come to their decision on the technical efficiency of the new scheme. The Marquess of READING held that the method of payment proposed by the Government was just and fair. Payment by capitation fees alone might lead to an undesirable scramble for patients. Could the Government say that it was not in their mind, in the present condition of affairs, to embark on a wider scheme—a State medical service and State control of doctors? Viscount ADDISON replied, "I can and do give that assurance." The amendment was carried by 53 votes to 37.

#### CHOOSING A PARTNER

On clause 34 the Earl of MUNSTER moved an amendment to oblige those concerned with filling a vacant medical practice to bear in mind when choosing an applicant such considerations as family ties and the wishes of the medical partnership. The Earl of LISTOWEL said it was the desire of the Government that partnerships should continue so long as the doctors themselves wanted to work in partnership. He thought that family or group relationships between an applicant and the area where he wished to practise would be a material factor which the executive council could not fail to take into account in advising the Medical Practices Committee about the application. Therefore, he doubted whether any express reference was needed in the Bill, but he would gladly consult with the Minister of Health to see if it was possible to draft a form of words for inclusion at a later stage. The amendment was withdrawn.

#### PROHIBITION OF SALE OF PRACTICES

Speaking as a lawyer, Lord MAUGHAM thought some of the penal provisions of clause 35 unfair and unjust to the doctors, and Lord JOWITT promised to look into some of the points again, notably the case described by Lord LLEWELLIN of a doctor's house which was a bigish dwelling with surgery attached to it situated in a neighbourhood where most of the houses were small and occupied by tenants of the weekly wage-earner class.

#### THE NEEDS OF THE DEAF

Viscount CECIL OF CHELWOOD moved an amendment providing for a supplementary service for the deaf, including the provision and maintenance of hearing-aids and the testing of hearing, running parallel to the supplementary ophthalmic service which is to be organised by the executive councils. Lord HORDER regretted that the same prominence had never been given to defects of hearing as had been accorded to defects of sight. The Earl of LISTOWEL said that the service which Lord Cecil wanted for the deaf would be

better carried out, under present circumstances, by part II of the Bill, that was to say by the hospital and specialist services. Later it should be possible to set up hearing clinics in conjunction with health centres as part of the local health service. At present the amendment might even prejudice the limited service which could now be provided for the deaf. If this supplementary service were to be given by otologists and specialists they would have to be taken from the hospitals because there were not enough of them to provide for both types of service. The new and cheaper hearing-aid sponsored by the Government would be put into manufacture as soon as possible. The amendment was withdrawn.

#### RIGHT OF APPEAL

The Marquess of READING moved an amendment to replace an appeal to the Minister, from a decision of the tribunal to exclude a doctor from any list or all lists, by an appeal to a High Court judge. The debate ranged over what Lord JOWITT described as a well-trampled battlefield with hardly a blade of grass left on it. He thought he was right in saying that there was no great demand for this amendment from the doctors. The Insurance Acts procedure had worked well. The Minister was entrusted with the duty of seeing that there was an efficient service, and he could not be deprived of the right to remove somebody whom he thought was unsuited. Viscount CRANBORNE wondered whether it would not be possible to give the doctor greater protection at the tribunal proceedings by allowing him to be represented by counsel and to call evidence, and Lord LLEWELLIN suggested these tribunals should be heard in public and that the chairman should be a practising barrister of some years' standing. Lord JOWITT said he thought this a possible way out of the difficulty, though he suspected that the doctors themselves might object to public tribunals. He promised to do everything in his power before the report stage to see that the tribunal was a really satisfactory body. The amendment was withdrawn.

#### POSTGRADUATE TRAINING

On Oct. 23, the last day of the committee stage of the Bill, the Marquess of READING moved an amendment to provide postgraduate courses for nurses employed in the service as well as doctors and dentists. Lord HORDER declared that next to the doctors it would be the nurses upon whom the success of working the scheme would fall, and it had struck many people that there was inadequate reference to their work throughout this Bill. The nurse was as keen upon being kept up to date as the doctor. The discussion, Viscount ADDISON said, showed how badly the Government were treated. For the first time the State was making provision for postgraduate medical training, yet they received no thanks. London offered unique opportunities for postgraduate training and the Government intended to help the medical profession and the teaching colleges to develop them. The amendment related to a clause dealing with medical practitioners under part IV of the Bill who were not employed whole-time. Whole-time servants, such as nurses and any medical men who were employed whole-time, would be provided with facilities and would be expected to undergo regular refresher courses. The amendment was withdrawn.

#### DISCOVERY OF RECORDS

Lord LLEWELLIN moved to insert a new clause compelling a council, board, or committee to produce documents and records. He said that all hospitals would henceforth be Crown property, and, as he understood the law, the Minister, or any officer acting under him, would be able to claim the privileges or prerogatives of the Crown. Assuming that there had been negligence he wished anyone who brought an action to have as much chance as they would have had if the hospital

had not been taken over by the Minister. Lord JOWITT agreed that it was most desirable that in proceedings against the Crown the litigant should have a very full measure of discovery, and he hoped that he would live to introduce the Civil Proceedings against the Crown Bill which would give a very wide right of discovery. But there might be a conflict of private interest with the public interest, and those concerned with Government business should have the right to communicate with each other freely without fear that their reports would be dragged out in a court of law. But subject to these reservations he would do what he could to secure that in actions relevant to this Bill there should be a complete measure of disclosure. Lord LLEWELLIN wanted words put in the Bill to ensure that documents which previously had always been compellable out of a hospital authority should also be compellable out of a regional hospital board. Lord JOWITT thought nothing further was needed in order to ensure this. The amendment was withdrawn.

#### THE SCHEDULES

On the third schedule, Lord LUKE moved an amendment to provide that before making appointments to fill vacancies on a regional hospital board the Minister should consult the board. Lord JOWITT accepted this amendment and also a further amendment moved by Lord Luke to provide that before filling vacancies on a hospital management committee the board should consult the committee. Lord Jowitt was, however, unwilling to agree that the boards and committees should have the right to appoint their own chairmen, but he promised to consider whether the boards might do so subject to the Minister's approval.

#### The Report Stage

The amendments made to the Bill in committee were reported in the House of Lords on Oct. 28. Lord LLEWELLIN then moved an amendment to ensure that doctors on the staff of a hospital, whether in an honorary or in a paid capacity, shall have the right to arrange for the treatment of their private patients there. Lord JOWITT confessed that he did not think the new words added anything to the Bill, but if they cleared up any ambiguity he was happy to accept them, and the amendment was agreed to.

#### ENDOWMENTS

Lord JOWITT moved to insert a proviso that endowments given to hospitals after the passing of the Bill but before the appointed day should be vested in the hospital management committees. The effect of the amendment, he said, was to put these gifts in the same position as if they had been made after the appointed day. Treasury control must always be rigorous, and it was right that it should, for all taxpayers were anxious that money should be saved where possible. But the running of a hospital on strict lines meant that many little comforts and amenities would not be provided unless the charitable came forward as they had done in the past. The Government were anxious to encourage them to do so, and he did feel that there was a danger that people would not give their money between the passing of the Act and the appointed day if they knew it would be carried over to a general fund. The amendment was carried.

Lord Jowitt moved an amendment to ensure that the Minister shall secure

so far as is reasonably practicable, that the objects of the endowment and the observance of any conditions attaching thereto, including in particular conditions intended to preserve the memory of any person or class of persons, are not prejudiced.

He hoped their Lordships would agree that these words would give effect to what everyone wanted—that the wishes of the people who gave money to hospitals were not disturbed more than was necessary to make the hospitals efficient. The amendment was agreed to.

#### FUNCTIONS OF THE HOSPITAL MANAGEMENT COMMITTEES

Lord JOWITT moved to substitute the following subsection for subsection 2 in clause 12

It shall be the duty of the hospital management committee of any hospital or group of hospitals, subject to and in accordance with regulations and such direction as may be given by the Minister for the Regional Hospital Board, to control and manage that hospital or group of hospitals on behalf of the Board, and for that purpose to exercise on behalf of the Board such of the functions of the Board relating to that hospital or group of hospitals as may be prescribed.

The new subsection, like most of the other amendments, was, he said, in accord with the undertaking given by the Minister. But the new subsection differed from the old in emphasis and form. The criticism levelled against the Bill as drafted was that while the duty of the regional board was set out with precision, it was not really said what the hospital management committee had to do. And that was true, for the Government intended to deal with the matter entirely by regulation. But they were anxious that there should be the greatest measure of decentralisation and devolution, and Noble Lords had not unnaturally been anxious to see this in the Bill. He must make it plain that what the committees did they were to do on behalf of and under the control of the boards, but he wanted to establish on the face of the Bill that they had a real job of work to do. Viscount MAUGHAM, though he did not think the new amendment entirely carried out the desires of those who had the interests of the hospital management committees at heart, believed that with the help of this subsection the regulations and directions which might be given by the Minister would do so. But if the committees remained merely the agents of the boards they might not be able to do anything without consulting the boards, and that was what the committees did not like. He did not himself believe that that was the intention of the Government, and he thought that what the Government had said would ensure that the regulations and directions would be so framed that all the everyday work of the hospitals would be, by devolution, the business of the hospital committee, to be carried out by them without constant appeals either to the board or the Minister. Lord LLEWELLIN was satisfied that the amendment did show on the face of the Bill that the committees were to be given the control and management of the hospitals.

#### THE TEACHING HOSPITALS

Lord JOWITT moved an amendment to provide that the university with which a teaching hospital is associated should be provided with facilities for clinical teaching and research. He had found, he said, the joint pressure of Lord Moran and Lord Horder irresistible when they asked him to put in something to show that one of the duties of a teaching hospital was to teach. He agreed whole-heartedly and had therefore placed it in the forefront of the list of their obligations, for unless teaching was properly done the whole art and skill of the profession would go. He had, however, been unable to accept the suggestion of Lord Moran's amendment that the Government were bound to carry out whatever the university liked to order, for even universities might have rather large and ambitious ideas. He had therefore included in the amendment the words "Such facilities as appear to the Minister to be required for clinical teaching and research."

#### RIGHT OF DISCOVERY

Lord LLEWELLIN moved to insert at the end of clause 13

A Regional Hospital Board, board of governors or hospital management committee shall not be entitled to claim in any proceedings any privilege of the Crown in respect of the discovery or production of documents, but this subsection shall be without prejudice to any right of the Crown to withhold or procure the withholding from production of any document on the ground that its disclosure would be contrary to the public interest.

Lord JOWITT, in accepting the amendment, confessed that he did not himself think it was necessary, but experienced people had expressed apprehension and doubt which he thought it best to remove.

#### FUNCTIONS OF THE LOCAL AUTHORITIES

Lord ADDINGTON moved an amendment permitting a local health authority to delegate some of its functions under clause 19 to borough councils. Lord LLEWELIN pointed out that the transfer of these powers by the L.C.C. to their boroughs had been made mandatory by Lord Balfour of Bureleigh's amendment. Lord JOWITT, in reply, said he was much opposed to Lord Balfour's amendment. If it became law there would be two health authorities in all the London boroughs, some working in one service and some in another, and all the services to be carried out in a health centre. He believed it would be absolutely chaotic. Then again the amendment was only permissive. That infringed another principle which he believed to be vital. "Do not leave it to the political agitation of the future as to who is going to have these powers," he advised the Noble Lords. "Take your courage in both hands, and say that we put these powers upon the major local authorities; there they are, there they stay, that is their job, and they cannot get out of it." The amendment was withdrawn.

#### GENERAL MEDICAL SERVICES

In rejecting an amendment on the point Lord JOWITT gave an assurance that doctors would have ample notice of the terms and conditions of service before having to make up their minds whether they were going to come in or not. The Minister had agreed that they should aim at a period of six months.

The Earl of MUNSTER moved to add to clause 34 that

The Medical Practices Committee shall, in a case where persons have to be selected from a number of applicants, and the Minister shall, on an appeal in any such case, have regard to any desire expressed by any applicant to practise with other medical practitioners already providing general medical services in the area or part of an area concerned, and of any desire expressed by such other medical practitioners to take any applicant into practice with them, and shall have special regard to the matters aforesaid in cases where an applicant is related to any such other medical practitioner.

Lord JOWITT accepted the amendment, for he believed the Medical Practices Committee as sensible men would in any case have regard to principles of this kind.

#### THE NEEDS OF THE DEAF

Viscount CECIL OF CHELWOOD moved an amendment to clause 41 to provide supplementary services for the deaf similar to those provided for teeth and eye cases. Viscount ADDISON promised to consider whether some duty of this kind to help deaf people could be inserted earlier in the Bill at the Third Reading, but he did not think this clause was an appropriate place, because outside the medical profession there were few competent people for dealing with defects in hearing, and therefore there could not be a supplementary service for the deaf. Their treatment, including the provision of apparatus, must be provided in hospitals and clinics. The amendment was withdrawn.

#### THE APPEAL TRIBUNAL

Lord LLEWELIN moved an amendment strengthening the protection given to a doctor appearing before the tribunal by giving him the following rights:

of appearing, either in person or by counsel or solicitor or such other representative as may be prescribed, before the Tribunal and, in the case of an appeal, before a person appointed by the Minister; and  
of being heard by the Tribunal or the person so appointed and of calling witnesses and producing other evidence on his behalf; and  
and that the hearing, whether by the Tribunal or the person appointed as aforesaid, shall be in public if the person who is the subject of the inquiry so requests.

He also later moved a further amendment to the seventh schedule providing that the chairman of the tribunal should be a practising barrister or solicitor of not less than ten years' standing. Both amendments were accepted:

#### DENOMINATIONAL HOSPITALS

Lord JOWITT moved the following new clause:

... Where the character and associations of any voluntary hospital transferred to the Minister by virtue of this Act are such as to link it with a particular religious denomination, regard shall be had in the general administration of the hospital and in the making of appointments to the hospital management committee to the preservation of the character and associations of the hospital.

He was, he said, unable to accept Lord Iddesleigh's amendment inserting the words "and to the staff" after "committee." He agreed that it was essential that such officers as the matron and resident physician in a hospital of this kind should be of a particular denomination, but it did not matter whether the surgeon, for instance, was a Roman Catholic or a Plymouth Brother. The amendment was agreed to.

#### FROM THE PRESS GALLERY

##### Bricks and Brickbats

Opening a debate on housing in the Commons on Oct. 21, Mr. R. E. MANNINGHAM-BULLER complained that thousands of people were enduring appalling conditions of overcrowding both in the towns and in the country, yet there had only been an advance of 21,149 sites on which development had begun since Mr. Bevan took office. Moreover, on the sites available, only 18,000 new permanent houses had been erected by the end of August. No-one expected the number of permanent houses to approach the pre-war monthly average of 30,000, but surely the Government's programme should have produced more than 5000 permanent houses in each of the summer months. The main reason for this sorry figure appeared to be the four-to-one rule in relation to local authorities and private enterprise, which meant that where a local authority was laggard nothing was done in the area. From the August report it was obvious that the local authorities had started twice as many permanent houses, and had finished less than half as many as private enterprise. This was not the fault of the local authorities, who were carrying a burden for which they had not been designed. Did the Government, Mr. Manningham-Buller asked, appreciate sufficiently the needs of rural areas? Between the wars something like 40,000 houses a year were built in the country, but only 3162 had been built in the rural districts while Mr. Bevan had been in office, and 3056 of these were produced by private enterprise. He warned the Minister that all his skill in rhetoric, and all his wordy vehemence would not save him from the wrath of the people who, but for his policy, might have been enjoying better housing conditions this winter.

Mr. A. BEVAN, Minister of Health, claimed that the Government's decision last year to place the principal responsibility for the provision of houses upon the local authorities had been justified. By the end of August they had handed over to the building industry the job of building 155,000 permanent houses, excluding 54,000 licences given for houses for sale. He would continue to insist that houses should be built to let, and that the local authorities should be the only instrument for carrying out the housing programme. The only valid criticism of his policy was that no houses at all should be built for sale. The temporary housing programme had been so devised by the Conservatives that unfortunately its completion was now competing with the permanent programme. But the supply of building materials was now marching with the number of houses put into contract by the local authorities. One of the reasons for the slower rate of the permanent programme was the very success of the local authorities, who had put a higher number of houses into contract than the industry were able to handle, and therefore a comparatively small labour force was spread too thinly over a large number of houses.

Lady MEGAN LLOYD-GEORGE thought the number of workers still employed on bomb damage repairs disquieting compared with those engaged in building permanent houses. Above all, non-essential work must be ruthlessly cut. She appealed to the Prime Minister to establish a minister of building to coordinate the activities of the other ministries and to be responsible

for building priorities. Dr. I. COMYNS drew attention to the serious situation in blitzed areas. In Silvertown, his own constituency in the East End of London, 16,000 families were desperately in need of accommodation. Was it any wonder, he asked, that the temper of the people was rising and that they put forward a claim for priority for their housing? He suggested that the labour shortage could be relieved in three ways—by a severe curtailment of the licences granted by local authorities and the Ministry of Works, by limiting the issue of licences by the Ministry of Works for non-essential work without regard to local needs, and by limiting the permitted registration of master builders.

Mr. C. KEY, parliamentary secretary to the Ministry of Health, in reply, said that talk about the failure to mobilise the private builder was beside the point, because practically all the present building was being carried out by private builders for the local authorities. In the end the four-to-one rule only operated in regard to the user of the house. In a recent circular the Ministry had urged that small builders should be brought together to build under contract for the local authorities 2 to 6, or up to 12, houses at a time. But the Government held that it was for the local authorities to decide that the houses should be provided, not for those who could afford to pay most but for those who had the greatest need. As showing the nation-wide effort of the local authorities to provide houses, Mr. Key said that whereas by March 31, 1920, out of a total of 1802 local authorities only 370 were building houses and only 715 houses had been completed, on August 31 this year of 1469 local authorities 1172 had houses built or building and had completed 6800 permanent houses. They had a further 89,584 houses under construction. Meanwhile work had been completed on the repair of 630,000 war-damaged houses, a further 89,000 had been made habitable, something like 50,000 houses had been erected, and 25,000 families had been provided with accommodation by the adaptation and conversion of houses. The labour actually employed on housing work had increased by 70% between July 31, 1945, and August 31, 1946. By the latter date the Government had provided accommodation for 200,000 families, and had under construction accommodation for another 200,000.

### QUESTION TIME

#### Proposed Hospital Regions

Colonel M. STODDART-SCOTT asked the Minister of Health whether he was yet in a position to place in the library of the House a map showing the hospital regions he had in mind in the National Health Service Bill and the medical schools with which they were associated.—Mr. A. BEVAN replied: No. If the Health Bill becomes law in its present form it would then be my duty to consult the bodies and organisations concerned and lay an order defining the hospital regions before Parliament.

#### Resettlement of Medical Practitioners

Sir ERNEST GRAHAM-LITTLE asked the Minister of Health what provision was made for the resettlement in practice of medical practitioners whose houses were mortgaged to insurance companies at the time of their call-up to the Forces and who were faced with foreclosure by the insurance companies and found themselves, on demobilisation, homeless and without means to buy another practice.—Mr. A. BEVAN replied: The arrangements made to assist the resettlement of medical officers discharged from the Forces do not include the provision of money for the purchase of a practice which can normally be obtained from the financial agencies with whom the medical profession are accustomed to deal. If the Health Service Bill is approved by Parliament the purchase of a practice will, when the service comes into force, no longer be necessary.

#### Hospital Domestic Staff

Mr. R. W. SORENSEN asked the Minister of Labour whether, in order to ease the shortage of hospital nurses and domestic staff, further steps would be taken to invite applications both for training in nursing and for domestic work from foreign and colonial sources, including West Africa.—Mr. G. ISAACS replied that in addition to those coming from overseas under existing schemes, a thousand women selected from displaced persons now in the British Zone of Germany would shortly be arriving in this country for domestic work in T.B. hos-

pitals. The extension of this scheme to include student nurses and also domestic workers for other types of hospital was under consideration.

#### M.R.C. Staff

Replying to a question, Mr. HERBERT MORRISON said that the salaries paid to the staff of the Medical Research Council were as follows:

	Numbers	Salaries
Administrative officers	10	590-2750
Scientific staff, including qualified assistants	204	300-2500
Other staff paid monthly	171	250-750
Established staff paid weekly	63	Under 250
Temporary staff paid weekly (mainly under age 21)	96	Under 250

In addition, there are 15 scientific officers and 8 temporary staff paid weekly employed on a part-time basis, with salaries pro rata within the ranges given above. The staff of the council were free to join trade unions and participate in union activities, as were civil servants.

#### What We Eat

Mr. EDWARD EVANS asked the Minister of Food how the overall consumption of food in the United Kingdom in September, 1946, compared with the consumption in July, 1939; in how many main items the consumption was greater, in how many it was less; and by what percentages in each case.—Mr. JOHN STRACHEY replied: Comparisons for as short a period as a month are misleading, and for the overall consumption of food my statisticians work on a six months' period. We were eating in the first half of this year on the average about 7% less calories per head per day than before the war. For the current six months consumption appears to be running at a rate of 2920 calories per head per day as compared with 3000 before the war; thus our overall consumption may be shown, when we get the final figures, to be now only some 3% below pre-war. But of course these averages conceal the fact that some people are eating much less, and other people much more, food than they did before the war. The following figures from the *Statistical Digest* (August, 1946) compare the actual amounts of these foods which went out of our hands and into those of the public in the three months' period, June, July, and August of this year, with the consumption of those foods on an average for the years 1934-38.

In fats, butter, margarine, cooking fat, and the like, taken together, we are each of us on the average eating about 4 oz. for every 5 oz. we ate before the war.

We are getting 9 oz. of tea for every 10 oz. we drank before the war.

We are only getting just over half as many shell eggs per head as we did before the war, and the same is true of bacon and ham.

Taking fresh and tinned meat together, we are eating almost exactly as much, on the average per head, as we did before the war.

On the other hand we are eating:

Nearly 3 lb. of fish for every 2 lb. of it we ate before the war. Even after bread-rationing we are still eating just a little more bread, cakes, &c., than before the war.

We are eating 5 pots of jam or marmalade for every 4 pots that we ate before the war and, last but not least, we are drinking very nearly half as much milk again, 47% more, than before the war.

The House must not suppose that in giving these figures I am denying the existence of a food shortage. On the contrary there is still a food shortage just as there was before the war. But now because of the great increase in working-class purchasing power everybody has much nearer a fair share.

#### Milk-production

Replying to a question, Mr. T. WILLIAMS stated that the estimated total quantity of milk produced, including milk fed to livestock, in England and Wales in the year ended May 31, 1945, was 1402 million gallons, and that for 1945-46 was provisionally estimated at 1444 million gallons. The corresponding figure for 1938-39 was 1463 million gallons.

#### Supplies of Penicillin

Sir JOHN MELLOR asked the Minister of Supply whether he was satisfied that sufficient penicillin was now available for United Kingdom requirements; and whether he would revoke the Control of Penicillin Order, 1946.—Mr. JOHN WILMOT: Although the supply position has improved considerably, the removal of control measures would not be justified at present. The scope of the order is, however, being extended, as from Nov. 1 next, to allow registered veterinary surgeons to acquire supplies of penicillin.—Sir JOHN MELLOR: Are we not now exporting penicillin?—Mr. WILMOT: Yes.

### Bovine Tuberculosis

Lieut.-Colonel G. M. SHARP asked the Minister of Agriculture whether the months of delay in the identification of a tuberculous cow in a herd suspected of having caused bovine tuberculosis was due to unavoidable technical reasons; and whether he would exercise his powers under the Food and Drugs (Adulteration) Act, 1938, and order immediate pasteurisation of the milk from that herd.—Mr. T. WILLIAMS replied that where tubercle bacilli were found in a bulk sample of milk taken in a consuming area, the offending cow, if still in the herd, was usually detected quickly, but in a small minority of cases there might be some unavoidable delay, due to the need for biological tests. The point raised in the latter part of the question was, however, under consideration by the departments concerned in connexion with the revision of the Milk and Dairies regulations.

### Care of Children

Mr. WILSON HARRIS asked the Minister of Health whether his attention had been drawn to the strictures passed in the report of the Curtis Committee on the treatment of children in many public-assistance institutions; by what local or central authority these institutions were inspected; whether there had, in fact, been regular inspection; and whether the facts cited were known by his department.—Mr. BEVAN replied: These institutions are supervised by county and county-borough councils and inspected by my inspectors. During the war the frequency of inspections had to be reduced and many of the defects found could not be easily remedied, but my department and the authorities did their best under war-time conditions to maintain a proper standard.

Mr. WILSON HARRIS: I am sure the Minister feels as strongly about this as anyone could but does he mean that the revolting conditions disclosed in this report could go on existing without anyone in a position to alter them knowing about them; if so, can he give the House a definite assurance that any steps taken under this report will provide absolute safeguards against any child being subject to these conditions in future?—Mr. BEVAN: The hon. member and the House generally will probably have an opportunity of considering the whole matter and they will then be able to satisfy themselves whether our proposals are sufficient to prevent a recurrence of these unhappy incidents. But I hope hon. members will not convey the impression that this state of affairs is universal, otherwise we should lose very many of the devoted workers who are at the moment feeling that they have been tainted by the general atmosphere.

Mrs. LEAH MANNING: In view of the last remark would it not be a good thing if the Minister published the names of those institutions against which the worst of these strictures have been made and which have given rise to the greatest public indignation?—Mr. BEVAN: I would like notice of that question, but I must point out that there are some difficulties connected with it. If evidence given to a Crown inquiry is to be published in this way it might stop such evidence ever being collected in future.—Mrs. AYRTON GOULD: Is anything being done to put a stop to bad conditions, where it has been proved that they exist, pending the statement to be made in the House?—Mr. BEVAN: Certainly; inspection is now proceeding more vigorously and efficiently than ever before and greater protection is given to these children.

### B.C.G. Vaccine

Dr. S. SEGAL asked the Minister of Health to what extent supplies of B.C.G. vaccine for tuberculosis were now available in this country; and how they might be obtained.—Mr. BEVAN replied: B.C.G., which is used in various countries for the prevention (not the treatment) of tuberculosis, is not at present available here. Steps are being taken, however, with a view to securing its manufacture in this country.—Dr. SEGAL: Is it not time the Minister appointed a commission of inquiry into the relative merits of this and other vaccines for the prevention of tuberculosis among contacts?—Mr. BEVAN: The situation in this field fortunately changes almost from week to week, and it is indeed doubtful whether a commission of inquiry would be in a sufficiently static position to make its recommendations of any value.

### Tuberculosis in Vienna

Replying to a question, Mr. J. HIND stated that there were 491 new cases of tuberculosis in Vienna in April, 481 in May, 586 in June, 369 in July, 382 in August, and 335 in September. The number of beds at present available for these cases in Vienna was 2500.

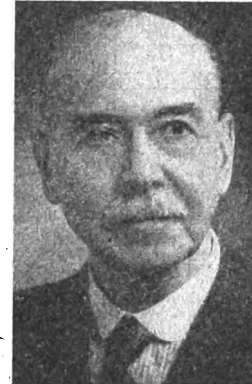
## Obituary

### T. WARDROP GRIFFITH

C.M.G., M.D., LL.D. ABERD., D.SC., F.R.C.P.

Dr. T. Wardrop Griffith, emeritus professor of medicine in the University of Leeds, died at his home in Leeds on Oct. 21, at the age of 85.

Born in Aberdeen, he was educated at the grammar school and the university there. A year after qualifying, with highest honours, in 1882, he went to Leeds, where he was to spend the rest of his life. After holding an appointment as resident medical officer at the General Infirmary, he turned his attentions to anatomy, and in 1887 was elected to the chair. The next year he took his M.D., again with highest honours. He became M.R.C.P. in 1901, and F.R.C.P. in 1908. He had wide interests, for he held appointments also as honorary physician and honorary pathologist to the General Infirmary; and in 1910 he surrendered the chair of anatomy to take that of medicine, which he retained until his retirement in 1925. His main interest was cardiology; and his Schorstein lecture of 1912 was devoted to Cardiac Problems.



J.P. Studio, Leeds

During the first world war he served, as a major and later lieut.-colonel, with no. 2 Northern General Hospital at Beckett's Park, Leeds; and in 1918 he was appointed C.M.G. From 1918 to 1927 he represented the University of Leeds on the General Medical Council. He was also honorary cardiac consultant in Yorkshire to the Ministry of Pensions, honorary consulting physician to the Leeds Public Dispensary, and consulting physician to St. James's Hospital. In 1922 his own university honoured him with the degree of LL.D., and in 1929 he received the honorary degree of D.Sc. from the University of Leeds. From 1924 to 1926 he served on the council of the Royal College of Physicians.

The Leeds School of Medicine owes much to Wardrop Griffith. His teaching in the outpatient department and the wards, coupled with his devoted care for patients and his never-failing punctuality were a source of inspiration to the students of his day; and he gained the affection and regard of all who came into contact with him.

His wife, formerly Miss Louise Talbot, of Leeds, died in 1937. Two sons survive him, one of whom is headmaster of Oakham School.

## Public Health

### Paratyphoid Fever in Sheffield

THE outbreak of paratyphoid fever reported in Sheffield is due to Vi-bacteriophage type 2. Admissions to hospitals continue, and 94 cases were confirmed or suspected up to Oct. 28. The outbreak is peculiar in that the attack-rate is heaviest in children under 10 years of age and the maximum incidence appears to be in the 1-5 year age-group. At these ages the disease is of moderate severity. The more usual ailments have been excluded, but the vehicle of infection remains undetermined. The outbreak appears to be confined to Sheffield, but doctors in surrounding districts should be prepared to encounter cases of paratyphoid fever. By bringing suspicious illness to the notice of health departments promptly they may help the investigations.

### Infectious Disease in England and Wales

WEEK ENDED OCT. 19

Notifications.—Smallpox, 0; scarlet fever, 1048; whooping-cough, 1375; diphtheria, 278; paratyphoid, 22; typhoid, 5; measles (excluding rubella), 2385; pneumonia (primary or influenzal), 407; cerebrospinal

fever, 30; poliomyelitis, 20; poliö-encephalitis, 1; encephalitis lethargica, 1; dysentery, 57; puerperal pyrexia, 134; ophthalmia neonatorum, 72. No case of cholera, plague, or typhus was notified during the week.

The number of service and civilian sick in the Infectious Hospitals of the London County Council on Oct. 16 was 835. During the previous week the following cases were admitted: scarlet fever, 66; diphtheria, 25; measles, 21; whooping-cough, 29.

**Deaths.**—In 126 great towns there were 1 (0) from enteric fever, 1 (0) from measles, 1 (0) from scarlet fever, 11 (1) from whooping-cough, 1 (0) from diphtheria, 48 (0) from diarrhoea and enteritis under two years, and 8 (2) from influenza. The figures in parentheses are those for London itself.

Rhondda reported the fatal case of an enteric fever. There were 8 deaths from diarrhoea and enteritis at Liverpool.

The number of stillbirths notified during the week was 295 (corresponding to a rate of 33 per thousand total births), including 28 in London.

## Appointments

EUSTACE, A., M.B. N.U.I., D.P.H.: medical officer of health and school medical officer, Accrington.  
 GEFFEN, D. H., M.D. Lond., D.P.H.: medical officer of health, borough of St. Pancras.  
 LLOYD, N. L., M.B. Lond., M.R.C.P.: chief medical officer, Ministry of Supply.  
 LOVELOCK, J. E., B.M. Oxfrd, M.R.C.P.: physician i/c department of physical medicine, Hospital for Consumption and Diseases of the Chest, Brompton.  
 MCILRTY, I. J., M.B. Edin.: assistant medical officer for maternity and child welfare, Sheffield.  
 MOORE, E. H., M.B. Lpool, D.P.H.: deputy medical officer of health, Accrington.  
 PATERSON, A., M.D. Edin., M.R.C.P.: physician, Maudsley Hospital, London.  
 ROTH, M., M.B. Lond., M.R.C.P.: senior registrar, Maudsley Hospital, London.  
 STOKES, J. F., M.B. Camb., M.R.C.P.: assistant physician, University College Hospital, London.  
 WHITE, D. N., M.B. Camb., M.R.C.P.: senior registrar, Maudsley Hospital, London.

### Chelsea Hospital for Women:

EVANS, A. B., M.B. Camb., F.R.C.S., M.R.C.O.G.: surgeon to outpatients.  
 JACKSON, I. M., M.B. Camb., F.R.C.S., M.R.C.O.G.: chief assistant.  
 LEWIS, T. L. T., M.B. Camb., F.R.C.S.: chief assistant.  
 RICKFORD, R. B. K., M.D. Lond., F.R.C.S., M.R.C.O.G.: chief assistant.  
 STEEL, G. C., M.R.C.S., D.A.: anaesthetist.  
 WOODFIELD-DAVIES, H., L.M.S.S.A., D.A.: anaesthetist.  
 WYNN-WILLIAMS, G., M.B. Lond., F.R.C.S., M.R.C.O.G.: chief assistant.

## Births, Marriages, and Deaths

### BIRTHS

HEMPHILL.—On Oct. 23, in London, the wife of Dr. Peter Hemphill—a daughter.  
 KREMER.—On Oct. 21, in London, the wife of Dr. Michael Kremer—a son.  
 MISKIN.—On Oct. 22, at Hove, the wife of Dr. G. W. Miskin—a daughter.  
 MOSS-BLUNDELL.—On Oct. 25, at Moreton-in-Marsh, the wife of Major A. J. Moss-Blundell, R.A.M.C.—a son.  
 PUGH.—On Oct. 19, at Hitchin, the wife of Dr. Griffith Pugh—a daughter.  
 RIDDOCH.—On Oct. 22, in London, the wife of Mr. Keith Riddoch, F.R.C.S.E.—a son.  
 SANDERSON.—On Oct. 20, the wife of Dr. G. H. Sanderson, of Horn-castle—a daughter.  
 SCHOLEFIELD.—On Oct. 18, at Chiswick, the wife of Mr. John Scholefield, F.R.C.S.—a daughter.  
 TURNER.—On Oct. 21, at Maidenhead, the wife of Dr. Donald Turner—a daughter.  
 WELBON.—On Oct. 21, at Ipswich, the wife of Dr. J. W. S. Welbon—a daughter.

### DEATHS

BURRELL.—On Oct. 22, at Fareham, Arthur William Burrell, M.D. Lond., M.R.C.S., aged 84.  
 DRYBROUGH-SMITH.—On Oct. 19, at St. Leonards-on-Sea, Ernald Drybrough-Smith, M.D. Edin., F.R.C.S.E., aged 64.  
 ELLIOT.—On Sept. 7, at Shoal Bay, New South Wales, Henry Pritchard Elliot, M.B. Edin., aged 75.  
 FELIX-JONES.—On Oct. 21, at Bournemouth, Frederick Felix-Jones, M.R.C.S., D.P.H., aged 90.  
 GRIFFITH.—On Oct. 21, at Leeds, Thomas Wardrop Griffith, C.M.G., M.D., LL.D. Aberd., D.Sc. Leeds, F.R.C.P., emeritus professor in the University of Leeds, aged 85.  
 JACKSON.—On Oct. 21, at Worthing, Brevet-Colonel George Scott Jackson, C.B.E., D.S.O., T.D., M.B. Glasg.  
 LEDWARD.—On Oct. 19, Hugh Davenport Ledward, M.A., M.B. Camb., late of Broadway, Letchworth, Herts, aged 68.  
 MACDONALD.—On Oct. 26, at Barnton, Midlothian, William Kelman Macdonald, M.D. Edin.  
 MALLAM.—On Oct. 24, at Oxford, Ernest Mallam, D.M. Oxfrd.  
 PEACOCK.—On Oct. 22, at Ipswich, William Henry Peacock, C.B.E., M.B. Durh.  
 TROUP.—On Oct. 24, at Inveressie, Aberdeenshire, George Alexander Troup, T.D., M.D. Aberd., D.P.H.  
 VIRET.—On Oct. 23, Wilfrid Foster Viret, D.S.C., M.R.C.S., aged 36.

## Notes and News

### MORE NURSES

THE demands which nursing is going to make on the woman-power of the country can no longer be met from the yearly quota of girls who obtain the school certificate, and Sir Ernest Rock Carling, F.R.C.S., speaking at the Southend Municipal Hospital on Oct. 19, declared that examinations were anyhow a false guide to the women who were wanted. He would like to see established a two-year basic course in the art and craft of nursing, open to girls without any difficult entrance examination, to be taken by all recruits, which would at the end entitle them to the name of "nurse"—not assistant nurse. In a further course of 1½ to 2½ years for all whose education was adequate, specialisation might begin early, and these students would attain to the titles of nursing-sister (surgical), (children), (obstetric), and so on. From the best of this class would be chosen those who would graduate from the staff colleges which he would like to see set up in every region or group of regions, each allied to a university. Their graduates would provide the matrons, sister-tutors, and sisters-in-charge.

Going on to speak of the future functions of these leaders of the profession, Sir Ernest suggested that the work of the matron might be divided between wardens, who would be in charge of the nurses' colleges and hostels, and administrators of high rank who would not attempt to preserve a day-to-day knowledge of all the diverse fields of technical competence. That would be left to the sisters in charge of medical and surgical units, whose status was enhanced in proportion as treatment became more technical. Indeed, Sir Ernest thought, the sister-in-charge had had a raw deal from the Rushcliffe Committee; for in his opinion hers is the supreme position in the nursing world of the future.

### INDUSTRIAL HEALTH IN CROYDON

AT Croydon, which up till now has had seven or eight doctors employed on part-time factory work, an industrial medical council has been formed to provide employers with clinical and advisory services. The council is prepared to undertake the examination of employees, the treatment of factory injuries, and the training of first-aid personnel; and to advise on hygiene in the factory, prevention of sickness, observation of young workers, and food. According to the *Manchester Guardian* (Oct. 24) it is suggested that the smaller firms should organise themselves into groups of four and six, all of whose employees would be attended and advised by one doctor; and the Croydon Chamber of Commerce has agreed to assist in this arrangement. The scheme has been initiated principally by Sir Ernest Cowell, F.R.C.S., who sees the council as the prototype of a national scheme.

### HEBERDEN SOCIETY'S DINNER

AT a dinner given by the society in London on Oct. 25, Dr. C. W. Buckley, the president, proposing The Future of Rheumatology, recalled that the society, now celebrating its tenth anniversary, had originated and developed almost side by side with the Empire Rheumatism Council. A new stage in the campaign was beginning, in which the disease was to be studied from its origin; the first objective must be to educate the general practitioner in the early manifestations of the disease; the general public, too, should be taught the importance of seeking prompt medical advice. Prof. L. S. P. Davidson said that central and local authorities had been slow to support the campaign because they had hitherto not been satisfied that the scientific and clinical approach were up to the required standard; indeed, physicians, including those in teaching hospitals, had run away from the problem. Now, however, the Ministry of Health and the Department of Health for Scotland were willing to help. Professor Davidson expressed his faith in a sound future service for the elucidation of the problem. Dr. W. S. C. Copeman, proposing The Guests, said that the presence of Lord Moran, F.R.C.P., indicated that the society had attained adult status. He also welcomed as a guest Lord Horder, an honorary member of the society, to whom the success of the campaign was largely due; Lord Horder had taken an active part in the campaign against rheumatism from the first, when "he found this a medical Cinderella of easy virtue." Dr. Loring T. Swaim, replying for the guests, said that since the formation of the American Rheumatism Association the general public's interest in the disease had been aroused. Moreover, in every American university

students were having a course of instruction on the disease. Dr. Birger Strandell said that the Swedish Medical Society had lately established a rheumatism section; the problems in his country were similar to those in Britain.

#### CONCESSIONS TO NURSING CANDIDATES WITH WAR EXPERIENCE

ASSISTANT nurses who have been enrolled by virtue of two years' whole-time nursing since the war began may be granted a remission of six months in the normal three-year period of training for State registration. This concession already applies to men and women who have had suitable nursing experience in the Forces or as members of the Civil Nursing Reserve, the British Red Cross Society, or the St. John Ambulance Brigade. Men and women with not less than two years' active nursing experience in one of the above categories will also be eligible for a remission of one year in the normal two-year period of training for the Tuberculosis Association's certificate: they may be allowed to take part I of the examination on entry to training.

Application should be made to the hospital or sanatorium where the candidate wishes to train.

#### THE SMOKE EVIL

In his presidential address to the National Smoke Abatement Society at Brighton on Oct. 24, Sir GEORGE ELLISTON said that the society's policy is no longer a counsel of perfection; it has now become a matter of urgent necessity on the lowest economic grounds alone. "There is little use the Ministry of Fuel and Power and other Ministries lamenting the shortage of coal for every purpose—industrial, domestic, and export—when we scatter no less than 2½ million tons of it unburnt into the air to cause damage to our buildings and possessions, which with other costs conservative authorities have estimated at £2 million per week. . . . Fantastic as it may seem, we are in effect employing 10,000 miners to produce smoke, and a far greater number of other people in clearing up and making good all the damage it does." The fight against the smoke evil, which for generations had wasted so much of the nation's health and wealth, was now, Sir George thought, entering its final and decisive stage. "The full implementation of all that is contained in the Domestic Fuel Policy Report, the provision of new kinds of legislation, and the early establishment of expanding smokeless zones—all these and other policies are practicable, and give well-defined objectives that when they are won will mean the virtual end of smoke."

A report to the conference showed that, of 200 local authorities questioned, about a quarter have considered the possibility of heating buildings from a central source, as has been done successfully on the Continent. In all parts of the country antiquated grates burning solid fuel are being fitted in new houses because of the acute shortage and high cost of modern types able to burn both soft coal and other solid fuel. One speaker said that in the ordinary domestic grate only 10% of the potential heat in the coal is usefully employed, and another recalled that more than two years ago the *Housing Manual* of 1944 urgently recommended that the new types only should be used in all new houses. "We hear with dismay that appliances of obsolete pattern are still being produced and supplied to housing authorities."

#### SAFETY UNDERGROUND

It will be recalled that some weeks ago a London Transport electric train overran the buffers after the collapse and sudden death from heart-failure of the motorman. Precautions against such accidents as this fall into two groups: (1) engineering devices, such as automatic signalling and "dead man's handles"; and (2) the medical selection of motormen. We are informed that operative staff employed by the London Passenger Transport Board are carefully investigated after any lengthy illness or whenever their complaint may be associated with sudden incapacity. They are also examined at promotion and at the ages of 60, 62, and 64, and their vision is tested at the ages of 50 and 55. Regular medical examination may reveal some of the causes of sudden complete incapacity; but others, such as angina pectoris, petit mal and grand mal, narcolepsy, and congenital cerebral aneurysm may remain undetected in the absence of a preliminary complaint by the patient. Fortunately sudden illness from these causes seldom occurs without some preliminary incapacity; and experience has shown that the man's sense of responsibility prompts him to declare his symptoms.

#### CARE IN MILK CERTIFICATION

THE Ministry of Food is appealing to doctors to observe scrupulous accuracy in certification when patients ask for priority milk and to confine the issue of certificates to the categories sanctioned. During the late war priority allowances to invalids amounted to about 900,000 gallons a week; they now stand at 1,300,000 a week, though there is no reason to suppose that there has been a corresponding increase in invalidism.

The supply situation this winter will be such that unless a reduction to the war-time level is attained the weekly allowance to normal consumers will probably have to be reduced to below the present 2 pints. After Nov. 30 no medical certificate for priority milk dated before Nov. 3 will be valid, and the Ministry hopes that doctors will take this opportunity for recertification to explain to applicants for certificates that stricter criteria are imperative. Failing improvement it may be necessary to curtail the allowances to invalids or to reduce the number of priority categories.

#### CANCER EXPLAINED FOR THE LAYMAN

In a little book<sup>1</sup> designed to provide the non-medical reader with factual information about the nature, diagnosis, and treatment of cancer, and to stimulate his interest in cancer research, Dr. Berenblum uses in the main non-technical and simple language. Where technical terms are unavoidable they are clearly explained and are included in a glossary. Eight pages of diagrams and photographs provide simple, well-chosen visual aids to a comprehension of the problems discussed. The frequency of cancer, the influence of heredity and environment, and the essential nature of the disease are discussed, and the author does much to dispel the prevalent but erroneous belief that, since nothing is known about cancer, one man's opinion is as good as another's. He sketches present-day methods of treatment and puts them in a favourable light, without ignoring their limitations. The exact difficulties which face those in search of an ideal curative agent are set forth candidly, which will give laymen some data on which to judge extravagant claims.

Among experts, the chapters on the nature of cancer and research would be likely to provoke some adverse comment, but it is not for the expert that they were written. The likely effect upon the layman is difficult to judge: he will certainly gain insight into the complexity of the whole problem and will realise that workers in this field have accomplished much.

#### University of Oxford

In a congregation on Oct. 17, the following degrees were conferred:

*B.M., B.Ch.*—J. G. Byrne, I. M. Shepherd, J. C. Edwards, L. H. Truelove, E. O. Field, M. S. de Mowbray, Marion C. Robinson (all in person); C. H. Kaye, E. L. Newell (in absentia).

#### University of Cambridge

The following degrees were conferred on Oct. 19:

*M.D.*—Elchon Hinden, W. B. D. Malle, H. L. Ellis.  
*M.B., B.Chir.*—M. Q. Birkbeck, E. A. D. Boyd, Rodney Finlayson, B. O. Reed, P. F. C. Jackson, J. H. Jacobs, I. M. Ramsden (by proxy); E. L. McDonald, M. G. Cox (in person).  
*M.B.*—J. L. Morgan (by proxy).

Messrs. Eli Lilly & Co. have undertaken to provide \$3500 for research on the relation of radiation to chemotherapy. The work will be carried on in the department of radio-therapeutics, under the direction of Dr. E. Friedmann.

#### University of London

Dr. M. A. Rushton has been appointed to the university chair of dental medicine tenable at Guy's Hospital medical school. Dr. C. V. Harrison has been appointed to the university readership in morbid anatomy tenable at the British Postgraduate Medical School.

#### Royal College of Surgeons of England

A meeting of fellows and members will be held at the College, Lincoln's Inn Fields, W.C.2, on Wednesday, Nov. 13, at 5.30 P.M.

The Bradshaw lecture will be delivered on Thursday, Nov. 14, at 5 P.M., by Sir Heneage Ogilvie, who is to speak on Surgical Handicraft.

#### Ministry of Pensions

Prof. N. Hamilton Fairley, F.R.S., has been appointed honorary consulting physician in tropical medicine to the Ministry.

1. Science versus Cancer. By I. Berenblum, M.D., M.Sc., demonstrator at the Sir William Dunn School of Pathology, Oxford. London: Sigma Books. Pp. 116. 6s.

**Board of Control**

The Board of Control are returning from St. Annes-on-Sea to London and from Nov. 11 their address will be 32, Rutland Gate, Knightsbridge, S.W.7. (Telephone: Kensington 3456.)

**General Board of Control for Scotland**

The appointment of Dr. H. B. Craigie as a medical commissioner has been announced. Dr. Craigie is at present deputy superintendent of Whittingham Mental Hospital, Preston.

**Reablement in Scotland**

The Fitness Centre at Gleneagles Hotel is to be transferred next year to a part of Bridge-of-Earn Hospital. Mr. Joseph Westwood, Secretary of State for Scotland, has decided that reablement shall be available to people from all types of industry, with special recognition of miners' requirements.

**Demonstrations in Neurology and Psychiatry**

At St. George's Hospital medical school, London, clinical demonstrations in neurology and psychiatry are to be held at 4.30 p.m. on Thursdays, by Dr. Anthony Feiling and Dr. Desmond Curran. The first demonstration will be given by Dr. Feiling on Thursday, Dec. 5.

**Demonstrations of Contraceptive Technique**

On Thursday, Nov. 7, at 2.30 p.m., a practical demonstration of the technique of the use of a variety of contraceptive methods will be given at the C.B.C. clinic by Mrs. Marie Stopes, D.Sc. Medical practitioners may apply for tickets to the secretary, C.B.C., 108, Whitfield Street, London, W.1.

**Rural Life Conference**

A rural life conference has been arranged by the Church Missionary Society, to be held at High Leigh, Hoddesdon, Herts, from Jan. 7 to 10, 1947. The aim is to further the study of man in relation to his environment. Applications should be directed to the acting secretary, Rural Life Conference, C.M. House, 6, Salisbury Square, London, E.C.4.

**Prize for Work on X Rays**

The Royal Society of Edinburgh will award in 1947 a David Anderson-Berry medal, together with a sum of about £100, for the best recent work on the therapeutic effect of X rays on human diseases. The last date for applications, which may be based on published and unpublished work, has been postponed to Jan. 31, 1947. Entries should be addressed to the general secretary of the society, 22, George Street, Edinburgh, 2.

**Ministry of Health**

Dr. G. A. Clark, late professor of physiology and dean of the medical faculty at Sheffield University, has been appointed to the whole-time staff of the Ministry of Health as a principal medical officer.

On the retirement of Dr. R. E. Whitting at the end of August, Dr. C. F. Good became principal medical officer (insurance service). Dr. W. D. Hopkins is now a principal medical officer and Dr. L. M. Ladell and Dr. A. R. Doyle are senior medical officers (insurance service). Dr. E. Martin has retired.

Our annotation on staff organisation in the Ministry (1946, i, 932) should have included the name of Dr. Percy Stocks (General Register Office) as a senior medical officer.

**Electroencephalographic Society**

The standardisation and interpretation of results was discussed at the society's autumn meeting at the Maudsley and Runwell hospitals on Oct. 4 and 5, when a number of European workers attended. "If we are to attempt to bring electroencephalography to an exact science," said Prof. E. D. Adrian, F.R.S., the president, "it is essential that we formulate common standards and common terms which will form the basis of an international E.E.G. language." The society's primary object is the exchange of information on the science and practice of electroencephalography. It also aims to maintain a high standard in technique and the interpretation of records; to this end it has issued recommendations on the criteria of abnormal records and on the performance of E.E.G. apparatus. It is intended that membership shall be accepted throughout the world as implying a high standard in technique and interpretation. The society is willing to advise any centre or institution. The hon. secretary is Mr. G. Parr, 68, Compton Road, London, N.21.

**Causes of Death**

The Minister of Health has appointed the following medical committee to advise the Government on the forthcoming revision of the international list of causes of death:

Sir Ernest Rock Carling, F.R.C.S. (chairman), Dr. C. F. Harris, Prof. A. J. Lewis, F.R.C.P., Dr. A. H. T. Robb-Smith, Mr. Eardley Holland, F.R.C.O.G., Prof. N. Hamilton Fairley, F.R.C.P., F.R.S., Prof. A. Bradford Hill, D.Sc., Dr. Percy Stocks, Dr. Melville Mackenzie, Prof. Sydney Smith, M.D., Prof. W. W. D. Thomson, M.D.

The present classification of causes of death, first adopted by the International Institute of Statistics in 1893, has been revised five times. The next revision, due to be made in 1948, and the establishment of an international nomenclature of diseases are to be carried out under the auspices of the World Health Organisation.

**Return to Practice**

The Central Medical War Committee announces that the following have resumed civilian practice:

Dr. R. H. DOBBS, 135, Harley Street, London, W.1.  
Mr. CHARLES DONALD, F.R.C.S., 66, Harley Street, London, W.1 (Langham 2878).  
Mr. D. LL. GRIFFITHS, M.B.E., F.R.C.S., 14, St. John Street, Manchester, 3 (Blackfriars 9598).

The laboratory chemicals section of the British Drug Houses Ltd. has been transferred to new works at Poole, in Dorset, leaving more space at Graham Street and Wharf Road, London, N.1, for the pharmaceutical and medical side of their work. Inquiries for this section should now be addressed to the B.D.H. Laboratory Chemicals Group, Poole, Dorset. (Tel.: Poole 962.) Mr. Frank Hartley, PH.D., F.R.I.C., secretary of the Therapeutic Research Corporation of Great Britain Ltd., has been appointed manager of the scientific services department of the British Drug Houses Ltd.

Fifty Indian probationary nurses are to be trained in Sydney metropolitan hospitals. Hospitals in other State capitals may train a further 66 nurses, most of whom will go to Melbourne.

**Diary of the Week**

NOV. 3 TO 9

**Monday, 4th**

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

5 P.M. Mr. Terence Millin: Surgery of the Prostate.

**Tuesday, 5th**

ROYAL COLLEGE OF SURGEONS OF ENGLAND

5 P.M. Mr. C. Price Thomas: Surgical Treatment of Pulmonary Tuberculosis.

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

8 P.M. *Orthopaedics*. Short papers.

LONDON ASSOCIATION OF THE MEDICAL WOMEN'S FEDERATION

8.30 P.M. (B.M.A. House, Tavistock Square, W.C.1.) Lady Florey: Chemotherapy of Infected Wounds.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle Street, W.C.2

5 P.M. Dr. R. T. Brain: Electrotherapeutics.

CHADWICK PUBLIC LECTURES

2.30 P.M. (42, Broadway, S.W.1.) Mr. Asa Briggs: Public Opinion and Public Health in the Age of Chadwick.

**Wednesday, 6th**

ROYAL COLLEGE OF SURGEONS OF ENGLAND

5 P.M. Prof. R. St. Leger Brockman: Intestinal Obstruction.

ROYAL SOCIETY OF MEDICINE

2.30 P.M. *History of Medicine*. Prof. J. J. Izquierdo (Mexico City): Neglect of Harvey's *De Motu Cordis* in Spanish-speaking Countries and its Recognition after Three Centuries.

8 P.M. *Surgery*. Prof. John Morley, Mr. C. G. Rob: Treatment of Acute Peritonitis.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1

3.30 P.M. Dr. Brian Russell: Possibilities in the Prevention of Disorders of the Skin.

**Thursday, 7th**

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.1

5 P.M. Dr. D. Evan Bedford: Hypertensive Heart Disease. (Bradshaw lecture.)

ROYAL SOCIETY OF MEDICINE

8 P.M. (Maida Vale Hospital for Nervous Diseases, W.9.) *Neurology*. Clinical meeting.

MEDICAL RESEARCH SOCIETY

5 P.M. (University College Hospital medical school.) Dr. W. J. Kolff: Artificial Kidney.

LONDON SCHOOL OF DERMATOLOGY

5 P.M. Dr. G. B. Mitchell-Heggs: Penicillin in Diseases of the Skin.

**Friday, 8th**

ROYAL SOCIETY OF MEDICINE

5 P.M. *Clinical*. Cases at 4 P.M.

LONDON CHEST HOSPITAL, Victoria Park, E.2

5 P.M. Mr. S. C. Suggitt: Carcinoma of the Larynx and Pharynx.

ROYAL MEDICAL SOCIETY, 7, Melbourne Place, Edinburgh

8 P.M. Dr. J. R. Rees: Social Psychiatry and Medical Progress.



**CHILBLAINS IN SERVICEWOMEN**

**ALBERTINE L. WINNER**  
O.B.E., M.D. Lond., M.R.C.P.  
LATE LIEUT.-COLONEL R.A.M.C.;  
HON. MEDICAL CONSULTANT FOR  
WOMEN'S SERVICES IN THE ARMY

**E. S. COOPER-WILLIS**  
M.A. Camb.  
LATE CAPTAIN ARMY  
GENERAL LIST

In the winter of 1942 the Auxiliary Territorial Service (A.T.S.) authorities began to receive reports that chilblains were causing a serious loss of efficiency among their personnel; so they asked the medical department of the War Office for help.

It seemed necessary to obtain first some accurate information on the incidence of chilblains, the amount of disablement caused, and the effect of service and employment. An inquiry was carried out by means of a questionnaire, which was answered by a carefully planned sample of the A.T.S. This questionnaire was framed by one of us (A. L. W.) with some help from experts, but not, as it transpired, enough. The replies were a sad warning of the dangers of unskilled surveys—questions were misunderstood and stupidly answered, and even when the form was correctly completed the results were impossible to code and compute with certainty. The only thing we got out of this survey was a remarkable list of the remedies which had been found to benefit the sufferers.

This questionnaire was therefore scrapped and another prepared, this time in conjunction with Major B. B. Swann and E. S. C.-W., both statisticians. The second questionnaire was issued in the autumn of 1943. It was distributed by the statistical officers at Command Headquarters at home, in close co-operation with the medical and A.T.S. authorities there, and it reached a sample of over 3000 Servicewomen, who completed the form, whenever possible, in the presence of an officer, who dealt with questions about the form and tried to ensure that it was correctly answered. The completed forms\* were examined to remove obvious inconsistencies and mistakes, and the remaining forms were sorted and tabulated by Hollerith machinery. The answers to 3003 questionnaires were analysed. It was found that the age-distribution of the sample was that of the A.T.S. as a whole, though it had been deliberately selected in that it contained specified numbers of girls in the main jobs.

In assessing the results that follow it should be remembered that the population at risk consisted mainly of healthy young women under 40 (those over 40 were a tiny proportion). Information was not sought from women over 40 or from men. There is, however, a general (but not scientifically proved) impression that male troops have a much lower incidence of chilblains.

**Results**

**INCIDENCE**

We obtained incidence-rates for chilblains at different ages by studying the histories of the girls as given in their replies. We could thus relate the number of girls who said they had started but not yet stopped chilblains at a given age, say 25, to the number of girls who had reached or passed 25 years. This method had two advantages over the more obvious one of relating those at each age who still suffered to the numbers in the sample at each age. First, it enabled us to get incidence-rates for the earlier ages before girls join the A.T.S.; secondly, the incidence-rates obtained are based on larger numbers of cases than those of the simpler method, and hence in that respect are statistically more reliable.

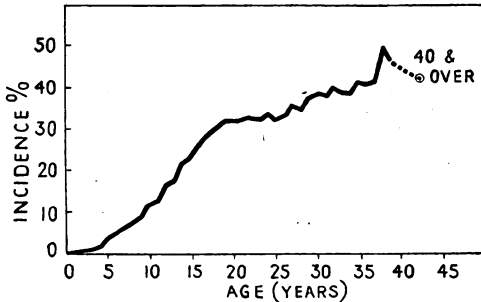
\* Copies of this form, and of two other appendices, will be sent to readers who require them. Application should be made, in writing, to the Editor of THE LANCET, 7, Adam Street, Adelphi, London, W.C.2.

As the figure shows, the incidence of chilblains, as estimated, is much influenced by age. It rises steadily up to the age of 40 or so—in fact, over the whole range of ages for which our sample gives reliable results.

Applying these incidence-rates to the whole A.T.S., we estimated that at the end of 1943 about a third of the women had chilblains in winter and perhaps another sixth had had chilblains at some time in their lives. Thus, of this sample of healthy young women, at least half will have had chilblains before they are 40. The figure of a third agrees fairly well with an estimated incidence of 30% found by the cruder method of relating those who said they suffered in winter to the total of the sample. It seems doubtful how far the rates found among the A.T.S. can be applied to the civil population, especially in peace-time. We cannot say whether A.T.S. service has specifically influenced liability to chilblains, but there is reason to think that the war years have seen an increase in their prevalence. The percentage chances of starting and of stopping chilblains at each age, computed in an analogous manner to that described above for incidence-rates, showed that the chances of starting chilblains are greatest between the ages of 15 and 16, and the chances of stopping them greatest at 20.

Below are shown the results of subdividing our data into two parts, and calculating the chances of starting chilblains,

based on the girls' histories up to October, 1939, and similar figures based on the four war years October, 1939, to October, 1943. The rates suggest a considerable increase in the chances of starting chilblains from the age of 18 years onwards during the war period. This increase is not related to war service but to the war years, and starts in the winter of 1939-40, before many had joined up. This confirms the French reports cited below.



Incidence of chilblains from childhood to middle-age, calculated from the replies to a questionnaire among A.T.S. personnel.

*Chance (%) of starting chilblains in one year, estimated from experience—*

Age (yr.)	(a) Before Oct., 1939	(b) Oct., 1939-Oct., 1943
14 and 15	3.5	3.6
16 and 17	3.2	3.3
18 and 19	2.0	2.7
20 and 21	1.2	2.6
22-25	1.0	2.2
26 onwards	1.0	1.6

**LOSS OF EFFICIENCY**

Of the 910 girls who had chilblains, 290 (i.e., 32% of them, and 10% of the whole sample) said that their chilblains hindered them in their normal activities, and 213 of these said that their chilblains had sometimes prevented their carrying out certain normal activities.

Normal activity	Percentage of those who had chilblains	Percentage of whole sample
Dressing and undressing	1	..
Carrying on normal work	6	2
Walking .. .. .	17	5
Playing games .. ..	13	4

These figures, being based on the sufferers' own replies, are unlikely to err on the side of understatement. Hence we may conclude that the amount of serious incapacity and actual interruption of work caused by chilblains was

negligible from the Army's point of view. The loss to the sufferer's efficiency, when it fell short of complete incapacity, cannot be estimated from this inquiry.

INTERVALS FREE FROM CHILBLAINS

We asked whether, and between what ages, sufferers had enjoyed periods of respite from the complaint, but the question was unfortunately misunderstood by many of the girls. As a result we cannot calculate the absolute frequency of such intervals. We can, however, examine their relative frequency at different ages, and this suggests that temporary freedom from chilblains is commonest between the ages of 25 and 30.

FREQUENCY OF CHILBLAINS AMONG RELATIONS OF SUFFERERS

Girls who had chilblains said more often than did girls who did not have chilblains that one or more near relations had also suffered. The differences in the figures given below are suggestive but need not necessarily be interpreted as meaning that there was really an incidence among the relations of sufferers higher than that among the relations of girls who had no chilblains; for sufferers are likely to be more interested in the chilblains of their relations, or else to be informed of them by way of consolation. It is noteworthy that the highest stated incidence—that among brothers and sisters of girls who still suffered—was not much higher than that estimated for the A.T.S. as a whole.

	1646 girls who had never had chilblains	447 who no longer had chilblains	910 who still had chilblains
A parent suffered ..	4%	10%	20%
A brother or sister suffered ..	12%	26%	34%
An aunt, uncle, or cousin suffered ..	2%	4%	5%
No near relation suffered ..	84%	65%	50%

The percentages total more than 100 because some girls said that more than one relation had chilblains.

INFLUENCE OF A.T.S. OCCUPATION ON CHILBLAINS

There is evidence of a definite association between being in certain A.T.S. occupations and having chilblains. The results we found may be summarised as follows (they are discussed in more detail below):

- (1) Office workers—i.e., officers and clerks—appear to have been more liable to chilblains than those in other occupations.
- (2) Cooking appears to affect chilblains favourably.
- (3) Office workers get chilblains more often on their hands and less often on their legs, feet, and ankles than do other girls.
- (4) The reverse is true of cooks and other indoor non-sedentary workers—i.e., storewomen, postal workers, and anti-aircraft plotters—whose chilblains are more common on the legs, feet, and ankles, and less so on the hands, than are those of other girls.
- (5) There was no evidence that exposure—i.e., in outdoor occupations, such as anti-aircraft operational employments—had any effect one way or the other. The only exception is searchlight personnel, possibly the most exposed of all, where the incidence is significantly reduced.

**Incidence.**—Out of some 21 trades † the actual incidence of chilblains in our sample is above the average—i.e., 30%—among officers, clerks, and drivers of motor vehicles, whereas it is below the average in cooks, teleprinter operators, and searchlight personnel:

	No. of cases
Officers .. .. .	109 (65%)
Clerks .. .. .	412 (38%)
Drivers of motor vehicles ..	141 (43%)
Cooks .. .. .	345 (17%)
Teleprinter operators .. ..	132 (15%)
Searchlight personnel .. ..	100 (16%)

These differences are the only ones we judge to be statistically significant.

† Set out in appendix II (obtainable on written application to the Editor).

The above results should not be too readily accepted as evidence of the influence of occupation on incidence, nor can these percentages be taken as reliable estimates for the A.T.S. as a whole. The samples of each trade are small and had mostly to be selected from a few units for reasons of economy. Hence we cannot tell whether the girls are really representative of their trades. We can, however, obtain additional evidence from the answers to the question on how service in the A.T.S. has affected chilblains. The answers for the 1357 girls who had at some period suffered from chilblains were as follows:

No change or no answer .. ..	52%
Stopped or better since joining A.T.S.	28%
Started or worse since joining A.T.S. ..	20%

In the absence of any way of telling what would have happened to these girls if they had not joined the A.T.S., we cannot evaluate the effect of A.T.S. service on the whole group. We can, however, compare the relative frequencies of favourable and unfavourable effects on girls in the various trades. We find that officers and clerks have been affected for the worse and cooks for the better by their service:

	Better	Worse	No. of cases
Officers .. .. .	14%	42%	83
Clerks .. .. .	23%	29%	207
Cooks .. .. .	37%	8%	118

These are the only differences we can accept as statistically significant. We did not examine in detail how far the differences between trades might be due to difference in the ages of the girls in the sample. At the date of the survey over three-quarters of the A.T.S. were between 18 and 26 years old, ages over which the incidence of chilblains did not seem to change much. † The largest age-differential was expected to be between officers and other ranks. Correction of the rate for officers for this difference would only mean a reduction of about 10% in it. Moreover, the question of the effect of A.T.S. service on chilblains should be very much less affected by age-differentials than the crude incidence of figures, as the chances of starting and of stopping chilblains are nearly equal over the relevant range of ages. Hence, where the two tests lead to similar results, we feel fairly confident that age-differences cannot explain the observations.

**Sites.**—Among the 910 girls who still had chilblains the percentage frequencies of the various sites were as follows:

Feet .. .. .	48%
Hands .. .. .	28%
Ankles .. .. .	13%
Legs .. .. .	9%
Ears .. .. .	1%
Other places and no reply ..	1%

We find the following outstanding differences from the above between office workers and indoor non-sedentary workers:

	Officers and clerks	Cooks, storewomen, plotters, and postal workers
Hands .. .. .	34%	19%
Feet, ankles, legs	65%	78%
Elsewhere, &c. ..	1%	3%

EFFECTS OF MENSTRUATION

The monthly period did not make any difference to the chilblains of the 1357 who had ever had them, 1% thought their chilblains were better and 1% worse during menstruation.

CONDITIONS AGGRAVATING CHILBLAINS

We asked in the questionnaire whether any of the list of conditions or circumstances aggravated a girl's chilblains. The percentage frequency of the answers is

† Data on the effect of age on chilblains are set out in appendix III (obtainable on written application to the Editor).

given below, based on the 910 who still suffer. There did not appear to be any significant difference between trades.

Hot-water bottles and sitting by the fire ..	24%
Cold dry weather .. .. .	19%
Cold damp weather .. .. .	19%
Tight shoes or gloves .. .. .	9%
Protracted standing .. .. .	8%
Exposure to draughts .. . . .	6%
Being out of doors .. .. .	6%
Keeping hands wet .. .. .	5%
Changing from battle dress to Service dress	2%
Unclassified .. .. .	2%

REASONS FOR CHILBLAINS STOPPING

The reasons given by those who no longer suffered for the cessation of their chilblains did not suggest that in many cases the usual remedies and treatments were found very effective if sought. In more than half the cases the girls did not know why their chilblains stopped, and in only about 26% were the cures ascribed to home remedies or doctors' treatment.

Don't know and no answer .. .. .	55%
Home remedy or doctors' treatment ..	26%
Change of occupation or moving to another part of the country .. .. .	19%

TREATMENT USED

The first questionnaire asked "What have you done for your chilblains that makes them better?" and the replies provided an interesting sample of folk medicine, magic, medical fashion, and the results of patent-medicine advertising. There are 78 remedies suggested, and we list them below as a revelation of the resource and variety which results from the absence of any specific well-authenticated remedy:

<i>Ointments</i>	
Zinc ointment	'Zambuk'
Sulphur ointment	'Diamond Chil Cure'
Wintergreen ointment	'Nulrose'
'Mentholatum' ointment	'Chilipaste'
'Iodex'	'Panacell'
Lanolin	'Zeekol'
Herbalist's ointment	'Mystic'
'Snowfire'	'Lazarus'
'Grasshopper' ointment	'Itsit'
'Germoline'	
<i>Lotions</i>	
Methylated spirits	Chalk and vinegar
Surgical spirit	'Sloan's liniment'
Tincture of iodine	'T.C.P.'
Hydrogen peroxide	'Vick liniment'
Pot. permanganate	'Dettol'
Tinct. benzoin co.	'Milton'
Menthol in surg. spirit (14.5%)	'Cadum'
Spirits of camphor	'Ayrton Saunders C.C.'
<i>Other local applications</i>	
Whisky	Ammonia and
Lard	opheldeldox
'Radox'	'Antiphlogistine'
Cajuput oil	Ichthyol
Castor oil	Raw potato
Camphorated oil	Roasted onion
Snow	Onion dipped in paraffin
Turpentine and mustard	Paraffin
'Elastoplast'	Urine §
'Camphor ice'	
<i>Internal remedies</i>	
Halibut-liver oil	Colloidal iodine
'Adexolin'	Vitamin C
Calcium	Hay tea
'Calsimil'	'T.C.P.'
<i>General applications</i>	
Hot and cold bathing	Hot water
Salt-water baths	Ultraviolet light
Mustard baths	

§ cf. Heinz and von Noorden (1921).

Other treatments

Eating green vegetables	Woollen coverings
Eating cheese	Crépe soles
Drinking milk	Boots
Exercise	Insoles
Extra clothes	Fresh air
No artificial heat	Chamois leather

Survey of Literature

The literature of chilblains is enormous and on the whole very unsatisfactory. There are a few classical papers which are really valuable and a great mass of contributions advocating a specific treatment with aetiology adapted to conform with the alleged results. The literature has not been summarised for sixteen years. The best general descriptions are those of Klingmüller and Dittrich (1926-27), Dittrich (1929a), Haxthausen (1930) with very full bibliography, and Buerger (1937). Dubreuilh and Petges (1911) are the main source for rare types and sites.

The first accurate pathological description and the first clear differentiation from frostbite were made by Hodara (1896), but the most important modern histological studies are those of Klingmüller and Dittrich (1926-27) and Dittrich (1929a), who concluded that the essential lesion was an inflammation of the smallest arterioles and capillaries, with hyperkeratosis, thrombosis of the minute vessels, and oedema; they grouped together, under the term "perniosis," ordinary chilblains, cutis marmorata, perniosis folliculata, and erythrocyanosis frigidus. This last condition, seen on the legs (especially of women), has a large literature of its own and is outside the scope of this paper, but most modern writers agree that it is similar to, if not identical with, chilblains.

The main aetiological factor is generally agreed to be cold, but Leduc (1927) thought chilblains were first-degree burns due to incautious exposure to heat after chilling. An interesting development of this idea is Keining's (1940) distinction between autumn and spring chilblains: autumn chilblains developing mainly in women on hands and feet, due to cold and damp alone; winter chilblains commonest in male agricultural labourers, on the hands, and associated with cold plus the increasing radiation from the spring sun. There is, however, no unanimity about what factors predispose certain individuals to chilblains. Many Continental authorities regard them as manifestations of tuberculosis (Permin 1903, Stephani-Cherbuliez 1936 with excellent bibliography), but most workers now regard the chilblain merely as a *locus minoris resistentia* providing good soil for a tuberculous process—e.g. Bazin's disease (Dittrich 1929b, Jausion, Meunier, and Somia 1941). Others have sought to incriminate a dietetic or environmental factor; an "epidemic" of chilblains of abnormal severity was described in Germany during the inflationary period in 1921-22 (Katz 1922) and in France during the very cold winter of 1940-41 (Rabut 1941, Bordet 1941, Jausion, Somia, and Meunier 1941, Mouriquand et al. 1942). Specific dietary deficiencies incriminated have been vitamin P (Jausion, Somia, and Meunier 1941) and vitamin A (Mouriquand et al. 1942).

Other factors blamed have been hypogonadism (Charron 1925), pituitary dysfunction (Lereboullet 1922), focal sepsis (MacKenna 1937), and intestinal toxæmia (Robertson 1920, Savill 1926). Wright (1897) described diminished coagulability of the blood, thus providing the basis for the popular treatment with calcium; but Percival and Stewart (1924) showed that the blood-calcium level was consistently normal, and that no improvement was produced by raising it with parathyroid, and Hallam (1930) could not confirm Wright's findings concerning coagulability.

The present trend, however, is to correlate chilblains with some defect, inherent or acquired, in the peripheral

circulation. Dittrich (1929a) regards the histological evidence as in accordance with this, and Hallam (1930) has drawn attention to the association with acrocyanosis. Moreover Barber (1926b) described a case in which the presence of bacterial emboli apparently conditioned the site and onset of chilblains, and Lewis (1941) points out the prevalence in limbs the seat of old poliomyelitis. There is some experimental work tending in the same direction. Ackermann (1936) sought to prove that there was a sympathetic hypotonia; but, conversely, Brack (1940) thought he had demonstrated vasoconstriction and excessive loss of heat. Dittrich (1929a and b, 1936) and Lippert (1936) considered the essential feature was over-reaction to cold, whereas Lewis (1941) interpreted his experiments as showing a normal reaction to cold in an already abnormally cold skin. Finally Schröder (1944) demonstrated an abnormally slow response to warming in the skin of subjects disposed to chilblains.

A few other points in the natural history are of interest. The only estimates of general incidence we have been able to trace are those of Hallam (1931), who found that the incidence in 1000 casualty patients was 5.3%, in 1000 medical patients 9.2%, and 1000 tuberculous patients 13.2%. A high incidence in tuberculous patients has also been recorded by Permin (1903) and Stephani-Cherbuliez (1936). Stephani-Cherbuliez (1936) and Hallam (1930) also give age-distribution curves. A familial incidence is mentioned by Barber (1926a) and Watson (1941). Barber (1926b) also makes the interesting observation that sufferers from chilblains are of two distinct types: the stout phlegmatic "lymphatic" type, and the thin nervous type. A peculiar type of "senile chilblain" was described by Meneau (1897), and other rare clinical types by Dubreuilh and Petges (1911), Dubreuilh (1921), and Piechaud and Cazenave (1925). Finally there is a curious and probably highly significant geographical distribution of the literature, which is mostly British, French, German, and Swiss. The only really good American paper is that of Buerger (1937), and all other American papers we have been able to trace deal with rare reactions to cold and not at all with what we understand by chilblains.

The literature of therapy is confused and extensive, and serves only to reinforce the contention that there is no specific remedy. An attempt to review it in detail would take many pages, and it has already been adequately done, by von Noorden (1928) and Haxthausen (1930). All agree that measures to improve the general health are important and that adequate clothing is also essential. The most interesting recent contributions to treatment are the use of sympathectomy (Goldsmith 1936), previously mentioned by Dore (1928), and paravertebral sympathetic block (Simmons 1945); the addition of Grenz rays (Goldsmith 1936) to an already impressive armamentarium of physiotherapeutic measures, the revival of passive hyperemia by Herxheimer (1942), originally described by Mitchell (1926), and the use of vitamins A and P, as previously described. Other recent suggestions have been histamine and bee venom (Watson 1941), fluorescein (Léfevre and Dubarry 1941), and 'Prisco' (benzylimidazolin) (Brack 1940). All these have their warm advocates, but a scrutiny of the work published over the last forty years inspires only a scepticism and mistrust of all these alleged advances, and a conclusion that the radical and scientific remedy for chilblains has not yet been discovered.

#### Discussion

The results obtained in this inquiry are not as final and clear-cut as we should have liked, and some of them are not easy to evaluate. Certain clinical conclusions are, however, justified.

It appears that, if the A.T.S. can be accepted as representative of the healthy female population, at

least half, at any rate under war-time conditions, will have had chilblains by the time they are 40 years old. It does not appear that these lesions are really disabling except to a very small proportion of women, and the loss of working time involved in the Army was not thought to justify the expenditure of money and man-hours which would have been required either for a scientific investigation into their cause or an elaborate trial of various remedies. The investigation was not, therefore, carried any further except for a very rough trial of one remedy discussed below. However, we are under no illusion about the discomfort, even misery, caused by chilblains which do not actually disable, and the very high incidence seems to require further research when more normal conditions prevail.

The relation to employment, though not conclusive, is suggestive. The general trend is consistent and appears to indicate that (1) office workers are more liable to chilblains than are those whose work is active; and (2) those whose work is in offices tend to get chilblains on their hands, and those who stand most of the day get them on their feet. This seems to indicate that one factor is circulatory stasis.

The incidence in outdoor workers is certainly not above the average, except for motor drivers, whose work may keep them in one position for long hours. Cold must be a factor, for chilblains as a rule only develop in winter. On the other hand, we are informed by our American and Canadian colleagues that chilblains are almost unknown over there in spite of their bitter winters, and they attribute this to the universal practice of heating (or overheating) their rooms, cars, and trains, and wrapping up really warmly when they go out. Their statements are borne out by the lack of American and Canadian literature mentioned above. Some confirmation of this view is provided by the fact that the only sedentary workers to have a relatively low incidence are the teleprinter operators, whose delicate machines necessitate their offices being kept at a warm and constant temperature. Possibly our national dislike of centrally heated rooms may not be quite so healthy as we fondly think.

The familial factor is suggestive but nothing more, in view of the notorious fallibility of the human memory, and in view of the unobservant character of the average person. This point could only be settled by a large-scale questioning of numerous families, and would be an interesting piece of research for the family doctor, who could do much to elucidate the natural history of chilblains.

The apparent increased incidence since the war is not easy to explain. It apparently started from the first winter, long before any fuel or food shortage had made itself felt; it may be partly related to the very hard winters of 1939-40 and 1941-42, but it is interesting in view of the German findings of 1921-22 and the French reports of 1941-42 mentioned above.

The therapeutic position is wholly unsatisfactory. The fact that 78 remedies had been used, allegedly with success, seems to indicate that none is specific. The basis of most seems to be counter-irritation or the administration of calcium or of vitamin. The use of urine is a fascinating relic of ancient magic, and it would be interesting to know why the onion must be roasted or dipped in paraffin. No-one mentioned thyroid medication, which is surprising, since there is some evidence that both the obese hypothyroid and the thin anxious type are especially liable to chilblains; indeed few of the numerous remedies mentioned in the medical literature occur in our list.

Therapeutic trials were no part of this investigation, because the difficulties of planning and controlling research on a large enough scale on a condition not found in hospitals were thought at this juncture to be

excessive. But one particular ointment was given a rough and ready trial in various parts of the country :

	Parts		Parts
Phenol .. ..	1.0	Soft paraffin .. ..	25.0
Camphor .. ..	6.0	Hard paraffin .. ..	7.5
Balsam of Peru ..	2.0	Lanolin anhydrous to ..	100.0

The instructions issued with it were either (1) the affected part to be immersed in hot water at bedtime, dried carefully, and the ointment applied; or (2) the ointment to be rubbed in night and morning. About 2600 one-ounce tubes of this were issued and distributed to ordnance depots, clerical units, and operational anti-aircraft units. The reports from the medical officers were almost uniformly favourable, many of them stating that under the influence of the ointment chilblains were less painful and healed rapidly, some saying that it was the best remedy they had met. We do not, however, deceive ourselves that this is more than an efficient palliative which probably acts by stimulating local circulation.

### Summary

An analysis has been carried out on 3003 questionnaires filled in by A.T.S. officers and auxiliaries, concerning the incidence and natural history of chilblains.

When the incidence at different ages was calculated, it was found that at least half the women would have had chilblains by the time they were 40 years old.

Actual time lost from work was very small.

The incidence rises steadily up to the age of 40. The most likely age for starting was 15-17, and for stopping 20-22 years. There was also a tendency to have a clear interval between the ages of 25 and 30 years.

There is some evidence that, in this group at least, chilblains have been more prevalent during the war years, though not during war service.

Office workers have a higher incidence than have those in active occupations.

Outdoor exposure does not appear to have any effect.

Office workers tend to get chilblains on their hands, whereas those whose work involves much standing get them on their feet.

There is some indication of familial influence on chilblains.

Very many remedies are reported as having proved beneficial, and it is concluded that none is specific.

The formula of a useful palliative ointment is given.

The published work on the subject is reviewed.

Our thanks are due to Lieutenant-General Sir Alexander Hood, Director-General, Army Medical Services, for his interest and permission to publish this paper; Brigadier R. M. B. MacKenna, consulting dermatologist to the Army, for constant help, stimulation, and advice; Captain C. M. B. Large, late R.A.M.C., who did much of the hard work in preparation and analysis; and the Command statistical officers and others who administered this survey. Last but not least we testify gratefully to the courtesy and helpfulness of the library staff of the Royal Society of Medicine.

### FOOTNOTE

Our report was shown to the late Sir Thomas Lewis a few months before his death. He said that, in his opinion, the next part of the investigation should be to determine the critical temperatures and humidities of the environment associated with the onset of lesions; to inquire whether turbulence of air currents in rooms or offices affected the onset; and, more particularly, to determine the temperatures of the extremities of the subjects during the period preceding the onset of chilblains. This last question was designed to discover whether there was a common or an individual temperature below which all persons liable to chilblains would get them. It was not practicable to carry out such investigations under Service conditions, but the suggestions may be of interest to other workers.

(Bibliography at foot of next column)

## TRAUMATIC PULMONARY ŒDEMA TREATED WITH CONCENTRATED PLASMA

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PULMONARY ŒDEMA due to trauma carries a grave prognosis. It was observed not infrequently in battle casualties, and its causes included blast, petrol explosions, chest wounds, fat-embolism, and accidental overtransfusion with either blood or saline. In civilian accidents it is observed in burns due to underground explosions (in miners), in petrol explosions, in accidental inhalation of noxious gases in industry, and in accidental overtransfusion. Except in overtransfusion, accepted methods of treatment are not very successful.

In seeking to control pulmonary ŒDEMA due to blast, burns, or chest wounds in battle casualties, I brought into use intravenous concentrated plasma as an addition to the more usual therapeutic measures. The results of this method appeared so striking that I brought the method to the notice of fellow Army surgeons in Italy in February, 1945, in the hope that they would explore more widely its life-saving possibilities. Since that time I have been told by several of my colleagues of success attending the use of the method in their hands. It therefore seems that the method should be brought to general notice in the hope that it may prove as useful in pulmonary ŒDEMA due to trauma in civilian accidents as it did in battle casualties.

Pulmonary ŒDEMA is characterised by severe respiratory distress and pronounced cyanosis. Large quantities of frothy mucus are thrown up into the trachea and well up through the larynx. According to the degree of consciousness present, attempts are made by the patient to cough up the frothy mucus. Auscultation of the chest detects coarse crepitations throughout which sound very

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close to the stethoscope. Danger to life lies in drowning through vast quantities of mucus in the alveoli and bronchial tree.

#### RATIONALE

I have observed on many occasions that concentrated plasma administered intravenously reduces œdema in second-degree burns, apparently by its direct action in raising the osmotic pressure in the capillaries. If this can be done in traumatic œdema in other parts of the body, it should be possible in pulmonary œdema due to trauma, though not in pulmonary œdema produced by circulatory failure as a terminal event or due to overtransfusion.

It is argued that, by withholding other fluids, the reduction in œdema could be maintained long enough to allow adequate local and general oxygenation to take place, with a resultant return to a nearly normal state of the lung capillaries. This would prevent any tendency for the condition to recur. In cases where pulmonary œdema had not developed but could be expected, the raised osmotic pressure would tend to prevent œdema.

The results described below appear to be compatible with the truth of this thesis.

#### METHOD

Many of the recognised methods of treatment for pulmonary œdema of traumatic origin are included, for it must be emphasised that concentrated plasma, intravenously administered, is an addition to them, not a replacement of them.

(1) Atropine gr.  $\frac{1}{50}$  is administered intravenously to diminish bronchial secretion to a minimum as soon as possible. It is considered that the atropine can have no direct bearing on the pulmonary condition.

(2) So that maximal oxygenation may take place, as much of the mucus in the bronchial tree as possible must be removed. If the condition has only recently developed and consciousness has not been lost, the patient is encouraged to cough up as much of the mucus as possible. Often, however, the patient is either comatose or semi-comatose. If this is so, the patient is laid supine, and the foot of the bed raised, to encourage the mucus to flow towards the larynx. A tube is passed, under direct vision, into the trachea, and the mucus is sucked out. The injection of 'Coramine' 3-5 c.cm. intravenously at this stage will often produce a temporary return of the cough reflex. This will bring still more of the mucus into the scope of the suction tube.

(3) Oxygen is given continuously by a method which ensures the maximal concentration of that gas in the nasopharynx. The B.L.B. mask has proved efficient for this, save in particularly restless and irritable patients, in whom the nasal catheter was used.

(4) The above-mentioned measures are instituted as rapidly as possible, and the administration of concentrated plasma intravenously is begun coincidentally. Originally, double-strength plasma was used (the dried equivalent of 800 c.cm. of human plasma dissolved in 400 c.cm. of sterile water). Latterly, triple-strength plasma has been used (the dried equivalent of 1200 c.cm. of human plasma dissolved in 400 c.cm. of sterile water). The plasma is administered at a rate of about 80 drops a minute, and little difficulty is experienced in maintaining the flow if slight pressure is used. A dose of 400 c.cm. is usually adequate, but occasionally up to 800 c.cm. is required.

(5) Other fluid intake should be limited, to obtain the maximal benefit from the increased protein concentration in the circulating blood.

(6) Should it be proposed to use the method in accelerating recovery from pulmonary œdema as a result of overtransfusion, an adequate venesection is a necessary preliminary to the infusion of the concentrated plasma.

#### ILLUSTRATIVE CASE-RECORDS

In the following cases the pulmonary œdema was due to various kinds of trauma. This shows the wide application of the method.

CASE 1.—An officer was admitted to a c.c.s. with wide-spread burns due to a petrol explosion. His general condition was good, but standard-strength plasma was administered by slow drip, because a great quantity of fluid was being lost from the burns.

Operation under continuous 'Pentothal' anaesthesia. All the second- and third-degree burns of face and ears, including the lips and the inside of the mouth, the second- and third-degree burns of both hands, with gloving of the hands, and the second-degree burns of both knees (patient was in shorts at the time of burning) were cleansed and dressed with sulphanilamide powder and soft-paraffin gauze, and the hands were immobilised in the position of function in plaster.

During anaesthesia vast quantities of mucus welled up into the trachea, and patient became very cyanotic despite the administration of oxygen. Pulmonary œdema was diagnosed on the additional evidence of widespread coarse crepitations in the chest. The administration of the anaesthetic agent was stopped, atropine gr.  $\frac{1}{50}$  was given intravenously, and the trachea was sucked out under direct vision. During the latter procedure, burning of the larynx was observed by the anaesthetist.

As the effects of the pentothal wore off, the cough reflex returned, and further quantities of mucus came within the scope of the suction tube. At the same time double-strength plasma was substituted for normal plasma until 400 c.cm. had been administered. This was followed by a slow normal-plasma drip. Twenty minutes later, on leaving the theatre, patient's colour was good, and moist sounds in the chest, previously abundant, were reduced to a remarkable degree.

There was no tendency for the pulmonary œdema to recur, and thirty hours later the patient was fit for evacuation to a base hospital.

In this case it was considered that the pulmonary œdema was the result of burns of the respiratory tract.

CASE 2.—A lance-corporal, on admission to an advanced surgical centre, was extremely ill owing to a sucking wound of the right midaxillary line caused by a machine-gun bullet, and other injuries.

No details are available of the preoperative infusions administered, but the resuscitation was being carried out by an officer whose realisation of the dangers of transfusion in recent chest injuries was such that he had to be persuaded to give any infusions, and then gave them only very sparingly.

Operation under chloroform and ether followed by ether administered by the Oxford vaporiser (field surgical units did not carry gas-and-oxygen in those days). An obvious sucking hæmopneumothorax was present in the right mid-axillary line. The abdomen showed no definite signs of penetration.

The chest wound was laid open and a fracture of the sixth rib found. The soft tissues were excised, and enough of the fractured rib was removed to permit inspection of the pleural cavity. A large hæmatoma of the lower lobe of the lung was seen, and there was no visible rent in the diaphragm. The wound was closed in layers. A perforating wound of the right elbow, related to the chest wound, shattering the lower end of the humerus and the elbow-joint, was excised and immobilised in a padded plaster. A perforating wound of the buttock required no operation. At the end of operation, hæmoptysis was observed.

After return to the ward, patient's condition was extremely grave, and oxygen was administered continuously. During the next three or four hours there was a gradual recovery, and consciousness was regained for a short period. About six hours after operation the patient gradually lost consciousness and appeared to be moribund, and large quantities of mucus welled up into the trachea. Widespread coarse crepitations were heard in the chest.

Treatment was instituted along the lines already described, double-strength plasma being used. The immediate response was dramatic, owing to clearing of the airway by suction followed by administration of oxygen, and over the next half-hour the moist sounds in the chest were observed to be diminishing. This "drying" effect continued, and the œdema did not tend to recur. Consciousness was regained half an hour after treatment was begun.

Five days later patient was fit for evacuation, there having been no further evidence of pulmonary oedema. Six weeks later it was learnt that the chest was considered as healed and only the orthopaedic problem of the shattered elbow remained.

**CASE 3.**—An officer was injured by the explosion of a mine under the jeep in which he was riding. The force of the explosion was such that the jeep disintegrated and large parts of it (and of his fellow passenger) were never found.

On admission to an advanced surgical centre patient was cold, clammy, pulseless, unconscious, and appeared moribund, with a blood-pressure of 50/? The prognosis was hopeless.

The injuries were (1) bilateral blast injury of the lungs, diagnosed on the history, cyanosis, some respiratory embarrassment, and widespread coarse crepitations throughout both lungs; (2) a very large laceration of the sagittal line of the scalp without obvious fracture of the skull, which suggested that his head had met with sufficient violence to cause loss of consciousness; (3) lacerations over the left parietal and occipital regions of the scalp; (4) a traumatic amputation of the right forearm, with shattering of the elbow-joint and fracture of the lower end of the humerus on the same side, with great coincident muscle damage; (5) two penetrating wounds of the right shoulder region; (6) a simple fracture of the left medial malleolus, with much bruising and great displacement of the fragment; and (7) severe contusion of the right ankle.

The blast injuries of the lung were regarded as being of the greatest immediate seriousness. It was felt that there was almost no hope that the patient would become fit to stand operation. Blood-loss had obviously been severe, so blood-transfusion was started slowly because of the chest condition. After two pints of blood had been administered there was no evidence of any response. Pulmonary oedema then manifested itself, pink frothy sputum welling up from the trachea. The depth of unconsciousness was such that the cough reflex was absent.

Treatment was begun with atropine gr.  $\frac{1}{60}$  intravenously, tracheal suction, and continuous oxygen. Coramine 5 c.cm. was given intravenously while the tracheal suction was being carried out, and a temporary but helpful return of the cough reflex was obtained. Triple-strength plasma 400 c.cm. was administered at a rate of 80 drops a minute.

In half an hour the colour had notably improved and the pulmonary oedema was disappearing. The cold clamminess of the body had been replaced by general warmth and superficial vasodilatation. The blood-pressure was rising steadily but slowly. Three hours after starting treatment for the pulmonary oedema the blood-pressure had reached 110/80, and the pulmonary oedema did not tend to recur. Semi-coma still persisted. It was now judged to be the suitable moment for operation (eight hours after admission and at least twelve hours after wounding).

**Operation,** under very light pentothal anaesthesia, consisted of rapid reamputation of the arm through the level of the fracture of the humerus, excision of all other wounds, and rapid one-layer closure of the scalp wound over sulphanilamide powder. The fractured ankle was manipulated and a padded plaster applied.

The condition of the patient did not deteriorate during the operation, but in the next two hours after operation the axillary temperature rose to nearly 105° F, beginning to fall thereafter on the application of cooling measures. This hyperpyrexia could have been the result of a reaction to the plasma or of some injury near the heat-regulating centre, and did not recur.

Ten months later patient was alive and well, having recovered from severe psychological disturbances which were present on his return to consciousness.

**CASE 4.\***—A sepoy, by the explosion of a shell very close to him, received multiple injuries, including a badly shattered right femur, with very gross and extensive muscle damage, necessitating high thigh amputation.

After operation the breathing became difficult, cyanosis appeared, and the semiconscious patient made poor attempts to cough up the large quantities of mucus in his bronchial tree. Coarse crepitations could be heard throughout the chest. Early pulmonary oedema was diagnosed, and treatment was begun with 400 c.cm. of triple-strength plasma, followed

by 400 c.cm. of double-strength plasma. This produced a resolution of the pulmonary oedema, which did not tend to recur. However, patient gradually became more unconscious, despite the absence of external evidence of head injury, and died three days after being wounded.

As the patient was an Indian a necropsy was not done. The differential diagnosis lay between blast injury of the lung and brain, fat-embolism, and a combination of both. In any case naked-eye necropsy in the field would not have established a final diagnosis.

The important fact remains that the pulmonary oedema was controlled and death was due to the cerebral condition.

**CASE 5.**—A guardsman had been injured by a shell which landed so close to him that, when he came to, he found himself lying on the edge of the shell crater. His only external injury was a tangential laceration of the knee, just involving the joint without damaging the bone.

On admission his breathing was laboured, pulse-rate rapid, and he was slightly cyanosed. No mucus was welling up into his trachea, but high-pitched rhonchi were heard all over the lungs. He was a very much sicker man than his external injury warranted, and he was diagnosed as a case of early and perhaps slight blast injury of the lungs. Later he coughed up a little blood, which tended to substantiate the diagnosis.

He was given 400 c.cm. of triple-strength plasma at about 80 drops a minute. A severe rigor came on after about 200 c.cm. had been given. The rate of administration was diminished and morphine gr.  $\frac{1}{4}$  administered, after which the rigor ceased.

Within an hour the cyanosis had disappeared, breathing had become easy, and the general condition had improved. No operation was performed beyond injection of the knee-joint with penicillin and applying suitable splintage. No further anxiety was caused by his chest condition.

This case is described because it is justifiable to suppose that concentrated plasma played a part in averting pulmonary oedema.

#### COMMENT

It appears clear that the initial improvement in the cases of pulmonary oedema described above can be attributed to the standard measures applied. The outstanding advantage which appears to result from the use of concentrated plasma is the tendency for progressive improvement and the remarkable absence of any tendency for the condition to recur. No case which is described above has required more than one clearing of the trachea by suction.

#### DANGERS OF CONCENTRATED PLASMA

Reactions of various degrees of intensity may arise, but these do not differ from the reactions which may arise when normal plasma is used to replace plasma loss. Excluding those cases in which bad plasma is used mistakenly, reactions only appear to be really dangerous when a serious hyperpyrexia develops. By careful observation this may be anticipated and the infusion stopped. If, on the other hand, it appears that death is a certainty from the pulmonary oedema unless administration of the plasma is continued, a fresh amount of plasma may be prepared and given through a fresh giving set, and the pyrexia controlled by the usual cooling measures.

In cases where the pulmonary oedema is caused by overtransfusion, an adequate venesection is a necessary preliminary to the use of the concentrated plasma, or the condition will be aggravated. I have seen such a case treated mistakenly with triple-strength plasma without venesection, with aggravation of the condition. This case subsequently responded to venesection when the error was pointed out. I have used it in such a condition, after ordering a preliminary venesection, and been well pleased with the rate of return to normal of the lungs.

\* This patient and case 5 were treated with concentrated plasma, at my suggestion, by Major D. E. Stephens, S.A.M.C., to whom I am indebted for the case-records.

## SUMMARY

Intravenous concentrated plasma has seemed to be a valuable addition to recognised methods in the treatment of pulmonary oedema due to trauma.

Illustrative cases are described.

There has been no tendency for the pulmonary oedema to recur, in the types of cases described, after this treatment.

Apart from the risk of reactions to the plasma, the method is dangerous only if applied, without preliminary venesection, in cases of pulmonary oedema due to overtransfusion.

## ACUTE PHOSGENE POISONING EFFECTS OF PLASMA REPLACEMENT

### EXPERIMENTS WITH DOGS AND GOATS

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DURING the war 1914-18 two types of clinical cases were observed in men exposed to lung-irritant gases: the "blue" case and the "grey" case.<sup>1</sup> The "blue" case showed congested veins and was benefited by venesection. In the "grey" case severe circulatory collapse and leaden cyanosis, with rapid thready pulse, were evident.

In the experiments described by Cameron and Courtice<sup>2</sup> and in other experiments where dogs and goats have been exposed to pure phosgene, signs resembling those of the "blue" case in man have not been seen. As oedema develops, the plasma volume falls, the blood concentrates, the peripheral veins collapse, and the blood-pressure is maintained at first but fails later. Acute phosgene poisoning in these animals thus resembles the "grey" case seen in man.

The logical treatment of such cases of phosgene poisoning would be transfusions of plasma or serum, to maintain the falling plasma volume and so improve the general circulation. The picture is complicated, however, by the fact that the animal is at the same time suffering from anoxaemia due to insufficient oxygenation of the blood in the lungs. The experiments of Cameron and Courtice suggest that, as the lung capillaries appear to be completely permeable to the plasma proteins, any transfusion of a protein solution to improve the general circulation would at the same time increase the pulmonary oedema and so decrease the degree of oxygenation of the blood in the lungs. It was hoped, however, that, by improving the peripheral circulation, the increased blood-flow to the tissues would counteract any decreased oxygenation of the blood in the lungs. The effects of plasma, serum, and concentrated serum were therefore investigated in dogs and goats after exposure to phosgene.

### METHODS

Unanaesthetised dogs and goats were exposed to phosgene (440 mg. per cubic metre for various times) in a static chamber and were transfused about sixteen hours after exposure when haemoconcentration was well marked.

The plasma or serum was given by drip transfusion into a vein in the foreleg. The animal remained quietly on a table during the course of the transfusion, which usually took 30 min. The drip apparatus used for human transfusions in the Army was used. The amount of fluid given was calculated from the rise in Hb % caused by the phosgene before the transfusion began. When four-times-concentrated serum was given, the amount was only a quarter of the calculated plasma loss.

Blood samples were taken from the jugular vein before exposure to phosgene, sixteen hours after exposure, and immediately after, and two, six, twenty-four, and forty-eight hours after transfusion if the animal survived. The Hb % and plasma-protein concentration of these blood samples were estimated, the former by the Haldane haemoglobinometer, and the latter by microkjeldahl digestion and nesslerisation. The serum or plasma given did not cause agglutination of the recipient's cells in any case.

Dog serum and plasma were used in these experiments with dogs, and goat serum and plasma with goats. To obtain the plasma and serum, normal dogs and goats were bled about 20% of their blood-volume by venepuncture of the jugular vein and suction. Strict aseptic precautions were taken. The dog serum was dried by the Army Transfusion Unit and was reconstituted when required as normal or four-times-concentrated serum. The dog plasma and the goat serum and plasma were all used fresh.

### RESULTS IN DOGS

In these experiments 13 dogs have been transfused: 5 with four-times-concentrated serum, 4 with normal serum, and 4 with normal plasma. The results of all experiments have been similar.

*Four-times-concentrated Serum.*—Two dogs were exposed to the phosgene concentration for 10 min. Both were very ill sixteen hours later, with laboured respiration, cyanosis, and collapsed peripheral veins, the Hb of one having risen from 81% to 114%, and the other from 80% to 108%. After transfusion the symptoms became much worse, one dog dying two hours after, and the other seven hours after, transfusion.

Six other dogs were exposed for a shorter time, 6 min., to the same concentration of phosgene. The general symptoms of these dogs sixteen hours later were not so severe as those of the first 2 dogs. Three were transfused with four-times-concentrated serum, and 3 were left as controls. Fig. 1b shows the mean results of these two groups. The degree of haemoconcentration was much the same in both groups sixteen hours after exposure to phosgene. Immediately after transfusion, in the treated group, the Hb % fell slightly, but two hours later it had risen again to a level above that before treatment. Thereafter the level of haemoconcentration ran parallel with that in the control group. The plasma-protein concentration in the treated group was maintained by the proteins transfused; but, even so, much of the protein injected must have left the circulation. The treated animals were clinically worse after the treatment; but, as the pulmonary oedema was not too severe at the beginning, they all survived in spite of the transfusion. It was felt that, if a second transfusion had been given to try to dilute the blood, death would have resulted.

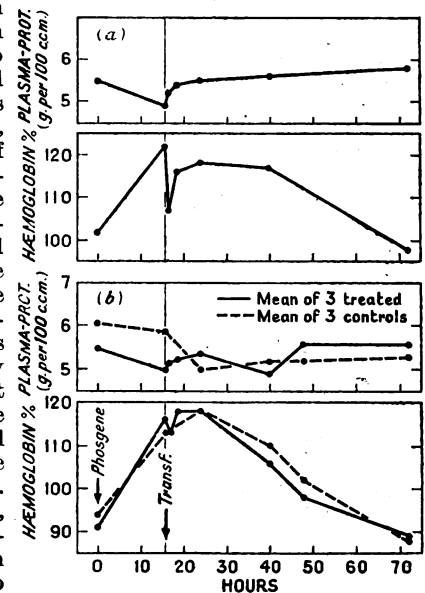


Fig. 1.—Effects of transfusion after exposure to phosgene in dogs: (a) transfusion with normal serum; (b) transfusion with four-times-concentrated serum.

1. Official Medical History of the War, Diseases of the War, 1923, vol. II, p. 393.  
2. Cameron, G. R., Courtice, F. C. *J. Physiol.* 1946, 105, 175.



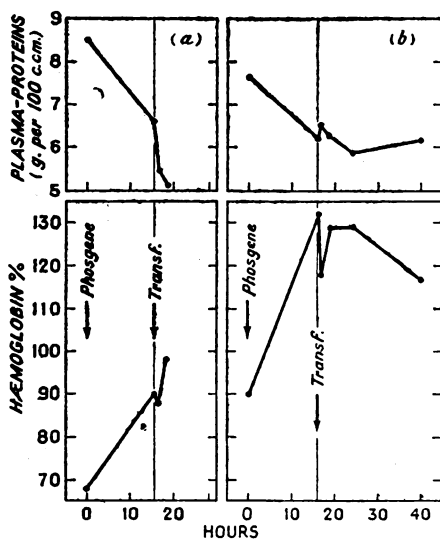


Fig. 2.—Effects of transfusion after exposure to phosgene in goats: (a) transfusion with normal plasma; (b) transfusion with normal serum.

*Normal Reconstituted Serum.*—Of the 4 phosgenised dogs transfused with normal serum, 1 died two hours after, and 1 six hours after, transfusion, and 2 survived. In 1 case there was no hæmodilution, and in the other 3 dilution was transient. The general condition of the dogs, as determined by rate and type of respiration, cyanosis of tongue and gums, and sounds in the chest on stethoscopic examination, was worse in all cases after the transfusion. Fig. 1a shows the effects in one of the dogs that survived. The plasma-protein level was raised, but the hæmodilution which took place immediately after the transfusion was not maintained.

*Fresh Normal Plasma.*—Of the 4 phosgenised dogs transfused with plasma, 1 died two hours after the transfusion and 3 survived. Hæmodilution in all cases was transient; and since the condition of the dogs was worsened by the transfusion, it was thought that a further transfusion would have led to death. The plasma-protein level fell even more in all cases after transfusion.

#### RESULTS IN GOATS

Three goats were transfused with normal plasma and 2 with normal serum. The results of all experiments were similar. Two typical experiments are depicted in fig. 2. The general behaviour of goats closely resembled that of dogs. The transfused fluid had either a temporary effect or none at all in diluting the blood, and the general condition of the animal was always very much worse after transfusion.

#### DISCUSSION

From all these experiments the following conclusions may be drawn:

(1) The fluid transfused, whether concentrated serum, normal serum, or normal plasma, passed out of the circulation very quickly, depending, on the whole, on the severity of the symptoms before transfusion.

(2) The proteins of the transfused fluids also left the circulation, but serum had a better effect than plasma in maintaining or slightly raising the plasma-protein concentration.

(3) The general condition of the animal was invariably much worse as a result of the transfusion.

(4) It was impossible in very severe cases of phosgene poisoning ever to give enough fluid by drip transfusion to dilute the blood, so rapidly did it pass into the lungs. In less severe cases the dilution of the blood was only temporary after a single transfusion, but the clinical

condition of the animal was made much worse; hence a second transfusion would almost certainly have led to death.

This question of transfusion in cases of hæmoconcentration and peripheral circulatory collapse in the presence of pulmonary œdema has arisen in conditions other than phosgene poisoning—e.g., after inhalation of nitrous fumes and other irritant gases. Presumably in all such cases of pulmonary œdema the capillaries of the lungs are affected. The experiments described show that these capillaries allow the passage of the normal plasma of the animal in the first instance, and likewise of the transfused plasma or serum. It was hoped that concentrated serum would, temporarily at least, withdraw some of the œdema fluid by osmotic action, as the transfused serum passes through the pulmonary circulation before the general systemic capillary bed. This hope was not justified by the experiments with dogs. Transfusions in the presence of gross pulmonary œdema are therefore definitely detrimental.

It is possible to have cases of shock due to thermal burns accompanied by only a slight degree of pulmonary œdema due to the inhalation of irritant gases such as nitrous fumes. In such cases great care should be taken if transfusions are given, as it is probable that a non-lethal exposure to a lung-irritant gas can easily be made lethal by repeated transfusions of plasma or serum.

#### SUMMARY

The effects of transfusions of four-times-concentrated serum and of normal plasma and serum have been investigated in dogs and goats with phosgene poisoning.

The transfusions have no lasting effect in relieving the hæmoconcentration and have a definite detrimental effect by increasing the pulmonary œdema. Transfusions are therefore contra-indicated in the presence of gross pulmonary œdema.

We are indebted to Brigadier Sir Lionel Whitby, of the Army Transfusion Service, for drying the dog serum used in these experiments. Our acknowledgments are also due to the Director-General, Scientific Research and Development, Ministry of Supply, for permission to publish this investigation.

## SALT DEFICIENCY IN SPRUE

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It is well recognised that in both tropical and non-tropical sprue the blood-pressure is lower than normal in some patients. Thaysen (1932) found a systolic blood-pressure of less than 100 mm. Hg in 7 of 13 patients with non-tropical sprue. Though a fall in blood-pressure is more common in long-standing cases of sprue, it is also found in some soldiers who contract the disease on war-time overseas service; of 41 soldiers with sprue who had been in India for four years or less, 4 had a systolic blood-pressure of less than 100 mm. Hg and a diastolic of less than 65 mm. Hg. Some such patients show not only hypotension but also signs of peripheral circulatory failure; these form an important group, in spite of their small numbers, for the occasional fatal case of early sprue is drawn from their ranks. The cause of the hypotension presents something of a problem, for in these early cases anæmia has not become gross. Moreover protracted malnutrition cannot be accepted as the sole cause of the hypotension, which may be observed in patients who are not conspicuously wasted in comparison with others who have had the disease for longer periods but whose blood-pressure has remained normal. The present series of observations was directed towards finding some more adequate explanation of the low blood-pressure in this group of patients.

*Methods.*—The following analytical methods were used:

Serum-sodium: uranyl zinc acetate precipitation.

Serum-potassium: cobalti-nitrite precipitation.

Serum-chloride: Volhard-Harvey titration.

Blood-urea: urease-Nesslerisation.

Plasma volume: vital-red method.

Chloride was determined in urine and stools by the open Carius method; sodium and potassium were determined on ash extracts of stools and urine.

#### GENERAL CLINICAL FEATURES

The ten patients investigated all had tropical sprue, contracted during their period of service in the India-Burma theatre of war. All of them had steatorrhœa, fat accounting for more than 30% of the dry stool weight. All had lost 10 kg. or more of body-weight. Glossitis was common but not constant. The duration of symptoms was less than a year, and none of the cases showed the severe degree of anæmia which is common in sprue patients coming under observation at a later stage of the disease. The appetite was capricious, and in several cases reluctance to take adequate amounts of food and fluid interfered with therapy; thirst was not complained of. Abdominal distension was general. Two of the patients had profuse watery diarrhœa at the time of investigation, and several others gave a history of diarrhœic episodes, separated by longer periods in which the stools were pale and bulky but well formed. A few of the patients, but not all, had had cramps.

These ten patients were selected from several hundred cases of sprue which passed through the same hospital in 15 months. The basis of selection was low blood-pressure with asthenia. All the patients in the series had a diastolic blood-pressure of 70 mm. Hg or less; the lowest blood-pressure recorded was 74/45 mm. Hg. Though "asthenia" cannot be reduced to quantitative terms, these patients formed in this respect a sharply differentiated group. The great majority of patients with steatorrhœa of a few months' duration are surprisingly well, even though they may have lost much weight; but the patients in our series were listless, lay flat in bed, and were incapable of exertion. The super-

TABLE I—BLOOD VOLUME AND ELECTROLYTES

Case	Serum-sodium		Serum-chloride		Serum-potassium		Blood-urea mg/100 ml	Plasma volume		Hæma- to- crit %	Blood- pres- sure mm Hg
	mg/100 ml	mEq/l	mg/100 ml as NaCl	mEq/l	mg/100 ml	mEq/l		litres	ml/kg		
1	300	130	580	99	..	..	60	2.5	61	37	90/52
2	300	130	545	93	16	4.1	42	3.0	52	36	74/45
3	320	139	608	104	..	..	45	2.2	41	40	88/56
4	310	135	571	98	15	3.8	40	2.2	40	44	92/68
5	315	137	573	98	18	4.6	30	1.9	42	50	96/54
6	304	132	564	96	..	..	50	1.7	34	46	100/60
7	278	121	517	88	20	5.1	45	2.0	44	40	94/54
8	314	136	573	98	22	5.6	54	2.5	46	43	94/60
9	312	135	566	97	20	5.1	29	2.4	46	46	110/68
10	258	112	515	88	20	5.1	36	2.1	53	42	100/70

ficial veins were collapsed, and the pulse was thin and rapid. The muscles and subcutaneous tissues were flaccid, and the skin wrinkled, more so than in other patients who had lost a comparable amount of weight. The skin was pale, though they were not anæmic.

The following case-record may be taken as representative of the more severely ill patients in the series.

#### ILLUSTRATIVE CASE-RECORD

A man (case 10), aged 22 years, with a year's tropical service, had had, since 1939, epigastric pain, heartburn, and occasional vomiting after fatty meals. A barium meal had

TABLE II—BLOOD ANALYSES IN CASE 10

Date	Serum-sodium		Serum-chloride		Blood- urea mg/100 ml	Plasma volume litres	Hæma- to- crit %
	mg/100 ml	mEq/l	mg/100 ml as NaCl	mEq/l			
Sept. 22	258	112	..	..	36	2.1	42
.. 23	296	129	515	88	32	..	..
.. 27	320	139	620	106	40	..	..
.. 29	310	135	612	104	45	..	..
Oct. 1	..	..	..	..	..	2.5	34
Nov. 1	337	146	615	105	24	2.7	41

The serum-potassium on Sept. 23 was 20.2 mg/100 ml. The alkali reserve on Sept. 29 was 47.3 vol/100 ml.

not disclosed any abnormality. No previous diarrhœa, dysentery, or malaria.

*Present illness* began in May, 1945, when he was in Eastern Bengal. The onset was sudden, with the passage of copious frothy watery stools. Loss of appetite and abdominal distension were present from the beginning, and he became very weak. Flatulence and abdominal discomfort were prominent symptoms from the onset, whereas tongue signs did not appear until 3 months after the diarrhœa began. He was evacuated to base, and admitted to this hospital on Sept. 20, 1945.

*On admission* he was severely ill and showed clinical signs of dehydration: dry wrinkled skin, coated tongue, and diminished intraocular tension. Pulse weak and dirotic; superficial veins noticeably collapsed. Blood-pressure 100/70, fell to 90/65 when the man sat up; pulse-rate 90, rising to 96 on sitting. Appetite poor, but he took fluids well. Tongue painful and reddened at the tip and sides, depapillated, but not fissured. Abdominal distension present, with flatulence. Patient passing ten pale fluid copious stools daily.

The patient's weight was 87 lb., his normal weight being 154 lb. A blood-count showed Hb 12 g./100 ml., red cells 3,000,000 per c.mm. A 3-day specimen of fœces weighed 3.5 kg., the dry weight being 239 g. This contained 36% of fat, the total output of fat in 3 days being 87 g., of which 82 g. were split. No mucus or inflammatory exudate was found in the stools.

*Progress.*—Patient was put on a sprue diet containing 118 g. of protein, 45 g. of fat, and 159 g. of carbohydrate a day, the total calorie intake being 1513 a day. This diet contains less than 5 g. of salt a day, and it was supplemented during the first three days of observation by 5 g. of salt to bring the salt content nearer a normal level. Even on this diet, comparatively restricted in salt, the serum-sodium level rose, and concurrently the patient's circulatory state improved, so that by Sept. 24, four days after admission, his pulse-rate had fallen to 72 per min., and his blood-pressure was 104/70 mm. Hg lying, but rose to 110/75 mm. Hg on sitting up.

After three days on a "normal salt" diet the patient was put on a "high salt" diet, with 25 g. of added salt a day; this had to be reduced after three days to 15 g., for the patient's appetite became capricious, and he passed increased amounts of watery stools.

Specific sprue therapy with parenteral liver extract was begun, and sulphaguanidine was given in a total dosage of 70 g. in four days; the stools became formed within three days, the wet weight being 300 g. a day.

The general condition improved rapidly, and a month after the start of treatment the patient's weight had risen from 87 to 128 lb. His blood-pressure was normal, tongue signs had disappeared, and he felt well, though his stools remained bulky and he was passing 96 g. of fat in three days.

#### LABORATORY FINDINGS

In table I are given the results of the estimation of plasma volume and hæmatocrit, and of serum-sodium, serum-chloride, and serum-potassium in ten patients. In the calculation of the plasma volume per kg. the patient's actual weight at the time of estimation has been used; had the normal body-weight been used, the values would have been lower by 10% or more.

Seven of the patients had a plasma volume of less than 2.5 litres, and two of them less than 2.0 litres. Five of the patients had a plasma volume of less than 45 ml./kg.

The hæmatocrit readings lay mostly between 40% and 46%; but one high value of 50% and two low values of 36% and 37% were observed. Later estimations of the hæmatocrit percentage showed that these normal values did in fact represent a moderate hæmoconcentration; for, when the plasma volume rose with therapy, the hæmatocrit percentage fell to values just below the usual normal limits. The serum-sodium values were uniformly low, ranging from 258 to 320 mg./100 ml. (112 to 139 mEq./litre). A control series of five sprue patients with gross steatorrhœa, but with a normal blood-pressure, gave values for the serum-sodium ranging from 318 to 354 mg./100 ml. Moreover, normal values were found for the serum-sodium in four of the patients reported in table I, on whom it was possible to obtain a blood sample after recovery. The serum-chlorides were also low, but less markedly so than the serum-sodiums (range 515-608 mg./100 ml., 88-104 mEq./litre). The serum-potassium was done in seven patients, and in none of them did it exceed the upper limit of normal. The highest blood-urea was 60 mg./100 ml., and in five other patients the blood-urea was over 40 mg./100 ml.

This group of observations indicated that in these patients hypotension and circulatory failure were associated with low serum-sodium and serum-chloride levels, and less constantly with a low plasma volume. They gave no evidence whether the observed sodium deficiency

The blood-urea level during the dehydration period lay within the normal range but was higher than after recovery; Kirsner et al. (1943) comment on the fact that blood-urea may show little increase in moderate degrees of salt deficiency. However, the urea clearance (table III) was depressed at the time when the blood-urea level was highest, and the 3-day output of urea also

TABLE IV—FÆCAL ANALYSES IN CASE 10

Period	Wet weight g	Dry weight g	Total fat g	Sodium		Chloride		Potassium	
				g	mEq	g	mEq	g	mEq
1	3520	239	87	4.6	200	1.2	34	1.0	26
2	9155	277	118	8.9	387	8.1	228	1.8	46
3	6130	220	71	9.0	392	4.0	113	4.9	126
4	3550	136	49	3.4	148	2.1	59	2.0	51
5	910	113	40	0.8	35	0.4	11	2.8	72
After	1225	265	96	0.5	29	0.03	1	4.1	105

fell. Comparison of the results in table II with the clinical data in the appended case-record on patient 10 shows that correction of the anomalous blood findings was attended by only partial clinical improvement. The pulse-rate fell, the blood-pressure rose, and the peripheral circulation improved. There was some gain in weight, but the patient continued to pass very large fluid stools, his appetite was poor, and he felt no better. It was obvious that salt deficiency had been responsible for only a part of the complex clinical picture, and rapid improvement in his general condition took place only after he was treated with sulphguanidine and parenteral liver.

MINERAL BALANCE AND EXCRETION

There was retention of sodium, chloride, and potassium throughout the first observation period of 15 days. In the case of sodium and chloride, this took place on dietary intakes varying from less than 10 g. to more than 20 g. of sodium-chloride a day, even though abnormal amounts of sodium and chloride were being lost in the stools. The retention of sodium and chloride was accompanied by a rise in their serum concentrations. In the after-period of three days the patient was in sodium balance and was excreting rather more chloride than he took in; there was still a retention of potassium, which may have been related to the fact that he was still putting on weight rapidly. Though the dietary intake of sodium and chloride, when expressed in milli-equivalents, was approximately equal, more sodium than chloride was retained, except during period 1, when the patient was on a diet containing less than 1 g. of salt a day. This suggests that in the period before our observations,

TABLE V—INTAKE AND OUTPUT OF ELECTROLYTES IN CASE 10

Period	Intake						Output					
	Sodium		Chloride		Potassium		Sodium		Chloride		Potassium	
	g	mEq	g	mEq	g	mEq	g	mEq	g	mEq	g	mEq
1	10.1	440	16.7	470	10.3	264	4.6	206	5.9	166	1.1	29
2	27.8	1210	43.0	1210	9.9	254	9.2	401	22.7	640	2.9	73
3	20.0	870	31.2	852	7.9	206	9.2	401	14.2	401	5.6	143
4	12.8	557	20.0	563	4.2	108	4.4	193	10.7	301	2.7	68
5	10.9	474	17.9	504	8.8	226	1.9	82	9.6	270	3.6	91
After	18.2	792	28.4	800	11.0	282	18.0	791	30.5	861	7.1	182

The potassium intake was derived entirely from the food, and its variability was due to the patient's having been unable to take different items of the measured diet at different times. The sodium and chloride were derived partly from the diet, and partly from supplementary sodium chloride, to the amount of 5 g./day in period 1, 25 g./day in period 2, 15 g./day in period 3, and 10 g./day in periods 4 and 5 and the "after" period.

TABLE III—URINE ANALYSES IN CASE 10

Period	Vol. ml	Sp gr	Sodium		Chloride		Potassium		Urea g	Urea clearance: % of average normal
			g	mEq	g	mEq	g	mEq		
2	4415	1.012	0.31	13.5	14.6	412	1.06	27.2	59	63
3	3000	1.010	0.21	9.1	10.2	288	0.68	17.4	40	46
4	4830	1.006	1.03	44.8	8.6	242	0.65	16.7	44	50
5	8640	1.007	1.08	47.0	9.2	259	0.75	19.2	97	85
After	7570	1.031	17.5	762.0	30.5	860	3.0	77.0	53	86

All periods are of three days, and the figures for sodium, chloride, potassium, and urea represent the total excretions in each period. Periods 1-5 are consecutive, starting from Sept. 22; the "after" period was the three days Nov. 12-14, at which time the patient had a normal blood-pressure but was still passing fatty stools.

was caused by inadequate intake or by excessive loss of electrolytes, or whether diminished activity of the supra-renal gland might be responsible for the hypotension, as suggested by Thaysen (1932). In the later patients of the series, treatment with salt, either by mouth or intravenously, was followed by the disappearance of the circulatory collapse, and the serum-sodium rather slowly returned to normal levels. The excretion of chloride in the urine was low, of the order of 3-5 g. a day, but chlorides were never absent from the urine. The urine and faeces of case 10 were collected over a 15-day period after his admission, and again for a 3-day period after he had completely recovered from dehydration, but while he was still passing large amounts of fat in the faeces. Tables II-V give the results of blood, urine, and stool analysis, and the mineral intake and output for corresponding periods.

The blood estimations (table II) showed a low serum-sodium level which rose rapidly when salt was added to the diet. The serum-chloride level was not so low as the serum-sodium initially, and it rose to within normal limits more rapidly. The initial plasma volume was lower than the value obtained after recovery, but the difference was not striking. The hæmatocrit percentage fell when dehydration was corrected, and later rose again to a normal value as the patient's general state improved.

when salt deficiency was actually developing, loss of sodium had exceeded loss of chloride. Even in the observation period loss of sodium in the stools was much greater than loss of chloride; and normal intestinal secretion is known to contain more sodium than chloride (Gamble et al. 1945). The total loss of sodium and chloride in the stools was greatly in excess of the negligible amounts found in normal stools. Even in the after-period, though chloride was practically absent from the stools, they still contained 0.5 g. of sodium in three days; at this stage the stool was still bulky and contained much fat, but the ratio of dry to wet weight was within normal limits. The greater loss of sodium than of chloride in the stools was clearly reflected in the urinary excretion of these ions. In the first observation period the urine contained only 6.1 mEq. of sodium in 3 days, whereas in the same time 132 mEq. of chloride was excreted. After some days on diet with added salt, the chloride output in the urine was still more than five times as great as the sodium output. Only in the after-period were sodium and chloride excreted in equivalent amounts. These findings indicate that salt deficiency in this patient was complicated by acidosis; the kidneys conserved base rigidly but continued to excrete chloride in significant amounts. Further evidence of acidosis may be found in the alkali reserve of 47.3 vol./100 ml., and in the finding of 113 mEq. of ammonia plus titratable acidity in one 24-hour specimen of urine.

#### DISCUSSION

The clinical and laboratory findings in these patients are those of dehydration due to salt deficiency. Similar episodes of dehydration are not uncommon in celiac disease, and Prunty and Macoun (1943) describe a case of non-tropical steatorrhœa with hypotension and low serum-sodium and serum-chloride levels. The comparative frequency of salt deficiency as a complication of tropical sprue does not seem to have been appreciated, for electrolyte studies in this disease have been almost confined to calcium and phosphorus metabolism.

The chief cause of salt deficiency in these patients is almost certainly the loss of sodium and chloride in the bulky, often fluid, stools. It may be left an open question whether the sodium and chloride in the stools represent unabsorbed dietary salt, or intestinal secretion which has not been reabsorbed in the usual way. The greater loss of sodium than of chloride suggests that intestinal secretions form a large part of the fluid stool. On the other hand, increasing the intake of saline fluid in case 10 was followed by a threefold increase in the bulk of the stool, which decreased again when the saline intake was reduced. Visscher et al. (1944) have shown that absorption of sodium, chloride, and even water is not a simple process of diffusion, but may differ by 200-fold from rates calculated from concentrations of these substances; and it is not impossible that an active process of this kind should be impaired in severe sprue, or even in chronic starvation. Although diarrhœa is the main cause of salt deficiency in these patients, the salt intake is also concerned; anorexia interferes with the intake of salt and salt-containing foods, and thirst is relieved by fluids which contain little or no salt. Our observations suggest that adrenal insufficiency, suggested by Thaysen (1932) as a cause of hypotension in steatorrhœa, was not an important factor in our patients. No increase in the serum-potassium was observed; and in case 10 sodium was adequately retained by the kidneys. Moreover, Prunty and Macoun (1943), in their case of salt deficiency in idiopathic steatorrhœa, found no biochemical evidence of adrenocortical deficiency. Sprue patients with hypotension do not respond clinically to therapy with desoxycorticosterone acetate (Leishman 1945).

*Therapeutic Implications.*—When the likelihood of salt deficiency in cases of sprue with profuse diarrhœa is

appreciated, much can be done in the way of prophylaxis. The diets normally used in the treatment of sprue are of no more than average salt content, and they require to be supplemented by the liberal addition of salt in cooking and seasoning, in any patient who develops diarrhœa. When anorexia interferes with the intake of food, it becomes even more important to give salt besides fluid. Skimmed milk, which forms a high proportion of the early sprue diet, contains less than 0.2 g. of salt per 100 ml.; the addition of 0.3 g./100 ml. (1.5 g. per pint) is well tolerated. Orange-juice and lemon-juice, fortified by 0.45 g. of salt per 100 ml., are suitable as drinks, and we have found that sprue patients take them well. A daily intake of 15 g. of salt should be aimed at in the sprue patient with diarrhœa in the tropics; the actual food in a sprue diet supplies only 5 g. of this, and the remaining 10 g. has to be added in seasoning and in weak saline drinks.

In established salt deficiency more intensive salt therapy by mouth has to be given. Though these patients do not usually complain of thirst they take saline fluids well. The limit to the amount of saline fluid which can be given by mouth is set by increase of diarrhœa, and improvement on oral therapy may take some days. In only one patient of this series was it necessary to give saline by vein. Even more important than replacement therapy is the necessity of cutting short the watery diarrhœa which is present in nearly all these patients. Though the stools have not shown the exudate of bacillary dysentery, sulphaganidine has been found effective in four patients of this series whose diarrhœa did not respond to diet and rest in bed. Parenteral liver should also be given as part of the general treatment.

With treatment on the lines suggested, all the patients in this series made a good recovery from their acute state of circulatory insufficiency. The stool fats, as might be expected, were not restored to normal, though they became less when diarrhœa was arrested. The patients were, however, brought from a state in which they seemed likely to succumb to one in which routine therapy for sprue could be applied and take effect.

#### SUMMARY

Between 5% and 10% of patients with sprue acquired on military service have had a low blood-pressure, asthenia, and signs of peripheral circulatory failure.

Ten such patients had low serum-sodium and serum-chloride levels, and in some cases a plasma volume which was low in relation to body-weight. Of these abnormalities the low serum-sodium level was the most pronounced.

A balance experiment on a typical patient showed abnormal loss of sodium, and to a less extent of chloride, in the faeces; in the urine, sodium was rigidly conserved, while chloride was excreted, though in amounts less than normal.

When the patient was put on a high intake of salt, sodium and chloride were both retained, and the serum-sodium and serum-chloride rose to normal levels; the blood-pressure rose, and clinical signs of dehydration disappeared, though the abnormal loss of fat in the stools was not affected.

It is considered that such patients show the clinical and biochemical pattern of salt deficiency, modified by some degree of acidosis, owing to the preponderant loss of sodium over chloride in the stools.

Loss of electrolyte in copious watery stools is thought to be the main cause of the salt deficiency, but diminished intake of salt in anorexic patients is also a factor.

The results reported do not suggest adrenal insufficiency, for the serum-potassium was not increased, and conservation of base by the kidneys was adequate.

Treatment by increasing the salt intake to 15 g. a day corrects the dehydration in a few days, and intravenous saline had to be given in one patient only.

If watery diarrhoea does not respond to diet and rest in bed, replacement salt therapy should be supplemented by sulphaguanidine, which has been found to check this type of diarrhoea.

I am indebted to the Director of Medical Services in India for permission to publish this paper, and to Colonel R. N. Phease, Officer Commanding Central Military Pathological Laboratory. The patients described were under the care of Lieut.-Colonels W. C. Smallwood and K. D. Keele, R.A.M.C., whose coöperation and interest in the work are much appreciated. I am grateful to Prof. R. A. McCance for many valuable suggestions both in planning and interpretation.

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## MYOCARDIAL FIBROSIS FOLLOWING ARSENICAL THERAPY

## REPORT OF A CASE

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This case is reported in view of the rarity of focal myocarditis following arsenical treatment. I have not been able to discover any report of a case in which a patient recovered from arsenical coma and later died of chronic congestive heart-failure, apparently also due to arsenicals.

A man, aged 41, stationed in West Africa, noted a penile sore on Oct. 25, 1944. On Nov. 25 the sore was still present. Kahn reaction + + +. He started a course of weekly injections of neoarsphenamine; the sixth and last injection of the series was given on Dec. 28, 1944, and the sore healed.

On Jan. 26, 1945, a further injection of neoarsphenamine was given, and on the 29th he reported sick with malaise, headache, and weakness in both hands. On the 30th he became restless and irritable and rapidly lapsed into coma, responding only to painful stimuli. Temperature 102° F, very restless, tongue dry. No neck-rigidity. Fundi: veins congested, otherwise no abnormality. Cranial nerves normal. Apparent weakness of left arm and leg. Tendon jerks present and equal. Plantar responses flexor. An attempt at lumbar puncture failed. Given quinine gr. 10 t.i.d. (no record of blood films available).

On Feb. 2 his general condition had improved, but he was still unable to answer questions. Left arm and leg spastic, abdominal reflexes absent, both plantar responses extensor. By the 19th he could coöperate normally, but had no memory of events for the previous three weeks. The left arm was spastic, with greatly increased tendon jerks; coördination impaired in both arms. Abdominal jerks absent. Leg jerks equal; power and coördination normal; plantar responses flexor. He was slightly breathless at rest in bed, with oedema of the legs and sacral cushion. Heart not enlarged clinically; sounds faint; pulse of poor volume; blood-pressure 105/80 mm. Hg.

On May 19 orthopnoea increased, jugular veins overfilled and pulsating, oedema still present, liver enlarged, crepitations at both lung bases.

On June 16 he was admitted to Pinder Fields Hospital. He had no previous history of rheumatism; in spite of twelve attacks of malaria in two years, he said that he was in robust health until just after the injection of neoarsphenamine on Jan. 26, 1945. He had been a heavy beer drinker. His relations had noted no change in personality.

On examination: a coöperative patient, with moderate cyanosis of nose, ears, hands, and feet; breathing slightly laboured at rest in bed; veins of neck full to angles of mandible; pitting oedema of ankles and over sacrum; liver enlarged to percussion; spleen not palpable. Pulse-rate 110 per min., pulse regular but of poor volume; arteries not palpable; blood-pressure 115/90. Apex-beat diffuse; cardiac

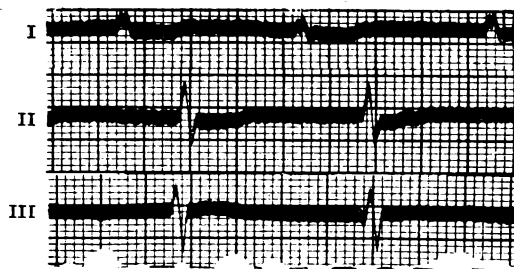


Fig. 1—Electrocardiogram: limb leads, showing small voltage, and diphasic flat T wave in leads I and II.

dullness extended 5½ in. to left of midline. Sounds faint; third heart sound present at apex; pulmonary second sound slightly increased; constant soft apical systolic bruit. Moist crepitations at bases of both lungs.

*Central nervous system:* residual spastic paresis of both arms, greater on the left, with grossly exaggerated tendon jerks and severe incoördination. Abdominal jerks absent; leg jerks present and equal; plantar responses flexor. No evidence of peripheral neuritis. Fundi: veins congested, otherwise no abnormality.

*Radiography of chest* (July 4) showed gross general cardiac enlargement; aortic arch normal; severe hilar and pulmonary congestion, especially at base of right lung. No evidence of tuberculosis.

*Blood-count* (July 4): Hb 86%, red cells 5,500,000, white cells 16,000 per c.mm. (polymorphs 41%, lymphocytes 18%, monocytes 4%, eosinophils 37%). Subsequent counts showed that the eosinophilia was maintained. Films persistently negative for malarial parasites.

*Other investigations:* test-meal showed acid secretion slightly below normal; stools repeatedly negative for parasites; no abnormalities in urine. Electrocardiogram showed a very small voltage in all limb leads, with a diphasic flat T wave in leads I and II (fig. 1). In the chest leads (fig. 2) the main deflection was downwards; and C.F.5 showed notching of the ventricular complex. Blood Wassermann and Kahn reactions on July 4 and August 1 were negative.

*Diagnosis.*—He presented the picture of chronic myocardial impairment without hypertension or evidence of rheumatic disease. Electrocardiography showed no evidence of bundle branch block or posterior wall infarction. Beriberi heart was a possibility. It seemed difficult to associate the condition with syphilis.

*Treatment and Progress.*—The congestion was slightly improved after treatment with mercurial diuretics; the pulse-rate dropped to 90 per min. Full doses of digitalis and intramuscular injections of 'Benerva' 50 mg. daily for fourteen days had no effect. His condition did not alter until

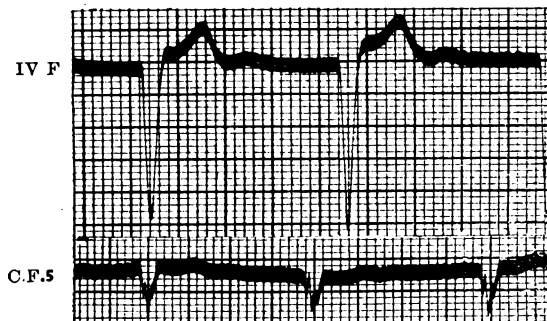


Fig. 2—Electrocardiogram: chest leads, showing main deflection downwards. C.F.5 shows notching of the ventricular complex.

early in August, when he developed a low-grade bronchopneumonia; the oedema then increased, and he became progressively drowsier and died on August 18. The pulse remained regular throughout.

## NECROPSY

There was gross oedema of the legs, genitalia, and sacral cushion; no skin petechiae. The peritoneum contained abundant clear fluid, and there was a large clear pleural effusion on the left side.

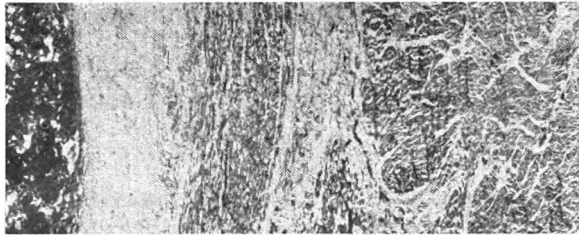


Fig. 3.—Extensive fibrosis of myocardium, dense subendocardial fibrosis, and adherent mural thrombus. (H. and E.  $\times 14$ .)

*Heart* weighed 520 g. Pericardium normal. Generalised dilatation of both ventricles; walls not thickened. Heart muscle pink and flabby; two minute fibrous scars in wall of left ventricle. Endocardium lining both ventricles greatly thickened, apical third of left ventricle being completely filled with greenish-red adherent thrombus; no thrombus found in any other chamber. Valves healthy; coronary arteries normal except for a small patch of atheroma  $\frac{1}{2}$  in. from beginning of left coronary; aorta likewise healthy except for two small patches of atheroma in ascending part.

*Lungs*: left lower lobe collapsed; much congestion with terminal bronchopneumonia. No infarcts seen; no evidence of tubercle other than a thick adhesion at right apex.

*Liver* weighed 1950 g., with characteristic nutmeg changes. Spleen weighed 420 g.; capsule tense; pulp very firm, fibrous, and intensely congested. *Kidneys* congested; no infarcts. *Brain* oedematous; cut surface exuded free fluid; no other abnormality; no evidence of old thrombosis. *Intestines*: no parasites found.

*Microscopical Examination.*—*Heart* showed extensive focal myocardial fibrosis, evidently the result of complete healing of an antecedent necrotic process. The scars were very telangiectatic, and there was much hæmatogenous pigment in phagocytes. There was very dense subendocardial fibrosis, with firmly adherent mural thrombus, showing early organisation (see figs. 3–5). Silver technique revealed no spirochaetes. *Spleen* much congested; excess of melanin pigment. *Brain*: sections from cerebellum, gyrus rectus, and thalamus revealed no abnormality. Unfortunately the rest of the brain was discarded before further sections could be taken.

#### DISCUSSION

Ransome et al. (1945) have suggested that some cases of arsenical encephalopathy are really cerebral malaria. Though the patient had previously had twelve attacks of malaria the onset of symptoms shortly after an injection of neoarsphenamine, given at a month's interval after a previous course, is in keeping with arsenical encephalopathy (Rabiner et al. 1943). Congestive heart-failure was found as soon as the patient recovered from the encephalopathy. A cerebral vascular accident, due to meningovascular syphilis, is improbable, especially

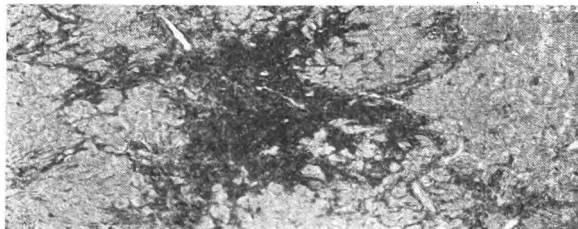


Fig. 4.—Focus of fibrous tissue. (Mallory  $\times 40$ .)

in view of the normal appearance of the brain post mortem.

The most likely sequence of events therefore seems to be that at the same time as the encephalopathy developed there was acute focal necrosis of the heart muscle, neither process being sufficiently severe to kill the patient immediately. After regaining consciousness he lived seven months, during which the necrotic areas in the heart muscle became completely fibrosed. The persistent eosinophilia is of interest, as it is thought to have an

allergic basis (Brown and McNamara 1940); no cause for it was discovered.

There was never any direct evidence of vitamin-B complex deficiency in this case. Since treatment was started exactly a month after the appearance of the chancre, and there was never any evidence of secondary syphilis (the patient was infected in Africa), the possibility of syphilitic myocarditis (Warthin 1925) is remote.

Brown and McNamara (1940) collected 7 cases of acute interstitial myocarditis following arsenical therapy, and added a case of their own; all these cases occurred in the course of exfoliative dermatitis and were rapidly fatal. They describe exudate, hæmorrhage, and minute foci of muscle necrosis, with heavy infiltration of white cells, mainly eosinophils; the blood-vessels were normal, and the necrosis was not perivascular.

Smith and Furth (1943) describe 3 cases of fibrosis of the endocardium and myocardium ("Fiedler's myocarditis") in which there was gradually progressive congestive heart-failure of obscure ætiology for 8 years, 9 months, and 8 months respectively. The clinical, pathological, and histological findings were strikingly

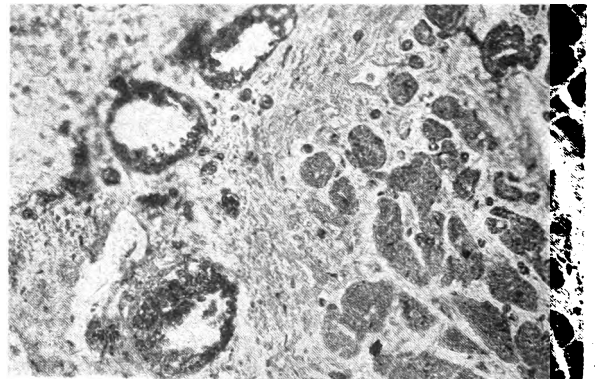


Fig. 5.—Dilatation of blood-vessels within an area of scar tissue. (H. and E.  $\times 250$ .)

similar to those in the present case. A common feature was the great weight of the heart, which in the present case could presumably be accounted for by the large thrombus in the left ventricle and by hypertrophy of the severely damaged myocardium called upon to work for seven months. There was no history of any of these patients having had either syphilis or arsenical treatment, and in all there was evidence of long-continued dietetic insufficiency. Smith and Furth postulate vitamin-B complex deficiency as the probable cause; they review previously reported cases of Fiedler's myocarditis and suggest that the condition is probably a variant of beriberi heart.

In the nervous system the commonest findings in arsenical encephalopathy are small perivascular hæmorrhages, oedema, plugging of capillaries, and perivascular necrosis (Wilson 1940). There is also evidence of primary necrosis of nerve-cells; Rabiner et al. (1943) describe a case in which fatal cerebral symptoms developed after 'Mapharsen'; they found discrete acellular areas of focal necrosis, as well as diffuse necrosis with astroglial reaction, in the cerebrum. These lesions were distinct from the vascular lesions usually described. Lichtenstein (1942) describes primary cell degeneration, with proliferation of the astroglia, in cases of postarsenical myelitis.

Lydon (1944) argues that primary cellular damage, as opposed to vascular damage, is the essential lesion in arsenical encephalopathy. He believes that nerve-cells, being highly developed, are the most susceptible to damage, but thinks it possible that other tissues may be similarly affected; he describes changes in the liver in a fatal case, without jaundice, possibly due to arsphenoxide, 'Mapharside.' He draws attention to similarities

between arsenical and Wernicke's encephalopathies, and suggests that vitamin B<sub>1</sub> is a reasonable prophylactic and therapeutic agent in both conditions. He suggests that "the administration of arsenic calls for excess of some other factor necessary for efficient cell metabolism."

Focal myocardial necrosis may evidently follow either arsenical therapy or chronic nutritional deficiency. Brown and McNamara (1940) suggest that in post-arsenical cases the lesion is a primary cellular necrosis; the findings in the present case appear to represent the end-result of such necrosis in a case which survived.

Severe arsenical reactions may be more widespread than is usually realised; further observation is required to determine whether there is any relationship between nutritional deficiency and arsenical reactions.

It is suggested that in fatal cases of arsenical encephalopathy organs other than the brain should be examined histologically more often.

#### SUMMARY

A fatal case of focal myocardial fibrosis is described in which the evidence suggests that the lesion was due to neoarsphenamine. The heart lesion manifested itself on the patient's recovery from arsenical encephalopathy.

My thanks are due to Dr. W. D. Forsyth, medical superintendent of Pinder Fields Hospital, and Dr. H. H. Moll, consulting physician to the hospital, for permission to publish this case; Dr. J. D. Spillane for his opinion on the nervous lesion; Prof. M. J. Stewart for his opinion on the slides and for reading the proofs; and Mr. R. J. Manby, of the University of Leeds, for the photomicrographs.

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## Medical Societies

### LIVERPOOL MEDICAL INSTITUTION

AT a meeting of the institution on Oct. 24, with Dr. G. F. RAWDON SMITH, the president, in the chair, a symposium on the

#### Use and Abuse of Sulphonamides

was opened by Dr. DOUGLAS RIDING, who dealt with the subject from the biological and physicochemical aspects. While he appreciated the tremendous value of the sulphonamide drugs to the clinician, as a pathologist he was disturbed by the potentialities for abuse in the new chemotherapeutic agents. In spite of our imperfect knowledge of disease processes, immunology, and enzyme chemistry, intelligent use of the sulphonamides might well mean the difference between death and life for patients suffering from such desperate conditions as puerperal sepsis, pneumococcal infections in the elderly, and cerebrospinal fever. What he deplored was "unscientific, indiscriminate, and mass bombing of every inflammatory battlefield with the sulphonamides." He then discussed the chemistry of the sulphonamides, with particular reference to the changes in pharmacological action brought about by modification of the essential groupings in the sulphanilamide molecule. Speaking of specific metabolite antagonists, he remarked that one could hardly hope to dabble in the fields of pharmacology and chemotherapy without some knowledge of the effects of competitive and non-competitive inhibitors on the velocity of enzymatic reactions. "A sulphonamide drug," he concluded, "is a chemical key which fits many doors in the castle of metabolism. Make sure it is the dungeon and not the pantry door which you lock, and if you are doubtful about the door, keep the key in the bottle in your consulting-room!"

Dr. C. A. CLARKE thought the sulphonamides were given far too often in undiagnosed cases. It was much more difficult to decide whether a sterile pleural effusion

in a young adult was tuberculous if sulphonamides had been given. He reviewed some surgical conditions in which a penicillin umbrella was used, and mentioned the attempted prevention of recrudescences of rheumatic fever by giving sulphonamides during the winter months. He then referred to the administration of sulphadiazine to 75,000 people in a Mexican town, which speedily stopped an epidemic of cerebrospinal fever. In his opinion toxic reactions were rare provided plenty of fluids were given and courses limited to about a week. The routine administration of the drugs in the tonsillitis ward was dangerous because of the risk of agranulocytosis. The main future of the sulphonamides lay in prophylaxis; in the treatment of established diseases they would slowly be replaced by penicillin and other antibiotics.

Dr. A. O. ROSS said that in venereal diseases sulphonamides were of value in the treatment of gonorrhoea, non-specific urethritis, chancroid, lymphogranuloma inguinale, and granuloma venereum, but had no lethal effect on *S. pallida*. Sulphathiazole was the sulphonamide of choice in the treatment of gonorrhoea in doses of 6 g. daily for five days. The urine should be alkaline and there should be a copious fluid intake. Minor toxic reactions, especially in private patients, were more common than formerly, and this was probably a sensitisation caused by previous improper administration for a trivial complaint. This militated against the effectiveness of the drug in more serious illnesses. Because sulphonamides substantially reduced the infective period of gonorrhoea, fewer cases than expected, pro rata with syphilis, had occurred in the last few years. It was regrettable that sulphonamide treatment of gonorrhoea was being ousted by the more effective penicillin, since the latter masked the possible coincident infection with syphilis. In the sphere of venereal diseases, the greatest abuse of the sulphonamides had been the irrational habit of prescribing them in subtherapeutic doses to women complaining of vaginal discharge, before establishing the diagnosis by laboratory methods.

The PRESIDENT expressed the opinion that pushing any drug to the patient's extreme discomfort in the way of depression and nausea was unjustified. In erysipelas the sulphonamides often gave dramatic results.

Dr. R. W. BROOKFIELD recalled the teaching of the late Prof. Hill Abram that when once the indications for a drug were well established it should be given in full dosage to produce the optimum effect rapidly. This certainly applied in the case of sulphonamides. The doctor's confidence in using a drug was considerably increased if he were well acquainted with the possible toxic effects and their relative frequencies. While the danger of agranulocytosis had been rightly stressed, its frequency appeared to have been exaggerated, since in that gathering, representing many aspects of medical practice, no-one seemed to have seen a fully developed case of severe agranulocytosis definitely attributable to sulphonamides. Little stress seemed to have been placed on dermatitis due to sensitisation. This had been a problem of some magnitude in the Far Eastern theatre and many soldiers and airmen had been invalidated home because of intractable dermatitis resulting from the external application of one of the sulphonamides. So serious was the problem that it was in general forbidden to exhibit sulphonamides externally and internally in the same subject. Possibly the severe reactions seen were largely conditioned by the effects of bright sunlight, since skin reactions did not seem to be nearly as common in this country.

Dr. LENNOX JOHNSTON maintained that the administration of sulphathiazole to all cases of "influenza"—a provisional diagnosis attached, in general practice, to almost all varieties of infections, many of which turned out to be acute bronchitis, incipient pneumonia, &c.—was invaluable in shortening the illness and incapacity. Except in doubtful cases of gonorrhoea in the female, as Dr. Ross had pointed out, it was advisable to give 5 to 6 grammes as early as possible, and before a final diagnosis could be made.

Dr. F. GLYN-HUGHES did not think there was much danger of general absorption when a sulphonamide was applied locally, so long as it was incorporated in a cream with a 'Tylose' or similar base. Impetigo and all streptococcal infections of the skin responded very well

to such treatment and he did not hesitate to reinforce the effect by giving the drug internally at the same time. He had seen only one case of agranulocytosis and this was sufficiently rare to justify publication. He agreed that penicillin was superior to the sulphonamides in syphilis and some other staphylococcal infections, but sulphathiazole cream was an excellent remedy. He had not had a fatal case of pemphigus neonatorum since using sulphonamides, and for the same reason gonococcal ophthalmia had lost most of its terror. Dermatitis herpetiformis could be controlled by sulphonamides, and many cases of pemphigus responded, at least temporarily, when all else failed. He had always regarded lupus erythematosus as a manifestation of streptococcal infection, and had found that most recent cases responded well to sulphonamide therapy, though he agreed that search for the focus of infection was necessary; he had seen recovery in 3 acute cases of this disease when a sulphonamide was the only drug used. As a routine all cases of erythema multiforme received the drug, and there was no better treatment.

Dr. G. Y. YARDUMIAN said that in general practice sulphonamides should be used as a prophylactic in many

diseases before an actual diagnosis was made, perhaps not in full doses. This would raise the morale of patients to some extent, since many of them asked for these drugs. If and when the patient was sent to hospital the amount of drug given and the duration of treatment should be stated. Sulphonamides were most beneficial in lobar pneumonia, but though the temperature came down on the second or third day this did not mean that resolution had taken place, since it may be delayed. They were also very useful in puerperal fever and erysipelas. When the patient was under sulphonamide treatment other means of helping him must not be forgotten, and plenty of fluids, warmth, and rest in bed prescribed.

Dr. G. WILLIAMSON said that sulphaguanidine had relieved anxiety in cases of bacillary dysentery in a mental hospital. All cases with clinical indications—e.g., pyrexia, diarrhoea with blood and mucus—were given a full course and within 48 hours were relieved of symptoms. Laboratory confirmation was not waited for in clinically positive cases but was obtained at the first opportunity. It was preferable to get clinical improvement rather than wait for laboratory tests before starting sulphaguanidine treatment.

## Reviews of Books

### 1. Penicillin: its practical application

Editor: Sir ALEXANDER FLEMING, M.B., F.R.C.P., F.R.C.S., F.R.S., professor of bacteriology in the University of London at St. Mary's Hospital. London: Butterworth. Pp. 380. 30s.

### 2. Penicillin: its properties, uses and preparations

Published by direction of the Council of the Pharmaceutical Society of Great Britain. London: Pharmaceutical Press. Pp. 199. 10s. 6d.

### 3. Penicillin in General Practice

J. L. HAMILTON-PATERSON, M.D., pathologist to Redhill County Hospital, Edgware. London: Staples Press. Pp. 95. 5s.

### 4. Practical Points in Penicillin Treatment

G. E. BEAUMONT, D.M. Oxf., F.R.C.P., physician to the Middlesex Hospital; K. N. V. PALMER, M.B. Camb., M.R.C.P., acting medical registrar at the hospital. London: J. and A. Churchill. Pp. 16. 1s. 6d.

WITH the exception of the handbook prepared by the medical staff of 21 Army Group and a special number of the *British Medical Bulletin* (1944, 2, no. 1), both of which had a somewhat limited circulation, no convenient and selected summary of the many original papers on penicillin therapy has been published. The removal of restrictions on the sale of penicillin to doctors gives occasion for the appearance of these four books, each of which gives sound guidance to those whose experience with penicillin is limited.

The books all give clear directions on dispensing and storage, with indications as to how much latitude can be allowed, and the one prepared for the Pharmaceutical Society points out that recent batches of penicillin are more stable than those of two years ago but that the potency of any batch is only approximate. On the clinical applications of penicillin there is little disagreement between the books. More attention than seems deserved is given by all to continuous administration; while useful in hospital practice, this is not easy elsewhere and seems to be less used than it was two years ago.

In the first book, one chapter of which has appeared in *THE LANCET* (1946, i, 805), Sir Alexander Fleming has called on the services of many others who have contributed to our knowledge of the subject; the account of his discovery and its development, and the chapter by Mr. Porritt and Professor Mitchell, are outstanding. Each chapter has a well-chosen list of references.

Seldom has so much information been compressed into two hundred pages as in the second book. The chemical assay of penicillin, the many methods of oral administration, and the various regulations under the Therapeutic Substances Act are all discussed in detail. The principles rather than the minutiae of clinical application are stated clearly and the book is informatively illustrated.

The authors of the two shorter books write on the practical applications of penicillin from their own

experience. Dr. Beaumont and Dr. Palmer give admirable directions for the technique of intramuscular injection.

### Human Biochemistry

I. S. KLEINER, PH.D., professor of biochemistry and physiology, New York Medical College. London: H. Kimpton. Pp. 573. 30s.

MANY books are now being written on the clinical aspects of biochemistry, and it becomes a task to choose a novel title from "clinical biochemistry," "biochemistry in or of medicine," "clinical pathology," and "clinical diagnosis by laboratory methods." This book with its original title is more biochemical than clinical, but a chapter on clinical applications of biochemical tests is informative and useful. The remaining 23 follow the orthodox order, discussing physical chemistry, protein, fats, carbohydrates, enzymes, hormones, vitamins, urine acid-base balance, and the like.

### Biology of Tissue Cells

ALBERT FISCHER, director of the Biological Institute, Carlsberg Foundation, Copenhagen. London: Cambridge University Press. Pp. 345. 31s. 6d.

THIS imaginative and stimulating book on tissue culture should appeal not only to specialists in this branch of biology but to all who are interested in the physiology of growth. As the author states in the preface, "it does not pretend to be a monograph nor a textbook, but includes a collection of experimental data on the subject, arranged in their proper relation to the main problems of biology and physiology." For this reason the work is less technical and of much greater general interest than most books on tissue culture. It deals mainly with unorganised growth in vitro—with cultures of actively migrating and dividing cells which have lost their normal histological arrangement and functional activity. Dr. Fischer regards such cultures not as colonies of independent individuals but "as primitive cell states or organism-like systems." He records much fascinating information about the biology of these systems; the laws which limit and control their growth, the structure, behaviour, and especially the interdependence of their component cells, their nutritive requirements, and their senescence and rejuvenation. Only certain aspects of organised growth in vitro are considered. Although this part of the book contains some interesting suggestions and ideas, it is inferior to the rest; for the remarkable capacity of many tissues for almost normal histological and sometimes anatomical development is not sufficiently stressed.

The translation from the Danish is adequate and the meaning usually clear, though there are some small errors of idiom and grammar. The bibliography is incomplete and sometimes inaccurate, owing, no doubt, to war-time difficulties, and a larger index would have been welcome. These, however, are trivial flaws in an important and eminently readable book.



# THE LANCET

LONDON: SATURDAY, NOV. 9, 1946

## Precedents

THE object of administration is to create conditions in which work can be done smoothly and well. That is indeed the main reason for forming the National Health Service. Like the autonomic nervous system of the human body, such a service should perform its administrative functions unobtrusively and without obstructing in any way the activities it exists to subserve. It is a means, not an end; and it will be a failure unless it proves itself a better means than those already used with partial success. The Government are rightly trying to improve on the empirical and haphazard organisation of the past; but the price paid for rationalisation would be too high if it led to the medical work of this country being run on bureaucratic lines. Mr. BEVAN has delivered the hospital service from the hands of local authorities, and there are grounds for hoping that the Ministry of Health, making more use of professional advisers, will try to avoid a stultifying control.<sup>1</sup> A special effort will, however, be needed to prevent the installation of bureaucratic machinery round the regional boards by which the hospital services are soon to be administered.

The task of each of these boards will be very big. In an address lately given as president of the Hospital Officers' Club, Mr. C. M. POWER has calculated that, if there are 20 regions, each board, serving an average of 2 million people, will have 125 hospitals (not counting mental institutions) with 30,000 beds and a staff of 15,000, and will dispose of some £6 million a year. To cope with these duties it will require, he thinks, at least five committees—finance; staffing; planning; supplies and equipment; building and establishment—and also a number of subcommittees dealing separately with such subjects as tuberculosis and nursing. It is obvious that, if the members of the board and its committees (who will be unpaid) meet only occasionally, much responsibility will rest on its officers; and unless the right arrangements are made from the start, there is grave risk of these officers developing a bureaucratic outlook and procedure which would offset the benefits obtainable from planning the regional service as a whole.

In an article<sup>2</sup> which deserves further attention, a correspondent has pointed out that there are two possible lines of development—two conceptions now competing for supremacy:

"On the one hand, we have the comparatively simple 'service' conception of the regional organisation, with departmental officers and staff, each possessing their defined sphere of responsibility, directing and inspecting the various departments of hospital activity. Thus, to take one or two examples at random, we should have a regional nursing officer responsible for the standard of nursing throughout the hospitals, without whose assent a matron would be foolish to venture upon any innovations in nursing technique or organisation. We should have a regional financial officer, without whose blessing no hospital committee would care to incur expense for which there was no precedent. We should have, too, a regional architect,

to whom projects would stand referred for translation into plans and estimates."

While admitting the many advantages of such a scheme our correspondent felt that it would raise the status of the regional officer at the expense of the people managing the hospitals, who will never pull their weight unless they have scope both for initiative and, in moderation, for mistakes. "If these people begin to feel that wisdom lies not in making their own decisions but in ensuring that their activities will commend themselves to the regional officers, heaven help us." The alternative which he proposed would reproduce a striking feature of the sector organisation of the E.M.S., where authority was vested in professional personnel—medical, nursing, and administrative—who themselves already occupied posts of responsibility at the principal hospitals concerned: he would make it a rule that "no-one shall be appointed to a post carrying regional authority who does not already and concurrently hold a 'key' position in his or her respective sphere." This, however, is not enough by itself; and his complementary suggestion is that the regions should adopt the practice of King Edward's Hospital Fund whereby, on major issues, accredited representatives of the hospitals always have an opportunity to meet the appropriate subcommittee of the fund. He recommends the principle that "whenever questions of policy arise on which opinions may differ, decisions shall be reached, not by an official applying to the papers on his desk criteria of some central policy, but always in discussion across the table with those responsible for the execution of the project." The Nuffield Provincial Hospitals Trust makes use of the same excellent method.

There remains the problem of the constitution of the boards and the way in which professional opinion can best be presented to them. Elsewhere in this issue the same correspondent, quoting the experience of voluntary hospitals, argues that the views of the profession will be most helpful to the board if they come in the form of considered recommendations from an advisory committee. He believes that the presence of too many doctors on the board itself—speaking perhaps discordantly—might actually weaken the professional voice in its counsels, which could or should be expressed most strongly by a medical advisory committee through its chairman and secretary. Moreover, if the board itself, losing sight of its proper functions, were to assume those of a medical advisory committee, its essential decisions would probably be taken by an inner ring. These decisions are ultimately financial. What the board has to do is not to treat patients but to create conditions in which others can do so: much of its time will be taken up with non-medical matters such as the employment of lay staff, the purchase of equipment and stores, and the distribution of money; and there is substance in Mr. POWER's plea that—whether he is a doctor or a layman—the primary qualification of its chief executive officer, or secretary, should be that he is an experienced hospital administrator. On the other hand, since the board's labours are useless except in so far as they promote the recovery of patients, it must at all times have the aid of a medical committee well qualified to speak on the needs of the service, on the assignment of

1. See *Lancet*, Oct. 19, p. 567.

2. *Ibid.*, July 27, p. 137.

tasks, and on the relative value of possible developments, as well as on the recruitment, appointment, and working conditions of medical staff. The secretary of this committee must of course be a doctor, but our correspondent would give him a seat on the board rather than make him the senior medical member of its secretariat. While it is evident that the board must have a paid staff, we can imagine nothing more harmful than a hierarchical system in which the doctors and nurses in the hospitals came to regard a regional official as their professional chief.

The voluntary hospitals, in eschewing hierarchy, have produced some remarkably sound precedents, and we trust that Mr. BEVAN's promise to "decant the best experience of the voluntary hospital administration into the future hospital service" will apply to principles as well as to persons.

### Progress with Folic Acid

It is now clear that folic acid will take its place among the vitamins. Like other vitamins, it has many natural sources and exists in several, probably closely related, forms. The name was originally given to an almost pure chemical substance isolated from spinach<sup>1</sup>; it is found in many other green leaves, including grass, and in mushrooms, liver, and yeast. The folic-acid compounds have been studied during the last decade under several names, for the following are now known to be folic-acid variants—vitamin M, deficiency of which causes a pellagrous syndrome of anæmia, leucopenia, diarrhoea, and mouth lesions in monkeys; vitamin B<sub>9</sub>, deficiency of which causes a nutritional anæmia in chicks; vitamins B<sub>10</sub> and B<sub>11</sub>, responsible for growth and feather development in chicks; and the "eluate factor" (from liver) and the "*L. casei* factor," both essential for the growth of *Lactobacillus casei* and *Streptococcus faecalis* R. It is the *L. casei* factor from liver that has been synthesised and whose constitutional formula has been established; the name "pteroyl glutamic acid" has been suggested for this folic acid, which will, so far as is known, produce all the effects of the other forms. The *L. casei* factor from yeast differs only in the number of glutamic-acid molecules; the relations of the other factors have not yet been worked out.

With its wide distribution, folic acid must be present in any mixed diet, and no instance of natural folic-acid deficiency in man has been described, though deficiencies have been artificially brought about by giving specially purified diets. Rats, and probably other mammals, are not dependent on food intake for their supplies of folic acid, since, as with vitamin K, they can synthesise it in their intestine. The addition to the diet of a sterilising sulphonamide-like sulphasuxidine prevents such synthesis, and this was how NELSON and ELVEHJEM<sup>2</sup> produced the folic-acid deficiency syndrome in rats—granulocytopenia and lack of growth—and corrected it by giving folic-acid concentrates. Leucopenia, especially lack of polymorphonuclears, is the outstanding hæmatological effect of artificial folic-acid deficiency in monkeys and rats, and when folic acid was first given to patients with nutritional anæmia it was with the idea of correcting the leucopenia. This it does; but

the effects on the anæmia were equally startling and have now overshadowed the leucopoietic properties.

The place of folic acid in the treatment of human disease is beginning to take shape. It is of no value in iron-deficiency anæmia, in anæmias characterised by hypoplasia or aplasia of the bone-marrow, in leukæmias, and in a still indefinite group of other anæmic conditions that yet respond to liver extracts. Folic acid is a powerful therapeutic agent in Addisonian pernicious anæmia, nutritional macrocytic anæmia, sprue, and the macrocytic anæmia accompanying pellagra; success has also been reported in celiac disease.<sup>3</sup> The results are variable in refractory megaloblastic anæmia, including non-tropical sprue, and in anæmia secondary to cirrhosis of the liver; but it is worth a trial in these cases. There is no convincing evidence that it has any effect in idiopathic agranulocytosis, or in the agranulocytosis or neutropenia secondary to dosage with drugs like the sulphonamides or thiouracil; in nutritional anæmia a leucopoiesis occurs as part of the general hæmopoietic recovery. Finally, there is the report of CARRUTHERS<sup>4</sup> from India that in patients with chronic diarrhoea (not dysenteric) and microcytic anæmia folic acid will relieve the diarrhoea without affecting the anæmia; and SPIES has noted that in sprue the radiological pattern of the bowel returns to normal and the excessive irritability disappears when folic acid is given.

The dosage of synthetic folic acid is being rapidly worked out. It can be given by mouth or parenterally dissolved in disodium phosphate. For pernicious anæmia the oral route is adequate; 20 mg. is given daily in the relapse phase and this dose is maintained until remission is well established, when it is reduced to 10 mg. daily or less. DOAN,<sup>5</sup> and DAVIDSON and GIRDWOOD,<sup>6</sup> report suboptimal results with doses of 2-10 mg. daily. For maintenance, DOAN reports that the dose needed varies from 40 mg. a week to 20 mg. every third week; with this régime minor neurological signs improve and no case has so far developed signs of involvement of the spinal cord tracts. Good results have been reported with single large doses of 150 mg. parenterally or 400 mg. by mouth; these produce a rapid reticulocytosis but are probably unnecessarily large. In nutritional anæmias, 20 mg. daily seems adequate, and the same dose is effective in sprue; the parenteral route has some advantage in the early part of the illness. The general conclusion is that 20 mg. is an effective daily dose for these anæmias and larger doses should not be given; folic acid is not easy to prepare and supplies are unlikely to be plentiful for some time. In the refractory types larger doses are in order, but there is little information yet; according to DOAN the maximal permissible intravenous dose is 150 mg., since larger doses may cause histamine-like vasomotor disturbances. Doses up to 400 mg. have been given by mouth without distress.

A comprehensive review of the development of knowledge about folic acid has been published by BERRY and SPRES,<sup>7</sup> and another appears in the UNRRA *Bulletin*.<sup>8</sup> The latter remarks that folic acid

3. Brody, H. P., Gore, L. *Lancet*, Oct. 26, p. 618. Dalton, H. W., Thomson, M. L., Wilson, V. K. *Ibid.*, Nov. 2, p. 652.
4. Carruthers, L. B. *Ibid.*, 1946, i, 849.
5. Doan, C. A. *Amer. J. med. Sci.* 1946, 212, 257.
6. Davidson, L. S. P., Girdwood, R. H. *Lancet*, Sept. 14, p. 373.
7. Berry, L. J., Spies, T. D. *Blood*, 1946, 1, 271.
8. UNRRA Health Division, European Regional Office. *Bull. commun. Dis. med. Notes*, 1946, 5, 1342.

1. Mitchell, M. K., Snell, E. E., Williams, R. J. *J. Amer. chem. Soc.* 1941, 63, 2284.

2. Nelson, E., Elvehjem, C. A. *J. biol. Chem.* 1942, 145, 173.

is valuable "in the treatment of anæmia, particularly macrocytic anæmia, irrespective of the clinical classification." But this is scarcely true; if anæmias are classified on a basis of clinical signs plus the type of morbid erythropoiesis, on a scheme like that put forward by ISRAËLS<sup>9</sup> in 1941, then it is clear that all anæmias that have so far been shown to respond to folic acid fall into ISRAËLS's "type 1," in which there is failure of maturation of pro-erythroblasts and deviation to megaloblastic erythropoiesis; anæmias in the other types do not respond. The evidence so far suggests that a response from folic acid can only be expected in patients whose sternal bone-marrow reveals definite megaloblastic change, and classification on these lines has, in fact, been followed by all clinical workers with folic acid. In nutritional anæmias this classification is particularly necessary, since non-megaloblastic macrocytic anæmias are common, and there is no evidence that they respond to folic acid.

Folic acid is still regarded as an enzyme or co-enzyme in the system that produces the liver principle. DAVIS<sup>10</sup> has shown that folic acid will increase the serum cholinesterase and will restore the blood-count of dogs rendered anæmic by feeding with choline chloride; the application of this information is not very clear, and there is no reason to suppose that the choline anæmia of dogs is in any way related to human megaloblastic anæmias.

The clinical research on folic acid has been of a high standard: cases have been carefully selected, proper criteria decided on beforehand,<sup>11</sup> and multiple therapy avoided; all of which makes for progress and firm assessment of results. The advent of such a potent hæmatinic agent as this makes it ever more necessary to observe the maxim: "Diagnosis before treatment."

### Oiled Bed-linen

DUST in coalmines and in cotton-mills has long been recognised as a cause of chronic respiratory diseases on which may be superimposed such bacterial infections as bronchitis, pneumonia, and tuberculosis. But dust in the home, in the office, and particularly in the hospital ward may also be a carrier of disease. Many respiratory pathogens—hæmolytic streptococci, diphtheria bacilli, pneumococci, probably tubercle bacilli, the viruses of smallpox and psittacosis, and certain rickettsiæ—have considerable viability outside the body and may be recovered from the clothing and bed-linen of affected patients and from the floor dust in the environment of human or animal carriers. Until recently the clinician was so imbued with the Flüggé doctrine of the spread of respiratory infection directly by droplets that he was unwilling to believe in a more indirect spread by bacteria-laden dust. Indeed the evidence in favour of dust-borne infection is still largely circumstantial, although numerous clinical records have incriminated infected dust as the source of streptococcal sore throats, "Q" fever, and psittacosis.

The part played by a particular agent in the spread of infection can be assessed by eliminating the agent from one group of mice or men at risk while allowing it to persist in a control group. Dust in mines has

been partially controlled by wet drilling and spraying. Its control in the home or in the hospital ward is an entirely different problem. During the late war this problem was ardently and ably tackled by VAN DEN ENDE and his colleagues, who showed that floor dust can be trapped by treating wooden or linoleum floors with spindle oil—a crude petroleum oil which, when sparingly applied to the unwaxed surface at intervals of 4–8 weeks, reduced by 80–90% the bacterial content of the air during sweeping or other activities. Later they devised a method for oiling sheets and blankets with an oil-in-water emulsion which retained over 90% of the bacteria-carrying particles ordinarily released during bed-making. At this stage the co-operation of the British Launderers Research Association was enlisted and resulted in an improved technique for oiling bed-linen on a large scale in hospital laundries.<sup>1</sup> The principle of the method is that oil drops are positively or negatively charged by the addition of cationic or anionic wetting agents which fix any desired amount of oil in the woollen or cotton fabrics. This method, used by WRIGHT and her colleagues<sup>2</sup> in a measles ward where streptococcal cross-infection was rife, caused a remarkable reduction in both latent and clinical infection contrasted with an untreated ward; in the control ward there was 73% streptococcal cross-infection and 14.3% acute otitis media, while in the treated ward the corresponding figures were 18.6% and 2.8%.

The scene shifts to America. ROBERTSON and his associates,<sup>3</sup> impressed by the part which infected dust apparently played in the spread of infection in army barracks and hospitals, began in 1943 to study the problem of dust control along lines similar to those followed by the English workers. First they confirmed that certain bactericidal substances and water-soluble wetting agents when applied to blankets had no bactericidal or adsorptive action on infected dust. Next, using a purified mineral oil ('Fractol A') as base, they found two substances which were particularly effective as wetting and fixative agents. The first of these, triethanolamine oleate, was finally discarded after field trials, because the oil tended to separate on standing, while the oil content of treated blankets was uneven, varying from 1% to over 5%, at which level there is a considerable fire hazard. The other emulsifying agent 'Triton E,' a substituted phenyl ether of polyethelene glycol, gave in a proportion of 13 parts to 87 parts of the oil a stable paste which, being non-ionic, was not neutralised by mixture with soaps or acids and was not affected by variations in the pH or hardness of the water. This oil emulsion, added to the last water rinse in the washing machine, is equally effective for the oiling of woollen and cotton goods, is cheap and easy to apply, and is non-irritating to the skin; in fact the whole procedure seems to be remarkably free of pitfalls. The fact that oiled blankets retain their dust-holding property after a number of washings suggests that the oiling of new blankets by the manufacturer might become a routine. The 2–4% of oil in the blanket cannot be detected by touch, and tests have shown that oiled blankets are likely to be warmer than unoled blankets and

1. Harwood, C. F., Powney, J., Edwards, C. W. *Brit. med. J.* 1944, i, 615.
2. Wright, J., Cruickshank, R., Gunn, W. *Ibid.*, p. 611.
3. Puck, T. T., Robertson, O. H., Wise, H., Loosli, C. G., Lemon, H. M. *Amer. J. Hyg.* 1946, 43, 91. Loosli, C. G., Wise, H., Lemon, H. M., Puck, T. T., Robertson, O. H. *Ibid.*, p. 105.

9. Israëls, M. C. G. *Lancet*, 1941, ii, 207.

10. Davis, J. E. *Science*, 1946, 104, 37.

11. Wilkinson, J. F., Israëls, M. C. G., Fletcher, F. *Lancet*, August 3, p. 156.

to last at least as long. Extension of the oiling to surgical dressings, wearing apparel, and other fabrics may follow.

Although the American workers have confirmed the value of oiled bed-linen for the control of streptococcal infection in hospitals,<sup>4</sup> they have been disappointed with the procedure for the control in barracks of non-bacterial "catarrhal fever," which occurred regularly as a winter epidemic among recruits.<sup>5</sup> The most likely explanation of this failure is that these non-specific upper respiratory infections are transmitted by direct contact or by droplet nuclei rather than by contaminated dust. There is good epidemiological evidence that certain virus infections, such as measles and chickenpox, are spread by droplet nuclei; and in the case of catarrhal fever the Americans found that double-bunking in barracks, which reduced considerably the opportunities for direct-contact transmission, also reduced by a half the epidemic incidence of the disease. Even with streptococcal infections, where the existence of secondary reservoirs in dust is well established, little is known of the relative importance of dust compared with droplets and droplet nuclei in the spread of the disease. However, the evidence incriminating dust in the spread of bacterial infections has been steadily accumulating, and it seems that the oiling of bed-linen by hospitals for children and for tuberculosis and other infectious diseases is both hygienic and practicable.

## Annotations

### PATIENCE REWARDED

THE appearance within a few weeks of four books designed to give guidance in the uses and hazards of penicillin is the epilogue of perhaps the most interesting drama of modern therapeutics. From now on neither pharmacist nor physician has any excuse for misusing penicillin. Supplies are ample; the price is moderate; the potentialities that we know are unlikely to be extended greatly, though there will still be advances—for example, in methods of prolonging the effect of a single dose and in oral administration.

In retrospect we can now consider whether this drama has been played well or ill. The preface to the monograph on penicillin published under the ægis of the British Pharmaceutical Society (reviewed elsewhere in this issue) suggests that harm has resulted from the conditions of secrecy and scarcity under which the earlier scenes were acted. It is a point worth consideration, since every day so many in so many laboratories seek out therapeutic agents as yet unknown to us. What made the early history of penicillin so different from that of many other drugs? Conceived—if Sir Alexander Fleming will forgive us—in obscurity, it was a weakly child saved only by parental devotion until its godfathers in Oxford gave it strong limbs and higher potencies. Transatlantic migration gave it fecundity (and, we must add, a split personality, since there is no longer one penicillin but many penicillins). Meanwhile it had won its spurs in the Radcliffe Infirmary and for three years slew innumerable staphylococci (and other pagans) from the Solomon Islands to Seattle. No hero of Christendom ever served such an apprenticeship of arms before he was released from tutelage. His powers were measured, his feats catalogued, and his

misdeeds, few though they were, corrected. He has now stepped into the world, a force for good at the service of those who require his aid.

Would as much benefit have been gained had penicillin been released for general use in, say, 1942? The question is admittedly an idle one, since peace and deep culture were both necessary before this drug could be available in quantities sufficient for all. Other drugs have been subject to intense therapeutic trial before they have been released on the open market. Manufacturers have coöperated nobly, and the medical world hears of the successes and not of those which have been consigned to the dustbin without demur when they have been shown to be either valueless or dangerous. Other drugs have resulted from coöperative endeavour where thoughts of pecuniary reward have been of secondary importance or less than that. But if we may judge from the history of the sulphonamides and their successors, penicillin has been the gainer from its slower development. Endocrinology likewise provides object lessons of the dangers of uncontrolled trial of therapeutic agents whose possible effects are scarcely known. Penicillin, it is true, seems to have few evil habits, but it is hard to believe that its history would have been such a continuous story of success if it had been thrown early on the world and lacked the arduous and painstaking nurture that it received from so many disinterested minds in this country and America.

Some of us remember with equal pride and shame a meeting of the section of pathology of the Royal Society of Medicine at St. Mary's Hospital in the early thirties when Dr. Fleming showed some pictures coloured with chromogenic bacteria and a plate on which some staphylococci had been inhibited by a mould. After all, we too got our plates contaminated and we did not boast about it. We were very young.

### PURIFICATION OF TETANUS TOXIN

THE preparation of the convulsive constituent of tetanus toxin in crystalline form, as reported<sup>1</sup> from Western Reserve University, U.S.A., is a step of outstanding importance towards the interpretation of the action of tetanus toxin used in the form of crude filtrates. The crystalline toxin is protein in character without a carbohydrate constituent and is apparently free from thiol groups. It has about 50,000,000 lethal doses for mouse, and about 3500-4000 flocculating units, for each mg. of nitrogen, the degree of purity being nearly 600 times that of the parent toxic filtrate. The basis of the method of preparation is precipitation at accurately controlled hydrogen-ion and salt concentration by methyl alcohol at temperatures of  $-4^{\circ}$  to  $-5^{\circ}$  C. The crystals tend to disintegrate at temperatures above  $-4^{\circ}$  C, creating considerable difficulties in handling the material. So far no electrophoretic sedimentation or solubility analyses have been published, but the fact that three recrystallisations gave no significant change in the flocculation value suggests that the material is a single protein.

Tetanus toxin has perhaps been the most troublesome of all toxins that the immunologist has to deal with. It has been known for some time that filtrates differ qualitatively in their properties,<sup>2</sup> as determined, for example, by the ratio of lethal doses in different animals, though the antitoxins produced by the injection of different filtrates are apparently identical.<sup>3</sup> The isolation of a pure crystalline toxin from such filtrates may well throw light on these and other, probably related, difficulties which have arisen in the titration of tetanus antitoxin; for in the crude filtrates it is possible that

4. Loosli, C. G., Robertson, O. H. *Amer. J. med. Sci.* 1945, **209**, 166.  
5. Commission on Acute Respiratory Diseases and Commission on Air-borne Infections. *Amer. J. Hyg.* 1946, **43**, 120.

1. Pillemer, L., Wittler, R., Grossberg, D. B. *Science*, 1946, **103**, 615.  
2. Glenn, A. T., Barr, M., Ross, H. E., Stevens, M. F. *J. Path. Bact.* 1932, **35**, 495.  
3. Smith, M. L. *Bull. Hlth Org., L.O.N.* 1942, **10**, 104.

other substances modify the course of the reaction between toxin and antitoxin and between toxin and tissue cell. The obscure problem of what happens when toxoiding occurs will also be brought definitely nearer solution now that the reaction can be followed on the single chemical substance instead of the mixture of substances present in the filtrate. It is to be hoped that this method will be successfully applied to other toxins, particularly to diphtheria toxin.

It is curious that the method of precipitation of protein with alcohol in the cold, first used some forty years ago by Mellanby<sup>4</sup> and now becoming of increasing importance, should have been neglected for so many years. The probable reason of its neglect was that the proper application of the method needed rigid temperature control at low temperature, and it was not till the war and American chemical engineering combined to provide facilities that Cohn, working on the fractionation of human plasma, was able to work out the conditions for successful large-scale handling of such processes.

### CHILD HEALTH

"Primary responsibility for the health of their children must continue to rest with parents and they should regard members of the health services as agents helping them to carry out their duties and not as authorities taking the responsibilities off their shoulders."

THE pædiatric committee of the Royal College of Physicians put this disclaimer on the first page of their final report,<sup>1</sup> but it does not prevent them considering responsibly and fully the duties of doctors to children. The principal means of promoting child health and welfare, they consider, are good food and good home and social conditions for both the child and the pregnant woman; proper training of doctors and nurses in the hygiene and feeding of children; education of parents and children in health; and the provision of good medical treatment services. The long-term policy, they hold, should be to make the general practitioner primarily responsible for the care of the child, in both prevention and cure of disease, since he is best fitted to give this service in the home. If his skill is to be adequate, pædiatrics should be a major clinical subject in his training, as recommended in this committee's interim report.<sup>2</sup> Where a health centre is established, one or more of the doctors on the staff should be specially interested in and trained in child health. Until enough well-trained doctors are available, those undertaking child-welfare work should have postgraduate training in the basic principles of public health, such as is contained in the course for the new certificate in public health, as well as postgraduate experience in the prevention and treatment of illness in children. Not only general practitioners but hospital pædiatric physicians should give some part of their time to preventive work, attending clinics, nurseries, and schools for the purpose; and, conversely, doctors employed whole-time by local authorities to do preventive work should be attached to a hospital and should spend, say, a fifth of their time in curative work. This general linkage of clinical and preventive work can be achieved, the committee think, if interchanges of staff are arranged between children's hospitals and departments and the local-authority health services, which will ultimately be staffed by general practitioners. In the meantime, since hospital pædiatrics are scarce,

it may be possible to give special hospital training in pædiatrics to a proportion of full-time assistant medical officers of health, returning them to their areas to do both curative and preventive work.

In future it seems likely that all school health work will be carried out by one of these three types of doctor, which means that school clinics will become closely associated with children's hospitals, as they should. Child health visitors, able to nurse the sick child and teach child health, should do nursing and preventive work in clinics and schools.

They consider that hospitals need rebuilding and regrouping, and that both equipment and staff—nurses as well as doctors—could be improved. At present most hospital beds for children are not under the care of trained pædiatrics, and only about 40% of the sisters in charge of such beds have been trained for the State qualification in children's nursing. Since acutely ill children stand transport badly, they should have beds in their own district, while beds for long-term cases should be in hospitals outside the town, though within range of visiting parents. Eye, skin, rheumatic, and orthopaedic conditions, the committee think, should be treated in special units housed in pavilions in the grounds of long-term hospitals; and general children's hospitals should have wards for infectious diseases, while fever hospitals should have general wards.

Much thought has been given to university teaching. The committee suggest that, in addition to the university departments of child health now developing, special departments closely connected with the universities might be established in non-university centres, each of which would guide pædiatric work in its own region.

Finally, to achieve integration of all child-health services, they suggest that a joint committee should be set up in each region, consisting of members of the university department of child health, and the regional and local-authority officers engaged in child-health work. This body would advise on all matters to do with child health, and would link the hospital service of the region with the services provided in each major local-authority area. They suggest, too, that under the National Health Service there should be a standing sub-committee on child health of the Central Health Services Council. The Royal College of Physicians, it is strongly recommended, should also have a standing committee on pædiatrics capable of advising on all such matters.

### WORLD HARVEST

WITH the gathering of this year's harvest in the Northern Hemisphere we can see roughly how much grain the world has in hand for the coming year. China seems to be better placed than was expected, though there may be large areas of scarcity; but in India and parts of Malaya the situation is likely to remain fairly critical, and even allowing for local shipments of rice the deficit countries of the Far East will still need to import nearly 10 million tons. Russia may have a million or so tons of surplus grain for export to countries within her zone of influence. The deficiency in Europe is estimated at 12 or more million tons; England will have to import 4-5 million; and an additional 2 million will probably be needed for various other regions, including South Africa and some of the poorer South American countries. The total needs of the grain-deficit areas in the coming year will thus amount to almost 28 million tons. But though the North American harvest has been good, the exportable surplus from Canada, the United States, Argentine, and Australia is unlikely to exceed 22-23 million tons, and may be less.

These figures are given in the October issue of the *Nutrition Bulletin*,<sup>1</sup> which emphasises the necessity of

1. Issued by the Children's Nutrition Council, 6, East Common, Harpenden, Herts. 5s. per annum.

4. Mellanby, J. *Proc. Roy. Soc. B*, 1908, 80, 399. Hardy, W. B., Gardiner, S. *J. Physiol.* 1910, 40, lxxviii.

1. Royal College of Physicians of London: Final Report of Pædiatric Committee, October, 1946. The committee are: Lord MORAN (chairman), Sir LEONARD PARSONS, Prof. F. S. LANGMEAD, Mr. EARDLEY HOLLAND, Dr. DONALD PATERSON, Sir WILSON JAMESON, Prof. J. C. SPENCE, Prof. N. B. CAPON, Dr. HELEN MACKAY, Prof. ALAN MONCRIEFF, Dr. J. A. CHARLES, Dr. R. C. LIGHTWOOD, Prof. AUBREY LEWIS, Dr. R. E. SMITH, Sir ALLEN DALEY, Prof. R. V. CHRISTIE, Prof. CHARLES McNEIL, Dr. DOROTHY TAYLOR, and Dr. JEAN MACKINTOSH.

2. See *Lancet*, 1945, 1, 605.

(1) preventing needy communities from eating their new supplies too rapidly; (2) preventing a bottleneck in transport if shipping passes altogether out of Government control; and (3) diverting coarse grains from the feeding of livestock in the New World to human consumption in the Old World. With the operations of UNRRA coming to an end, there is no international body empowered to purchase large stocks of foodstuffs; the International Emergency Food Council, established last May, can only assess the situation from time to time and submit recommendations, and the major countries will naturally tend to pursue the policies that seem best suited to their own interests. UNRRA will be missed because it protected the poorer liberated countries by preventing their wealthier neighbours from acquiring excessive supplies on the world market; and the richer countries seem likely to derive additional advantage from last week's decision of the American Department of Agriculture to abandon the bulk purchase of food for export.

The purpose of the World Food Board, advocated by Sir John Boyd Orr at the September meeting of the Food and Agriculture Organisation in Copenhagen, would be to make overseas farmers aim at a record harvest by guaranteeing the purchase of any surplus at a fixed price. This plan was rejected at last week's Washington meeting by the United States representative, who suggested, no doubt with the International Trade Organisation in mind, that importing and exporting countries can better solve their problems through multilateral agreements covering specific commodities. The American rejection has caused disappointment in this country, some holding that there is now little chance of whole-hearted American participation in an international attempt to fight the world food shortage; but Sir John Boyd Orr himself has since made it clear that his plan was simply put forward for discussion, and that the agency he has in mind would be composed of representatives not only of the F.A.O. but of the International Bank and other bodies. He insists that his suggestions are complementary to the aims of the International Trade Organisation, and he is confident that a satisfactory scheme will be evolved.

### DERMATOLOGY

THE views expressed early this year<sup>1</sup> by the Royal College of Physicians committee on dermatology<sup>2</sup> are carried further in a final report presented to the college last week. The concluding recommendations chiefly concern the training of undergraduates, the selection and training of future consultants and specialists, and refresher courses for medical practitioners.

Skin diseases account for some 6% of the work of general practice, and in industry occupational dermatitis wastes more time than any other form of industrial disease. Teaching of the undergraduate should therefore be such as will enable him, after qualification, to increase his knowledge and to correlate cutaneous signs with constitutional disorders. To meet the Goodenough Committee's wish<sup>3</sup> that medical training should be a smooth and logical development, the committee recommend that in the preliminary year of study he should acquire some knowledge of the common animal and vegetable parasites which attack man, and that, when studying physiology, his attention should be drawn to the importance of the physiological actions and reactions of the skin in the maintenance of health. Dermatological cases should be demonstrated to students during the

introductory course in which they first approach clinical work, and systematic teaching in dermatology should be incorporated in the general course of medical teaching before the student becomes a clerk in the skin department. As a clerk in that department, he should attend at least twice a week for three months, and should study inpatients as well as outpatients. To this end, and in view of the importance of dermatology in the health service of the country, 5% of the total beds in any teaching centre should be allotted to skin disorders; or, if this is impracticable, the beds should be provided in an associated hospital. Also the committee want teaching hospitals to have dressing-centres where the patients would attend for regular treatment. This would save much of the waste of drugs through faulty application at home; it would enhance the therapeutic efficiency of the departments; and if (as is proposed) each student worked there as dresser, the centres would provide valuable experience.

About 50 men are now in training as registrars or assistants in the dermatological departments of teaching hospitals, and it is suggested that clinical and laboratory facilities for basic training should in future be provided for 15-25 each year. As formerly many dermatologists had to supplement their basic training at institutions abroad, the recent proposal for the formation of a dermatological institute in London is welcomed by the committee, who emphasise however that the ancillary departments and staffing of such an institute must be of the highest order, and that in order to give equal opportunity to all suitable candidates there will have to be financial support for graduates in training. A would-be consultant in dermatology should, they think, obtain a diploma or degree comparable to the M.R.C.P. Lond. and should have a university degree, and he should have studied for five years after medical registration. During these five years he should first hold a resident or non-resident appointment in the department of general medicine for a year; then he should spend a further year in the pathological and bacteriological departments; and thereafter he should work as an assistant or registrar in the dermatological department of a teaching hospital, and should also study ancillary subjects, such as venereology, actinotherapy, radiotherapy, zymotic diseases, and industrial medicine. After this a period of research and study abroad is desirable. It is hoped that eventually all skin departments in hospitals—even in the smaller non-teaching hospitals—will be staffed by fully trained dermatologists. Meanwhile it will of course be necessary to employ many whose training has been less comprehensive, and the vacancies could be filled by graduates who have been practising dermatology for a reasonable time and who hold or have held hospital appointments in dermatological departments. Experience as a dermatological specialist in one of the Services will of course be a strong recommendation. For general practitioners it is suggested that courses should be offered by the institutions providing this type of postgraduate study—e.g., municipal hospitals and non-university centres. Oddly enough, no stipulation is made that these courses should be supervised by consultants or senior specialists; yet obviously the instruction of practitioners should be impeccable.

Finally, it is proposed that the Royal College of Physicians should set up a Dermatological Board, including representatives of the British Association of Dermatology and Syphilology and the professorial staffs of the dermatological units. The duties of this board would include the recognition of hospitals at which postgraduate training in dermatology could be undertaken, and decisions concerning the suitability of candidates for appointment to hospital staffs. But, for the present at any rate, it is not recommended that either the college or the board should create a diploma in dermatology.

1. *Lancet*, 1946, i, 205.

2. The members are Lord MORAN, P.R.C.P. (chairman), Dr. HENRY MACCORMAC (vice-chairman), Sir ARCHIBALD GRAY, Dr. H. W. BARBER, Dr. A. C. ROXBURGH, Dr. P. B. MUMFORD, Dr. G. B. DOWLING, Dr. M. SYDNEY THOMSON, Dr. R. T. BRAIN, Dr. J. T. INGRAM, Dr. W. N. GOLDSMITH, Dr. J. E. M. WIGLEY, Dr. L. FORMAN (hon. secretary), Dr. R. M. MACKENNA, Dr. B. C. TATE, and Dr. J. H. TWISTON DAVIES.

3. Report of the Interdepartmental Committee on Medical Schools, 1944, p. 43.

### TRIALS OF WHOOPING-COUGH VACCINES

IN conjunction with the medical officers of health of Manchester, Tottenham, and Wembley, the Medical Research Council are initiating field trials to assess the protective value of pertussis vaccines. In these three areas, parents of children aged 6-12 months have been invited to help by enrolling their children for inoculation within the next few months. The volunteer children are to be divided into two groups, one group receiving pertussis vaccine and the other group—the controls—an anticatarrhal vaccine. Details of the investigation are so arranged that no-one engaged in the day-to-day work of inoculation and subsequent follow-up will know which vaccine any particular child has received. The children are to be visited every month by specially appointed health visitors, who will take specimens for bacteriological examination from any child with a suspicious cough, and arrange for one of the doctors taking part in the trial to visit the child and make a clinical diagnosis. The results will be assessed at the end of two years.

In the propaganda to parents—mainly by pamphlets and personal visits by health visitors—all the details are fully explained. The enrolment of children has so far been encouraging. All general practitioners in the areas concerned have had a letter telling them about the investigation, and they have been asked to report any suspicious coughs in children included in the trial. The doctor will then be told immediately if whooping-cough is diagnosed by the special investigators.

In the first place American vaccines, as prepared for Professor Sauer, of Evanston, and Dr. Pearl Kendrick, of Grand Rapids, both of whom have claimed success with prophylactic vaccination, are to be used. The American vaccines have been chosen for trial because previous results obtained in controlled trials with a British vaccine had proved disappointing. If these prove satisfactory, further trials will be made with new British vaccines.

### ANÆSTHESIA

ON Oct. 30 the Princess Royal unveiled at the Royal College of Surgeons a memorial with the following inscription:

This tablet was erected in the Royal College of Surgeons of England by the Association of Anaesthetists of Great Britain and Ireland to mark the centenary of the first operation under anaesthesia in this country and to keep the memory of four British pioneers whose names will be held in honour from generation to generation

HENRY HILL HICKMAN  
JAMES YOUNG SIMPSON  
JOHN SNOW  
JOSEPH THOMAS CLOVER

In his speech on this occasion Dr. A. D. Marston, president of the association, pointed out that two of the pioneers thus commemorated were members of the college, while one was a fellow; and he announced that a medal named after John Snow is to be awarded from time to time for signal service to the specialty. As recorded on p. 702, Dr. Marston presided next day at a centenary dinner held in Lincoln's Inn.

The main events and personalities of the story of anaesthesia were again reviewed in a fascinating address, delivered after a reception at the Royal Society of Medicine on Nov. 1, by Dr. Stanley Rowbotham, president of the section of anaesthetics. It was surprising, he said, how long man suffered pain without making purposive efforts to relieve it; how long he had the means at hand but did not use them; and how long their use, once discovered, was opposed. Beginning with Sir Humphry Davy, who in 1799 stopped toothache with nitrous oxide and suggested that this gas might "probably be used with advantage" in surgical operations, he spoke of the experiments begun in 1824 by Hickman, the first man to conceive of an anaesthetic state, and passed from

the observations and practice of Faraday, Long, Clarke, and Wells to those of Morton, who by his enterprise and determination made anaesthesia an accomplished fact. Having shown a portrait of the first child delivered under an anaesthetic, who was of course baptised Anaesthesia, Dr. Rowbotham noted how the popularity of ether, chloroform, and nitrous oxide waxed and waned as new methods of giving them were devised. In 1884 local anaesthesia was introduced on the Continent, and it is still largely in use there because of the comparative scarcity of specialist anaesthetists. (Sir Gordon Gordon-Taylor expressed the opinion that surgery is not going to advance much further in European countries without an advance in their methods of anaesthesia.) Then came intraspinal, endotracheal, and intravenous techniques, basal narcosis, and curare.

The Society of Anaesthetists, parent of the R.S.M. section of anaesthetics, was founded in 1893, the first society in the world for the special discussion of the subject. The Association of Anaesthetists dates from 1932; the diploma in anaesthetics, which Dr. Rowbotham thinks has done more than anything else to raise the standard of anaesthetic practice, from 1935; and the Nuffield chair at Oxford, creating a great centre for teaching and research, from 1937. Contrasting the operating-theatre of 100 years ago with that of today, he was astonished at the difference already made in the removal of pain. What other branch of medicine could claim such progress in a century? "May the next hundred years be as prolific in its gifts to mankind."

### TOO WIDE A GAP

OUR suggestion on Oct. 26 that, in an experimental training school for nurses, a medical dean of nursing might be appointed has proved unwelcome both to Miss Houghton (p. 693) and to the *Nursing Times* (Nov. 2, p. 836). The dismay which this proposal, made in full sympathy with nursing interests, has evoked is some measure of the gap now dividing the two main professions responsible for the welfare of the patient. Perhaps it will reassure our nursing colleagues if we add that in medical schools we should like to see a senior member of the nursing staff appointed to ensure that medical students get enough instruction in the principles of nursing, that they watch all major nursing measures carried out by experts, and that no young doctor enters general practice (as many do at present) grossly ignorant of one side of the care of the sick. We must not be afraid to learn from one another: it has long been the great pride of medicine and nursing that knowledge is freely shared.

### THE BASIC SALARY

ON Monday the House of Commons, by 303 votes to 128, declined to say that remuneration of general practitioners in the National Health Service should normally be by capitation fees alone. Much was made of the advantages of a basic salary. But there would also be great advantages in reserving such a salary, as the House of Lords suggested, for circumstances in which it is clearly required. By accepting this arrangement the Government could have gone far to secure the willing participation of practitioners in the service. Happily the Minister's words, as reported on p. 697, allow us to hope that this question will be reconsidered in the coming negotiations.

Sir EDWARD THORNTON, late secretary for public health and chief medical officer for the Union of South Africa, has died at Pretoria. A former D.G.M.S. of the Union's Defence Forces, he later held the appointment of director-general of rehabilitation training. He was 68 years of age.

## Reconstruction

### MEDICAL ADVISORY COMMITTEES IN THE REGIONS

FROM A CORRESPONDENT

THE day is drawing near when the Minister of Health must appoint the regional boards. There has been a good deal of discussion about the area and functions of the boards, but comparatively little attention has been paid to their probable *modus operandi*. The object of this article is to point out that the regional organisation will in many important respects resemble that of a large hospital; and that in constituting the board the lessons of experience should play their proper part.

Detail, we are assured, will be delegated to the hospital management committees. Nevertheless, the board will eventually have to decide in broad principle questions which have agitated every hospital. For example, what share of the available funds shall be devoted to this or that form of medical advance? Shall effort be concentrated on tuberculosis, or on cancer, or on rheumatism? Shall the reconstruction of hospitals take precedence over the establishment of maternity units, or vice versa? There is no need to elaborate. In all such matters there is room for debate, and we cannot expect that progress will cease to be attended by a large diversity of opinion. Decisions of this order have in the past been the hard core of hospital management, and the regional boards will have to deal with them on a great scale.

What can experience teach us? The lesson is plain. It is that in the twin machinery of governing body and medical staff committee we have a pattern which it would be folly to ignore. The accepted practice in nearly all our great voluntary hospitals was well described in the recent debate in the House of Lords by Lord Moran:

"In the voluntary hospitals there is a medical staff committee, composed, as a general rule, of all the staff. . . . It is the duty of each of those members (who are connected with every kind of special service) to keep their colleagues informed of any new equipment or any new development of knowledge, wherever it may occur, all over the world. It is a unique instrument for keeping the management of the hospital up to date in practical matters. When the members of the committee have been so informed and have decided whether their colleagues' proposal is or is not justified, then a number of them sit on the board of management . . . and try to convince the board that this or that should be done. . . . It is a measure designed to afford technical advice to the board of management so as to keep the hospital up to date in its administration."

People sometimes forget, however, that the efficiency of this well-tryed machinery depends on the respective constitution of the two bodies, and may readily be destroyed if their functions are not kept distinct. Thus if too many doctors sit on the board, the effect is to transfer to that body discussions which ought properly to take place in the medical staff committee. The true function of the representatives of the medical staff committee on the board of the hospital is not to debate among themselves the pros and cons of different policies, but to convey to the governors the considered opinion of the medical staff as a whole. A wrong arrangement, sometimes made in deference to the desire to provide ample representation for the medical staff, defeats its own end: it confuses the lay body, and it mutilates the medical staff committee by removing from it the effective discussion of policy.

If then we are right in seeing a close analogy between the essential functions of the management of a great hospital and the work of the regional boards, it follows that very careful consideration ought to be given to their composition and to their relationship with the medical advisory committees which we hope to see set up alongside them.

The Bill lays down that a regional board shall include:

- (a) persons appointed after consultation with the university with which the provision of hospital and specialist services in the area of the board is to be associated;
  - (b) persons appointed after consultation with such organisations as the Minister may recognise as representative of the medical profession in the said area or the medical profession generally;
  - (c) persons appointed after consultation with the local health authorities in the said area; and
  - (d) persons appointed after consultation with such other organisations as appear to the Minister to be concerned;
- and the original members of the board shall also include persons appointed after consultation with such organisations as the Minister may recognise as representative of voluntary hospitals in the said area.

At least two of the members of the board shall be persons with experience in mental-health services.

Is there not a real risk that such a constitution may unwittingly, and with the best of motives, lead to the relegation of the medical advisory committee to an entirely subordinate position? It may be said that the need is substantially met by the representation of the medical interests on the regional board itself. But a little reflection will show that this is a mistaken view. The medical advisory committee ought to enable the medical staff of the hospitals of the region to participate at first hand in the development of policy: it is the men who are actually working in the hospitals who know the real relative urgency of the need for this or that. Moreover, the medical advisory committee ought to reflect—as does the medical staff committee of an individual hospital—the whole range of medical work and all the various specialities: otherwise it is unlikely to achieve a balanced outlook on the needs of the hospitals. These needs will not be met by a team of men on the regional board selected in accordance with the schedule quoted above. The university men will be drawn from the teaching hospitals; the nominees of the profession will naturally and rightly include general practitioners; the local authorities will put forward their medical officers of health; and there will be very little, if any, room for the men engaged in active work in the non-teaching hospitals of the region.

It is not, therefore, a mere flight of fancy to press that a medical advisory committee for the region is a necessity and not a luxury. The regional machinery must embody the twin organisation that has served the hospitals so well in the past.

#### TWO OBJECTIVES

To achieve this the Minister must so manage matters that two objectives are kept in view. On the one hand, the claims of medical interests to representation on the policy-making body must not be allowed to obscure its essentially financial and administrative character. On the other hand, the link between the medical advisory committee and the medical representation on the board must be such that the committee feels itself able to make its voice clearly heard in the board's deliberations. Its own elected chairman, and perhaps its medical secretary too, ought to be among the most influential members of the board. If the boards must be constituted before the medical advisory committees, seats on the boards ought to be reserved for representatives of the committees.

These objectives may not be easy to achieve, but unless they are kept very much to the fore the hospitals in the regions may find themselves governed by bodies that lack the machinery for effective liaison with those who possess first-hand experience of the need. A lively and useful medical advisory committee in each region will remain a dream unless the arrangements now made are such as to enable it to play a real and not only a paper part in the determination of policy.



Special Articles

CHILDLESSNESS AND THE SMALL FAMILY  
A FERTILITY SURVEY IN LUTON

RICHARD M. TITMUS

FRED GRUNDY

M.D. Leeds, D.P.H.

It is well known that there are many gaps in our knowledge of current reproductive patterns. The deficiencies fall broadly into two classes: (1) facts concerning marriage, birth, and the size of families, and (2) the causes determining these facts. This paper is chiefly confined to a study of some fresh material, and is mainly factual in content.

The last, and only, census in Great Britain which asked women who were married or had been married how many children they had borne was taken in 1911. Since then, the birth-rate has fallen by about 40%. Motives and values have been transformed. All the "known facts, supposed facts, acknowledged goals, dreamed goals, experiences and expectations about economic pressure, material inconveniences, and social ambitions" which enter into the decisions of one generation of parents may be weighted by a different set of secret coefficients by the next generation. We need, therefore, in order to understand the problems of the contemporary family, something more up to date than the census of 1911.

The Population (Statistics) Act of 1938 required certain essential information, like the age of the mother and the number of previous children, to be supplied on registration of every birth. But this only tells us each year about the 5% or so of women of childbearing age who give birth to a child. We learn nothing about the women who have recently passed out of the reproductive period or of the younger women who remain childless. We can still only guess, therefore, about the incidence of childless wives. The Royal Commission on Population has recently been engaged in gathering much new material and analysing a mass of statistical data that have flowed into its hands and into the records of the General Register Office. So far, however, the commission has not reported, and the data that have been made available to it have not yet been published.

When, in the summer and autumn of 1945, a social survey was launched in the borough of Luton (population approximately 101,000) the opportunity was taken to obtain at the same time information about some of these matters. For a full description of the survey, its method and operation, reference should be made to *Report on Luton*,<sup>2</sup> which includes an account of the problems of the questionnaire, sampling, coding, and analysis, together with a set of population tables.

So far as the fertility analysis is concerned, information was obtained from samples totalling 3803 married women. The cards relating to these women have been dissected according to age, duration of marriage, social class, interval between pregnancies, birth wastage, and size of family. Some of this material has been drawn upon, and condensed, in the following tables. It is hoped to publish a full report later.

CHILDLESSNESS

Table I sets out the proportions of childless wives in Luton. Women married more than once, divorced, separated, widowed, or deserted by their husbands are excluded from this and subsequent tables; and any absence of husbands on war service has been disregarded.

Section i of this table is not, of course, comparable with sections ii-iv, because some, or many, of the women

it examines may still bear children. We may, however, reasonably compare marriage durations of over 20 years, for not many women who have been married for that length of time and are still barren will have children.

Although it is commonly stated that there has been an increase in childlessness, this table does not confirm that supposition. Among those married under the age of 25 and for 20 years or more, for instance, the women who may still have babies show a smaller incidence of childlessness—less than 10%—than those who have passed their reproductive period. A division of the over-45 group into two subgroups covering all marriage durations—those aged 45-60 and 60 plus—shows a proportion of 19% for the former and 30% for the older generation. Among these two subgroups mortality has, of course, been operating to remove with advancing age a higher proportion of women from the sampled population. This process has probably been selective, but not so as to remove a smaller proportion of childless wives. Although the evidence is not conclusive, the studies that have been made of British material suggest that rates of mortality are lower among mothers than among childless married women. Some of the physiological factors which prevent childbirth also lead to earlier death.

The effects of mortality are therefore unlikely to explain the difference in the proportions childless in the two groups. The figure of 30% for those aged over 60 is unexpectedly high. One possible explanation, drawn from the history of the hat trade in Luton, is that the employment of large numbers of local women 30-50 years ago may have led to a higher incidence of childlessness, partly because of selective migration into the town, partly because of the economic inducements to remain childless, and partly because of the effect of bad conditions of work on the health of the women. If this is so, it means that the data for these older women are, from a national point of view, unrepresentative. Nevertheless, even if this percentage of 30 is discounted somewhat, there is still little in table I to suggest a rise in childlessness.

It may well be that the general belief in an increase of sterility and childlessness in recent decades is due to a

TABLE I—PERCENTAGE OF MARRIED WOMEN WHO HAVE NOT BORNE AT LEAST ONE LIVE CHILD\*

i. Women aged under 45 at mid-1945

Duration of marriage (yr.)	No. of women in group	Percentage of childless women among those married between age—						
		15-20	20-25	25-30	30-35	35-40	40-45	All †
0-5 ..	454	49	55	56	67	‡	‡	55
5-10 ..	667	18	22	32	32	38	—	25
10-15 ..	550	4	7	17	41	—	—	12
15-20 ..	379	0	9	21	‡	‡	—	11
20 plus ..	183	9	4	‡	—	—	—	6
All durations	2233	18	21	29	44	41	‡	24

ii. Women aged over 45 at mid-1945

20 plus ..	1281	9	14	22	28	36	46	19
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iii. Women aged 45-60 at mid-1945

All durations	1049	12	11	18	31	49	‡	19
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iv. Women aged over 60 at mid-1945

All durations	490	8	22	28	35	53	‡	30
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\* In the total number of women at risk, all live-born children were included, whether surviving or not. Stillbirths and miscarriages have been excluded.

† All marriages under age 45.

‡ Number too small to be trustworthy.

1. Myrdal, Alva. *Nation and Family*, New York, 1941.  
2. Grundy, F., Titmuss, R. M., and others. 1945. Luton: Gibbs, Bamforth & Co. (Luton) Ltd.

growing recognition of its importance in relation to the population question, rather than to any real enlargement of the problem. It is not impossible, too, that an over-diagnosis of sterility reflects a medical fashion of recent origin. But, whatever the explanation, the belief is not founded on ascertained fact, and the Luton material does not point to an increase of sterility.

The conclusion that there is no evidence of increasing childlessness could be invalidated if it were true that a larger proportion of women were not entering marriage, and further that those not doing so contained the group who would not, for physiological or psychological reasons, have had children if they had married. But, as the marriage-rate is very high in Luton, it is most unlikely that this factor of selective marriage is more important today than it was in the past. Much the same may be said for the country as a whole.

The proportion of Luton women aged 15-20 who were married was as high as 7.2% in 1945 (against 2.3% for England and Wales in 1939<sup>3</sup>), while at ages 25-35 83% were married (against 71% for England and Wales in 1939). By age 45 only 8% of Luton women remained unmarried. It would be almost impossible to raise the proportion above this level in Luton—or in the country as a whole. Such figures as these, expressing the high popularity of the social institution of marriage, provide, indeed, a greater reservoir of potentially childless marriages, and (it may be added) for divorces and separations.<sup>4</sup>

CHILDLESSNESS IN DIFFERENT SOCIAL GROUPS

The data comprising table I have been analysed according to the occupation of the husband, and the classification into social classes has followed that adopted by the Registrar-General at the last census. The number of women falling into social classes I and II is too small for the results to be significant, partly because Luton is pre-eminently a town of artisans, 62% of its men aged 20-65 being skilled workers, many of whom enjoy an income higher than most of the clerical and professional groups allotted by the Registrar-General to class II. The Luton material has, therefore, been analysed for two groups, (a) skilled workers (social class III), and (b) semi-skilled and unskilled workers (social classes IV and V).

Among women aged under 45 in 1945 the proportions childless are:

—		(a) %	(b) %	All social classes, including I and II (%)
Duration of marriage	15-20 years ..	11	11	11
	20 years and over	6	7	6

For those aged over 45 in 1945 with a marriage duration of 20 years and over:

—		(a) %	(b) %	All social classes, including I and II (%)
Age at marriage	15-20 yr. ..	11	10	9
„	20-25 yr. ..	14	12	14
„	25-30 yr. ..	24	19	22

Here again there is nothing to suggest a rise in the proportion of childless wives. Nor is there anything to warrant the prevailing idea that childlessness is commoner among those in classes I and II. There may be more childless wives because the age at marriage is

higher in the higher income groups, but given the same age at marriage then there does not appear to be much difference in the incidence of childlessness among social classes—at least in Luton.

CONTROLLED PARENTHOOD

While the Luton fertility tables do not show that a greater number of women are remaining childless, what they do reveal is the extent to which controlled parenthood is today being exercised by all age-groups and social classes. In table I, for instance, it is shown that after

TABLE II—PERCENTAGE OF WIVES AGED UNDER 45 IN 1945 HAVING AT LEAST ONE OR TWO CHILDREN WITHIN THE FIRST FIVE YEARS OF MARRIAGE

Duration of marriage at mid-1945 (yr.)	Women married between age—							
	15-20		20-25		25-30		30-35	
	Children	Children	Children	Children	Children	Children	Children	Children
5-10 ..	81	42	65	17	55	11	57	11
10-15 ..	87	41	73	25	59	10	54	9
15-20 ..	87	42	77	23	70	22	—	—
20 plus ..	77	38	82	29	—	—	—	—

TABLE III—DISTRIBUTION OF LIVE-BORN CHILDREN TO WIVES AGED UNDER 45 IN 1945 AFTER A MARRIAGE DURATION OF 10-15 YEARS

Women married between age—	Percentage of wives with the following family sizes—						Mean number of children per married woman
	0	1	2	3	4	5 plus	
20-25	8	34	33	16	5	4	1.90
25-30	19	41	26	10	1	3	1.41

an average of 2½ years of marriage only about half of the wives had had a child, and that after 7½ years a third of all the women married at 25-35 were still childless.

It has long been recognised that earlier marriages are more fruitful of children than late ones. This has been true even when marriages contracted between ages 15-20 and 25-30 are compared. Thus the 1911 census showed that after 2½ years of marriage the number of children born to 100 wives married at 15-20 was 60% higher than the number born to those married at 25-30. The corresponding figure for Luton women in 1945 was 23%.<sup>5</sup> A change of this order strongly suggests that the degree of parenthood control, hitherto exercised by women marrying in the late twenties and early thirties, is now in process of being adopted by those marrying at earlier ages. The trend is towards a uniform pattern of reproductive behaviour within marriage. As there is a close correlation between social class and age at marriage—generally speaking high social status means high marriage age—then it seems likely that this development of uniformity applies to class fertility as well as to age-group fertility. Thus we should expect to find, when national data become available to compare with the 1911 material, a much smaller class fertility differential.

Tables II and III present other aspects of current reproductive habits.

In reading these two tables it should be borne in mind that over half of all wives are married between the ages of 20-25. Next in importance to these ages is the group 25-30. Together, these two groups account for nearly 80% of all wives. It is the contribution made by these women which mainly determines the level of the reproduction-rate.

In table II, and examining first the most recent marriages, we see that after 5-10 years about two-

3. Later figures have not been published.

4. It is a common mistake, particularly evident in the popular press, to assume a greater incidence of broken homes because the number of separations increases. But this is not necessarily so; and they should be measured against the numbers exposed to the risk of separation.

5. This percentage may be abnormally low because of war-time marriages among young people, and the incentives for women to have at least one child. But such factors cannot explain away the difference between 23% and 60%.

thirds of those married between 20-30 had had one child, while only about 15% had had two children. Women of these ages who have had only one child in the first 5-10 years of marriage are unlikely to end their reproductive days with a family of four or more. Yet the 1911 census found that among the great group of wives married at 20-25 and whose marriages were contracted in 1851-61, the commonest size of family was ten. In 1945 the potential for large families in a similar age-group, who were married between 1935-40, was only 17%. But while this 17% may go on to three or more children, the next group of women who married during 1940-45 between ages 20-25 may provide an even smaller potential. For, as can be seen from table II, the proportion has fallen sharply from 29% (those married before 1925) to 17% (those married between 1935-40).

This particular story is taken a little further in table III. The marriage duration of 10-15 years has been selected because it may reasonably be assumed that, after this period of married life, the *ultimate* size of the family has been more or less set by the vast majority of couples.<sup>6</sup>

What is most striking about this table is that for both those married at 20-25 and at 25-30 the *commonest* family size was one. At the time of the survey the age of these women ranged between 30 and 45, with a mean of approximately 37. When the childbearing days of these women are over no doubt the 19% of childless wives married at 25-30 will have been reduced, while some of the one's will have moved up to the two's. But is it likely that many of the 75% (married at 20-25) and 86% (married at 25-30) who had less than three children after a mean of 12½ years of married life will finish with three, four, or five children?

#### PREGNANCY SPACING

To supplement the Luton fertility survey, which covered the childless and childbearing women of all ages, an analysis was made of the pregnancy histories of all married women who bore a live child during 1945.<sup>7</sup> A total of 1961 women entered the tables, and they were grouped as to:

	%
714 first pregnancies .. .. .	36
630 second " .. .. .	32
325 third " .. .. .	17
140 fourth " .. .. .	7
152 fifth plus " .. .. .	8=100%

A study of the interval between marriage and the first pregnancy showed that, among women aged 15-20 in 1945, all the pregnancies (52) occurred in the first three years of marriage. In the group aged 20-25, more than three years elapsed before 26% recorded a pregnancy; at ages 25-30 the proportion was 62%, and at 30-35 as high as 81%. At all ages combined, 53% of the wives giving birth to a live child in 1945 had a pregnancy during the first three years of marriage, and a further 18% did so in the next two years. In other words, nearly a third of these fertile women had been married more than five years before having a pregnancy.

As regards second pregnancies, only 29% of all the wives reported one during the first five years. For 50%, between 5 and 10 years elapsed before a second pregnancy occurred, and for 21% more than ten years.

Very few third pregnancies were recorded in the first five years (only 11%), 48% between 5 and 10 years, and 41% thereafter. When fourth and subsequent pregnancies are analysed, it is seen that less than 2% of all wives

6. If 1 or 2 children have been born within this period, then the size of the family when childbearing is completed may be 2 or 3, but it is unlikely to be 4 or 5.

7. By present husband. These histories were obtained in respect of women delivered by midwives, in the borough's maternity home, in private practice (including private nursing-homes), and in the public-assistance institution. It was interesting to note how atypical were the cases handled by private practice, for while as many as 54% of the women were aged over 30 84% of the pregnancies were first and second.

TABLE IV—SIZE OF FAMILIES. RELATIVE FREQUENCY OF FAMILIES OF DIFFERENT SIZES BORN TO WIVES MARRIED AT AGE 20-25

Children born	Luton: Wives aged under 45 in 1945 whose marriages had lasted 15-20 years	Luton: Wives aged 45-60 in 1945	Luton: Wives aged 60 plus in 1945	England and Wales (1911 census): Wives aged 50-65 in 1911
0 ..	10	11	22	6
1 ..	33	26	22	4
2 ..	28	26	13	6
3 ..	13	13	13	8
4 ..	9	9	7	9
5 plus	7	15	23	67
—	100	100	100	100

might be said to be continuously childbearing, for this was roughly the proportion who had had four pregnancies in the first five years of marriage. Of such pregnancies 60% occurred after ten years (20% after fifteen years), and 80% of fifth plus pregnancies after ten years (40% after fifteen years).

To summarise these results for all married women having a live-born child in 1945:

- Women reporting a second pregnancy—  
for 71% over five years of marriage had elapsed.
- Women reporting a third pregnancy—  
for 41% over ten years of marriage had elapsed.
- Women reporting a fourth pregnancy—  
for 60% over ten years of marriage had elapsed.
- Women reporting a fifth or subsequent pregnancy—  
for 40% over fifteen years of marriage had elapsed.

These figures express in concrete form the extent to which controlled parenthood has now become a part of the married lives of all sections of the community. Their effect on family size may be gauged by comparing the data for women who had not reached the age of 45 in 1945, but whose marriages had lasted between 15 and 20 years, with corresponding data for women whose reproductive days were over (table IV).

The large family of five or more children is, it seems, fast disappearing. The full psychological, social, and economic consequences of the changes in family size depicted in table IV have not yet been experienced. While great numbers of middle-aged and elderly people alive today have, or have had, a large supporting circle of brothers, sisters, and relatives, this will not be true of the children born of contemporary fertility patterns. We do not yet know what kind of problems will arise, and what type of society will be fashioned, by the generations composed of large numbers of one-child and two-child families when they reach maturity and responsibility. All the signs point to a—physically—healthier society. But in other respects there may be losses, for in the absence of biological supports and the safety-valve of religious exercise, the central issue of the future may well be, in Fromm's words, the problem of "moral aloneness."<sup>8</sup>

#### CONCLUSIONS AND SUMMARY

A study has been made of a few aspects of the problem of parenthood as revealed by a sample fertility survey in the industrial town of Luton. It would, of course, be wrong to assume that what is true of Luton is also true of the rest of the country. Other towns, such as Liverpool or Glasgow, with dissimilar social structures might show different patterns. Moreover, it should not be forgotten that many of the facts presented here reflect the abnormal war-time phenomena of high and youthful marriage-rates, and a consequent piling up of first births. These factors tend to distort comparisons with pre-war years. Nevertheless, it may reasonably be claimed that the facts reported roughly indicate the

8. Fromm, E. *Fear of Freedom*, London, 1945.

order of magnitude of the problems studied as they obtain today in the mass of industrialised communities in England.

Throughout the war of 1939-45 Luton's birth-rate—e.g., total live births related to total resident population of all ages—was higher than that in the country as a whole. Yet in 1945, when Luton's rate stood at 18.9 per 1000 population (as compared with 16.1 for England and Wales), the number of live births to 1000 married women aged 15-49 was only 88 in contrast to a figure of 92 for England and Wales in 1938. On the other hand the net reproduction-rate in Luton was above unity—namely, 1.03 for 1944-45—while this index stood at 0.95 for England and Wales. As Luton's birth-rate in 1938 was higher than the national rate in the same year, it seems, from a comparison with the figures for 1944-45, that the relatively large number of births in the town during the war years has not meant any increase in fertility *within marriage*. There were many more marriages, especially youthful ones, and a rise in the proportion of first-born children. It is highly probable that a corresponding development took place in the rest of the country, but until comprehensive national data have been published we cannot be sure.

The more notable biological facts reported in this paper may be summarised as follows:

- (1) There is no evidence of any increase in the proportion of childless marriages over three generations, and (given the same age at marriage) no marked social class differences.
- (2) The degree of control over childbearing within marriage, hitherto exercised by women marrying in the late twenties and early thirties, is now in process of being adopted by those marrying at earlier ages.
- (3) For many wives there is now a long interval of time between marriage and the first pregnancy, and between first and subsequent pregnancies.
- (4) Only a small proportion—less than 2%—of all wives can now be described as continuously childbearing.
- (5) A large increase has been noted in the proportion of one-child and two-child families in recent years, and a dramatic fall in the proportion of families containing five or more children.
- (6) The trend towards a smaller family size continued during the war—despite a rise in the birth- and reproduction-rates.

## OUR MENTAL HOSPITALS

### REPORT OF THE BOARD OF CONTROL FOR 1945

DURING the war the Board of Control ceased to publish their annual reports; so the report for the year 1945, the first to appear since 1939, has much to tell—and, surprisingly, much that is cheering.

Mental hospitals and mental-deficiency institutions evacuated 25,000 beds at the outbreak of war, thus putting space for some 42,000 beds at the disposal of the Forces and the Emergency Medical Service. In the hospitals to which the displaced mental patients were removed this meant overcrowding amounting at one time to 16%; and those who were then working in mental hospitals well remember the gloomy prognoses the sight of the close-packed beds invited. Yet few of the fears were fulfilled: certainly the death-rate increased during the early years, reaching in 1941 a point 33% higher than the pre-war average; but thereafter it slowly fell, until in 1945 it was just below the rate for 1935-39—68.4 per 1000 patients compared with 68.5. The death-rate for women in 1943 was 64 per 1000, among the lowest ever recorded; and it is curious to note that this happened when the shortage of nurses was greater than at any time during the century. This record may be compared with that of the previous war, when by 1918 the death-rate had risen to a maximum of 203 per 1000, or 111% over the pre-war quinquennial rate.

Nor was the increase of tuberculosis as devastating as had been expected. The incidence of fresh cases rose from 5.6 per 1000 in 1939 to 11.3 in 1941, but then began to fall, reaching 7.2 in 1945. The death-rate from tuberculosis, which was 3.8 in 1938 and 4.1 in 1939, rose to 9 per 1000 in 1942, but had fallen to 5 in 1945. Similarly the death-rate from dysentery showed a temporary rise, reaching a peak in 1941, then quickly returning to the 1938 level; by 1945 it was only 0.2 per 1000 patients.

### THE RULING FACTOR

What was the cause of this gradual change for the better, starting in mid-war? Evidently it cannot be put down to any improvement in living conditions, for these were throughout worse than in the 1914-18 war, when the death-rate in mental hospitals steadily rose. Overcrowding was greater in the recent war, blackout more strict, ventilation poorer, staff shortage more acute, enemy action more violent. Certainly the diagnosis of tuberculosis was made earlier, thanks to the intensive use of X rays; and the treatment of dysentery is nowadays more successful; but these measures alone could not have changed a main trend.

After the 1914-18 war the board concluded that reduction in quantity and deterioration in quality of food supplied to the patients was the chief factor inducing the increased sickness- and death-rates in mental hospitals. This time the board were on their guard. Mental patients customarily lose weight in the first two years of their illness, but in 1941 the board initiated studies to decide whether the losses were greater than in the pre-war years, and also whether overcrowding was having an effect on weight-loss. The degree of overcrowding existing at that time was found to make no difference to the proportion of patients losing weight; and from 1941 onwards the situation righted itself, weight-losses reverting to the pre-war range.

"The recovery was due, we believe," the board write, "to the changes induced in the latter half of 1941 as a result of which the food situation improved, and also because we became food-conscious and much was done to improve the quantity and balance of the diet."

Dietaries were investigated not in the rosy light of the official diet sheet but by studies of the bulk issues of food over a period of four weeks. The mean value was found to be 2360 calories daily, ranging from 1951 to 2731, whereas, since 1941, the level in the general population has been 2800 calories. In about half the hospitals the amounts of vitamins included in the food was below the League of Nations level. The analysis enabled a large number of hospitals to change their diets and particularly to improve the supply of vitamins C and A; on the whole the board feel that from 1942 onwards the diet was satisfactory, and they attribute the better health and welfare of the patients largely to this change.

In the early days, however, nobody could foresee this comparatively happy outcome, and many mental-hospital doctors and nurses felt indignant at what seemed a cynical disregard of their patients' welfare. It is worth noting in passing that their discontent could have been changed to willing support if a member of the board, or a Government official, however minor, had visited the hospitals and explained to the assembled staff in ten minutes what the relinquished space meant to the nation at large. It is imaginative dealing with the people on the spot which makes the difference between a happy and a disgruntled service—a point worth bearing in mind when the National Health Service is established.

### WAR AND MENTAL HEALTH

The effect of the war on the mental health of the community has been impossible to estimate. The

strain imposed by air attacks and family anxieties was partly offset by opportunities for full employment, a better standard of living, and the stimulus to the spirit of team-work in an important cause. Admissions to mental hospitals in 1940, 1941, and 1942 were lower, the board report, than the average for the five years before the war. By 1943 they had exceeded this average, and continued to rise in the next two years, reaching 33,961 in 1945, the highest number on record. But no fewer than 50.7% of these admissions were voluntary, and the patients discharged that year amounted to 71.7% of the direct admissions—also the highest figure on record. The percentage of patients, calculated on direct admissions during the year, who left mental hospitals recovered or relieved was 63; and for recoveries alone the figure was 33.2. The percentage of absolute discharges (including those who were not improved and 150 who absconded) was 71.7, compared with 66.8 for the preceding five years. The average annual percentage for the five years before the operation of the Mental Treatment Act, 1930, was 48.3.

#### DEMAND AND SUPPLY

The hospitals, in fact, are being used earlier and willingly by people with incipient mental illness, and a continued rise in admissions is therefore possible. To meet it we have old buildings, too few beds, and a staff shortage. At the end of 1945, bed-space for 17,020 mental patients still remained in the hands of the Services and the E.M.S., and a further 847 beds were not in use because they could not be staffed. For mental defectives, especially, it is often difficult to find institutional vacancies even when their need is urgent. The board draw fresh attention to the report of the Athlone Committee's subcommittee on the mental-nursing service, in which better conditions of service for the mental nurses were advocated.

#### SERVICES AFTERCARE SCHEME

In 1943, at the request of the War Office, the board founded a scheme for aftercare of ex-Service patients discharged from hospitals and E.M.S. centres on account of psychiatric disability, and in 1944 merchant seamen were included. The Ministries of Pensions, Labour, and Health, the Provisional National Council for Mental Health, and the Mental After Care Association all gave their help in this specialised form of reablement, and up to September, 1945, some 7800 patients had been referred to the board for help. The Provisional National Council arranged for patients to be visited in hospital by a trained social worker; and regional aftercare officers look after them in the areas to which they are discharged. No patient is referred unless in the opinion of the commanding officer he or she needs aftercare and has expressed willingness to receive it. As new cases are referred those whose needs have been met are closed down, but in 1945 new cases were still outrunning the numbers requiring no further help. The board note that the scheme could be extended and help given to other members of the Forces were it not for the shortage of trained psychiatric social workers.

They have been closely concerned with plans for integrating the mental-health service with the National Health Service. One aspect of this calls for the rewriting of the Lunacy Code, a task which would already have been undertaken but for the war. In 1926 the Royal Commission advised that the code should be recast and simplified, and the need is now urgent since the National Health Service Act will modify the Mental Treatment and Mental Deficiency Acts.

The report as a whole gives a picture of a promising and improving service badly hampered by lack of nursing staff and proper buildings. The staffing of mental hospitals is a part of the whole nursing problem, which is still not being faced realistically.

## In England Now

### *A Running Commentary by Peripatetic Correspondents*

I THOUGHT that I had attained to that sublime pose for which the tag of Horace serves as slogan—nil admirari—but my self-esteem has received a rude shock, for I am full of wonder. I have just returned from a brief visit to our hospitals in the Middle East, where I found the hygienic conditions contrasted so favourably with those of the last war that it seemed as if a miracle had been performed.

Thirty years ago I landed with a large medical unit at Basra, and within a fortnight half the officers were sick and in hospital. At that time flies and mosquitoes swarmed round the camps, dysentery was rife and malaria dangerously common, while the river steamers were crowded with sick on their way to India. Heavy chlorination gave the drinking-water a strong antiseptic flavour. For more than two years my daily ration for a bath was a petrol tin filled with water, which was carefully poured into the shallow canvas bath which each officer carried in his kit. The thought of an immersion-bath was a dream of Paradise. Latrines were primitive and the incinerator a prominent feature of the landscape. A commission which was sent out from England to inquire into hygienic conditions soon demonstrated the need for improvement since three out of the four members soon fell sick and it fell to my lot to treat them.

But their work and that of their successors has borne fruit. Today, hygienic conditions are immeasurably better. Malaria control has worked wonders. During a three weeks' visit I saw fewer mosquitoes than I do in a London garden in one day. The regular use of D.D.T. has almost banished flies; the water is pure and tasteless. The sickness-rate among the troops is but a quarter that of the last war. In the various hospital camps one can always have the luxury of a cold shower-bath, and sometimes even hot water is laid on. It only added to the interest to find that in one camp a toad appreciated the same amenities as the members of the mess. We thought the acme of luxury was the flushing water-closet far away in the desert.

The only sad and deeply felt regret came when one saw the huge cemeteries filled with those who would almost certainly have been saved if similar conditions and precautions had existed thirty years ago.

*My wife says it's her turn; so over to her.*

At 3.45 A.M. the phone rings. "Poor old boy, you'll have to get up," I mutter thickly into the darkness. An awful blast of cold air and even colder invective makes me curl up and pull my nightdress around my toes. He gets up, his super renal whatnots working at high pressure. From a long distance I hear that there has been an accident, so I roll over to keep his side of the bed warm.

How I envy those efficient wives who, when their husbands are called out, turn over and go to sleep in an instant! My imagination is too much for me (I often wish he would share some of it with me, but he is usually too busy), or perhaps my renals are super super ones; anyway, I call out fit to wake the children, "Don't forget you took the bag out of the car, darling." He hisses back in the manner of Gielgud, "Sweetheart, I have remembered." Why do they get so angry with us, as we try to help? Poor chap, it's not my fault you get called out. It's something to do with his glands that he gets het up. He says he's a Kretchmer's picnic... the real trouble is that they all like to appear so efficient; any suggestion, any hint from us...

The bed is warm now; how nasty to be lying on a roadside cut by glass... cold... shivering... surgical shock supervened... "At the inquest Dr. Prem said that death was due to shock consequent upon the injuries." How nice he looks in his dark suit; the Coroner smiles faintly, "Thank you, doctor." Dr. Prem left the witness stand, his monumental calm, the air of faint resignation... so certain... so impregnable. I roll over in bed. "Phooey" I say aloud into the darkness.

I hear a train come into the station and the sound of boxes being dumped on the platform. Fish. I must

queue up early again. In a few minutes the milk train will be in. I remember listening to them like this the night Pauline had her second. Fish and milk, babies and chores, and queues. They are packed like sardines waiting to see the doctor, I have to wait patiently in a long reptilian queue to get sardines; there is nothing funny in this any more.

I doze and then wake with a start to the sound of a siren. It is the whistling kettle. He is going to bring me tea and we are going to sit in the half light of dawn and he's going to tell me what happened. He brings me the tea and gets my bedwrap. He lights a cigarette, the smoke comes out through his nose and he begins, "They moved them off the road and took them into a luxurious nature cure place. . . ." We laugh happily. Just between you and me—it's going to be a wonderful day today. \* ~ \* \*

Within a twelvemonth I have climbed in England, Scotland, Ireland, and Wales. More: I have achieved my Lakeland majority, for a few days ago I returned from my twenty-first visit to the Cumberland Fells.

"I know those slopes: who knows them if not I?" sang Matthew Arnold, and I feel qualified now to claim the same familiarity with the route from Sty Head to Sca Fell as with the exposure of the saphenous opening after many (too many) years in the Royal Air Force.

And how much nicer, I have been reflecting, are the Cumbrian names than those of the other mountainous parts! Stickle Tarn and Scale Force; the simplicity of Gable and Pillar—contrast these with Lliwedd or Clogwyn Du'r-arddu, which may mean something to a Welshman, or with Stuc a Choire Dhuibh Bhig, which a Highlander has the satisfaction of knowing means the peak of the little black bastards, or something to that effect. True, Crib Goch (Wales) and Suilven (Scotland) have stern uncompromising names suited to their appearance, but they lack the music of Watendlath or the fantasy of Dollywaggon Pike. Ireland fares a little better. Errigal and Muckish, Hungry Mountain, and the Poisoned Glen immediately suggest visions of the Little People, but Sgùrr a' Mhadaidh or y Ddysgl suggest nothing at all to a Sassenach, unless it be a comparison with such horrors of medical terminology as axonotmesis or dysdiadokokinesis, which even if you know what they mean (and it is usually something pretty simple) are completely unpronounceable.

Incidentally, names aren't the only things which are more attractive in the Fells than in the Highlands or Snowdonia. Why, even the sheep look more intelligent, and as for the natives themselves—but those are deeper waters. Anyway, what Scot or Celt could possibly have thought of calling a mountain track anything so delightful as Moses Trod? \* \* \*

The Ministry of Food's appeal to doctors to go easy in issuing certificates for priority milk cuts at the very tap-root of medical practice—the doctor-patient relationship. The doctor's first loyalty, we keep saying, is to his patient; and here we are being asked to consider the interests of the community, as represented by the "normal consumer."

The doctor knows all about the troubles of normal consumers—he is usually one himself—but that doesn't make it any easier to refuse the plea of old Mrs. Muggins up the road, even though one suspects that most of the 14 pints a week that she gets for her duodenal ulcer goes into the plates of her three sons' wheat flakes.

As a fellow peripatetic remarked the other week, we doctors never asked to be the controllers of the nation's milk-supply, and we would be heartily glad to be rid of the whole time-consuming and thankless job. But nobody else is capable of taking it on, so we must make the best of it. What we are asked to do is to make a 44% cut in present certificates, and at least that would be saved for normal consumers if we could limit our certificates to people in the specified categories who are really going to drink the milk. The post-ulcer class is the one to keep an eye on, and I bet my boots that if they are cut down to the amount they actually drink we shall reach the 44% target with ease. We may have to instal a few chuckers-out in our surgeries, though. Will the Ministry of Food compensate us for loss of patients and for personal violence incurred in the exercise of our duty?

## Letters to the Editor

### CORONARY DISEASE

SIR,—In his Harveian Oration, based on his own large experience, Sir Maurice Cassidy returns to the vexed question of aetiology which has so long employed the minds of all physicians having an interest in angina pectoris.

It is now apparent that we shall make small progress with our aetiological inquiries while we continue to confine our researches to individual studies in the ward, the consulting-room, the home, and the dead-house. This is a disease of prevalence, a community disease, with particular age and sex associations and a rising national incidence which must surely be related to social changes and to occupational or habitual factors. What, in fact, are the most striking changes in the conduct and conditions of our lives accompanying the steady increase in the disease? The amount of mental work and of mental and emotional stimulation now possible in the course of a single day is something far in excess of anything experienced by our ancestors. The time has come to accept that the pace and pressure of life and their physiological consequences for neuromuscular systems are no longer things to be ignored, as malnutrition in relation to other sickness and mortality was ignored until a few decades ago.

Reference to the Registrar-General's Decennial Supplement (1930–32) and to the social post-mortem examinations which this volume so usefully and graphically illustrates reveals important evidence. The standardised mortality ratios for angina pectoris, grouped according to social class by occupation, indicate that the male death-rate for social class I (professional classes) is nearly 3½ times that for classes IV and V (working classes), the intermediate classes II and III showing an intermediate gradient. The tables disclose further that, whereas in class I the standardised ratio for males is much in excess of that for married women and equal in class III, it is in defect in classes IV and V.

All this evidence would seem to suggest that—setting aside the partial contributions of age, sex, and heredity—conditions of life and work must play an essential part, and further that particular forms of social and occupational experience are as surely responsible factors as are those forms of social experience which weight the scales in favour of the professional classes and against the working classes in the case of tuberculosis, rheumatic heart disease, gastric (but not duodenal) ulcer, and cancer of the skin and stomach. In an analysis of a series of private cases of coronary thrombosis a few years ago I found (after excluding, in order to discount the ageing factor, all cases at and over 60) that I had noted the coincidence of heavy mental or emotional strain in 40% of the remaining male cases. I had been making no ad-hoc study of aetiological factors during the years in which the records were accumulated.

When we come to a closer consideration of occupational influence we find (again from the Registrar-General's tables) that medical men and the members of other intellectual professions in a less degree have a much worse experience in respect of angina pectoris than any of the manual occupations. Taking 100 to represent the death-rate for all males between ages 20–65, the comparative figure for agricultural and gardeners' labourers is 32; for coal-miners below ground 40; for bank and insurance officials 183; for the Anglican clergy 218; and for physicians and surgeons 368. Where modern "psychosomatic" theory has tended to stress the importance of emotional conflict and repression (which largely reflect temperament) social statistics and clinical histories make a stronger case for such factors as mental overactivity or strain and the day-to-day cares of sustained responsibility, which largely reflect types of employment.

More intimate sociomedical investigations of all the prevailing chronic diseases of our age are now needed. The "multiple stress" diseases and accidental injuries in the western world are as worthy of epidemiological inquiry as the diseases due to infective agents. They now cause more loss of life and efficiency and call for a greater expenditure of time and money than the

communicable diseases. Like these they are due to a complexity of causes which vary with time and place and social change and which can, by appropriate methods, be unravelled. Unlike them they lack a specific factor which can sometimes be specifically countered. But social conditions and modes of work and habits are—albeit slowly—alterable things.

Oxford.

JOHN A. RYLE.

### NURSING

SIR,—The “experimental school of nursing” advocated in your leading article of Oct. 26 would be a useful piece of work, and certainly the time has come for some practical research into nursing techniques and the art of nursing as distinct from medical care.

I should not like to see the research progressing along the lines of exploration of the possibilities of a two-year basic course. The assistant-nurse training is the simple course in elementary nursing arts, and would in my opinion not be suitable for the girl of good education, who is interested in theory as well as practice, and can absorb both at a greater speed and to a greater degree than the type of candidate for whom the assistant-nurse course has been devised. The assistant nurse can always pass on to full training if she proves suitable.

I do not quite see the reason for the proposal of a “medical dean” for a nursing school. I would prefer a school committee with a nurse as chairman, and representation from the medical committee.

I fully agree that any nursing course based largely on the medical curriculum is likely to be unsatisfactory, but there must always be correlation between medical and nursing teaching. Ward and departmental sisters should have a definite share in the teaching of the curriculum, and an investigation into the number of patients for whom they can adequately care in addition to their teaching duties might well be made.

University College Hospital,  
London, W.C.1.

MARJORIE HOUGHTON  
Sister-tutor.

### INFECTED FOOD

SIR,—Organisms of the food-poisoning group may be excreted by patients, after the cessation of clinical symptoms and signs, for a longer period than is generally realised. Only three cases of *Bacterium typhimurium* enteritis were encountered in my laboratory during the last year, but two gave positive stools after many weeks.

A married woman, aged 35, was ill for only a few days but was still excreting salmonella organisms in fair numbers 12 weeks after the initial infection. After the first weeks she was in good physical condition and continued her normal activities. Unfortunately contact was lost after the twelfth week, so it was impossible to learn the full time the carrier state persisted.

A married woman, aged 70, was ill for a longer period but was still excreting *Bact. typhimurium* 16 weeks after the onset. During this time, in an attempt to stop the carrier state, cholecystectomy was performed, but the gall-bladder, although containing stones, was sterile and excretion of the pathogen continued, although in scantier numbers. At the end of 16 weeks the faeces were still positive but the patient was in good health and engaged in her usual activities. Contact was unfortunately lost at this point and the complete time the excretion of the salmonella continued could not be recorded.

If these women had worked in a large feeding-centre an outbreak of enteritis would have been inevitable sooner or later.

The routine investigation of all “food-handlers in feeding-centres” would be of great value, but of still greater value would be the faecal examination of all kitchen staff who develop any kind of “digestive upset,” whether this caused absence from work or not. Conditions of temporary or permanent dysentery or salmonella carrier states would thus be detected.

It would be good too if doctors would become more preventive-medicine minded. On a number of occasions on inquiry into faeces results in cases of enteritis I have heard words to the effect that “the diarrhoea only lasted a few days and soon cleared up and the patient is quite well; it didn't seem worth sending a specimen.” That the patient could have become a possibly dangerous carrier of an intestinal pathogen, and the significance of such a condition if established, had not been appreciated.

Downe, Kent.

R. IRENE HUTCHINSON.

### PERFORATED PEPTIC ULCER TREATED WITHOUT OPERATION

SIR,—I admire those pioneering surgeons who refuse to be bound by tradition and who try to profit by their observation and experience in devising new methods of treatment. Only this morning with early tea I read from Osler<sup>1</sup>: “Undue reverence for authority as such, a serene satisfaction with the *status quo*, and a fatuous objection to change have often retarded the progress of medicine.” But we must be sure that any particular change really means progress.

The statement that some cases of ruptured peptic ulcer recover spontaneously came as no surprise. During the several years that I acted as surgical registrar in the old Newcastle-upon-Tyne Infirmary during the opening years of the century, it was my fortunate lot to make the post-mortem examinations on cases dying in the surgical wards. I recall how often the patent evidences of old inflammatory trouble about the stomach and duodenum, not otherwise explained, suggested the probability of previous perforation. Sometimes the presence of an ulcer or a scar or a typical history was confirmatory. I became so convinced of this possibility that I stated it as an accepted fact in some of my writings (*Perforation of the Stomach, &c. Med. Pr. Sept. 4, 1912*). In those days the mortality in ruptured ulcer was appalling, but just about a year after the publication of that paper I had a clinical experience confirming the truth of the statement.

In August, 1913, I was asked to see an abdominal emergency in a farmer of 60, at his home in what was then a remote part of Northumberland. This man had suffered from stomach trouble for 25 years and had taken “stomach bottles” off and on during the whole of that time. Some 26 hours before my visit and 2 hours after he had vomited a meal, the patient was seized by sudden severe pain with collapse and acute abdominal tenderness. When seen by his own doctor 2 hours afterwards the man was white, cold, collapsed, sweating, and in severe pain. Altogether the condition was very alarming. After a total dose of gr. 1/2 of morphine the patient got relief and sleep.

When I saw the patient next day he was still very ill and looked dusky. The abdomen was not distended but was very tender in the upper part and the liver dullness was completely replaced by a tympanitic note.

We concluded that there had been perforation of a duodenal ulcer. Immediate operation was considered but accommodation in the small farm-house was poor, night was coming on, and candles were the only means of illumination that could be brought to the table. The practitioner and myself were alone, no nurse or other assistant being available, and I had only my small emergency bag with me. To move the patient to Newcastle would have meant a slow tedious railway journey of 46 miles. In view of all these circumstances we decided that the patient would have the better chance if left at home and treated by repeated small doses of morphine with minimal quantities of liquid by mouth.

The patient slowly improved, and a week later was well enough to be moved to Newcastle where an operation was carried out. On opening the abdomen there were unmistakable signs of a leaking duodenal ulcer with local extravasation. The involved area of duodenum was oversewn and gastro-enterostomy performed. After a rather stormy convalescence the man made a complete recovery, and 20 years afterwards, when in his 80th year, he wrote to tell me of his continued good health.

In those days I saw so many disasters associated with the calamity of perforation that I never again had the courage to leave a case without surgical intervention if operation seemed practicable. In some few cases of long-standing perforation the condition was so precarious that it was considered that the chances of recovery would be better with minimal interference, such as the insertion of a suprapubic or right iliac fossa drain, but in every such case the patient died.

While perforation is usually one of the most straightforward diagnoses in abdominal surgery, we must recognise that sometimes it may be very difficult to come to a correct conclusion in spite of all the aids. I have to

1. *British Medicine in Greater Britain. Aequanimitas. London, 1904.*

confess that more than once I have opened the abdomen only to discover that perforation was not present. During the last few years I have seen at least four such cases at Hammersmith Hospital and in two gas was actually demonstrated by the X ray below the diaphragm, and yet subsequent exploration failed to confirm that perforation had occurred.

Further, the very cases in which conservative treatment might be tried are those which yield a small mortality after operation. Yet in a catastrophe fraught with such tragic possibilities it is difficult to predict the exact course of events, and I have lost cases operated on within 6 hours. Nevertheless, as long ago as 1929, with my then assistant, Mr. Norman Hodgson, we had operated on a consecutive batch of 58 cases up to 6 hours after perforation without a death. In the same series there were 144 cases in the 12-hour period with a mortality just under 7%; and taking all the cases irrespective of the number of hours after perforation there were 209 with a mortality of not quite 15½%. These figures—and more recent ones are doubtless much better—show that surgeons may expect to deal by operation with large numbers of early perforations with a minimal mortality. It will probably only be in this same group that the problem of treatment without operation arises, so that this plan has a high standard of recovery with which to compete.

But to get the best results the operation must be as simple as possible, "as you cook little fish without much busyness" (Laotze). In the actual management of the operative treatment there are many points worthy of note. I never liked to operate on patients straight off the street, as it were, and an hour or perhaps two spent in preparation is well worth while. Once the decision to operate has been made some relaxing sedative should be given, and for this purpose morphine is the best. In the few cases where the patient feels sick or when a meal has been taken shortly before the calamity it is wise to pass a stomach tube, not for washing out the viscous but for decompression. Unless this can be done easily it should not be persevered with. The morphine helps to overcome rigidity, but in the rare cases where it fails the use of curare during anaesthesia may be successful. General anaesthesia undoubtedly contributes to the unhurried haste with which the operation can be carried out, and in these days it is interesting to recall that when it was my lot to deal with a large amount of emergency work the anaesthesia was of the simplest. We had no special anaesthetists for emergency work and no machines more complicated than the Clover inhaler. Chloroform on lint or open ether on gauze or the Clover fulfilled our needs.

A midline or transrectus incision, big enough not to impede the necessary manipulations for exposing the perforation and to do away with the use of retractors, is essential. The next step is to find the perforation and make it as accessible as possible for suturing. Extravasation, exudate, and loose lymph are mopped away from the vicinity only and the perforation is closed. With regard to the latter step there are sufficient expedients to deal with any combination of circumstances. In most cases up to 6 or even 8 or 10 hours' drainage is not necessary. If there is real need for special haste the parietal incision may safely be closed with through-and-through sutures of strong silkworm or silk (no. 5, Chinese twist).

In these emergencies the simplest life-saving operation, if carried out before peritonitis is established, is so often rewarded by recovery, even in the presence of adverse conditions, that I am apprehensive of any other method that may countenance delay and demand long and anxious supervision. During my not inconsiderable surgical experience—I operated on my first ruptured duodenal ulcer 43 years ago—I have noticed that when some plan other than operation is advocated for acute abdominal conditions it is often seized upon by the profession, and nearly always with a consequent wave of increased mortality or a recovery-rate clouded by much avoidable anxiety. This has certainly been so with regard to appendicitis.

My mind goes back to the days when recovery after ruptured ulcer was a rare event, and now that early

surgical intervention yields such great rewards it seems a pity to lightly turn away from the path. It is important that we should learn the real comparative value of the conservative method, but no-one should try the plan unless they are prepared to carry it out thoroughly and conscientiously in all its details. It would really be better if the trial could be left in the hands of a few.

In the meantime do not let us broadcast the conservative method as though a well-established surgical procedure like early operation was already outdated.

Taplow, Bucks.

G. GREFF TURNER.

#### SIR ALMROTH WRIGHT AND ANTI-TYPHOID INOCULATION

SIR.—Dr. Douglas Guthrie appears, by his letter of Oct. 19, to give a somewhat grudging assent to the contention that Wright was the originator of anti-typhoid inoculation. Any lingering doubt that remains may be resolved by reference to an article "An investigation upon the blood changes following anti-typhoid inoculation" (Leishman, Harrison, Smallman, and Tulloch) which appeared in the *Journal of Hygiene* (1905, 5, 380). In the introductory paragraphs of that article it is made quite clear that the pioneer work in this field was done by Wright when professor of pathology at the Army Medical School, Netley. While the investigation described in the article was the first systematic one of a long series that led to the adoption of the practice in the British Army with results, in two world wars, that are well known, it was preceded, as shown in the bibliography, by a series of related observations, dating from 1897 onwards, in which Wright was clearly the leading figure.

As the last surviving member of the group which made the investigation referred to above, mere justice to my former colleagues requires that mention be made of their full acknowledgment of the part played by Wright and of the inspiration so characteristic of his work and teaching.

Guildford.

A. B. SMALLMAN.

#### PSYCHONEUROSIS TREATED WITH ELECTRICAL CONVULSIONS

SIR.—Dr. W. L. Milligan's article in your issue of Oct. 12 requires comment because it gives a wrong impression about the relation of psychotherapy to electrical-convulsion therapy.

In these days it has become customary to insert in articles on the subject a note of caution about the use of electrical convulsions and to add a remark about psychotherapy somewhere in the discussion; Dr. Milligan is no exception. He employs electrical convulsions for patients that are resistant to "psychotherapeutic measures," and concludes in his summary: "Electro-convulsive therapy should not be used indiscriminately; the greatest care should be taken in selecting cases." But we are given little indication—indeed only the vaguest hints—about how to select cases; and his case-reports are not helpful in this respect, because all serious assessment of the personality is lacking.

As I read the article, taking the argument at its face value, I could not see any reason for Dr. Milligan's caution. There are no ill effects of a serious nature; 97% of the results are favourable and 3% "not improved." We do not even hear that the 3% are worse. Such evidence does not justify caution, and I am at a loss to understand why he expresses these apparently meaningless sentiments.

The truth of the matter is that once you are prepared to disregard all our knowledge of the nature and structure of the neuroses in relation to the personality as a whole (and Dr. Milligan's paper does this) there is no limit to what can be done with neurotic cases. If Dr. Milligan is really prepared to disregard our knowledge of psychopathology, let him say so and let us not have vague talk about cases resistant to "psychotherapeutic measures." To be more specific, which or how many, and in what combination, does he use the following in his "psychotherapeutic measures": psychological explanations, reassurance, re-education, simple suggestion, suggestion under hypnosis, hypnoanalysis, psychoanalysis? Has he used the methods of individual psychology or those of



analytical psychology, and what about group-therapy, &c.?

As it stands, he is like a man who says: "I have tried medicine (without however specifying what kind of medicine), and since that does not work we will try this surgical method" (which he describes accurately). It is much the same when he uses the word "resistant." If there is a resistance we must know what the patient is resisting; otherwise there is no sense in the word.

For those of us who hold that many neuroses are abortive attempts to cure a diseased mind, Dr. Milligan's results cannot be assessed. His caution is justified but not on the grounds of his evidence.

London, N.W.1.

MICHAEL FORDHAM.

SIR,—As a consulting physician I have been responsible for referring many patients to Dr. Beaton at St. James Hospital, from both private and hospital practice. I have also been privileged to see some of Dr. Milligan's cases before, during, and after treatment. I can confirm the claims made in his article of Oct. 12. I have yet to see the mental deterioration or the persistence of the initial memory defect which have been feared. I am satisfied that it is a most notable advance in helping the psychoneurotic patient.

All new methods should be subjected to the most searching examination and criticism, but this should not be captious. In these times much routine description must be omitted from articles through lack of space. If Dr. Tooley (Oct. 26) knows the mental-hospital world at all he must realise that in an institution with the reputation of St. James Hospital, Portsmouth, no patient lacks an "adequate examination."

The aim of treatment with the psychoneurotic patient is surely the removal of symptoms. This was achieved in over 90% of cases. The only question is whether the symptoms will stay "removed."

I have read and re-read Dr. Norman Glaister's discursive letter (Oct. 26) and am still unable to grasp its point. He writes disparagingly of five minutes' psychotherapy, yet Dr. Milligan expressly stresses the necessity of adequate psychotherapy in the resynthesis of the personality following treatment.

Southsea.

J. C. PRESTWICH.

RUBBER GLOVES

SIR,—I am writing to you hoping that a little publicity may produce some rubber gloves. For the last eight weeks I have been unable to obtain any, and so have had to attend confinements and to operate with bare hands. Fortunately no-one has yet died from septicæmia.

My would-be suppliers inform me that were it rubber contraceptives that I wanted they could supply me by the gross. No doubt the old adage holds good that "prevention is better than cure."

Hove.

F. E. GRAHAM-BONNALIE.

TESTIMONIALS

SIR,—The remarks of your peripatetic correspondent of Oct. 26 will interest the many who are trying to find employment in these hard times, and must raise serious doubts as to the value of testimonials in securing an appointment.

It is said that a good testimonial will get a man on the short list, and thereafter the final choice depends, inter alia, on the result of the interview. It would be interesting to have the opinion of those qualified to judge on this matter. There is no doubt that the specifically addressed testimonial, or better the personal letter, carries weight in the deserving case, but today the average candidate cannot afford to stand or fall on the result of one application. The result is the open testimonial, which has all the defects of open diplomacy. I have long disliked this document and the asking for it, so reminiscent of the Indian servant wanting his "chit"; since my return to civil life I have neither sought nor submitted a testimonial and am convinced that my progress has not been impeded thereby. I suggest that the submission of a list of names for reference should be more generally adopted since it gives selection committees a better idea of the true worth of a candidate.

Sheffield.

LOUIS A. IVES.

G.B. AND N.B.

SIR,—As a not very perfervid Scot I am occasionally annoyed by the misuse of the word England when Britain is meant. However, according to your report (Oct. 26, p. 626), Sir Henry Bashford uses the word Britain for England when he claims that the London Hospital is the largest voluntary hospital in Britain. It seems to me that there is no great merit in mere size, but this claim cannot be sustained. According to the *Hospitals Year Book* for 1943-44 (the last available) the bed complements are: Edinburgh Royal Infirmary 1287, Glasgow Royal Infirmary 980, London Hospital 891.

A. A. MACIVER  
Secretary.

Royal Infirmary, Glasgow.

\*\* We are glad of the correction. Sir Henry joins us in apology.—ED. L.

THIOUREA DERIVATIVES IN THYROTOXICOSIS

SIR,—A note in your issue of Sept. 7 (p. 368) says that there appear to be no published reports of agranulocytosis in patients treated with methyl thiouracil. This is not correct. Kristiansen (*Ugeskr. Læg.* 1945, 107, 255), Leschley Jacobsen (*Ibid.*, p. 721), and Ehlertsen (*Ibid.*, 1946, 108, 192) have each published a case with recovery, and Lundbæk has published a fatal case (*Ibid.*, 1945, 107, 253). Ehlertsen, who made a tentative comparison of the side-effects of thiouracil and methyl thiouracil (and thiourea), saw no conclusive difference between the two first-named.

Aarhus, Denmark.

C. HOLTEN.

Public Health

The Third Quarter

DURING the September quarter of this year 213,135 live births were registered, representing a birth-rate of 19.7, the highest recorded in any quarter since June, 1923. This maintains the upward tendency shown in the June quarter, when the number of births registered was 203,797.

The births and deaths registered during the September quarter, with figures for the corresponding quarters of 1945 and 1938, are as follows:

	Live births		Stillbirths		Deaths, including non-civilians	
	Number	Per 1000 popn.	Number	Per 1000 popn.	Number	Per 1000 popn.
Third quarter, 1946	213,135	19.7	5778	0.53	100,363	9.3
" " 1945	167,807	15.6	4676	0.44	97,159	9.0
" " 1938	158,082	15.2	6072	0.58	102,545	9.9

The birth-rate of 19.7 is 4.1 above that for the third quarter of 1945, and 4.5 above that for the corresponding quarter of 1938, the last complete pre-war year. The average for the September quarters of the years 1940-44 was 15.4.

Infectious Disease in England and Wales

WEEK ENDED OCT. 26

*Notifications.*—Smallpox, 0; scarlet fever, 1209; whooping-cough, 1499; diphtheria, 314; paratyphoid, 89 (71 at Sheffield); typhoid, 9; measles (excluding rubella), 2884; pneumonia (primary or influenza), 436; cerebrospinal fever, 28; poliomyelitis, 31; polioencephalitis, 2; encephalitis lethargica, 1; dysentery, 59; puerperal pyrexia, 160; ophthalmia neonatorum 68. No case of cholera, plague, or typhus was notified during the week.

The number of service and civilian sick in the Infectious Hospitals of the London County Council on Oct. 23 was 878. During the previous week the following cases were admitted: scarlet fever, 56; diphtheria, 21; measles, 17; whooping-cough, 13.

*Deaths.*—In 126 great towns there were no deaths from scarlet fever, 1 (1) from enteric fever, 2 (0) from measles, 4 (0) from whooping-cough, 3 (0) from diphtheria, 36 (4) from diarrhoea and enteritis under two years, and 13 (1) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 265 (corresponding to a rate of 29 per thousand total births), including 26 in London.

## Parliament

## NATIONAL HEALTH SERVICE BILL

## Third Reading in the Lords

ON Oct. 31 the LORD CHANCELLOR, in moving the third reading, regretted that the Government had not found it possible to frame an amendment to meet the wishes of Viscount Cecil of Chelwood in regard to the treatment of deafness. The noble Viscount had wanted a provision inserted after clause 41 which dealt with supplementary services. This matter of the ear, however, Lord Jowitt pointed out, was not like that of the eye, for anyone who wanted spectacles could go to an ophthalmic optician, but if he had anything the matter with his ears he should go to a properly qualified doctor. If ears could not come as a supplementary service they should come as part of the general hospital service under clause 3, where the Minister was under a duty to provide for "medical, nursing, and other services required at or for the purposes of hospitals," and "the services of specialists, whether at a hospital, a health centre . . . or a clinic." If he were to put in particularly deafness then he was sure that Lord Horder would want to put in rheumatism, and others of their Lordships would want to put in other things until they had set out a whole chain and achieved nothing. After consulting the Minister, Lord Jowitt repeated the definite assurance that a comprehensive service would include provision for deafness. By that he meant not merely the trained assistants that would be required, but also the provision of instruments to alleviate deafness. He would take up with the President of the Board of Trade the question of the production and price of deaf-aids. He regarded it as most important that such instruments should be produced in as large numbers as possible at the earliest possible date, and that they should be available to the public free of charge.

## THE AMENDMENTS

Turning to the amendments which had been accepted by the Government, Lord Jowitt said he hoped their Lordships would not take these as showing any weakening or lack of resolution or courage. On the contrary, he thought that the Minister had shown good sense and judgment in meeting the wishes of the House. The main part of the alterations had the effect of writing into the Bill undertakings given by the Minister. One illustration was the amendment dealing with the denominational hospitals, and he could give the assurance that the administration of the matter by the Minister would be in no niggardly or reluctant spirit. He was also glad that the Government had been able to hit upon a method of dealing with endowments which met the general wishes of the House. It did not interfere with the general principle that endowments were to be devoted to all hospitals, but it protected specific endowments intended for particular purposes. He thought it was also a good thing that the powers of the hospital management committee should have been set out in the way they now appeared in the Bill. He might be right or wrong, but personally he took the view that the position in regard to the discovery of documents had already been safeguarded.

Only one alteration of real substance had been made, that affecting the time between the appointed day and the passing of the Act, which might be as long as 18 months. The Minister had already arranged that after the appointed day endowments given to a particular hospital should not be taken away from that institution. That principle had now been extended to the interval of time directly after the Bill became an Act.

## TWO BLEMISHES

Lord Jowitt confessed that he thought the Bill had two blemishes. Their Lordships, in his view, were wrong

in saying that no part of a doctor's remuneration should be by way of salary. From his experience as Minister of National Insurance he realised that the success or failure of all these schemes depended largely on satisfactory certification. If there was lax or, still more, dishonest certification all these schemes would break on that rock. He had a profound regard for the medical profession, and for their standard of honour, but he had come across cases, not many, where there were two competing doctors, one strict and the other lax in their certification. The people on the panel of the strict doctor were inclined to leave him and go to the other doctor who was lax, not because the latter was a better doctor but because they could more easily get certificates. If the per capita payment had been abolished altogether, and there had been a straight out-and-out salary, that temptation would have gone. But he did not for a moment suggest that, because it would have brought in other troubles and would not have been practical politics. But to have given something in the way of salary would have been valuable, and he honestly believed that their Lordships had made a great mistake. The other blemish was the special treatment of London. It was a great pity that health services should be split between two authorities. For the rest, Lord Jowitt claimed that the Government had preserved the absolute right of choice of doctor. They were not going to force anybody to take a doctor he did not like. Nor was it their intention, as some nurses feared, to move people about in the regions. Anyone who had a contract to serve in a particular place could only be called on to serve there. Under this new health scheme there would still be great scope for voluntary service and he hoped that the passing of the Bill would not prevent such service from being forthcoming.

## SOME IMPROVEMENTS

Lord LLEWELIN thought that in their six days' work their Lordships had improved the Bill. One important change was that it had been made certain that a doctor—whether acting in an honorary capacity or not—who served on the staff of one hospital might get his patient admitted, or might even treat him in another hospital. Although Lord Llewellyn agreed that there should be a large hospital unit he hoped that the smaller hospitals in the country towns would not be closed, because they still had a useful function in attending to minor ailments which did not require the special treatment of the larger regional hospitals.

The amendments in regard to endowments would, he thought, allow of continuity of voluntary gifts, and maintain the continuity of memory when a gift was made for a specific purpose. The words "control and manage" now inserted into the Bill gave the hospital management committees a better function, and it was, Lord Llewellyn held, important that these bodies should not represent mere titles but should have obvious powers. He hoped the amendment making these committees capable of suing and of being sued would become part of the Bill. He was also grateful for the assurances given that doctors would have adequate notice of the conditions of service before the appointed day, and that in a proper case a relative should be given a reasonable chance of succeeding to a practice.

There was, he felt, much to be said for the Minister having the last word whether a doctor should continue in the service. But he thought the Bill had been improved by strengthening the doctor's rights before the tribunals.

## THE CAPITATION FEE

His amendment in regard to the doctor's remuneration, Lord Llewellyn pointed out, left exceptional cases to be dealt with by salary and capitation fee. It had never yet been stated what, in the new service, would be the normal proportion between salary and capitation

fee. If the Government did not see their way to accept the Lords' amendment they should say what proportion they had in mind. There were obvious things to be said against the capitation fee if it meant doctors taking on more patients than they could properly handle, or getting patients because they were slightly lax in giving certificates. But by and large it was undesirable to take away from doctors the sense of energy and hard work, and part of that depended upon their being able to attract patients by giving good service.

The Marquess of READING agreed with the Lord Chancellor in thinking that the amendment establishing payment for doctors purely by capitation fees was a blemish on the measure. He hoped that method of payment would not be eventually embodied in the Bill.

Lord BALFOUR of BURLEIGH said it would be a tribute to the good sense and judgment of the Minister if he saw fit to accept the amendment inserted in the Bill in regard to the London boroughs and their health services. The two major objectives of the amendment were to maintain the high quality of the maternity and child-welfare services in the boroughs, and to cease the process of undermining the quality of local government in the whole of the metropolitan boroughs. Both would be in serious danger if that amendment was not allowed to remain in the Bill. If the services were transferred to the L.C.C. the personal touch would be lost.

The Bill was read the third time with the amendments, passed, and returned to the Commons.

#### The Lords' Amendments in the Commons

On Nov. 4 the House of Commons met to consider the amendments made to the National Health Service Bill in the House of Lords.

##### FUNCTIONS OF THE METROPOLITAN BOROUGHS

In moving that "this House doth disagree with the Lords" in the amendment permitting the transfer of some health services from the London County Council to the metropolitan boroughs, Mr. C. S. KEY pointed out that it destroyed the co-ordination of the personal health services in London. The amendment would make a serious break in child-welfare work; for the care of the over-fives and of the under-fives in the nursery schools would go to the L.C.C., while the care of the under-fives at the day nurseries would be under the borough council. Prenatal and postnatal services would come under the boroughs, but it would be the L.C.C.'s responsibility to provide the midwives and maternity nurses. Again the borough councils would have to provide home nursing and domestic help in cases of illness, but preventive and aftercare services would still be dealt with by the L.C.C. The amendment gave the borough councils power to maintain maternity and child-welfare centres, but left with the L.C.C. the development of the health centres. The Bill aimed at setting up common health centres where there could be common knowledge among the people serving of each particular case. The unified service set up by the Bill would mean that a service of common standards would be provided for all areas in London irrespective of their poverty or wealth, whereas the amendment laid down that half of the cost of the services was to be provided by the borough council. As a Londoner he was proud to ask the House in the interests of London to disagree with the Lords in their amendment.

Mr. R. LAW argued that the principles of absolute uniformity did not run all through the Bill itself. Expectant mothers and health centres, for example, both came under several authorities. If there was anything in this argument it was that the whole Bill and not this amendment by itself was unworkable. Mr. SOMERVILLE HASTINGS thought the amendment would at least have been intelligible if it transferred all the health functions to the borough councils. As it was it would merely increase the number of health authorities

in London from three to four. Under the Bill the L.C.C. was to be the authority for health centres, and he was sure it was the Minister's intention to associate all the doctors in the new service with the prevention of disease. One way was to get them to work in health centres where the preventive services were being carried out in closest contact with health visitors, maternity and child-welfare clinics, and home nursing services. Yet the amendment wanted to put these services under the borough councils which would have nothing to do with the health centres, and would indeed have power to provide separate premises for their services. The amendment would thus separate more than was necessary the preventive and curative sides of the treatment of disease.

Mr. BEVAN described the discussion which followed as a fairly long one during which nothing new was heard. He pointed out that the amendment would give rise to as many anomalies as it sought to correct, for the anomalies were inherent in our local-government structure. Harrow, for example, had a population of 211,000, but the withers of the Opposition remained unwarped, though they were speechless with indignation about Holborn with a population of 22,000. He agreed that the accessibility of the local authority to the population was of the utmost importance, but in future the citizen who was in difficulty about his health would go to the health centre and not to the town hall. At the centre he could have all his wants attended to in the same place by the same organisation. These schemes had been carefully integrated and Mr. Bevan felt bound to pray of the House not to make a radical alteration at that stage.

The amendment was negatived by 296 votes to 134.

##### BASIC SALARY

Mr. BEVAN resisted the Lords' amendment that the remuneration of general practitioners under the new scheme should normally be by capitation fee. He had heard arguments for and against the basic salary but he had never yet heard an argument why it should be put in the Bill. It was not desirable for future negotiations with the medical profession to start with a statutory inhibition. He therefore seriously suggested to Members in all parts of the House that whatever their views about having a basic element in the remuneration they should not insist upon its going into the Bill but should leave it open.

He was not seeking to escape a discussion of the main issue, but he wished to face it forthrightly. By the abolition of the sale of practices the young doctor had been delivered from the hands of the moneylenders, but he had not been provided with a positive means of livelihood. It was therefore the Government's intention that while the young general practitioner was building up his list he should have the security of a salary. He could not accept the view that a doctor examined his patients any better if his heart was gnawed with financial anxiety. A basic salary would reduce competition for patients, and the build-up of panel lists had not always been done by methods which commended themselves to the best elements of the medical profession. Another reason in favour of a basic salary was that the remuneration of a doctor should contain an element to which inducements for special training and qualifications could be added. It had been suggested that they could add to the capitation fee, but that would be very untidy and almost impossible.

Some doctors feared that this was the beginning of a full-time salaried service. Mr. Bevan said he could not read into the mind of any future Minister, but that was not his own intention. The Government intended that the main source of a doctor's remuneration should be by capitation, and for excellent reasons. There was an argument for having a full-time salaried service; there was an argument for having full capitation; but there was no argument for having a high basic salary

and a small capitation, because the higher the basic element the more it became concealed capitation; for after the lists had reached the point where they absorbed the basic element, it was merely another form of capitation payment. If the basic element was too high they would find it difficult to carry out the recommendations of the Spens report. If the basic salary was too high obviously the capitation-rate would have to be lower, and the higher salaries recommended for successful general practitioners could not be achieved without unduly large lists. The fears of the medical profession were unfounded, and Mr. Bevan reaffirmed that it was not proposed that the basic element should be the main part of the remuneration.

Mr. J. S. C. REID declared that the Minister's calming assurances had no value unless Labour Party policy had been altered in the last three or four months. No-one suggested that there should not be a salary in areas of scattered population or that there could not be a fixed small payment for special qualifications. At present the medical profession were free and independent because the majority of doctors were free and independent. But as soon as the majority received a salary he believed the atmosphere would change. Mr. C. H. GAGE said that the medical profession had many great things to offer—integrity, high standards, and ideals. But it did not at present offer a sheltered and secure life. In that lay its strength. If the Minister gave it security he might take away something which was far more valuable—its high standards.

Sir HENRY MORRIS-JONES thought that if the capitation system was adopted the medical profession would be much more inclined to look favourably at the scheme. The salary basis would reduce the whole thing to a dull level of uniformity and the profession would lose the colour and characteristics which are the foundation of medicine. Dr. S. SEGAL doubted whether insecurity was always an incentive. Some doctors born into this world in a state of security were able to specialise. He hoped the Bill would ensure that other deserving elements of the community would not be deprived of their chance because of lack of security. The necessary corollary of the Minister's stand on the basic salary was that the State should make provision for the best students not only to qualify as doctors but also to have the opportunity of doing postgraduate work and research. He was convinced that in years to come the medical profession would see that it was in their own interests that part of their remuneration should be by basic salary. The amendment was negatived by 303 votes to 128.

The reasons for disagreeing with certain of the Lords' amendments were reported, and it was agreed to communicate them to the Upper House.

#### FROM THE PRESS GALLERY

##### Christian Science Nurses

On Oct. 29 in the House of Lords Viscount ASTOR moved to annul the Nurses Amendment Regulation made under the Nurses Act, 1943. A similar motion brought forward by Mr. Alfred Edwards was negatived in the Commons on Oct. 14.<sup>1</sup> Christian Science nurses, Lord Astor explained, were not taught the medical side of nursing, but in general hygiene their training was not dissimilar. Christian Science treatment, he continued, was not illegal; it was recognised by the Public Health Act, 1936. If this regulation was not repealed we should have a law which would be difficult to enforce and which would savour of persecution and intolerance. Were these women to be fined or imprisoned because they used the title laid down in the constitution of their Church? The Christian Scientists, Lord Astor was authorised to say, would not object to any regulation making it illegal for Christian Science nurses to advertise by name-plate, in the Press, or in any general publication. But they

asked that they should be permitted to use the title Christian Science Nurses in their official publications and in the records of their Church.

Lord HORDER declared this was a matter of public policy. For some time an effort had been made, not unsuccessfully, to raise the status of nurses. There was now statutory recognition of two types of nurse—the "assistant nurse" and the State-registered nurse. They were being asked to recognise another category which they were assured would only advertise itself through the medium of particular journals. If they could accept an assurance—Lord Horder did not think they could—that those journals were confined to this particular religious body, there might perhaps be some sympathy with Lord Astor's motion. But it was common knowledge that the circulation of at least one of those Christian Science journals was large and universal, and on that ground Lord Horder did not think the safeguard for the nursing profession was adequate. Therefore he hoped that the motion would not receive their Lordships' support.

Lord LLEWELLIN doubted whether it would be possible to bring home to any British subject who was described as a Christian Science nurse in a paper published abroad that an offence under the Act had been committed.

Viscount ADDISON pointed out that Noble Lords must either approve or disapprove of regulations. They could not amend them. As to Lord Astor's compromise, it did not come into the matter, for we could not control what was printed in the newspapers of the United States. This was not a religious controversy, he continued. What mattered was to safeguard the interests of the nursing profession. In the view of the Government it was not right that any set of people who were not nurses, whatever their religious convictions, should describe themselves as nurses. People did not refer to Christian Science doctors or Methodist doctors. Doctors had a medical qualification and that was the test of their being entered on the Medical Register, and the same applied to nurses. The motion to annul the regulation was negatived by 55 votes to 11.

#### Dental Controversy

In the House of Commons on Oct. 25 Mr. JOHN BAIRD, I.D.S., pointed out that dental benefits for insured people were different from medical benefits, because the latter were compulsory while the former were paid only by those insurance societies which had surplus profits, and this inadequate method had always been accepted reluctantly by the dentists. During the war the Dental Benefit Council, which had on the whole functioned well, was in abeyance, and negotiations between the profession and the Ministry were carried on by an emergency committee. In 1944 a new scale of fees was agreed on, again reluctantly, by the dentists, and in 1945 uneasiness arose among them and unfortunately, in the South of England especially, many withheld their services from National Health Insurance. As a result, negotiations took place between the Ministry of Health, who were then responsible, and the leaders of the dental profession. The strike was called off and the Minister gave an undertaking that he would reconstitute the Dental Benefit Council and set up the Spens Committee to inquire into their future remuneration.

The present point at issue, Mr. Baird declared, was not chiefly the scale of fees but the method of negotiation between the profession and the Government. A long-established machinery was being turned down, and the Minister was imposing on the profession, without consultation, a scale of fees which was considerably lower than that suggested by the Dental Benefit Council. The Spens Committee could not report before the summer, and if this dispute was allowed to continue until then a running sore would be created which would be difficult to remove. The Government ought to establish negotiating machinery in which both sides could have confidence. Mr. Baird agreed that the aim should be to encourage people to conserve their teeth rather than have them extracted and replaced by dentures, but many people had neglected their teeth, so that extraction and the fitting of dentures would continue for some years, and it was now impossible for a dentist to get a reasonable margin of profit for dentures provided under National

1. *Lancet*, Oct. 26, p. 621.

**Health Insurance.** He suggested that the Minister might give an undertaking that, if the Spens report showed that the present dental scale was inadequate, retrospective payments would be made from the time of this dispute.

**Mr. JAMES GRIFFITHS**, Minister of National Insurance, said the system of unequal benefits to insured persons was going, and ought to go. Whatever settlement was made now could only be temporary pending the introduction of the National Health Service scheme in 1948. In the meantime, Mr. Griffiths continued, he and the Minister of Health had to decide not what they thought the dentist ought to have but the scale of fees which the approved societies could meet. If there was not enough money to meet half the cost there could be no service. The approved societies had only a limited amount of money for this purpose, and it would cheat the insured people of this country if he as Minister approved a scale giving the dentists an increase in remuneration which the approved societies could not meet. He claimed that the Government were entitled to take the view that, apart from the fact that the acceptance of the suggested new scale would have meant a breakdown of the system, it involved such a radical departure from the old scale that it would prejudice the very issues which the Spens Committee had been appointed to investigate. It was in the interests of the dentists to rejoin the committee so that it might be able to go on with its work and report quickly. In 18 months the whole of the present system would go, and Mr. Griffiths would be glad to be one who pushed it out. But for the next 18 months he had the responsibility of seeing that the old system carried on, and anything he accepted was of no value unless the approved societies could work it.

### QUESTION TIME

#### Milk Distribution

**Sir HENRY MORRIS-JONES** asked the Minister of Food what was the total quantity of milk distributed per week to non-priority users and how much to priority users, stating the total amount for each category; and what was the average amount of milk per person bought, distributed, or consumed pre-war.—**Mr. JOHN STRACHEY** replied: The total weekly quantity of milk distributed to different categories of consumers cannot be precisely stated, but the total quantities authorised for non-priority users in Great Britain when the standard weekly allowance is 2 pints per week are approximately 9½ million gallons and for priority users approximately 10½ million gallons. The weekly quantities authorised for the different categories are as follows:

Non-priority		Gallons
Registered customers over 18 years .. .. .		7,300,000
Non-priority establishments—e.g., canteens, restaurants, groups of industrial, business, and clerical workers .. .. .		2,200,000
		9,500,000
Priority		
Registered customers under 5 years .. .. .		2,900,000
5 to 18 years .. .. .		3,300,000
Expectant mothers .. .. .		600,000
Mothers of children under 1 year .. .. .		300,000
Invalids suffering from conditions which qualify for extra milk .. .. .		1,300,000
Priority establishments—e.g., hospitals, schools, and milk-in-schools scheme .. .. .		2,100,000
		10,500,000

During September, when the non-priority allowance was 2 pints per week, the total amount of liquid milk actually distributed was 99·06 million gallons, or a weekly average of 23·114 million gallons.

For the years 1937 to 1939 inclusive the average weekly consumption of milk in England and Wales was 3·01 pints per head. For the year October, 1945, to September, 1946, the average consumption was 4·62 pints per head per week.

#### Approved Societies and Dental Benefit

**Sir WILLIAM DARLING** asked the Minister of National Insurance the total number of approved societies; the number paying dental benefit; and the total amount of funds hypothecated for dental benefit.—**Mr. T. STEELE** replied: The total number of approved societies and branches which constitute separate units for valuation purposes is about 6600; about 5000 of these have schemes of additional benefits which include dental benefit. The total annual allocation of funds for the provision of this benefit is approximately £2,400,000.

## Obituary

### WILFRID FOSTER VIRET

D.S.C., M.R.C.S.

Wilfrid Viret died at Bradford on Oct. 23 after a short illness. The second son of the late Dr. B. P. Viret, of Bradford, he was 36 years of age and was educated at the Bradford Grammar School, Leeds University, and University College Hospital. After qualifying in 1935 he was house-physician at Leeds General Infirmary and then took a short-service commission in the Royal Navy. He spent some years on the China Station, most of them in the river gunboat *H.M.S. Tern*. He saw something of the Sino-Japanese war and on a number of occasions attended civilian casualties after air-raids by the Japanese. Before his five years' term of service came to an end, war broke out in 1939 and he continued to serve in the Navy. In the early part of the war he was surgeon lieutenant in the destroyer *H.M.S. Vesper*, engaged in the Channel patrol, but later he was transferred to the cruiser *H.M.S. Aurora* and spent some years in the Mediterranean theatre of war. In 1944 he was awarded the Distinguished Service Cross for conspicuous bravery and devotion to duty.



On demobilisation last December Viret went into practice at Shipley, in Yorkshire, with his brother and sister-in-law. He bade fair to become the ideal family doctor, and was looking forward to a useful life in the English country to which he was devoted, his plans being divided between the Yorkshire Dales and Somerset. "A sturdy handsome man with a peculiarly deep resonant voice and a lively personality, his tastes were for simple things, good books and conversation, old furniture and glass. But above all he loved his home life, of which he had all too little during his ten years in the Royal Navy. He liked to potter about in a kitchen and cook unusual and tasty meals. His flair for cooking dated from boyhood, and at the age of nine he would cook the meals of his fellow wolf-cubs. His well-filled and alert mind caused him to write a clear and vigorous prose style, his letters from abroad being full of shrewd and witty observations of people, places, and affairs, illustrated often by thumbnail sketches characterised by economy of line."

In 1940 he married Penelope Mary Downes, and he leaves a son and daughter.

### STUART McDONALD

M.A., M.D. CAMB., PH.D. BIRM.

Prof. Stuart McDonald, jun., who died on Oct. 24 at the early age of 41, was one of the most brilliant of the younger pathologists.

The only son of Prof. Stuart McDonald, formerly professor of pathology at Durham, he was educated at Fettes and at Caius College, Cambridge, where he graduated B.A. in 1926. He received his clinical training at Edinburgh and Newcastle-upon-Tyne, qualifying in 1930. For the next four years he was demonstrator in pathology at Durham and assistant pathologist to the Royal Victoria Infirmary, Newcastle-upon-Tyne. In 1934 he went to Birmingham as senior lecturer in pathology and assistant pathologist to the General Hospital, and he was later appointed histologist to the Birmingham branch of the British Empire Cancer Campaign. Both at Durham and Birmingham he was actively engaged in research, as is shown by his many publications on a variety of subjects. He graduated M.D. in 1938, and the following year received the degree of PH.D. at Birmingham.

Always interested in military training, McDonald had received a commission in the Territorial Army in 1932, and for a time commanded the medical unit of Durham University s.r.c. In 1936 he was given the mobilisation appointment of deputy assistant director of pathology,

Shorncliffe Area, but in 1939 he was transferred, with the rank of major, to a Territorial Army hospital which had been formed in Birmingham. He was mobilised in August, 1939, and served as a pathologist in England, France, and India until August, 1943, when he became principal histopathologist to the new central laboratory for India Command, at Poona. In September, 1944, he was promoted to lieutenant-colonel on appointment as assistant director of pathology (research) at General Headquarters, India Command, Delhi. In this post he was responsible not only for an immense amount of routine work but for the initiation and administration of research in clinical pathology throughout India Command; under his charge eight research teams investigated problems concerned with scrub-typhus, amoebic dysentery and other protozoal diseases, penicillin and mepacrine therapy, and other subjects.

In October, 1945, he was inducted into the chair of pathology at St. Andrews University; but a few weeks later he fell ill and was ordered a long rest. Latterly his condition seemed to improve, and there was some prospect of his returning to duty.

Stuart McDonald was an outstanding teacher, with an unusual flair for stimulating the enthusiasm of his students, in whom he took a personal interest, sparing no effort to help them in their difficulties. His published papers and the many communications he made to scientific societies indicated his powers of exposition, and proved him to be a skilled and accurate observer, scrupulously attentive to detail and possessing a wide knowledge of his subject. He applied sound judgment to the interpretation of difficult cases, and his hospital work was much appreciated by his clinical colleagues. He was an enthusiastic angler and shot; he was, too, a good mixer, liked and respected by all who knew him. His sudden and unexpected death came as a great shock to his many friends.

He leaves a widow and two daughters.

#### SIDNEY DEANER

M.R.C.S.

Dr. Deaner, chief tuberculosis officer for Worcestershire, who died on Oct. 15 at the age of forty-two, qualified at St. Mary's Hospital in 1927. After a few valuable months spent in general practice he held house-appointments at the King Edward Memorial Hospital, Ealing, where he became interested in tuberculosis. He acquired further clinical and administrative experience at the South Wales Sanatorium, at Papworth, and in the Sheffield health department.

In 1932 he went to Worcestershire when the chief tuberculosis officer was Dr. Gordon Smith. Deaner gained his complete confidence and proved the ideal tuberculosis officer—enthusiastic, willing, and sympathetic, with never-failing courtesy, proud to be at the service of the patients and doctors of the county. When Gordon Smith died in 1939 there was no doubt who his successor should be, and Deaner was appointed to the position, which he held until his death. He loved hard work and had the organising ability and imagination necessary for progress; and it was on his advice that the council provided a unit for chest surgery at Knightwick Sanatorium, under the charge of Mr. Holmes Sellors. His popularity as a consultant was understandable, for he displayed the abilities of a general physician as well as those of a specialist in tuberculosis. At the beginning of the war Deaner and the other two county tuberculosis officers all wished to join the Services, but Deaner could not be spared. At once he started to train the central clerical staff in first-aid work, and later as detrainee officer at the Worcester railhead he directed a devoted and efficient band of stretcher-bearers who dealt with convoys of Service patients. He took a leading part in reviving the Midland tuberculosis group of the Society of Medical Officers of Health, and became its secretary. He was also secretary of the Worcester and Bromsgrove division of the B.M.A. Three years ago the first symptoms of a fatal disease appeared, but his courage and the love of his work never left him, and in his last months he struggled with Russian grammar in the hopes of becoming a translator of medical books.

"Sidney Deaner," writes a colleague, "was the perfect T.O. He knew the tuberculous families, their

homes, their work, and their difficulties; he helped plan their future. Much of his time was spent in the dispensaries, slums, and factories of the Black Country. Industrial diseases interested him immensely and he described silicosis amongst the Stourbridge clayminers. Robust, energetic, and stocky, with a straight back, and black curly hair, one recalls him on the terrace of Knightwick Sanatorium on the Ankerdine hillside with a bundle of tomograms selected for the next meeting of the clinical society. Here, overlooking his favourite Teme Valley, he delighted to be, and he was certain to have plenty of interesting cases to show to the doctor who sought his help. Happy are the memories he has left in Worcestershire."

He leaves a widow and a young son.

## Diary of the Week

NOV. 10 TO 16

### Monday, 11th

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1  
8.30 P.M. Dr. E. R. A. Merowether: Field of Research in Industrial Health.

### Tuesday, 12th

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1  
5.30 P.M. *Psychiatry*. Dr. H. Eysenck: Measurement of Personality.

### CHELSEA CLINICAL SOCIETY

6.30 P.M. (South Kensington Hotel, 41, Queen's Gate Terrace, S.W.7.) Mr. B. H. Burns, Mr. Charles Read, Dr. M. Bewley: Backache.

### LONDON SCHOOL OF DERMATOLOGY, 5, Lisle Street, W.C.2

5 P.M. Dr. H. Corsi: Diseases of the Nails.

### EDINBURGH POSTGRADUATE BOARD FOR MEDICINE

5 P.M. (Royal Infirmary.) Mr. Angus Sinclair: Interdependence of Biology and Other Branches of the Higher Learning.

### Wednesday, 13th

#### ROYAL SOCIETY OF MEDICINE

4.30 P.M. *Physical Medicine*. Sir Max Page: Uses of Physiotherapy in an Accident Service.

#### MEDICAL SOCIETY OF THE L.C.C. SERVICE

4.30 P.M. (County Hall, Westminster Bridge, S.E.1.) Dr. J. Alston, Dr. B. Young, Mr. M. Jemson: Penicillin in the Treatment of Disease.

#### ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1

3.30 P.M. Miss Barbara M. Duncum, D.Ph.: Popular History of Anesthesia.

### Thursday, 14th

#### UNIVERSITY OF LONDON

5 P.M. (University College, Gower Street, W.C.1.) Sir Joseph Barcroft, F.R.S.: Recent Work on Placental Transmission.

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

5 P.M. Sir Henrice Ogilvie: Surgical Handicraft. (Bradshaw lecture.)

#### ROYAL SOCIETY OF MEDICINE

5 P.M. *Ophthalmology*. Dr. Godtfredsen (Denmark), Mr. E. D. D. Davis: Eye Signs in Malignant Nasopharyngeal Tumours. Mr. F. W. Law: Ring Scotoma after Retrobulbar Neuritis. Cases will be shown.

#### PROVISIONAL NATIONAL COUNCIL FOR MENTAL HEALTH

10.30 A.M. (Caxton Hall, Westminster, S.W.1.) Conference on Mental Health: opening session. Dr. J. R. Rees: Application to the Civilian Population of War-time Experience of Neurosis and Backwardness in the Forces. Dr. T. F. Mahn: Employment of the Mentally and Emotionally Handicapped.

#### SOCIALIST MEDICAL ASSOCIATION

7.30 P.M. (296, Vauxhall Bridge Road, S.W.1.) Dr. F. R. G. Heaf: Social Aspects of Tuberculosis.

#### LONDON SCHOOL OF DERMATOLOGY

5 P.M. Dr. Sydney Thomson: Animal Diseases Communicable to Man.

### Friday, 15th

#### ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS, 58, Queen Anne Street, W.1

5 P.M. Dr. J. M. H. Campbell: Heart in Pregnancy.

#### ROYAL SOCIETY OF MEDICINE

8 P.M. *Obstetrics and Gynaecology*. Mr. Everard Williams, Mr. Terence Millin: Stress Incontinence in Micturition.

8 P.M. *Radiology*. Miss M. S. Cripps, Miss Baker, Dr. Freund, Dr. N. S. Finzi: X-ray Treatment of Inflammatory Diseases.

#### FACULTY OF RADIOLOGISTS

2.30 P.M. (Royal College of Surgeons.) Sir Gordon Gordon-Taylor: Malignant Tumours of the Testicle. (Skinner lecture.)

#### TUBERCULOSIS ASSOCIATION

3.15 P.M. (26, Portland Place, W.1.) Dr. J. F. Brallsford: Technique and Standardisation of Radiographs of the Chest.  
5.15 P.M. Dr. G. S. Todd, Dr. David Anderson: Chest Diseases and Flying.

#### WEST LONDON MEDICO-CHIRURGICAL SOCIETY

8 P.M. (West London Hospital.) Clinic-pathological meeting.

#### LONDON CHEST HOSPITAL, Victoria Park, E.2

5 P.M. Dr. Shirley Smith: Heart in Pulmonary Disease.

## News

## University of Edinburgh

On Oct. 26 the following diplomas were granted :

*D.P.H.*—L. S. Anderson, H. A. Barker, A. D. C. S. Cameron, K. H. Cheung, P. S. Clouston, W. W. Hutton, R. S. Kennedy, R. I. S. Lewis, D. I. McCallum, David McGowan, J. M. Nair, W. G. Pollard, K. D. G. Reid, D. S. F. Robertson, Bernard Snell, Daniel Thompson (all in absentia); Edward Campbell, J. R. Gray, G. A. Lowe, Isobel P. MacKenzie, Richard Scott, J. E. Simpson, John Sleigh.

*D.M.R.*—Norman Saks and A. C. P. D. Thomson (in absentia); Peter Aitken, Margaret D. Cameron, J. C. Wood.

## University of Glasgow

On Oct. 26 the following degrees were conferred :

*M.D.*—G. L. Montgomery (with honours), Joseph Spears, A. C. Stevenson.

## Royal College of Physicians of London

At a comitia of the college held on Oct. 31, with Lord Moran, the president, in the chair, it was agreed that an International Congress of Medicine should be held in September, 1947. It was also decided that there should be an organisation of the members of the college with provision for meetings and the election of two representative members to serve on the council.

Sir Archibald Gray, Dr. Macdonald Critchley, Sir Lionel Whitby, Dr. A. A. Moncrieff, and Dr. Janet Aitken were elected councillors. The following were elected representatives of the college :

Dr. C. M. Hinds Howell on the committee of management of the Conjoint Board; Dr. F. S. Langmead on the Central Midwives Board; the President, Sir Leonard Parsons, Dr. H. E. A. Boldero, Dr. W. G. Barnard, and Sir Allen Daley on the standing joint committee of the three Royal Colleges; Dr. Hinds Howell, Dr. M. E. Shaw, Dr. J. B. Harman, and Dr. J. C. Hawksley on the Committee of Reference; Dr. Hinds Howell and Dr. Harman on the Central Medical War Committee.

Dr. G. S. Wilson was appointed Milroy lecturer for 1948, his subject being the History, Design, and Purpose of the National Public Health Laboratory Service.

The following having satisfied the censors' board were elected to the membership :

R. R. Andrew, M.D. Melb., Docteur Antonius Docteur, M.B. Cairo, J. P. Baird, M.B. Edin., major R.A.M.C., Margaret R. Becklake, M.B. Witwarsand, J. P. Bolton Carter, M.B. Camb., A. S. V. Burgen, M.B. Lond., A. D. Charters, M.D. Camb., Sujata Chaudhuri, M.B. Punjab, C. J. M. Clark, M.B. Lond., Patrick Corridan, M.B. N.C.I., P. J. N. Cox, B.M. Oxf., W. S. McR. Craig, M.D. Edin., J. P. Crawford, L.R.C.P., F. E. Crawley, M.D. Glasg., F. W. Dickson, M.B. Glasg., K. W. Donald, D.S.C., M.D. Camb., R. G. Evans, M.B.E., M.B. Lond., Mary Farquharson, M.B. Camb., Richard Fletcher, M.B. Camb., Sydney Grievie, M.B. Witwarsand, L. G. Hannah, M.B. N.Z., J. N. Harris-Jones, M.B. Lond., A. I. Harrison, M.B. Lond., B. E. Heard, M.B. Wales, M. S. R. Hunt, M.B. Lond., R. J. Isaac, L.R.C.P., A. H. James, B.M. Oxf., Brian Lees, L.R.C.P., M. I. Levin, M.B. Witwarsand, R. B. Lucas, M.D. Edin., Joseph Luder, M.B. Lond., D. H. Makinson, M.B. Camb., flight-lieutenant R.A.F.V.R., R. B. Martin, M.D. Durh., A. N. T. Menezes, M.B. Lond., lieutenant-colonel R.A.M.C., G. El D. Nor el Din, M.D. Cairo, B. D. Patel, M.B. Lond., P. D. Samman, M.B. Camb., Isidore Schrire, M.B. Cape Town, Esther E. Simpson, M.B. Lond., Jean V. Simpson, M.B. Lond., A. J. Singh, M.D. Punjab, B. C. Sinha, M.B. Calcutta, Y. G. Sofer, M.B. Lond., G. S. C. Sowry, M.B. Lond., C. A. Storr, M.B. Camb., G. B. Stratton, L.R.C.P., W. St. C. Symmers, M.B. Belf., Michael Symons, M.B. Camb., R. B. Terry, M.B. Lond., A. J. Thomas, M.B. Wales, John Wallace-Owen, M.B. Camb., C. E. Van Rooyen, M.D. Edin. (in absentia), R. P. Wain, M.D. Leeds, A. G. W. Whitfield, M.B. Birm., A. W. Williams, M.D. Camb., D. I. Williams, M.B. Lond., G. M. Wilson, M.B. Edin., Lionel Wolman, M.D. Camb., Charles Zabra Neumann, M.D. Malta.

Licences to practise were conferred upon the following 114 candidates (92 men and 22 women) who have passed the final examination of the Conjoint Board and have complied with the by-laws of the college :

Ruth A. Ainsworth, T. W. Backhouse, W. O. Backus, P. T. Ballantyne, P. J. Banks, B. W. Barris, J. H. Beaton, R. W. Bell, P. L. Berger, P. G. Bevan, I. A. Blackmore, R. W. Booth, R. W. A. Bottoms, W. I. H. Bourne, L. W. Bowen, P. A. Boxall, Thomas Brandl, D. S. N. Brierley, F. B. Briggs, M. H. Brook, Brenda M. Buck, P. J. Burdon, Yvonne B. Capon, Sybil C. Capper-Johnson, P. J. Chapman, Patricia Chippindale, H. E. Christensen, L. W. Clarke, P. W. Clements, R. A. Cocks, J. F. Cozan, W. A. D. Combe, A. T. Cook, D. C. Cooke, H. S. Couling, Mary Creevey, Thomas Crisp, D. W. J. Cullingford, Hans Dasch, A. J. A. Dawes, R. A. Dawes, K. R. Dempster, H. D. Eastham, W. McC. Edgar, G. B. Elliott, Kathleen A. Elliott, Audrey T. Evans, I. A. Fainer, James Fairlie, Joyce Faulkner, M. E. Fearnley, E. C. Fleming, Leslie Ford, R. H. Fox, H. H. Frank, Margaret A. Gee, J. H. H. Gibbon, A. W. Goffman, Jean F. Gordon, W. V. Graham, G. J. Hadfield, A. A. Hall, P. S. Hall, J. L. Harris, J. B. Hearn, Erica W. Higgins, A. H. Hollings, K. D. Hopkirk, P. K. Hopper, R. F. H. Horn, B. B. Jakeman, J. L. Jenman, Gwyneth M. V. Johns, R. I. Johns, F. D. Kay, I. A. Kellock, R. H. Lake, B. H. Lees, J. R. Leslie, H. M. Lyons, H. G. Mather, D. McI. Maxwell, P. R. H. Molesworth, Nesta G. Morgan, G. C. Morse, J. E. Owen, Sheila M. Parker, Alice M. Pendlrill, J. H. S. Perrett, T. L. Pilkington, N. C. D. Pizey, P. N. Porritt, Eva M. Raybould, B. F. Richards, D. A. Richards, Betty Scroter,

Stanislas Silbermann, Morris Silverberg, J. P. A. M. Skene, Gwendolen D. Smith, Margaret T. Smith, Patricia E. Smith, M. J. Squires, B. H. Storey, Michael Strode, Wilfrid Wagland, Hubert Walters, L. G. R. Wand, G. B. B. White, A. MacK. Whittington, K. L. Williams, P. H. Williams, T. B. Williamson, Audrey J. Worman.

Diplomas were conferred jointly with the Royal College of Surgeons on those named in THE LANCET of Oct. 19 (p. 585), and on the following :

*D.C.H.*—H. G. Farquhar, Erich Kahn, Margaret Munro, A. M. Young.

*D.M.R.-T.*—Sydney Curwen, R. F. Hendtlass, C. L. Lewis, T. McK. Robb, W. R. Ward.

*D.M.R.-D.*—John Aspin, R. F. Ashwin, A. T. Aylmer, W. M. Forster, Sidney Haase, H. A. R. Hamilton, W. S. Holden, F. L. Ingram, S. J. Johnson, A. M. Jones, D. R. Maitland, J. H. Middlemiss, K. D. F. Morle, E. H. Mucklow, Cecil Pickard, R. A. Reynolds, W. H. T. Shepherd, Theodore Stephanides, G. H. Thomas, M. R. Tomlinson, H. J. Trenchard, Peter Watts, W. J. R. Wyness.

## Royal College of Obstetricians and Gynaecologists

At a recent examination for the D.R.C.O.G. the following were successful :

T. M. Abbas, J. S. Astbury, R. H. O. Bannerman, Alan Barker, A. P. Bates, T. C. Beard, A. V. G. Bibby, J. M. Bowen, Samuel Burke, D. J. Burnett, Diana Butler, P. H. Cardew, T. E. A. Carr, Betty J. Clymo, C. K. Cole, N. K. Crooke, T. K. Davies, Ruth M. Dearing, Janet M. Done, Kathleen A. D. Drury, R. C. Dwyer, C. T. F. Ealand, W. S. R. Fenton, Hugh Flack, Mary Francis, W. K. Frewen, Kamel Girgis, Mary E. Goodson, A. H. Grenz, G. E. R. Hamilton, Emily G. Hamlyn, J. R. Hassan, Lore M. Hasselacher-Traub, J. J. Hayward, Mary A. Hewett, Monica M. Hogben, F. L. E. Hugh-Musgrove, E. D. Hull, G. A. Humphreys, J. B. Joyce, Christine Kirby, T. H. Lawton, Constance G. Lee, Joan M. Levett, Kathleen V. Lodge, E. L. Loewenthal, Alison J. McNairn, Kathleen M. A. Millard, V. V. Mobile, J. A. O. Mulcahy, N. J. S. Nathan, A. D. Newsholme, Rosalind M. L. Nicol, J. M. Norman, R. T. Norman, Rachel Jacob, W. B. O'Brien, J. J. O'Donoghue, J. J. F. O'Sullivan, W. H. Phillipps, G. T. Pitts, G. E. Prendiville, R. W. K. Purser, Jean F. Ramsay, Mary J. Reading, J. S. Redfern, T. F. Redman, B. C. M. Reed, Edward Ridehalgh, F. L. Robertshaw, T. W. Roddie, J. V. Rose, Helen M. Russell, H. E. Rutherford, L. C. Rutter, J. A. Sadler, J. C. T. Sanctuary, Eleanor M. Sawdon, K. B. Scott, H. N. Skelton, Margaret E. A. Slater, S. A. Swanson, J. M. Thomas, R. R. Trussell, C. M. F. Walters, P. de S. Wijesekera, D. M. Wilkins, John Wills, B. W. Wood, M. R. Woods.

## Conjoint Board

Mr. Francis Stent has been appointed secretary to the board in succession to Mr. Horace Rew, who will retire on Nov. 30.

## Royal Faculty of Physicians and Surgeons

On Wednesday, Nov. 13, at 4 p.m., Dr. W. N. Pickles will deliver a lecture to the faculty at 242, St. Vincent Street, Glasgow. His subject is to be The Country Doctor.

## Scottish Conjoint Board

The following have been admitted licentiates of the Royal Colleges of Physicians and Surgeons of Edinburgh and the Royal Faculty of Physicians and Surgeons of Glasgow :

Flora S. Barry, Athelstan Blench, C. K. Brown, P. A. Clarke, E. D. Cloughley, Thomas Corrie, Hilda M. Davies, Harry Fernbach, John Hamilton, Phaik-lin Lim, P. A. R. Lornie, Anna Majlisz, F. R. Moreland, John McLaughlin, J. A. Pool, E. W. Russell, Richard Short, Edward Silverstone, H. J. Stott, P. J. Vertannes, D. T. Wilson, Julius Zucker.

## Provisional National Council for Mental Health

A conference on Mental Health is to be held at Caxton Hall, London, S.W.1, on Thursday and Friday, Nov. 14 and 15. On the first day there will be an opening address, at 10.30 a.m., by Sir Otto Niemeyer, chairman of the provisional council, and lectures by Dr. J. R. Rees on the Application to the Civilian Population of War-time Experience of Neurosis and Backwardness in the Forces, and by Dr. T. F. Main on the Employment of the Mentally and Emotionally Handicapped. At the afternoon session, beginning at 2.30 p.m., Mr. Aneurin Bevan, the Minister of Health, will give a short address, and Prof. A. J. Lewis will speak on Community Care in relation to the extended powers of health authorities under the new National Health Service Bill. At 10.30 a.m. on the second day, the Care of the Homeless Child will be discussed by Miss Lucy G. Fildes, Ph.D., who will be followed by Miss Margery Fry, speaking on Juvenile Delinquency; in the last session, starting at 2.30 p.m., Miss Norah Gibbs will lecture on the Integration of the Psychological Services under the new Education Act, and Dr. John Bowlby on the Future Role of the Child Guidance Clinic in Education and Other Services. The conference will mark the inauguration of the National Association of Mental Health (Inc.), which has been formed by the amalgamation of the Central Association for Mental Welfare, the Child Guidance Council, and the National Council for Mental Hygiene.

**Association of Plastic Surgeons**

The meeting to inaugurate this association, at the Royal College of Surgeons on Wednesday, Nov. 20, at 5 p.m., will be followed by a dinner at the college. Those wishing to attend the dinner should notify the secretary, Sir Harold Gillies, 149, Harley Street, London, W.1.

**Genetical Society**

A public lecture will be delivered at the London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1, at 5 p.m., on Friday, Nov. 22, by Prof. Tage Kemp, director of the University Institute of Human Heredity, Copenhagen, who will speak on Multiple Factors in Morbid Inheritance; a film, the Fat Dwarf, will be shown.

**Socialist Medical Association**

The following lectures will be given at 296, Vauxhall Bridge Road, S.W.1, on Thursdays, at 7.30 p.m.: Nov. 14, Dr. F. R. G. Heaf, Social Aspects of Tuberculosis; Nov. 28, Dr. F. Avery Jones, Social Aspects of Peptic Ulcer; Dec. 12, Dr. J. Tylor Fox, Social Aspects of Epilepsy; Jan. 2, Dr. A. T. M. Wilson, Social Aspects of Medical Psychology; Jan. 16, Dr. J. N. Morris, Social Aspects of Juvenile Rheumatism; and Jan. 30, Dr. H. Joules, Occupational Hazards of the Health Worker.

**Association of Anæsthetists**

On Oct. 31 the Association of Anæsthetists of Great Britain and Ireland celebrated the centenary of anæsthesia by holding a dinner in the great hall of Lincoln's Inn. Sir Alfred Webb-Johnson, F.R.C.S., said that the achievements of British medicine in the past hundred years made up one of the brightest constellations in the history of this country. The early work on anæsthesia formed a sort of prologue to the development of antiseptics, X rays, radium, bacteriology, vitamins, and hormones. Anæsthetists might well feel what Oliver Wendell Holmes called "a noble satisfaction" in steering their patients through some of the most critical situations of life. They were right to insist on their status, which was that of a practical practising physician, administering drugs of great potency, and assessing the fitness of patients to receive them. They were also practical common-sense people who had established their headquarters in Lincoln's Inn Fields. Dr. A. D. Marston, the president, said that anæsthetists had much to gain from other specialties and from combined operations against disease. But they also had their autonomous moments and were expanding their sphere, and he was glad to see that Birmingham had led the way by putting an anæsthetist in charge of resuscitation and the treatment of shock. Not so long ago the British Medical Association held that every general practitioner's knapsack held a bottle of chloroform which might be used at any time for any operation; but the B.M.A. now recognised the value of the specialist anæsthetist and had acceded to a request from 400 members to form an anæsthetists' group. Replying to Dr. John Gillies's toast of The Guests, Dr. Charles Hill, secretary of the B.M.A., feared lest the bottle of chloroform in the practitioner's knapsack might be replaced by a mass of printed forms to be completed in triplicate. Commenting on reports of a recent speech by Mr. Bevan to medical students, he concluded a topical rejoinder by remarking that the Minister needed no guidance in using the chloroform which comforts, the ether which irritates, or the curare which induces muscular relaxation. Dr. Wesley Bourne, of Montreal, bringing greetings from Canada and the United States, pointed out that, in commemorating the early anæsthetists, we should properly go back to the philosophers of chemistry—Priestley, Davy, Lavoisier, Faraday—by whom man has ever since been kept on tiptoe. He quoted Paget's saying that the fault in specialisation lies not in narrowness but in shallowness and a sense of self-sufficiency. Dr. Murchi, of Copenhagen, also responded as a guest. Finally, Dr. Z. Mennell said that, as every anæsthetist knows, what counts is the man behind the machine; and the president's health was drunk with musical honours.

*Corrigenda.*—In our annotation on Training in Child Welfare (*Lancet*, Oct. 26, p. 608) we stated that the National Nursery Certificate is planned for girls between 14 and 16 years of age. Actually it is planned for girls between 15 and 17, and the age is to be raised to 16–18 as soon as possible.

An annotation last week on Cancer of the Corpus Uteri quoted Professor Heyman as saying that in reported series of cases treated by hysterectomy he had found a relative five-year survival-rate of 40–50%. The percentage should have been stated as 48–55.

**Appointments**

- BECK, A., M.D. Frankfurt, L.R.C.P.E.: pathologist, North-Western Hospital, Hampstead.  
 BOWYER, H. W., M.D. Glasg.: assistant physician to outpatients, Bolton Royal Infirmary.  
 HERVEY, W. A., F.R.C.S.E.: otorhinolaryngologist, Queen Mary's Hospital for the East End, London.  
**London Hospital, Whitechapel:**  
 BOWEN-DAVIES, A., M.B. Camb., F.R.C.S.: assistant surgeon to aural department.  
 PERRY, K. M. A., M.D. Camb., M.R.O.P.: assistant physician.  
 THOMPSON, V. C., M.B. Lond., F.R.C.S.: assistant surgeon to thoracic department.  
 VAUGHAN-JACKSON, O. J., B.M. Oxid, F.R.C.S.: assistant surgeon to orthopedic and accident department.  
**Hampstead General and North-West London Hospital:**  
 ENZER, J., M.R.C.S.: physiotherapist.  
 HINDENACH, J. C. R., M.D. N.Z., F.R.C.S.: orthopedic and fracture surgeon.  
**Middlesex County Council:**  
 DISCOMBE, G., B.Sc., M.B. Lond.: pathologist, Central Middlesex County Hospital.  
 HELLER, R., M.D. Rome and Vienna: tuberculosis medical officer.  
 MCQUISTON, T. A. C., M.D. Belf.: tuberculosis medical officer.  
 MEYER, B. U., M.B. Lond., D.C.H.: assistant tuberculosis officer.  
 ROBINSON, C. A., M.B. Camb., D.M.R.E.: consulting electro-therapist, West Middlesex County Hospital.  
 STEWART, C. J., M.B. Lond., D.R.C.O.G.: assistant tuberculosis officer.  
 STRADLING, P., M.B. Lond.: assistant tuberculosis officer.  
 TRENCHARD, H. J., M.B. Birm., M.R.C.P.: tuberculosis medical officer.  
**Colonial Service:**  
 COSGROVE, P. C., M.B. Dubl., M.R.C.P.I., D.T.M.: specialist (physician), Sierra Leone.  
 DA COSTA, A. B., M.B. Edin.: district medical officer, St. Vincent, Windward Islands.  
 FOLEY, E. J., M.B. Lpool, D.P.M.: specialist (psychiatrist), Tanganyika.  
 FORSTER, E. F. B., M.B. Dubl.: African medical officer, Gambia.  
 FOSKETT, D., M.B. Camb.: medical officer, Kenya.  
 FREEMAN, D. E., M.B. N.U.I.: medical officer, grade II, British Solomon Islands Protectorate.  
 HOLLINS, F. R. T., M.B. Dubl.: medical officer, grade II, Fiji.  
 HOLUB, Z. C., M.D.: medical officer, Aden.  
 HOWAT, T. K., M.B. Glasg.: medical officer, Gold Coast.  
 HUTTON, P. W., M.B. Camb., M.R.C.P., D.T.M. & H.: physician specialist, Uganda.  
 LAMBERT, M. A., M.B.: medical officer, Leeward Islands.  
 LANGFORD, C. C., M.B. Dubl.: medical officer, Uganda.  
 MCSHINE, A. D., M.R.C.S.: medical officer, grade C, Trinidad.  
 MERRY, C. H., M.R.C.S.: medical officer, grade C, Trinidad.  
 NICOL, B. M., M.B. Aberd.: medical officer, Nigeria.  
 OWEN, G. A., M.R.C.S.: medical officer, Gold Coast.  
 PETRIE, W. O., M.B. Edin.: medical officer, Nyasaland.  
 READ, M. T., M.C., M.R.C.S.: medical officer, Malaya.  
 RICHARDSON, R. K., L.R.C.P.E.: medical officer, grade C, Trinidad.  
 ROBINSON, W. L., M.B. Belf.: resident surgeon, Windward Islands.  
 RUSSELL, H. B. L., M.R.C.S.: medical officer, Gold Coast.  
 SMALL, T. M., L.R.C.P.E., D.P.H.: medical officer of health, grade B, Trinidad.  
 SMITH, R. B. S., M.B. Durh., D.T.M., D.T.H.: senior medical officer, Northern Rhodesia.  
 VAN DE LINDE, P. A. M., M.B. Lond.: medical officer, Hong-Kong.

**Births, Marriages, and Deaths****BIRTHS**

- JAMIESON.—On Oct. 24, at Edinburgh, the wife of Dr. J. M. M. Jamieson—a daughter.  
 McDOWALL.—On Oct. 30, at Emsworth, Hants, the wife of Dr. E. B. McDowall—a daughter.  
 PRICE.—On Oct. 30, at Oxford, to Dr. Celia Westropp, the wife of Mr. Francis Price—a son.  
 STRONG.—On Oct. 27, at Liverpool, the wife of Dr. John Strong—a daughter.  
 STUART-HARRIS.—On Nov. 2, at Sheffield, the wife of Prof. C. H. Stuart-Harris, F.R.C.P.—a daughter.  
 THOMPSON.—On Oct. 25, at Horsham, the wife of Dr. F. A. Thompson—a son.

**MARRIAGES**

- BROOKS-BLAGG.—On Oct. 31, at Car-Colston, Notts, Geoffrey O. Brooks, G.M., M.C., M.B., to Ursula Grace Blagg.  
 GRIFFIN-JORGENSEN.—On Oct. 26, at Chislehurst, Gerald A. Griffin, M.R.C.S., to Thelma Doreen Jorgensen.

**DEATHS**

- BARNETT.—At Dunedin, New Zealand, Sir Louis Edward Barnett, C.M.G., M.D. Edin., F.R.C.S., emeritus professor of surgery in the University of Otago, aged 81.  
 CROFT.—On Oct. 31, at Nuneaton, John Thomas Herbert Croft, M.R.C.S.  
 HALSTED.—On Oct. 29, at Selsey, Sussex, Harold Cecil Halsted, M.D. Durh., aged 84.  
 HIRD.—On Oct. 30, at Wimbledon, Frederick Robert Hird, M.R.C.S.  
 MCKENDRICK.—On Oct. 31, at Glasgow, John Souttar McKendrick, M.D. Glasg., F.R.F.P.S., F.R.S.E., aged 72.  
 MILLIGAN.—On Oct. 30, at Bournemouth, James Milligan, M.B. Durh., L.D.S. R.C.S.  
 THORNTON.—On Oct. 26, at Pretoria, Brigadier Sir Edward Newbury Thornton, K.B.E., V.D., M.R.C.S., D.P.H.  
 VAKIL.—On Oct. 23, in London, Chunilal Bhimabhai Vakil, M.R.C.S., aged 63.



OBSERVATIONS ON THE  
PSYCHOLOGY OF THE TUBERCULOUS\*GEORGE DAY  
M.A., M.D. Camb.RESIDENT PHYSICIAN, MUNDESLEY SANATORIUM, NORFOLK ;  
LATE CAPTAIN R.A.M.C.

THE material for this study is drawn from a rather specialised class of tuberculous patient. These patients, or their relations, are in a position to afford substantial fees for their sanatorium treatment. This buys them detailed and unhurried medical attention as well as rather luxurious amenities which they would not enjoy in a less expensive establishment. This specialised class does not, however, consist of the Idle Rich. The Idle Rich either does not get tuberculosis, or, if it does, takes it to Switzerland or the South of France. Our patients are mostly hard-working professional men and women, and are drawn from the Army, the Navy, the Church, and the Stage—barristers, doctors, schoolmasters, book-makers, business men, and their wives, sons, and daughters.

It is a special group in that the patients have not been subjected to the stresses and strains classically held to be responsible for pulmonary tuberculosis—malnutrition, overcrowding, bad working conditions, or exposure. By this standard there appears to be no excuse for their breakdown. Then why do they break down? Obviously because they have become infected by the tubercle bacillus (as we all do); but for some reasons their tissues are in a condition to give it a good home instead of destroying it or imprisoning it for life. Is it just by chance that their tissues are so hospitable?

In 1935 I noticed a striking thing. So often there emerged from the patient's recent history an unhappy love episode. Girls had been jilted, young men had got themselves engaged to the utterly wrong girl, and were in painful conflict realising it more or less consciously. This state of affairs seemed to be far commoner than chance would warrant. It looked as if the Victorian novelists had got hold of a little-understood truth when they portrayed their lovelorn heroines going into a decline.

Another puzzling aspect was that tuberculosis struck down young adults. Why? The physical body should surely then be at its prime. It is fully grown; metabolism is no longer concerned partially with growth and development but wholly with repair and replacement. Could the answer be that young adulthood is a time when emotional stresses reach their highest peak? In the group I am discussing it is a time for weaning from the family circle and the backing and security of the home. The men in particular have to stand on their own feet and accept the consequences of their choice, be it of helpmeet or lifework. It is a time of hopefulness, too much hopefulness perhaps; but it is a worrying time, indeed a frightening and suicidal time for some.

As time went on I found I could extract relevant facts from an increasing proportion of patients—it increased from about 5% to nearly 50% as my shyness wore off and as I came to use dream analysis. And in 60% of these cases I could discern a very good reason why tuberculosis or some similar chronic incapacitation was necessary to them at that juncture. I could also see why it would continue to be necessary to them, unless something in their life-pattern suffered change. But it was disappointingly seldom that I was able to do anything to bring the change about.

So in 30% of the whole sanatorium population, I decided, the patient was sick in mind as well as body.

## CASE OF THE YOUNG DOCTOR

My first case is that of a young Irish doctor who developed pulmonary tuberculosis while doing a house-physician's job in the south of England.

Alan was a popular stocky little fellow—the bustling rigger-forward type—full of vitality, who rapidly became persona grata with everyone in the sanatorium. His lesions, however, failed to respond to treatment, and he was still on bed rest at the end of six months. An artificial pneumothorax was attempted, but it did not relax the cavity-containing zone, because there was an intractable adhesion holding it out. He had a three-month course of 'Sancorysin' injections without converting his sputum even temporarily. At the end of six months his general condition was good; he had gained lots of body-weight and looked and felt fighting fit, but his rectal temperature rose to 37.6° C (99.7° F) each evening; his sputum, though scanty, was still positive; his blood-sedimentation rate remained steadily higher than it should have been. His disease activity was in statu quo.

Then we crushed his phrenic nerve. It worked like a charm. His diaphragm rose and within a few days his temperature had dropped to normal limits. His B.S.R. dropped steadily and he became sputum-free. And then he awoke one morning with glove-and-stocking anaesthesia. Being a doctor he had diagnosed it himself before we could answer his bell, and we found him bellowing, "Why the hell have I got a conversion hysteria?" It was no good asking us. We didn't know. He started sweating almost continuously; he couldn't sleep; and by the end of the week he had shrunk a stone in weight.

Then one evening in a darkened room he told his story. He was a Roman Catholic, and his fiancée, who was an extremely nice girl, was also a Roman Catholic. But he was possessed, as it were, of two personalities, a saint who was a devout practising Roman Catholic and a sinner who wasn't; and they were not on speaking terms. The saint adored his beloved with religious fervour, but the sinner treated her differently. His fiancée was devoted to him, but was shamed at being forced to enjoy prenuptial bliss against her better inclinations. So their relationship became degraded in both their eyes, and they were pretty miserable though deeply in love with each other. I think it is significant that he took a house-job in the south of England—just about as far from Ireland as he could get.

Here he became involved with a nurse, developed the signs and symptoms of tuberculosis (with, he confessed, no little feeling of relief), and sped back to Ireland to his mother and his fiancée. He was not too easy there, and he again elected to cross large tracts of land and water to Mundesley, where he was happy, carefree, and well esteemed by his fellows. And now, when he showed signs of getting better of his tuberculosis, he himself gets very sick in spirit. It seemed obvious that he was not yet ready to re-enter the world from which tuberculosis had afforded him escape.

What seemed so odd to me was that he had never grouped all these phenomena in his own mind before; but then I suppose people don't. He *did* see it when it was pointed out to him, and he *did* see that the saint in him and the sinner in him had to be reconciled and come to terms and be atoned, if he wanted to become an integrated human being.

The next thing that happened was that he sent for his fiancée, confessed all, and was forgiven. He made a rapid and uninterrupted progress from then onwards.

Two years later I ran into him again, and he was simply crackling with good health. But I noticed he did not introduce me to the girl he had with him. I couldn't help wondering whether the saint hadn't mixed a little too freely with the sinner, and ended up like the young lady from Riga.

## FANTASIA

From a particular and completely unvarnished case-history I wish to turn to a blended version of several cases which had sufficient points in common for this

\* A paper read to the Northfield Psychiatric Society, Northfield Military Hospital, Birmingham, in November, 1944.

operation. Here is an extract from an article I published pseudonymously just before the war<sup>1</sup>:

"The most hopeless case is the one who exhibits what I call the 'Dornford Yates syndrome.' She (and it's nearly always a she) really believes that somewhere round the corner there exists such a world as that gifted writer portrays in his delirious fantasies: a world where women are worshipped from the crowns of their heads to their glittering insteps by clean-limbed leisured sportsmen with a taste for witty philandering; where every lawn is centuries old and every car a Rolls. It is a make-believe world we create whenever we put on evening dress and smoke cigars and behave a little above ourselves; but most of us accept the twopenny bus-ride back to reality with something like relief.

"The 'D.Y.S.' not only believes it exists, but that it is her rightful kingdom from which she is exiled for having been born to the wrong parents or having married the wrong husband. Cinderella's Prince Charming does not live up to premarital sample. Disabling illness of any kind provides an escape from reality into a world which matches her fantasy. On her admission to a nursing-home or sanatorium she enters her kingdom—or should I say queendom? Enthroned in bed she gains the power and the glory about which hitherto she has only been able to dream. Meticulous service she exacts from all who attend her, rewarding here with a gracious word, reproving there with queenly displeasure. Visitors, inquiries, gifts of flowers, and exciting negligées all heighten the illusion. Her rapid unpopularity among the other patients is, of course, rationalised. 'The other patients dislike me, my dear, simply because the doctors make rather a favourite of me,' confided a Queen Me to a newcomer (who went to the trouble of ascertaining if it were true!)—'I have never been so neglected in my life,' she once snapped at a giggling floor-maid, and added, skilfully avoiding understatement, 'but then at home I had seven servants.'—'Really, mum, would that be all together or one after another?' innocently asked the floor-maid; and was reported for impertinence.

"Reality has an uncomfortable way of breaking through the best fantasies, and, when it does, the time has come to move to another establishment, bearing horrific tales of the short-comings of the last one which forced the patient to abdicate.

"Now, the striking feature about cases of this kind is not that the disease runs a sluggish and protracted course, but that all attempts at adjuvant treatment seem doomed to meet with failure. Artificial pneumothoraces prove unselective; section of adhesions fails to close cavities; sanocrysin therapy provokes forbidding constitutional reactions. A malign Fate seems at work. A dramatic improvement once occurred when a husband's interest was found to be straying elsewhere. . . . But it might equally well have caused a dramatic decline, so it is not to be advocated. She is, after all, the victim of a disorder more intractable even than her tuberculosis, which is in comparison only a stage-property. She is perfectly adjusted to Being an Invalid, so why should she get well?"

#### PSYCHOLOGICAL ASSISTANCE

In general practice, having decided that an illness is functional and psychopathological in origin, one is faced with the problem—what is to be done about it? It is profoundly difficult to bring home to a patient one's conviction that he has within him a "black spot, not so big as a pin's head, but waiting to spread and destroy him in the fullness of time"—when the black spot is neither cancer nor tubercle but—Fear. Unless seriously distressed, patients in private practice are apt to take umbrage at the mere suggestion that they should undergo any systematic psychological treatment. It is an aspersions on their sanity. But delicate, difficult, and disagreeable as the task may prove, such a patient must have it brought home to him that he is sick at heart as well as in body, and that he can be helped to help himself. Before anything can be attempted he must become aware of a need for help and feel a genuine desire for it. Only then will he cooperate without doubts and misgivings.

Personally, I have found that dream analysis meets most situations, if you have the time; and in sanatorium

practice you have plenty of time. It starts off like playing a new game, but soon becomes more and more engrossing and deeper and deeper in its effect, and eventually the patient gets the knack of analysing his own dreams with the minimum of guidance. In fact he does all the work. When he gets tied up he asks for guidance, and in my happy experience at this stage your presence is almost purely catalytic. It doesn't matter what you say or suggest. If your suggestion misses the mark, it bounces off and is ignored. You have done no harm. But if you hit the gold, it "brings him up all standing and carries away his bob-stay"; or perhaps, better still, your suggestion is angrily repudiated, resisted, and rejected. But you have sown the seed, and it is only a matter of time before it flowers. Quite often a misunderstanding will ring the bell:

A discontented ex-patient, who was living alone in lodgings in the village (rather than go home to her mother, putting off the evil day), used to come up to see me twice a week. Her mother was her chief immediate problem. The mother was a deaf and dowdy earnest woman who rather disliked her darling daughter but did not know it. The darling daughter detested her mother, knew it, and gloried in it.

One day the girl was pouring out a long dream with her own running commentary, but my mind was elsewhere. The village amateur dramatic society, I knew, was about to start work—just the thing for her! Give her a chance to meet some people purposefully and not merely socially. She'd be able to give herself a much-needed rest for two or three evenings a week. Impulsively I blurted out, "Are you interested in amateur theatricals?" "I loathe amateur theatricals," she replied, "Why?" "All right, all right. Don't snap my head off. Nothing, nothing. Go on. I'm listening."

The next time she came to see me she said, "Sorry I was so dense. The penny didn't drop until next day. I know now why you asked me about amateur acting, you pig. It's perfectly true; I am dramatising myself the whole time. I never realised it before. What can I do about it? I find I'm doing it the whole time, blast you." For the first time she was completely natural.

And that is the way of it. Very often one's most cryptic utterances, which one could not explain or defend if challenged, may bear fruit. For whoever carries a question to the oracle on his lips also carries the answer in his heart. Shakespeare came very near it when he said:

"Our remedies oft in ourselves do lie  
Which we ascribe to Heaven."

He might have added "or to the doctor."

In my next case I used dream analysis and unearthed material I could not possibly have got any other way, for the patient was intelligent and intellectual and had an almost maddening amount of poise.

She had read more Freud than I had, and thought there was a tremendous lot in it—applied to other people. By his standards she judged herself to be pretty well all right. This patient was a doctor's wife and therefore had not been diagnosed until both her lungs had become pretty extensively excavated. She was treated with bilateral A.P.s, adhesions were cauterised on both sides, and from the viewpoint of pure lung-carpentry we achieved what we wanted. But she did not heal. She hung fire.

Her dreams showed clearly that her marriage was a failure—more, that it was in effect her wasting disease of which her tuberculosis was a somatic expression. She had never admitted that she was ill-mated, even to herself. Her husband, who had a touch of the Asiatic in his blood, was an expert and experienced love-maker. One moment he fascinated and terrified her by his ruthlessness, and the next could put on a "hurt small boy" act which never failed to arouse her motherly feelings. At every turn she was completely in his power and completely frustrated from being herself when he was about.

One dream I would like to relate without comment. She was fishing in clear deep water from the lower steps of a jetty, when suddenly a sort of Loch Ness monster reared its ugly head and rushed across the bay straight at her. She turned,

1. *Lancet*, 1939, 1, 1343.

screaming in terror, and fled up the steps to me, who was standing at the top, and awoke.

Eventually she decided to divorce her husband for cruelty, both mental and physical, for which she had a very good case, and her papers were sent in. Her tuberculosis which had hung fire all these months began to get better.

The case was defended and lasted three days. She had a gruelling time in the box, for her ruthless husband had left no sofa-cushion unturned in his search for letters of one sort or another with which to bolster up his counter-evidence. She came through well and won hands down.

After the decree nisi she was forced to have embarrassing dealings with her ex-husband concerning the welfare of their joint children, and her emotions towards him were rather confused. He was so charming, courteous, and considerate.

She continued to send me her dreams with her own interpretations for my comments. And this is the last one she sent me. She was fishing in deep clear water from the lower steps of a jetty, as in the other dream, but on the other side, facing east instead of west. Suddenly a sort of Loch Ness monster reared its ugly head and rushed across the bay at her. She turned, screaming in terror, and was about to flee up the steps, when she heard me chuckling with amusement. So she stood her ground and seized the monster in both hands. It shrank and shrank until it was a poor little iridescent minnow in the palm of one hand. She gently threw it back into the water.

(I will comment on this second dream. I think it pretty decent of her unconscious to drop us a line to let us know how we are getting on.)

She married again, this time a man more her own weight, somebody who laughs at the same thing as she does, and her tuberculosis is arrested.

#### HAPPINESS IS NOT ENOUGH

To me, concerned with getting people to overcome their tuberculosis by fair means or foul, that case strengthens my belief that a change of heart and a change of circumstances can be necessary before healing will proceed. My next one shows how change of circumstances alone. . . .

Peggy had an unfortunate early history. She never knew her father, her mother died when she was fourteen, and from then onwards she was self-supporting. She was in turn parlour-maid, cook, chorus girl, shop girl, mannequin, and glamour girl. She worked her way out to Canada as a stewardess and back again when she'd had enough. She then married a rather worthless playboy racing-motorist who was pretty poor both in money-sense and woman-sense. She had to sell her jewels to keep him, and to work in a hat-shop to earn the rent for their flat. He contributed nothing unless he backed a winner with his pocket-money, when they blued it with the greatest enjoyment. It was only when he diverted her hard-earned rent to another woman's lap that she protested, walked out on him, and put in her papers for a divorce.

We next find her settled down comfortably as a young farmer's wife, leading a happy outdoor life, riding, rearing, and breaking in colts, tending the poultry-farm, and having lovely fun in the kitchen. It was an idyllic existence. The young couple were deeply in love with each other and the young farmer lavished all the good things on her that she had lacked before.

After a couple of years she developed a small patch in one lung and reddening of one arytenoid. These were discovered almost accidentally, one might say, owing to the thoroughness of her general practitioner; for there were no physical signs. It was for other symptoms she consulted him. She was six weeks' pregnant. In accordance with general usage she was advised to have therapeutic abortion, and this was done. After which no time was lost getting her under sanatorium treatment, where she was put on absolute rest.

From the hardships she had gone through she might have been by now a hard-mouthed hard-bitten disillusioned young woman; but she was not. She was one of the sunniest and sweetest young women I have ever met. Nothing disturbed her infectious gaiety. She bubbled with fun and friendliness. Everybody fell for her, women in particular. She had managed to acquire and cherish somehow delight in poetry, music, and sketching (Corot, Debussy, and Swinburne). She was the adored adopted aunt of about half a dozen children.

Her tuberculosis spread in both lungs, larynx, and trachea. Each X-ray film showed advancing shadows, until each lung looked like a snowstorm. She had to talk in whispers, and her swallowing of food was painful to watch. It was evident that she was going to die, and that nothing could be done.

A week or so before the end she developed a strong positive transference towards me; so I took to sitting with her at night when her dyspnoea frightened her, until her opiate took effect and she dropped off to sleep.

It was then that I learned her history and her bewildered attitude towards it. Her divorce had never gone through; so she had never been able to marry Bill, the young farmer. But that didn't worry her in the least; to her it was perfectly natural and right that she should make him happy. There was no feeling of guilt. She adored him; and her life with him and the horses, the ducks and the goats, was idyllic—but it was somehow *unreal*. Even had she been legally married to Bill, she would have continued to feel that her first unhappy marriage was the real one. Miserable and exasperated often, insecure always as she had been with the playboy, it was the small memories of midnight feasts—of a stray kitten they adopted on Christmas Eve and played with on the bed—it was memories like these that kept crowding in now. And then she said something startling. Without rancour or self-pity, without question and with complete acceptance, she said, "It looks as if I have a need to suffer." She died that night. There was no mistake about the dose of morphia.

I feel that her history is worth giving in some detail, because it has features in common with two other women patients. In all three cases there had been an unhappy but curiously vital first marriage, and a brief glimpse of happiness and security in a second unlegalised alliance, which seemed to them unreal and dreamlike in comparison. In all three the disease was diagnosed early and brought early to treatment without avail. They all lost their good looks and became skull-faced, with bodies and legs bloated with oedema. All three had sweet sunny dispositions, which persisted undimmed to the end in spite of their afflictions.

I must confess I am most puzzled and somewhat dismayed. Mere external happiness, adjustment to the outer world, doesn't seem enough.

#### CONFOUNDING THE DOCTORS

My last case is very different.

Gladys I first saw when I was still in general practice in 1933. She was aged about 19 and was a cheerful, cow-like, but rather slovenly cook-general in a farmer's household. I was attending the farmer, and, as I made my way out one day through the kitchen she told me she had been coughing up some blood and asked, "Did it make any difference?" Well, she was a real Queen Square conjoint case—bilateral excavation and a family history riddled with phthisis.

She was admitted forthwith into a sanatorium and discharged at the end of the statutory three months "improved." True she had gained a lot of body-weight and looked fitter, but the activity of her disease, although doubtless lessened, merited at least another three months on absolute rest, with a campaign to eliminate her cavities. She went home, and was on the club; and then she moved from the district and I lost track of her.

When she next came to me she was seven months' pregnant and had been married very nearly as long. She was pretty well, but I dreaded the labour and the puerperium. I can't remember the labour—it was probably a B.B.A.—but her disease *did* flare up and spread during the puerperium as I had feared; and with great difficulty I kept her in bed at home for three months. In fact she was still in bed when I sold out of the practice. Before abandoning her I told her she must never do it again and gave her explicit instructions how not to do it again. And had to add that it was nothing to giggle at either.

Some seven years later, in 1942, I spent my summer holiday doing a locum in my old practice—a fascinating and unique opportunity for follow-up which I could not resist. I was asked to call in and see Gladys, when I was passing that way, because of some hæmorrhage, and I was surprised thus to learn that she was still alive, and marvelled at her tenacity to life.

I called and found her spooning out dinner to nine children all below the age of 7½. The children were singing and hammering the table with their spoons like the Christmas carol, while she sat placid and cow-like, smiling on her brood. The din was terrific.

The hæmorrhage was from a cervical erosion. She was not pregnant at the moment; so I persuaded her to have a further overhaul and radiography of her chest. The cavities, one of which used to be the size of a tangerine orange, had disappeared completely. There was plenty of firm-looking scar tissue but no sign of any activity.

I simply could not explain it; but, when her husband came in, I seemed to see daylight. He was an ordinary farm labourer, a cheerful good little worker, and a good family man. Though desperately poor and living primitively in a condemned cottage they were wildly happy and laughed a lot.

Here then is a matter for discussion. What made Gladys's disease, which was definitely *advanced* and progressive seven years before, heal in spite of the continued presence of all these classical adverse conditions? Why did she do better than our sanatorium patients? Can it have been sheer contentment? Or can it have been contentment plus the gratification of her deep creative impulse?

That raises another point. Phthisiologists make it a rule to forbid women to have babies for as long as five years after the cessation of all symptoms of activity, because of the tragedies which are apt to occur during the puerperium if the disease has not long been arrested, and is still latent.

All are agreed that the tuberculous woman often does phenomenally well during her pregnancy—even in the early months before the enforced rise of the diaphragm and the restriction of its movements can play any part in the mechanical relaxation and immobilisation of the lesions. It is, some say, as if some fetal hormone assisted the mother's tissues to arrest the disease. Be that as it may, it is certainly the abrupt diaphragmatic descent during parturition which is responsible for the massive basal spread during the puerperium which is so often fatal.

Nowadays I take the line that this danger can be obviated successfully by the immediate induction after labour—or better still after cesarean delivery—of a pneumoperitoneum; so that the volume of the pregnant uterus is replaced by an equivalent volume of air, to keep the diaphragm tented up. This may well be reinforced by phrenic interruption on the more threatening side. So far, in the few cases where this has been done, it has worked out very well.

Should this prove to make parturition less dangerous, I cannot help wondering whether pregnancy may not be a good therapeutic prescription, in appropriate cases, not only because of its mechanical and alleged endocrine advantages but also because it satisfies a deep-rooted instinct, and the patient is thereby granted a brand-new squalling reason for not dying.

Looking back I wonder if Peggy, the farmer's wife, might not have lived had her pregnancy been allowed to come to term.

#### NATURE OF THE DISEASE

My tentative conclusions are that patients who develop pulmonary tuberculosis in the absence of any of the classical physical environmental causes often do so because of dis-ease in their psychological environment—their relation to themselves or to the world outside.

We are all agreed that certain physical distressing circumstances lower a patient's resistance to disease, but that is only an empirical phrase to cover everyday experience. We really know nothing yet about the biochemical tissue changes (if any) that are involved when "resistance is lowered." We are only saying really that the soil is being made ready for the seed. The patient's tissues are ready to be diseased. In

psychological distress the patient as a whole is ready to be ill—in fact is ill already. And the ubiquitous bacilli both endogenous and exogenous are there ready to oblige.

This is tantamount to saying that tuberculosis provides means for a flight from frustration, for self-punishment and all those other dark urges which are continually shipwrecking our best behaviour. I believe this, with half of me; but my alter or super ego would like to have mathematical confirmation. I cannot be whole-hearted until we can measure in grammes per litre the presence or absence of disease-resisting substances in the body fluids.

Even if we cannot accept that thesis fully, I think we must agree to the generalisation that every individual reacts to a disease according to his personality; from which it must follow that the psychoneurotic, when given a touch of tuberculosis, will exploit his disease process to suit his pattern of living—or of dying. Moreover, such a patient may develop a secondary reactive personality, of which the disease is a complementary and necessary part, as in the "Dornford Yates syndrome" I described earlier.

Obviously, if such a patient is to recover from his tuberculosis, we must treat more than the local lesions and the toxic manifestations. His concurrent psychological dis-ease must be alleviated, and alleviated in good time, if he is to recover and not become chronic or incurable. Time itself is notoriously a great healer in cases of emotional maladjustment that are not basic. The period of retreat in a sanatorium—that mother figure—brings about changes in both the inner and outer lives of many, probably most patients. They overcome the disease *when they are ready*. But for quite a few cases it would be as well if psychiatric help and guidance were at hand to expedite their readjustment.

#### POSTSCRIPT, 1946

The foregoing was written and delivered before I had received any psychiatric training or had been taught the correct terminology. I have since learned by experience in Army psychiatry that it is not always necessary to raise conflicts and forgotten traumata to the conscious level. In a vast majority of everyday cases there is no more need to drag in—or drag out—the ubiquitous Œdipal Situation than there is to invoke the Second Law of Thermodynamics when soldering a kettle. Therapy can operate directly on the unconscious, giving it, as it were, a wholesome tweak which helps it to unravel itself. It is hard to understand how this happens, but no harder perhaps than understanding how many trusty empirical treatments—such as hot-water bottles, deep massage, and bottles of medicine—alleviate concealed underlying organs in distress. Both patient and physician are equally in the dark as to what really happens inside, but whereas the patient accepts the change gladly and unquestioningly, the physician cherishes a Scientific Hypothesis.

I have spared the reader—and myself—a great deal of trouble by refraining from rewriting the paper in the correct terminology.

"... The principal beneficence of a university should be that it stimulates an appetite for knowledge and understanding. You must not, of course, expect to *receive* education from your university; for a university that offered an orderly, finite, and readily comprehensible scheme of education—education as differentiated from instruction—could only exist as the political instrument of a despotic or total State. To acquire education you must reach out for it. You cannot obtain it by sitting down as if to three rationed courses in a workers' canteen; the process is more like picking blackberries, and some of the fruit you gather will certainly be green and cause distress."—ERIC LINKLATER in a rectorial address at Aberdeen University, Oct. 26.

## THE POLIOMYELITIS EPIDEMIC IN MAURITIUS IN 1945

CLINICAL FEATURES AND ORGANISATION OF TREATMENT

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A MAJOR epidemic of poliomyelitis is always a serious matter. Where conditions are primitive and the medical services exiguous, such an event is catastrophic; and it may therefore be of interest to describe the measures taken for dealing with the recent outbreak in Mauritius.

On March 21, 1945, one of us (H. J. S.) was informed by the Colonial Office that poliomyelitis had broken out in Mauritius, and was asked to go there as quickly as possible to do whatever was necessary for the care of those affected. As an island epidemic is a particularly favourable subject for epidemiological investigation, the Medical Research Council agreed to second Dr. A. M. McFarlan to conduct a survey. Miss Crossley, a physiotherapist from the Wingfield-Morris Hospital, Oxford, was also a member of the party, and we left England by air on April 7.

Since it seemed likely that one of the greatest difficulties would be shortage of staff—there are too few doctors in Mauritius—we asked Lieut.-General Sir Alexander Hood, D.G.A.M.S., if he would allow one or more Army medical officers serving in Africa to be seconded for work in Mauritius. His response was characteristically generous, and we were given leave to discuss recruitment with the appropriate directors of medical services. We were most hospitably received in Cairo by Major-General J. C. A. Dowse, and it was agreed that two men from M.E.F. would be sent to Mauritius if East Africa were unable to spare anyone. However, we found Brigadier R. P. Cormack, E.A. Command, both willing and able to help; Major G. W. A. Dick was permitted to join Dr. McFarlan, and the services of two Mauritian Army doctors stationed in the island, Major A. de Chazal and one of the writers (J. R. R.), were promised. Another of the writers (E. I. B. H.) was stationed in Nairobi at the time and was permitted by Air Vice-Marshal Sir Brian Baker to join the party. It was also agreed that we might call on the R.A.F. for supplies of 'Duralumin' required for making splints, and that free use should be made of the air transport service for the conveyance of pathological material from Mauritius to Uganda. Arrangements had been made for sending specimens for animal inoculation to Dr. K. C. Smithburn at the Rockefeller Yellow Fever Research Institute at Entebbe.

We reached Mauritius on April 15 and started work on the following day. The island is some 38 miles from north to south and 28 from east to west, and is situated in the Indian Ocean about 600 miles east of Madagascar and 20 degrees south of the Equator. The total population is about 419,000; Indians (265,000) predominate and are mostly descendants of indentured labourers; there are roughly three times as many Hindus as Moslems. The 143,000 Creoles are descendants of African and Malagasy slaves. More recent arrivals are the Chinese (10,000), who are almost all shopkeepers. The old-established colonists are of French descent and are relatively few; and there is a sprinkling of people from the United Kingdom. The economy of the island depends almost entirely on its chief product, cane sugar.

### FIELD ORGANISATION

By the time we arrived Dr. A. Rankine, director of medical and health services, had received notifications of over a thousand cases. Dr. McFarlan decided that from the epidemiological standpoint it would be best to start work in Savanne, a rural area with small communities, in which cases were still occurring at the time

of our arrival. He then proposed to tackle an urban area (Port Louis, the capital); next Pamplemousses, a rural district adjoining the urban area of Port Louis; and finally the Rosehill district in which it was believed the epidemic began. From the clinical standpoint it hardly mattered where we started, but we thought it would be best to follow the epidemiologists.

The plan of campaign was as follows. The list of notifications gave a rough indication of the extent of the outbreak in each of the nine districts of the island. We tackled each district in turn. The government (district) medical officers, sanitary inspectors, health guards, sugar-estate doctors and dressers, and the village schoolmasters were most helpful in guiding Dr. McFarlan and Major Dick to the homes of patients (a few were already in hospital); but the detailed hunting down—there is no other way of describing it—could be done only by full-time workers. We were lucky to have some v.a.d. nurses at our disposal, intelligent young ladies from French families who knew every part of the island intimately and were fluent in its Creole patois. They soon became so efficient that it was possible to entrust them with many of the detailed inquiries appearing on the special case-sheet which we devised. As they collected their data Dr. McFarlan, Major Dick, and the v.a.d. nurses arranged for the patients to be sent to a convenient centre, such as a district or sugar-estate hospital, dispensary, or schoolroom, where we examined them one or two days later.

Muscle charts were used on which the extent of the paralysis was recorded according to the system of grading approved by the peripheral nerve injuries committee of the Medical Research Council (1943). The thorough examination of the muscles of a small child is laborious and time-consuming; but, unless observations are made in fair detail, there is no sure foundation for classification, prognosis, or treatment. The three of us were sometimes able to examine as many as 60 cases a day, though this is not to be recommended when working in a tropical climate. Those who required splints were measured for them, and lists were made, in order of urgency, of patients in need of hospital treatment. Few parents refused to allow their children to come into hospital; this was largely due to the powers of persuasion of the v.a.d.'s, though their approach was entirely objective and no specious promises of cure were made. At times the clinical team went ahead of the epidemiologists in order that as many patients as possible might be seen; but where this was done the attendances were rather less satisfactory and a second visit was usually necessary after the v.a.d.'s had rounded up the stragglers.

Information about the disease and its treatment was disseminated by broadcasts, and the distribution of printed versions of the broadcast talks; the press was most helpful throughout, the articles and reports that appeared being accurate and balanced. Lectures and demonstrations were given to doctors, and one lecture to school-teachers from every part of the island.

Most of our evenings were devoted to sorting out notes and orders for splints, and analysing data, and the volume of clerical work soon became considerable. Here again the Army came to the rescue; we were provided with two clerks from the A.T.S. and two from the R.A.M.C. Mrs. Moody, wife of the Colonial Secretary, and Mrs. Ward, wife of the Director of Education, also devoted many hours to the thankless task of making duplicates of the case-notes.

### CLINICAL FEATURES

This paper summarises the clinical features of the outbreak, the epidemiological findings having been described elsewhere (McFarlan et al. 1946).

On account of our relatively late arrival, no search was made for non-paralytic cases. This would have been a tedious and time-consuming task because it would

have been necessary to distinguish carefully between abortive attacks of poliomyelitis and mild recrudescences of malaria. About 96% of the patients whom we saw were or had been paralysed. Over 900 patients were examined; but, since some were not seen until shortly before our departure, we had to be content with more limited numbers for statistical analysis.

TABLE I—SITE OF INVOLVEMENT OF CENTRAL NERVOUS SYSTEM

Site	Lumbar	Lumbar and cervical	Cervical	Medulla	Uncertain	Total
No. of cases	258 (64.3%)	88 (22.0%)	38 (9.5%)	10 (2.5%)	7 (1.7%)	401

*Age-incidence.*—Of 851 cases, 63.9% were in children aged 0-4 years and 30.9% in children aged 5-9. The extremes were a child aged 2 months and a man of 61.

*Site of Paralysis.*—Analysis of 401 case-histories gave an estimate of the frequency with which various parts of the central nervous system were affected (table 1). The lumbar enlargement was affected in 86.3% of cases.

In 212 cases where only one side was paralysed there were 109 with paralysis of the left side and 103 with paralysis of the right. This equality was found in the subgroup with paralysis of one lower limb or of one lower and one upper limb, but in the 32 patients with paralysis of one upper limb only there were 21 with paralysis of the right and only 11 with paralysis of the left; this finding supports the suggestion made by several authors on clinical grounds, and supported by experimental evidence (Levinson et al. 1945), that the extent to which a part is used may have some bearing on the location of paralysis.

It has been said that trauma may also play some part in determining the site of paralysis. Of 8 cases with a history of trauma in the fortnight before illness, 3 later had paralysis of the lower limb which had been injured, and in 1 of them the other lower limb was also affected. In the remaining 5 cases the site of paralysis bore no relation to the site of injury.

Injections of quinine into the gluteal muscles had been given to 28 children during the fortnight before the onset of poliomyelitis. There were 13 to whom one injection was given; in 7 paralysis later appeared in the lower limb of the side on which the injection had been made, and in 6 the paralysis affected the lower limb of the opposite side. Injections into both buttocks had been given to 15 children; in 11 paralysis of both lower limbs followed, and in 4 paralysis of one lower limb. In none of these cases was paralysis due to action of the quinine on the sciatic nerve, though some such cases were seen. There was no convincing evidence

TABLE II—PERCENTAGE OF CASES WITH EACH GRADE OF PARALYSIS AS DETERMINED BY HISTORY

Grade	0	I	II	III	IV	Cases
Cases with onset— (a) before Feb. 24 or after April 8	3.7	35.5	34.7	8.4	17.7	107
(b) between Feb. 25 and April 7	3.8	46.7	28.7	10.0	10.8	765
All cases..	3.8	45.3	29.4	9.8	11.7	872

of a relationship between the site of injections and the site of subsequent paralysis.

*Severity of paralysis* in 872 cases, including 58 deaths, was roughly assessed in four grades according to the maximal extent of paralysis as determined by history (table II). Grade 0 comprised patients with weakness only but with clinical and epidemiological findings which made the diagnosis reasonably certain. In other cases paralysis of the face, neck, back, or respiratory muscles,

or medullary paralysis was reckoned as equivalent to involvement of a limb, and grades I, II, and III comprised patients with paralysis of one, two, or three "limbs" respectively. Grade IV included patients with paralysis of four or more "limbs."

Paralysis of one "limb" was most common, and of two "limbs" next most common. When the cases were arranged according to the week of onset, it was found that during the six weeks from Feb. 25 to April 7, when the epidemic was at its height, there was a higher percentage than in earlier or later weeks of cases with one limb paralysed and a lower percentage of cases with two or more limbs paralysed. This suggests that at the peak of the epidemic, as compared with earlier and later periods, the virus was causing paralysis in more persons who had sufficient immunity to localise the infection to one part of the spinal cord. Faber et al. (1943) have provided some evidence of such immunity in cynomolgus monkeys after exposure of mucosa to poliomyelitis virus. The percentage of cases in grade 0 was the same in both periods; but little significance can be attached to this finding, since no particular search for such cases was made; there were only 33 grade 0 cases among the 872.

The severity of paralysis in 293 cases was assessed in a similar fashion on the results of clinical examination.

TABLE III—PERCENTAGE OF CASES WITH EACH GRADE OF SEVERITY AS DETERMINED BY CLINICAL EXAMINATION

Week of disease	Grade of severity				Cases
	0	I	II	III	
-4	17.3	48.4	24.1	10.2	29
5	24.0	56.0	20.0	..	35
6	40.0	40.5	19.0	..	37
7	28.2	50.0	11.8	10.0	60
8	35.4	31.1	18.9	14.6	48
9	36.8	40.4	15.8	7.0	57
10 +	48.2	25.9	17.4	8.5	27
All cases	32.7	42.3	16.5	8.5	293

It was found (table III and fig. 1) that the percentage of recoveries (grade 0) increased, and the percentage of single-limb paralyses (grade I) decreased, with the time elapsing between the onset of illness and the day of examination.

Hence, if the results of clinical examination were used to compare the severity of groups of cases, or of cases in different epidemics, it would be necessary to take into account the duration of illness at the time of examination. In Mauritius the cases in Savanne appeared to be more severe than in Pamplemousses, but the explanation was that in Savanne the epidemic was later and examinations were made early, whereas in Pamplemousses the reverse was the case. Table III gives some indication of the average rate of recovery during the second month of the disease, but the estimate is clearly less satisfactory than one obtained from successive examinations of the same patients.

Another analysis (table IV) was made to determine the incidence of permanent crippling; the figures were of necessity provisional, since it was too early to assess the prognosis in all cases with much accuracy.

From this table we may deduce that the incidence of crippling (per thousand cases the approximate total) will be as follows:

Lower limbs: slight	..	..	..	Rather less than	260
" " moderate	..	..	..	" "	48
" " considerable	..	..	..	" "	About 70
" " and trunk: much disability	..	..	..	Rather less than	80
Upper limbs: only slight	..	..	..	About	40-50
" " one useless	..	..	..	Rather less than	36
Bedridden	..	..	..	About	26

More or less involvement of the trunk muscles was found in 85 cases in the sample: therefore a watch for the development of spinal curvature will have to be kept in about 170 cases—a very considerable number.

So far as treatment was concerned, we divided the patients into three groups:

*Those with complete paralysis of one or more limbs persisting for 3-4 months.*—According to Harry (1938) the prognosis in such cases is bad, and recent experience has confirmed his view. We therefore decided not to retain children so affected in hospital for a long period; when it was clear that there was persistent total paralysis of a lower limb, an appliance was supplied, and the child was discharged as soon as he could walk.

*Patients with paralysis of the trunk muscles.*—It was thought wise to retain such cases for a long period, nursing them in strict recumbency, in the hope of minimising the incidence of scoliosis and the need for supplying spinal or abdominal supports.

*Patients with moderate paralysis, showing some improvement.*—All these children have been treated intensively, and inpatient treatment will be continued until serial muscle charts show that no further improvement is occurring.

THE EMERGENCY HOSPITAL

In Mauritius there are barely enough hospital beds for the ordinary needs of the population. When Brigadier E. R. Cullinan, consulting physician, E.A. Command, visited the island towards the end of March, he urged the necessity for the immediate establishment of one large central emergency hospital, and as a result of his advice Colonel Ronald Yeldham handed over to the medical and health department a collection of huts on the racecourse at Floreal. The site was pleasant and healthy and the huts well built; the difficulty was to equip and open them within reasonable time; there had been three hurricanes between January and April, which had caused widespread damage, and there was a shortage of labour and materials.

Although the conversion of the buildings began on April 9, the opening of the wards failed to keep pace with the enrolment of patients for admission, and we found ourselves in the unexpected and embarrassing position of being unable to deal adequately with the results of our propaganda. Parents brought their children to the gate of the hospital and demanded admission. We were equally anxious to get all the children who needed treatment, about 420 out of the 1000, into hospital as quickly as possible, so that at least the development of contractures might be prevented. As a temporary measure, admittedly unsatisfactory but better than nothing, some of the less urgent cases were admitted to sugar-estate hospitals and fitted with appropriate apparatus pending the opening of more wards at Floreal.

TABLE IV—INCIDENCE OF PERMANENT CRIPPLING

Sample: 500 cases—i.e., about half of the total

	Cases	%
Died	29	(5.8%)
Early recovery	157	(31.4%)
Some weakness of one lower limb	130	(26.0%)
Both lower limbs affected; able to walk with difficulty and only if supplied with appliances	35	(7.0%)
Paralysis of both lower limbs and more or less involvement of trunk muscles; will get about only with great difficulty	29	(5.8%)
Paralysis of one upper limb, proximal segment	26	(5.2%)
Both lower limbs affected; likely to walk well with appliances	24	(4.8%)
Complete paralysis of one upper limb	16	(3.2%)
Widespread paralysis; may be bedridden	13	(2.6%)
Paralysis of one lower limb and trunk muscles; may walk well with appliances	11	(2.2%)
Paralysis of one upper and both lower limbs	10	(2.0%)
Paralysis of one upper and one lower limb	7	(1.4%)
Paralysis of trunk muscles alone	5	(1.0%)
Paralysis of face	3	(0.6%)
Paralysis of one upper limb, distal segment	2	(0.4%)
Paralysis of neck	2	(0.4%)
Paralysis of both upper limbs	1	(0.2%)
Total	500	

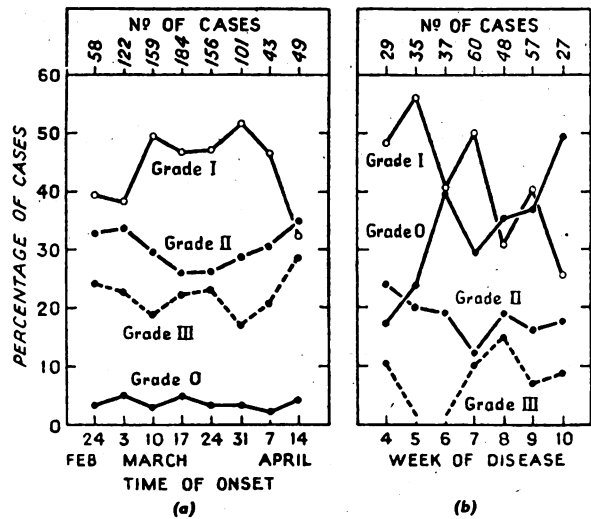


Fig. 1—Severity of paralysis, as determined by (a) history and (b) clinical examination. For explanation of grades see text.

In response to an appeal made to all the East African colonies Dr. and Mrs. H. B. Cumpston came to Mauritius, and they were appointed medical superintendent and matron of the hospital. The services of an Army sister were placed at our disposal by Lieut.-Colonel Leake, O.C. Station Hospital; in May, Dr. Henry de Boer, director of the Uganda Medical Service, sent one of his nursing sisters, and another Army sister was sent from Nairobi by Brigadier Cormack. The junior nursing staff consisted entirely of V.A.D.'s; they lacked experience and were imperfectly trained, but their enthusiasm and devotion to their work were most encouraging and they learned quickly from lectures and ward instruction.

TREATMENT

*General Hygiene.*—The huts were thoroughly cleaned and sprayed with D.D.T. before occupation. When a child was admitted, all its clothes were left outside. In almost all cases the hair was cropped short, and, after bathing, skin infections were promptly treated with appropriate ointments and paints. A child with poliomyelitis cannot be properly treated unless its skin is healthy. We were afraid that this rather drastic initiation might be resented by some parents, but it was not—they thought it was a necessary part of the treatment, as indeed it was.

*Splints.*—Plaster-of-paris is of little value for prolonged splinting of the lower limbs of small children (and in poliomyelitis the lower limbs are mostly affected), since it is easily soiled and disintegrates rapidly if wet with urine. Metal is essential, and experience of the Malta epidemic confirmed one's preference for duralumin. The Government of Malta sent the duralumin splints that had been used in the 1942-43 epidemic (Agius et al. 1945); after minor repairs all were fit for use, and we hastened to supply them to those patients whom they happened to fit.

It was agreed that one of us (E. I. B. H.) should be solely responsible for the supply of apparatus, and it was found that the workshops at H.M. prisons offered the best facilities for splint-making. There were no difficulties about shortage or impermanence of labour; and the costs of production were very low. Within a few weeks the Senior Chief Officer (Mr. W. McCormack) organised a skilled industry entirely new to the prisons; and the prisoners, many of them desperate criminals, were soon turning out large numbers of accurately fitting splints. Their sympathy and interest were aroused to such an extent that they devoted such spare time as they had to making toys for the children. And one evening, after they had finished installing some apparatus at the hospital, three reprieved murderers were found visiting each ward in turn and solemnly presenting toys to about a hundred small patients.

All apparatus was designed in a simple way, and the technique of measurement reduced to elementary terms, so that it could be mastered easily by the v.a.d. nurses. Broadly speaking, there are two ways of splinting a limb affected by poliomyelitis: the splint can be made so as to afford maximal relaxation to all paralysed muscles, in which case adjustments may be necessary as recovery occurs; or a splint can be designed to rest the limb in a generally favourable position without regard to the exact distribution of the paralysis. The second policy (which is physiologically sound) was followed in Malta and again in Mauritius, with the result that it was possible to reduce the number of types to four:

(1) *Short leg splint* for paralysis only below the knee. There was a socket for the heel, and the foot-piece was at right angles with the leg-piece (fig. 2). The cross-bar prevented rotation.

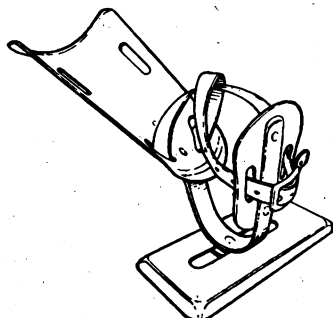


Fig. 2—Short lower-limb splint.

(2) *Long leg splint* for paralysis including hip or thigh muscles. Foot-piece as before, knee and hip flexed 15° each. If the abductors of the hip were paralysed, the splinted limb was placed in 15° of abduction. Where both lower limbs were affected, this position was easily maintained with a curved cross-bar attached to the splint beneath the foot-pieces (fig. 3a and b).

(3) *Gas-pipe (Bradford) frame* for all severe cases of spinal and abdominal paralysis. Used with a jacket restrainer immobilising the trunk on the frame (fig. 4). It was simple to add lower-limb splints when needed (fig. 5).

(4) *Abduction splint* for all paralyses of the upper limb involving the shoulder-girdle muscles, the limb being held in 90° of abduction, a few degrees of flexion, and no rotation, the elbow being flexed at 90° (fig. 6). Double abduction splints presented no difficulty (fig. 7), but special adjustments had to be made in the few cases where the trunk muscles besides one upper limb were involved.

Fixation was minimal—for example, a figure-of-eight at the ankle, one strap below the knee and another at the upper

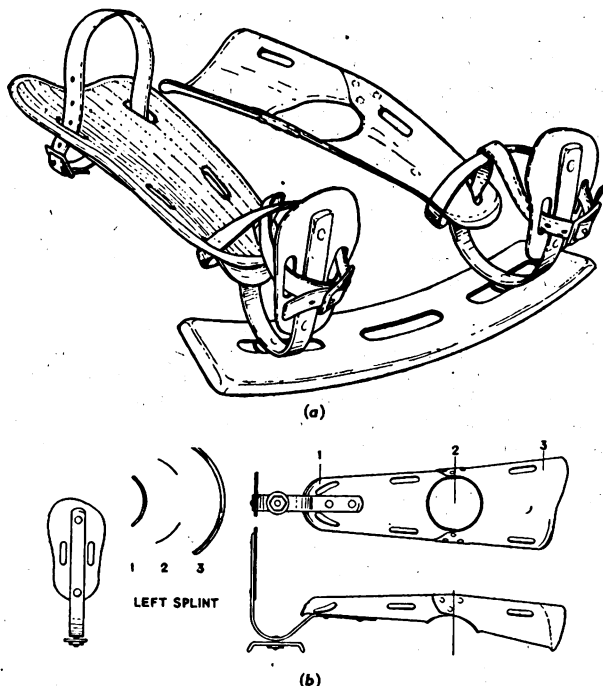


Fig. 3—Long lower-limb splint: (a) assembled for use; (b) component parts.

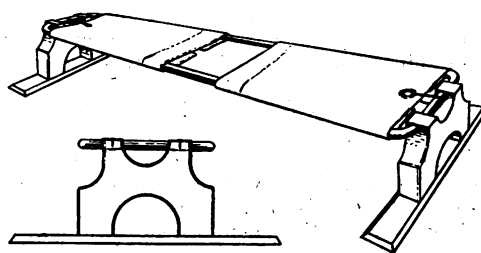


Fig. 4—Bradford frame for paralysis of trunk muscles.

third of the thigh—the aim being not immobilisation but the maintenance of the limb in a satisfactory position.

*Physiotherapy.*—(1) The prevention of contractures was a paramount necessity, and in every case the joints of the affected parts were put through a full range of passive movements once a day. There were very few cases in which persistent pain either in the muscles or joints gave rise to difficulty.

(2) Remedial exercises were given daily in all cases in which muscle action was sufficient to make graduated exercises worth while. Four v.a.d. nurses soon learned how the exercises were to be given and to base treatment on the distribution of paralysis as shown by the muscle charts.

Three cubicles were constructed and furnished, with stout cross-wire (used for reinforcing concrete) overhead to which graduated spring-suspension apparatus, all home-made, could be attached. These cubicles proved even more satisfactory than the standard Guthrie-Smith apparatus.

A small therapeutic pool (fig. 8) was constructed in reinforced concrete by the public-works department, and a separate boiler, presented by the Navy, gave hot water.

The walking-bars were of unusual design (fig. 9), there being three sets of bars of different heights and distances apart so as to enable children of all sizes to take exercise at the same time. The bars were made of gas-piping, and the track was shaped like a small racecourse, with a little gate for entry.

(3) Massage is primarily of value in improving the circulation, and the need for it is less in a warm than in a cold climate. Since it is probably less effective than exercise in suspension apparatus or in warm water, it was used in relatively few cases.

AFTERCARE

*Permanent Apparatus.*—It was thought desirable to start the manufacture of permanent apparatus before we left Mauritius, and the prisons' workshops proved well able to construct surgical boots, short irons, toe-raising springs, and calliper splints. The manufacture of spinal supports was held up by the lack of strip steel, since sent from the United Kingdom.

*Aftercare Clinics.*—Complete arrangements were made for the establishment of clinics at convenient centres throughout the island on much the same lines as in the Shropshire, Oxford, and Devon schemes. It was clear that, unless this was done, the efforts made in dealing with the immediate effects of the epidemic would be largely wasted. Furthermore, the kind of services required for the aftercare of paralysed children could easily be expanded to meet the requirements of a comprehensive orthopaedic service.

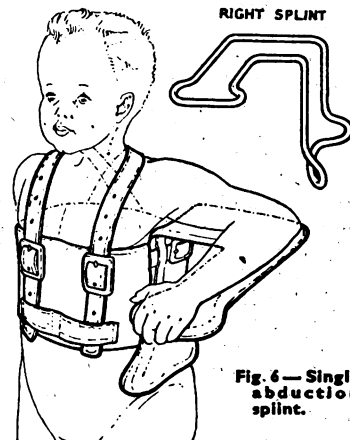


Fig. 6—Single abduction splint.



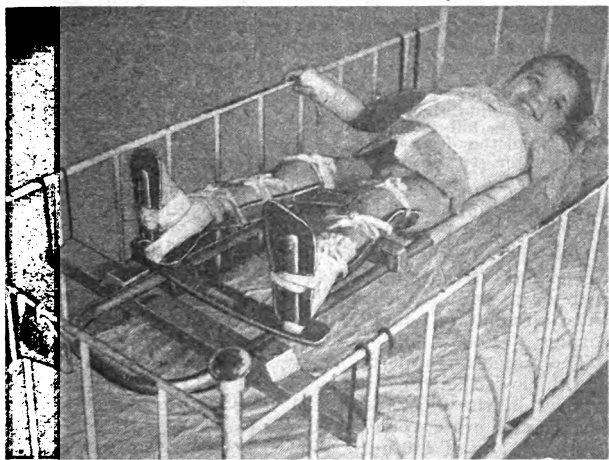


Fig. 5—Child with paralysis of trunk muscles and lower limbs. This was a Malta case, but the technique of splinting was the same in Mauritius.

**District Visitors.**—It was recommended that two district visitors should be appointed who would visit each centre about once a fortnight to supervise the welfare of outpatients, attend to minor repairs of appliances, and arrange for the attendance of children at the surgeon's (J. R. R.'s) clinics. School-teachers were also asked to keep in touch with children after they had returned to their homes.

**Orthopaedic Service.**—The government of Mauritius had already envisaged the establishment of an orthopaedic service. The need for it had been recognised for some time, but the epidemic made the matter urgent and it was decided that a surgeon should be appointed as soon as possible. Mr. J. W. Fitton, F.R.C.S., has now left this country for Mauritius.

Two English physiotherapists have also been appointed on a three-year contract, and it is hoped that two Mauritian women will come to this country for training as physiotherapists.

In Mauritius interest in rehabilitation has been such that 100,000 rupees (£7500) has been contributed for the building and equipment of a rehabilitation centre. Thus, it is hoped that the complete service will ultimately include: (1) orthopaedic wards at one of the two general hospitals; (2) a physiotherapy department at the same hospital; (3) an adjoining rehabilitation unit; (4) a

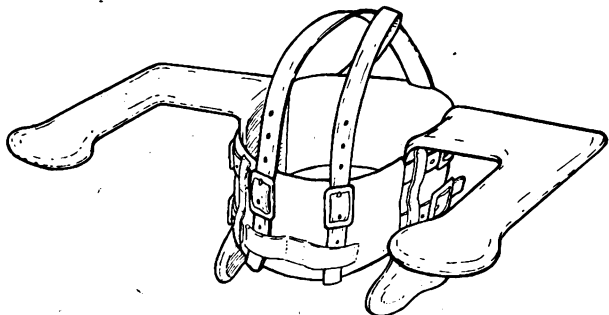


Fig. 7—Double abduction splint.

small department at the other general hospital in Port Louis for dealing with accidents and such outpatients as cannot be dealt with elsewhere; (5) a system of orthopaedic clinics throughout the island; and (6) an appliance shop at the prisons. This last is already established, and provision will be made for the fitting and maintenance of artificial limbs for pensioners and others, the parts being supplied by the Ministry of Pensions' contractors in this country; the Senior Chief Prisons Officer and one of his men are now receiving a course of training at Roehampton.

Thus out of the havoc wrought by this serious epidemic some good has come, and it may well be that within a few years Mauritius will have an orthopaedic service unequalled in the Colonial Empire.

This paper is based on a report presented to the Secretary of State for the Colonies. In addition to those whose names are mentioned in the paper (without whose aid this work could hardly have been done) we are indebted to H.E. the Governor of Mauritius (Sir Donald Mackenzie-Kennedy, K.C.M.G.) and to the Colonial Secretary (Mr. Sydney Moody, C.M.G.) for unflinching help and encouragement. Only considerations of space prevent us from naming many others, in almost every walk of life, who responded so readily and generously and became our devoted co-workers.

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APPENDIX

The following is a brief account of the appliances designed and made in the prisons and used during the epidemic:

Splints for Lower Limb

These were made from duralumin, which is stronger than aluminium though more easily corroded unless treated.

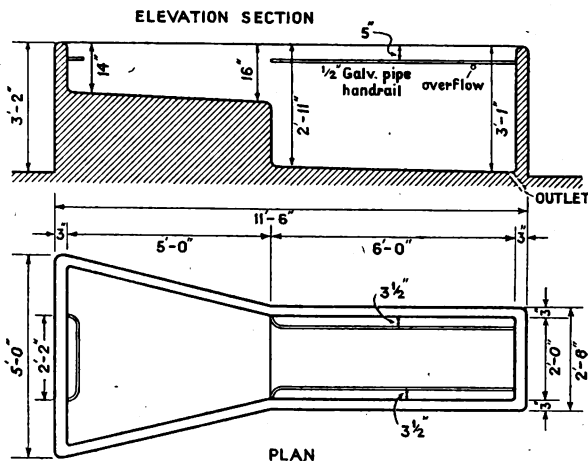


Fig. 8—Therapeutic pool.

The alloy becomes malleable at 450° C and hardens after an hour, before which time it can be worked with ease; it then continues to harden, a process known as "age hardening." The heating is best carried out in a salt bath.

Lower-limb gutter splints were made long or short, single or double. The only difference between the single and double splints is that the cross-bar is curved, to allow abduction to any moderate angle. The single splint has a straight cross-bar.

Sheet duralumin, gauge 1/24 in., is suitable for the thigh- and calf-pieces, 1/18 in. gauge for the foot-piece and cross-bar, and 1/8 in. strip duralumin for the connecting L-piece.

**Thigh-piece.**—The proximal edge is oblique at an angle of 20°, making the inner edge shorter than the outer. The upper edge is everted to prevent chafing of the thigh. A half-circle is cut out of the lower margin to correspond with a similar excision in the upper margin of the calf-piece;

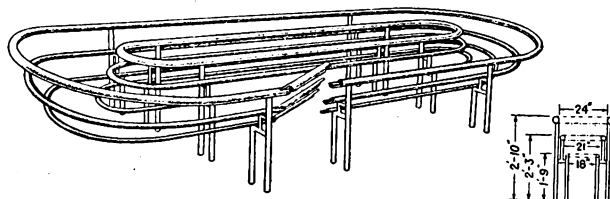


Fig. 9—Walking-bars.

thus there is a round opening behind the knee. Two slots, 1 in.  $\times$   $\frac{1}{4}$  in., are cut one on each side,  $\frac{1}{4}$  in. from the lateral margin and 1 in. from the proximal end.

The thigh- and calf-pieces are joined at an angle of  $15^\circ$ , so that the foot-piece and the upper end of the thigh-piece both rested on the bed, with the contained limb in a comfortable position.

**Calf-piece.**—Unless it is for a short splint a half-circle is cut in the proximal edge, corresponding with that in the thigh-piece. Two slots are cut in the upper end similar to those in the thigh-piece, and two slots in the lower end set obliquely at  $45^\circ$  across the corners. The lower edge, and for a short splint the upper also, is moulded outwards to prevent chafing.

**Foot-piece.**—Shaped roughly like the sole of a boot. Two slots, 1 in.  $\times$   $\frac{1}{4}$  in., cut one on each side, halfway along the length and  $\frac{1}{4}$  in. from the edges.

**Connecting L-piece.**—Width  $\frac{1}{2}$ –1 in. according to size of splint. The straight portions of the L are riveted to the calf-piece for half its length and to the foot-piece for the whole of its length. There is a wide U-bend,  $1\frac{1}{2}$ –3 in. wide and deep, at the angle of the L, to accommodate the heel. A  $\frac{3}{8}$  in. screw is riveted into the curve of the U to fit into the slot in the cross-bar.

**Cross-bar.**—For a single splint this consists of a straight strip 2–3  $\times$  6–8 in. A hole is drilled in the centre to take the screw mentioned above. The bar is turned at right angles along its edges for greater strength.

The cross-bar for a double splint is curved, the curve being the quadrant of a circle of radius equal to the length of the lower limb. Slots are cut in the bar to allow variation in the degree of abduction.

#### MEASUREMENTS

The measurements supplied to the instrument-maker are body measurements, from which he works out the splint measurements as described below. The calculations are accurate for average-sized splints, and certain obvious allowances must be made for very large or small splints. The measurements of width for the thigh- and calf-pieces are on the flat before bending into an arc slightly wider than a semicircle.

Great trochanter of knee	Subtract 3 in. = Length of outer edge of thigh-piece
External condyle of knee to sole of foot	Subtract 2 in. = Length of calf-piece for long splint
	Subtract 4 in. = Length of calf-piece for short splint
Girth of thigh at groin	Divide by 2 = Breadth of thigh-piece at upper end
Girth at knee	Divide by 2 = Breadth of thigh-piece at lower end, and breadth of calf-piece at upper end
Girth above malleoli	Divide by 2 = Breadth of calf-piece at lower end
Length of foot, heel to great toe	Add 2 in. = Length of foot-piece
Breadth of forefoot	Add $\frac{1}{2}$ in. = Breadth of foot-piece at widest point
Breadth of heel	Add $\frac{1}{2}$ in. = Breadth of foot-piece at heel

#### Upper-limb abduction splint

This was designed for ease of manufacture and comfort in wearing both when in bed or when ambulatory. The framework is made from duralumin, mild steel, or brass rod of a gauge of  $\frac{5}{16}$  in. for large splints and proportionately smaller gauge for small splints.

The frame is covered throughout with leather and padded in its vertical component and at the waist. A canvas bodice with shoulder-straps is sewn on to the posterior part of the chest-piece and fastened with two buckles and straps. The shoulder-straps are adjustable with buckles sewn on the front of the bodice. The bodice is cut away under the axilla to prevent chafing.

The width of the splint averages 3 in. for a medium-sized child aged 3–5 years, and 4–5 in. for adults. The width is the same from the hand to the crest of the ilium, where the splint broadens out to encompass nearly half the girth at the waist. The waist-piece is curved in two dimensions to fit round the waist and follow the curve of the crest of the ilium. It is about 2 in. wide and is well padded. The hand-piece is about 1 in. wider and is padded to give a comfortable grip.

#### MEASUREMENTS

Measurements are given for the frame only, since it was found that measurements for the bodice were best taken by the tailor who could then ensure a perfect fit.

From posterior axillary fold, or middle of the head of the humerus, to the tip of the olecranon	Add $\frac{1}{2}$ in. = Length of outer or posterior rod of arm portion
From axilla to crest of ilium	Add $\frac{1}{2}$ in. = Length of vertical limb and length of outer rod of forearm portion
Half the girth at waist	Divide by 2 = Length of waist-piece

#### Bradford frame

The metal frame (fig. 4) is made from mild steel tubing with an internal diameter of  $\frac{1}{2}$ – $\frac{3}{4}$  in. and painted or sprayed with aluminium paint. It is rectangular, with rounded corners.

The frame is supported on two wooden blocks 4 in. high and hollowed out to reduce weight. The frame fits into grooves in the blocks and is held down with metal strips. The frames are covered by two canvas slings, laced underneath; a gap of 4–6 in. is allowed between the two canvases to prevent soiling and to allow the use of a bedpan.

Where double gutter splints are required the lower canvas can be dispensed with, a wooden bar being fixed across the frame to support the splints under the thigh-pieces (fig. 5).

#### MEASUREMENTS

From vertex to sole of heel	Add 4 in. = Length of frame
From vertex to coccyx	Add 2 in. = Length of upper canvas
Breadth between posterior axillary folds (or middle of the heads of the humeri)	= Width of frame, overall or external measurement
Length of lower canvas	= Length of frame, less length of upper canvas, less 4–6 in.

## PENICILLIN FOR GONORRHOEA IN THE FEMALE

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In the past gonorrhœa in the female has seldom received the attention which it deserves from the medical profession; and in recent years the introduction of new and effective remedies has detracted from an interest which was never strong, for there is a tendency to assume that these infections are easily cured and are not accompanied by serious after-effects. There is still no genuine recognition of the fact that this is a most damaging complaint, with far-reaching consequences, unless treated skilfully in its early stages. What Thomson said in 1923 is still true: "Until this state of affairs is remedied, and the treatment of both acute and latent gonorrhœa in the female is taken up seriously by the profession, the incidence, which is already large, will undoubtedly increase, and the gonococcus will continue to be responsible for a large proportion (some put it as high as 50%) of the tubo-ovarian and other pelvic conditions which are seen in gynæcological wards, and for a great amount of the chronic ill health from which so many women suffer."

The discovery that penicillin is remarkably effective in producing clinical cure of gonorrhœa marks an advance in treatment, but there are dangers in the wave of over-optimism that has followed the wide publicity given to enthusiastic reports. General release of penicillin on the market may lead to its indiscriminate use and give rise to a sense of false security, with disastrous consequences. Some patients are inclined to look on gonorrhœa like a mere cold, to be thrown off in no time by the aid of a single injection. A large percentage of those treated with penicillin do not complete the course of observation and tests of cure.

As examples of the optimistic view one may quote Marshall (1945):

"With a dosage of 100,000 units and upwards, in four or five separated injections over eight to twelve hours,

a rapid clinical cure of 90% of cases of uncomplicated and sulphonamide-resistant gonorrhoea can be confidently expected."

A Ministry of Health circular says:

"Thus a single injection of 200,000 units (penicillin in oil) has been sufficient to effect apparent cure in over 90% of cases of acute gonorrhoea."

Willcox (1946) records that, during a recent visit to the United States, "It was an often-expressed view that gonorrhoea was beaten; and, though there were isolated voices urging maintained caution, there was an increasing tendency to relax the severity of the tests of cure in the disease."

According to Willcox, J. F. Mahoney gave 200,000 units of an aqueous solution of penicillin in five doses to male patients; and, apart from instructing the patient to obtain a blood-test in three months' time, there were no tests of cure.

In assessing cure of gonorrhoea in females there is more evidence of caution, for general examinations have been conducted once a month for three months in some centres. Yet, in a very large clinic in Chicago, cultures and smears after three days constituted the only follow-up of cases of clinical cure, apart from monthly blood-tests for three months.

All these facts indicate an attitude of mind which must be regarded as dangerous, having regard to the past history of this perplexing and insidious disease. Methods of treatment have changed quickly, but the character of a disease changes slowly, and there is no reason yet to suppose that gonorrhoea has lost its predilection for infectious latency.

The example of the sulphonamides is still before us, and it may be well to learn caution from consideration of the recent past.

Cokkinis (1939) claimed that 77% of cases of gonorrhoea treated with sulphonamides in the second week of the infection were cured, with a late relapse-rate of 9%. King (1939) claimed that with sulphapyridine in over 90% of 300 cases signs and symptoms had disappeared in less than three weeks. Laird (1942), using various schemes of dosage in 764 cases, obtained very similar results with sulphonamides, with a success in each series ranging from 81 to 91%.

Later came a very different report. Campbell (1944) pointed out that in Sicily and Italy, from the very first, sulphonamides were relatively ineffective. Whereas, until that time, 65-70% of patients had recovered completely on whatever initial course of sulphapyridine or sulphathiazole had been given, the percentage had dropped at once to considerably less than 20. Under the very best conditions, and with the employment of an increased dosage of drugs, such as sulphathiazole and the small available supply of sulphadiazine, success resulted in not more than 45%. The remaining 55% had continued to show gonococci after treatment, and these persisted for a very long time.

Harkness (1944) attributed this state of affairs to "drug resistance." He thought that three potential factors were involved—faulty dosage; indiscretions of the patient; and previous administration of the drug.

At that time I urged that the indiscriminate use of sulphonamides for minor ailments was likely to lead to decline in the efficiency of these drugs, and I recorded an impression that there was an increase in the number of "gonococcal carriers." It has seemed recently that history may be repeating itself, since my results with penicillin in gonorrhoea were less favourable, in female patients at any rate.

It has long been known that the assessment of the results of treatment of gonorrhoea in the female presents great difficulties; and the experienced clinician demands a considerable period of observation and many tests before reaching a decision about cure.

In view of these considerations I have analysed 39 consecutive cases of gonorrhoea in the female which have recently been under observation at the L.C.C. (White-chapel) Clinic. The table gives the results of this analysis, and it will be seen that in no less than 18 of the 39 cases the results were unsatisfactory, and that in a further

## POSITIVE FINDINGS AFTER TREATMENT

Case	Diagnosis	Units of penicillin given	Smears	Cultures
1	S and G1	2,400,000 (div.)	..	..
2	S and G1	2,400,000 (div.)	U+, C+	..
3	S and G2	2,400,000 (div.)	U+	..
4	S and G1	2,400,000 (div.)	U+, C+	..
5	S and G2	2,400,000 (div.)	..	..
6	S and G2	2,400,000 (div.)	..	..
7	S and G1	2,400,000 (div.)	..	..
8	S and G1	2,400,000 (div.)	..	C+
9	S and G1	2,400,000 (div.)	C+	..
10	S and G1	2,400,000 (div.)	..	..
11	S and G1	2,400,000 (div.)	..	..
12	S and G2	2,400,000 (div.)	..	..
13	G1	300,000 (div.)	C+	C+
14	G3	300,000 (div.)	U+, C+	..
15	G2	150,000 (div.)	U+, C+	U+, V+, C+
16	G1	150,000 (div.)	..	..
17	G vulvo-vaginitis	150,000 (div.)	U+, V+	..
18	G vulvo-vaginitis	150,000 (div.)	U+, V+	..
19	G3	150,000 (div.)	§	..
20	G2	150,000 (div.)	..	C+
21	G1	200,000 (water)	..	..
22	G3	200,000 (water)	C+	V+
23	G3	200,000 (water)	U+	..
24	G1	200,000 (water)	..	V+
25	G1	200,000 (oil)	U+, C+	U+, V+, C+
26	G1	200,000 (oil)	U+	..
27	G vulvo-vaginitis	200,000 (oil)	U+	..
28	G1	200,000 (oil)	..	..
29	G3	200,000 (oil)	..	..
30	G1	200,000 (oil)	¶	U+, V+
31	G1	200,000 (oil)	C+	..
32	G1	200,000 (oil)	..	..
33	G3	200,000 (oil)	C+	..
34	G3	150,000 (oil)	..	..
35	G3	200,000 (oil)	..	V+
36	G3	200,000 (oil)	..	..
37	G1	200,000 (oil)	C+	..
38	G2	200,000 (oil)	C+	U+, V+, C+
39	G1	200,000 (oil)	C+	..

+ = extracellular gram-negative diplococci.  
div. = penicillin given in divided dosage; in all other cases penicillin was given in a single injection.

S, syphilis.

G1, gonorrhoea with treatment less than 2 weeks after infection.

G2, gonorrhoea with treatment 2-4 weeks after infection.

G3, gonorrhoea with treatment 4-52 weeks after infection.

U, urethra. V, vagina. C, cervix.

\* Additional 200,000 units in oil given—still U+.

† Still + after 300,000 (div.) and after 250,000 (oil); treated

successfully with sulphadiazine.

‡ Sulphadiazine and menformon given with successful result.

§ Still + after 200,000 (oil) and 300,000 (oil).

¶ Developed gonococcal Bartholinitis after penicillin.

16 cases there was evidence of probable failure. In the table the cases are grouped according to the scheme of treatment used.

#### ADMINISTRATION OF PENICILLIN

Four different schemes of dosage were used:

- (1) Multiple injections of an aqueous solution—five doses of 30,000 units two-hourly, totalling 150,000 units, or five doses of 60,000 units two-hourly, totalling 300,000 units.
- (2) Single injection of 200,000 units in aqueous solution.
- (3) Single injection of 150,000 or 200,000 units in arachis oil and beeswax.
- (4) Inpatients, with syphilis also, were given sixty injections, each of 40,000 units at three-hourly intervals, totalling 2,400,000 units.

All penicillin was kept in the refrigerator. The aqueous solution was made up fresh for each injection. The syringes used were sterilised by boiling, and no antiseptics were employed.

#### TESTS USED

- (1) Smears were taken from the urethra and cervical canal and stained by a modification of Gram's stain. In the table certain smears are marked +; these specimens were reported as doubtful, which implies gram-negative *extracellular* diplococci, in all other respects morphologically indistinguishable from gonococci.
- (2) For cultures, material from the urethra, the posterior fornix of the vagina, and the cervical canal was inoculated onto Price's serum agar (pH 7.5-7.6). The slopes used for the urethra and cervical canal and the plate used for the posterior fornix of the vagina were warmed to 37° C in an incubator before use and were immediately returned to the incubator after inoculation. This technique is essential if the gonococci are to be grown successfully.

#### CASE ANALYSIS

Of the 39 patients 12 had gonorrhoea and syphilis and were admitted to hospital, where they received 2,400,000 units of penicillin in sixty injections of 40,000 units at three-hourly intervals. Of these 12 patients 5 showed signs of active gonorrhoea, with positive tests, after discharge from hospital. One of these patients received a further injection of 200,000 units of penicillin in arachis oil and beeswax, and still showed extracellular gram-negative diplococci.

The series included 3 children with vulvovaginitis. In our experience this type of case has not responded well to penicillin, and Dr. F. R. Curtis has reported (in a personal communication) similar experience in treating children in Germany. In this respect case 17 is of much interest. This was a child, aged 4 years, who first received 16 g. of sulphathiazole, with improvement, followed by a clinical and bacteriological relapse. Penicillin 150,000 units was then given in divided dosage; tests were again positive, and this was followed by 300,000 units of penicillin in divided dosage. Tests were still positive, and the child was given a further single injection of 250,000 units in arachis oil and beeswax. Relapse took place again; so a course of sulphadiazine was given, with subsequent negative findings. All other members of the family were examined and found to be free from infection.

The other 2 cases of vulvovaginitis cleared with sulphonamides after unsuccessful treatment with penicillin. It is reasonable to suppose that such children become "gonococcal carriers," for there is often very little clinical evidence of the infection.

Case 30 is also of special interest, inasmuch as this patient developed a Bartholin abscess, from the pus of which gonococci were cultured, seven days after the administration of 200,000 units of penicillin in arachis oil and beeswax.

#### RELAPSE OR REINFECTION

The problem of whether a case is one of true relapse or of reinfection is commonly insoluble. Often this is a question of the patient's word, and there are no fixed standards of reliability.

In every case in this series the patient was closely cross-examined about the possibility of reinfection. I intended to exclude any case in which there was the least shadow of doubt regarding reinfection; but the occasion did not arise.

Several of the patients with double infection were examined on the day of leaving hospital, or next day.

#### COMMENT

Reports have been published claiming 90% or more of successes in removing gonococci from the secretions and in resolving the clinical signs of gonorrhoea. The present small series of cases does not confirm these findings and, in the mind of the careful clinician, will raise even greater doubt about the bacteriological cure of patients treated in this way.

Now that penicillin is available generally to all practitioners, a word of warning may be given against its indiscriminate use. It will be unfortunate if patients with vaginal discharge are treated with penicillin without proper investigation, as they sometimes have been with the sulphonamides. It should be remembered that *Trichomonas vaginalis*, monilia yeasts, and some other organisms which give rise to an abnormal vaginal flora do not respond to penicillin. The gonococcus may also be present in these cases, and this fact may be obscured by treatment without preliminary diagnosis.

Three points seem to be essential for successful penicillin therapy: a correct diagnosis, an adequate dosage of penicillin, and a prolonged period of observation after treatment. Far from any relaxation of the tests of cure for gonorrhoea, more care in observation and tests after treatment should be the rule. This should be simplified by the fact that it is important to keep these patients, who have been treated with penicillin, under observation for at least six months, to be certain that a coexisting syphilitic infection has not been suppressed by the administration of the penicillin.

It is possible that our present dosage of penicillin for gonorrhoea is inadequate, and that it is only sufficient to induce latency in some cases. However, the cases in which 2,400,000 units of penicillin were given without success suggest the possibility that some strains of gonococci are naturally resistant or have acquired resistance.

Vulvovaginitis has been always a difficult condition to treat, and it does not appear that the ideal method of treatment has been discovered yet.

#### SUMMARY

Of 39 females with gonorrhoea treated with penicillin, in amounts generally considered more than adequate, 24 did not respond to the treatment.

Tests showed positive or doubtful findings in either smears or cultures, or both, at a period of not less than seven days after the start of treatment.

In 3 patients tests were still positive after treatment with increased dosage of penicillin.

I wish to thank Mr. Ambrose King, F.R.C.S., director of the L.C.C. (Whitechapel) Clinic, for his helpful coöperation.

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## EPIDEMIC KERATO-CONJUNCTIVITIS IN BENGAL

### THE INCUBATION PERIOD

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In September, 1944, and in September, 1945, outbreaks of epidemic kerato-conjunctivitis occurred among Service personnel in the Calcutta area. In the 1944 series 10 cases were seen and treated at a Royal Air Force centre. One was severe and developed a tenonitis, and another case was complicated by iridocyclitis. This account deals with the series of 17 cases seen in September, 1945, at the same R.A.F. centre (see table). The patients were airmen who had all been playing football on muddy grounds in the Calcutta area; 8 patients came from one unit, 7 of whom played football on a very waterlogged ground on the same day, and for some of the players it was the only game in which they had recently taken part. Therefore the date of infection could be accurately determined, as could the date of onset of symptoms, and thus the incubation period. A considerable number of cases also occurred among Army personnel in the same area and at the same time, and these were treated at the Army hospital.

**Symptoms.**—The disease was characterised by an acute onset of pain and lacrimation in one eye, the usual story being that the man woke up in the morning with these symptoms, having retired to bed the previous night perfectly well. Only in 2 of the 17 cases had both eyes been involved. Examination showed intense conjunctival injection, swelling of the lids—mostly the outer two-thirds—and some chemosis of the lower palpebral conjunctiva. Lacrimation and photophobia were well marked, but a purulent discharge was rare. The keratitis was usually of the superficial punctate type, more often affecting the periphery, but sometimes it was generalised. In a few of the cases the subepithelial layers were involved, and in one the corneal infiltration was of the disciform variety. Corneal sensation was much diminished in all cases. Keratic precipitates were present in 3 cases (four eyes). Preauricular adenitis was a prominent feature and was present in all cases, and in some the

submaxillary glands were involved. The glands were always painful and tender at the onset of the disease. The interval between the onset of symptoms and the presence of corneal changes was short, under seven days in all cases, and in many the keratitis was well marked when first seen only a day or two after the onset. History of trauma to the eye was obtained in only 2 cases.

**Incubation Period.**—This was between twelve and seventeen days, and in most cases this could be determined with accuracy. This period is longer than that suggested by Feigenbaum et al. (1945) and Sanders (1942) who put it at four or five days.

**Infecting Agent.**—This is thought to be a filtrable virus, and all conjunctival swabs when taken in these cases were negative. In Bengal, by September the monsoon season is more than half over, and the ground is soft and at times under water. The virus is thought to be present in the soil and to be transferred readily to the eyes of footballers playing on muddy grounds. The disease has been recognised in India for many years, particularly in the coastal districts (Kirkpatrick 1920).

**Treatment.**—It was soon realised that, apart from instillation of atropine and the wearing of dark glasses, other local treatment to the eye appeared to do more harm than good, except that the more severe cases were given a course of short-wave diathermy, and the impression gained was that it was of benefit. All patients were also given vitamins B and C by mouth.

**Progress.**—This varied with the severity of the case, and the period from the onset of symptoms to the time when the eye was quiet was from six days to three weeks. Visual acuity returned to normal or just below normal after a further period of three or four weeks, but corneal sensation took longer to recover.

### SUMMARY

An outbreak of epidemic kerato-conjunctivitis in the Calcutta area is described.

The incubation period could be accurately determined in most cases, and was between twelve and seventeen days. This is longer than that previously described.

I wish to thank the Director-General of Medical Services, R.A.F., for permission to publish this report.

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Case	Age (years)	Probable date of infection in 1945	Date of onset of symptoms	Incubation period (days)	Condition of eyes	Duration of disease until eye was quiet (days)
1	23	August 15	August 31	16	Well-marked superficial keratitis extending to subepithelial layer; K.P. present	21
2	27	August 17	Sept. 1	15	Superficial only; no K.P.	9
3	24	August 17	Sept. 1	15	Central, superficial; no K.P.	14
4	23	Not known	Sept. 4	?	Superficial only; no K.P.	6
5	22	August 17	August 30	13	Subepithelial, peripheral; no K.P.	16
6	24	August 17	Sept. 3	17	Superficial, peripheral; no K.P.	11
7	22	August 16	Sept. 1	16	ditto	11
8	24	August 17	August 30	13	ditto	15
9	31	August 17	August 30	13	Superficial peripherally, with central disciform keratitis; no K.P.	15
10	24	August 17	August 31	14	Generalised, superficial; no K.P.	—
11	23	August 21	Sept. 5	15	ditto	13
12	23	Early Sept.	Sept. 16	Under 15	Bilateral, generalised, superficial, both eyes; K.P. both eyes	20
13	23	Early Sept.	Sept. 16	Under 15	Generalised, superficial; no K.P.	16
14	37	Early Sept.	Sept. 16	Under 15	Generalised; K.P. present	16
15	23	Sept. 2	Rt. eye Sept. 14 Lt. eye Sept. 18	12 16	Generalised; no K.P.	Rt. eye 16 Lt. eye 12
16	25	Not known	Sept. 18	?	Peripheral; no K.P.	12
17	24	Not known	Sept. 24	?	ditto	16

K.P., keratic precipitates.

## FETAL BONES IN URINARY BLADDER

## UNUSUAL TERMINATION TO ECTOPIC PREGNANCY

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It is extremely difficult to obtain an accurate history from a patient from the African bush. Details of past history are bound to be lacking in so far as symptoms of no importance will be remembered while others having a bearing on the case will be forgotten. Furthermore facilities for diagnosis are naturally limited, cystoscopy and radiography being unknown luxuries at an African bush hospital.

A woman, aged 38, came to my outpatient clinic at the African hospital, Ijebu-ode, Nigeria, complaining that she had passed some small bones in her urine on three occasions in the last four months. She had brought two of these bones with her to show me, and on inspection they looked very like small vertebrae. These bones were sent down to Lagos for further investigation and the report came back that they were not thought to be human bones, nor was it considered likely that they had been passed in the urine, it being suggested that they had been passed per vaginam, having been placed there on some previous occasion, since it was the custom in certain tribes to insert all sorts of bones up the vagina after the delivery of a child.

Pending the report I had asked her to come back to the hospital in two weeks; but, as happens only too often out here, she did not return to my outpatients' clinic till three months later. During this time she had passed more bones, but these she had not kept to show me.

A complete history and examination now made revealed further details. On several occasions between November, 1942, and April, 1943, she had passed in her urine small bones. There was no history of any haematuria, and dysuria occurred only when the bones were passed. She had been married for fifteen years and had had dyspareunia during the last two years. She had intermittent amenorrhoea during 1942. She had not been delivered of any children.

Nine years ago, she stated, she became pregnant, and at full term she was seized with severe abdominal pain accompanied by a show of blood per vaginam. These pains lasted only about half a day, and the bleeding stopped in one day. The swelling of the abdomen gradually subsided in three months.

Nothing abnormal was found on abdominal examination. Examination per vaginam revealed a tender irregular hard swelling in the anterior wall of the vagina. This swelling was readily palpable bimanually, but its exact site could not be determined. A metal catheter was then inserted into the bladder, and, when this was moved round, a hard mass could be felt. The cervix was high up in the vaginal vault, and the body of the uterus was not palpable.

In view of the above history and the clinical findings a tentative diagnosis of an old ruptured ectopic pregnancy which had ulcerated through into the bladder was made. Under spinal 'Nupercaine' 15 c.cm. a suprapubic incision was made. The contents of the pelvis were then examined, and dense adhesions between the uterus and the proximal portion of the left broad ligament and the bladder were found. The hard mass which had been palpable per vaginam appeared to be entirely in the bladder. The peritoneal cavity was closed, and an opening was then made into the bladder. From the bladder were removed numerous bones of various sizes, many of which could be identified, including the right half of a mandible, small ribs, and portions of the skull. After removal of all the bones the bladder was examined and found to be apparently normal except for a depression at its posterior left angle. A suprapubic catheter was inserted for a few days after the operation, and the patient made an uneventful recovery.

## Preliminary Communication

EFFECT OF *p*-AMINO-METHYL-BENZENE-SULPHONAMIDE<sup>1</sup> ON BIOSYNTHESIS OF NICOTINAMIDE

Ellinger and Coulson<sup>2</sup> observed that the output of nicotinamide<sup>3</sup> as its methyl derivative in human urine was greater than its dietary intake, and concluded that there was an extradietary source of nicotinamide, probably the intestinal flora. Using the "sterilising" drugs sulphaguanidine and succinyl sulphathiazole, Ellinger, Coulson, and Benesch,<sup>4</sup> and Ellinger, Benesch, and Kay<sup>5</sup> succeeded in reducing the output of urinary nicotinamide methochloride in several persons on the average to 30% of their previous output. The bacteriological examination of the faecal flora, however, was incomplete and inconclusive. They deduced that the reduction of the output of nicotinamide methochloride was due to the bacteriostatic effect of the sulpha drugs on the intestinal bacteria normally supplying a considerable proportion of the nicotinamide required by man. The fact that nicotinamide is produced by the flora of the human intestine was confirmed by Najjar et al.<sup>6</sup> using a different method.

It had been shown by Burkholder and McVeigh<sup>7</sup> and Thompson<sup>8</sup> that certain bacteria normally inhabiting the intestinal tract can produce and release nicotinamide when grown in vitro in an entirely synthetic medium. Since Knight's investigations<sup>9</sup> on the nutritional requirements of bacteria it has been known that bacteria consumed nicotinamide, and Koser and Baird<sup>10</sup> and Benesch<sup>11</sup> have shown that bacteria can destroy nicotinamide. Benesch<sup>11</sup> showed that a suspension of bacteria from a human caecum produced nicotinamide under aerobic and destroyed it under anaerobic conditions. He suggested that the nicotinamide available for absorption from the gut was determined by the bacterial production and destruction of the compound and therefore depended on the relative numbers of bacteria producing and consuming or destroying nicotinamide.

An extensive investigation is being carried out on the constitution of the faecal flora in man under various conditions, and an attempt is made to correlate it qualitatively and quantitatively with the extent of the urinary elimination of nicotinamide methochloride. We decided to examine the effect of 'Ambamide' (*p*-amino-methyl-benzene-sulphonamide,  $H_2NCH_2.C_6H_4.SO_2NH_2$ ) on the intestinal flora and on the urinary output of nicotinamide methochloride. According to Domagk<sup>12</sup> this drug is mainly active against anaerobes. If Benesch's assumption that the bacterial nicotinamide uptake was the result of the production by aerobes and the consumption by anaerobes is correct, a drug with a bacteriostatic action predominantly against anaerobes should increase the output of nicotinamide methochloride.

## EXPERIMENTAL RESULTS IN MAN

Experiments with ambamide were carried out on two female physically fit patients of West Park Hospital, Epsom, who volunteered for the experiment and were

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very coöperative. Samples of twenty-four-hour urine were collected daily, and faeces were collected twice weekly for about six months. The urine was measured and examined for nicotinamide methochloride by the method of Coulson, Ellinger, and Holden.<sup>13</sup> The faeces were cooled in a refrigerator to about 2° C immediately after having been passed. A sample was weighed out equalling about 25 mg. dry weight, and a suspension was made in 5 ml. of sterile peptone water and filtered through a sterile paper filter. This filtrate was diluted 1:40, and further serial dilutions of 1:10 were made in peptone water. In case 1 examinations were carried out with the dilutions to determine quantity and types of microbes growing aerobically and anaerobically on solid media, and of gas- and acid-producers growing in litmus-lactose broth, types of anaerobes and anaerobic spore-bearers growing in Brewer's medium and of acid-resistant aerobes and anaerobes in acetic-acid-glucose broth; smears were examined from the original suspensions. In case 2 no solid media have been used, but in addition the total of living aerobic and anaerobic organisms was examined by titration, and aerobic and anaerobic spore-bearers and acid-resisters were quantitatively estimated. In both cases the patients were given ambamide 1.5 g. three-hourly (12 g./day) for six days. The results are shown in table I.

The results show that during the ambamide dosing period there was an increase in the number of coliform

TABLE I—BACTERIAL COUNTS AND OUTPUT OF NICOTINAMIDE METHOCHLORIDE BEFORE, DURING, AND AFTER DOSING WITH AMBAMIDE

	Before dosing	Dosing period						After dosing	
		Days						Days	
		1	2	3	4	5	6	3	7
<i>Case 1</i>									
Coliform bacteria on solid media ..	3	..	..	6	..	..	7	5	4
Gas- and acid-producers in litmus-lactose broth ..	5	..	..	6	..	..	7	5	4
Nicotinamide methochloride (mg.) ..	3.58*	5.74	6.66	11.15	Lost	7.44	7.19	6.62*	4.70*
<i>Case 2</i>									
Gas- and acid-producers in litmus-lactose broth ..	2	..	..	(7)	..	..	9	8	6
Growth in Brewer's medium ..	3	..	..	(7)	..	..	8	7	6
Spore-bearers in Brewer's medium ..	2	..	..	2	..	..	3	3	3
Total living organisms:									
aerobic ..	5	..	..	(7)	..	..	9	7	6
anaerobic ..	5	..	..	(7)	..	..	9	7	6
Spore-bearers:									
aerobic ..	0?	..	..	2	..	..	2	2	3
anaerobic ..	2	..	..	0	..	..	2	2	3
Acid-resisters:									
aerobic ..	3	..	..	3	..	..	2	2	3
anaerobic ..	2	..	..	2	..	..	0	2	(5)
Nicotinamide methochloride (mg.) ..	2.90*	4.22	Lost	6.29	9.82	9.09	7.72	4.50*	3.33*

\* The average of 3 days.

The numbers in the tables represent the serial numbers of the last tubes containing microbes.

The numbers in parentheses mean that the last tube examined still contained microbes.

13. Coulson, R. A., Ellinger, P., Holden, M. *Biochem. J.* 1944, 38, 150.

TABLE II—DAILY OUTPUT (µg.) OF NICOTINAMIDE METHOCHLORIDE IN RATS BEFORE, DURING, AND AFTER DOSING WITH AMBAMIDE

Rat no.	Before dosing (average 3 days)	Dosing period				After dosing		
		Days				Days		
		1	2	3	4	1	2	3
1	38.8	13.5	21.3	107.8	196.7	236.0	44.6	38.8
2	31.4	60.6	124.0	318.0	373.9	449.0	242.0	101.2
3	42.7	28.2	46.8	202.1	273.8	298.2	117.0	56.8
4	86.2	90.7	160.3	311.2	412.8	498.1	217.2	113.6
5	741.0	414.3	418.7	824.0	723.0	587.0	689.7	875.0
6	1104.0	334.0	594.2	1792.0	2120.0	772.0	774.0	Lost

bacteria growing on solid media in case 1; of bacteria growing in Brewer's medium and of total living organisms under aerobic and anaerobic conditions in case 2; and of gas- and acid-producers in both cases. The methods used up to now have not given satisfactory information about the total number of anaerobes, but anaerobic spore-bearers and anaerobic acid-resisters showed in case 2 a temporary reduction in numbers. The gas- and acid-producers which increased in number were three types of coliform bacteria, and the organisms growing in Brewer's medium were mainly diplo- and strepto-cocci. The anaerobic spore-bearers were mainly large gram-positive rods in pairs or chains; and the anaerobic acid-resisters gram-positive rods which produced acid and clots in milk.

After the treatment with ambamide had been stopped, the bacteria and the output of nicotinamide methochloride returned slowly to their previous levels, except the acid-resisting anaerobes, which rose to a considerably higher level.

EXPERIMENTAL RESULTS IN RATS

In another experiment the effect of ambamide on the output of nicotinamide methochloride in rats was examined, but the bacterial content of the faeces was not examined. Adult rats were put on a mixed diet, and the daily urinary output of nicotinamide methochloride was estimated before, during, and after administration of ambamide. Each rat received ambamide 2.25 g. a day in its food for four days. Four of the rats had a low output of less than 100 µg., and two a high output of more than 500 µg., of nicotinamide methochloride before being given ambamide. The results are shown in table II, which shows, after a temporary depression in some instances, a considerable rise in output of nicotinamide methochloride in all but one rat (no. 5) during and immediately after the period of dosing with ambamide.

DISCUSSION

The chief results of the experiments are the increased output of nicotinamide methochloride and the increase of the coliform intestinal flora during the period of dosing with ambamide. These coliform bacteria can produce nicotinamide in vitro.<sup>14</sup> Whether this increase of the coliform flora is due to a direct stimulating effect of ambamide or to a destruction of anaerobes enabling increase of the coliforms cannot be concluded from the present experiments and must be examined further. No information can be obtained about the total numbers of anaerobes with the methods used so far, since most of the aerobes are facultative anaerobes and appear also in the anaerobic cultures. The increased output of nicotinamide methochloride may be due to the increase of nicotinamide-producing coliforms alone or to the simultaneous decrease in nicotinamide-consuming or nicotinamide-destroying anaerobes.

14. Ellinger, P., Kader, M. M. 1945, unpublished.

The complete experiments will be reported in detail later. They show distinctly that the ingestion of ambamide increases simultaneously the numbers of coliform bacteria, which are known to synthesise and release nicotinamide, and the elimination of nicotinamide methochloride in the urine. This is further evidence for the conclusion that human nicotinamide requirements are partly covered by the release of this compound by the intestinal flora.

We are deeply indebted to the late Dr. H. Schütze for advice and supervision of the bacteriological work.

Our thanks are due to Dr. G. A. Caldwell for permission to carry out the investigation at West Park Hospital, Epsom; Drs. S. W. Hardwick and W. P. Berrington for the clinical care of the subjects; the nursing staff of West Park Hospital for the careful collection of the specimens; Miss D. Garner for technical assistance; and Messrs. R. F. Reed Ltd., of Barking, for ambamide tablets. The work was carried out with a grant from the Medical Research Council (personal grant for A. E. and grant for technical assistance and expenses).

*Addendum.*—Since this paper was submitted two more people have been treated with ambamide and the faecal bacteria and the urinary output of nicotinamide methochloride examined. In one person conditions were similar to those reported. In the other the rise in coli and nicotinamide methochloride occurred only after a temporary depression similar to that observed in rats.

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## Reviews of Books

### Physics for the Anaesthetist

R. R. MACINTOSH, M.A., D.M. Oxf'd, F.R.C.S.E., D.A., Nuffield professor of anaesthetics, University of Oxford; WILLIAM W. MUSHIN, M.A., M.B. Lond., D.A., first assistant in the department. Oxford: Blackwell Scientific Publications. Pp. 235. 30s.

KNOWLEDGE of the basic sciences, clinical acumen, and technical skill are the requisites of the trained anaesthetist. Extensive theoretical knowledge without the power of clinical application is of little value. Many anaesthetists, however, are technically very dexterous and yet do not know or are incurious about the meaning of everyday observations. The authors of this book have picked out the relevant physical laws and fully expounded their application to anaesthetic practice. Among other things, they discuss the structure of matter and the properties of gases and vapours; why cylinders of nitrous oxide freeze up; how the modern anaesthetic apparatus has developed; the working principles of the various meters for measuring gases; the causes of heat-loss through the respiratory tract; atmospheric pressure and the results of increased and decreased pressure; gas-cylinder pressures; the importance of turbulence and resistance in the design and use of anaesthetic equipment; the rationale for the use of helium-oxygen mixtures; aero-embolism and intravenous infusions; and the effects on the circulatory, renal, and respiratory functions of osmosis, diffusion, and filtration. Useful tables of physical data and a short biographical study are included, and the work is fully and admirably illustrated by Miss M. McLarty.

*Physics for the Anaesthetist* fills a want long felt by anaesthetists both old and young. It may also be recommended to the preclinical student, who will find his first year's work far more interesting if he appreciates the application it will have later.

### Medical Uses of Soap

Editor: MORRIS FISHBEIN, M.D. London: J. B. Lippincott. Pp. 182. 18s.

THIS instructive volume, dealing with soap and many of its effects upon the skin, has been compiled by a group of experts. The chemistry of soap and its usual method of manufacture is clearly and briefly explained,

and a slight knowledge of the different varieties is certainly useful to those who may have to deal with some of the ill effects produced by soap. The action of soap in cleansing is, as is well known, brought about by the removal of the dirt-impregnated horny layer, alkali being more efficient for this purpose than acid. It is stressed, however, that too thorough removal of the natural covering of the skin tends to deprive it of some of its essential protectiveness. To a certain extent, too, soap is germicidal—but unfortunately only weakly germicidal for staphylococci. However thoroughly scrubbing with soap and water may be carried out, bacterial flora cannot be completely removed from the skin; but in the prevention of syphilis the immediate use of soap and water is probably far more valuable than many of the other prophylactic measures frequently advised.

In cases of dermatitis due to soap, direct damage to the skin is the most important factor, but softening of the skin by the alkaline action of soap may often prepare the way for secondary infections. In treating diseases of the skin the question whether to withhold soap and water or not is sometimes difficult to answer, and the authors discuss the problem fairly fully. There are useful sections on the use of soap in industry, and for shampooing and shaving, and the use of sulphonated oils as cleansers is also considered.

### Modern Treatment Year Book 1946

Editor: SIR CECIL WAKELEY, D.S.C., F.R.C.S., senior surgeon, King's College Hospital, London. London: Medical Press and Circular. Pp. 326. 15s.

THIS latest volume, the twelfth in the series, runs true to type—a miscellany from which the practitioner will glean many a useful tip. It is refreshing in these days of "scientific" medicine to find an exposition of how to cure warts in children by "charming," and the article on the treatment of migraine is wonderfully comprehensive. Post-war difficulties are probably responsible for the rather large number of misprints. This is not a quick reference book, but its 37 chapters are a useful guide for the general practitioner to the intricacies of modern medicine.

### Die Grundlagen unserer Ernährung und unseres Stoffwechsels

(5th ed.) EMIL ABDERHALDEN, professor in the University of Zurich. Berne: Huber. Pp. 202. Sw. fr. 8.50.

THE first edition of this book appeared during the first world war and became well known in Germany in the years which followed when nutrition was uppermost in many German minds. Abderhalden kept the book up to date, in spite of his other activities, all the time he held the chair at Halle. Whatever his political views may have been, the close of the second world war found him still at Halle, but he has now accepted a chair at Zurich and there, in what must be his old age, he has prepared a fifth edition of his little book.

It is not often easy for a man with an encyclopaedic mind to write an elementary book; but if he can bring himself to do so the result may be very good, and has been so in this instance. This book is simply written, but on the whole still up to date, showing a balance lacking in many English and American books of similar calibre. There are good chapters on the parts played by plants and animals in the economy of nature, the various food-stuffs, water, minerals and vitamins, digestion and cellular metabolism, and quantitative requirements (though this chapter does not reach the standard of the others). Protein requirements should nowadays be considered in terms of amino-acid requirements; and more might have been said about the value of plant and animal proteins in human nutrition: in Germany today there is a tendency to believe that only animal protein has any virtue at all. The addendum on the bread question is rather weak: the author sets himself firmly on the fence—which is quite permissible if he finds the seat comfortable—but the only evidence discussed has to do with the amount of B<sub>1</sub> in flours of various extraction. Nevertheless there are some delightful little points made here and there in this book, and it may be recommended safely to anyone who wants a good introduction to the subject of nutrition.



# THE LANCET

LONDON: SATURDAY, NOV. 16, 1946

## Yes or No ?

THE enactment of the National Health Service Bill last week obliges the profession to reconsider its provisions and decide on a course of action. The Act, as it now emerges, is a much less revolutionary measure than it would have been if the original suggestions of Mr. ERNEST BROWN had been translated into law. It derives much more from the long discussions between the profession and the Ministry of Health than it does from any doctrinaire ideas of the present Minister's political party. It is in fact much less socialistic than was predicted a year ago. Inevitably any measure making State provision over a widening field must conflict at many points with established custom. The question whether the advantages of a service planned on these lines outweigh the disadvantages is one that each one of us must answer individually in the light of his own convictions and circumstances. Fortunately we are to have an early opportunity of recording our opinion. The council of the British Medical Association has wisely judged that the time has come to ascertain the wishes of the profession about the next step.

The Act now passed does not attempt to set out a detailed workable scheme ready to be put into action on the appointed day. It is in fact only a framework—an enabling Act, allowing the Minister to make regulations whereby a service can be brought into being. In drafting these regulations, Mr. BEVAN will undoubtedly invite the aid of the profession: indeed he has indicated more than once that though the responsibility for the policies shaping the Act itself was one which Parliament could not and would not abrogate, there would afterwards be ample scope for consultation and expert collaboration in working out its translation into action. Hence we may confidently expect an invitation to participate in this next phase. Are we to accept this invitation? It is this question that we are each being asked in the plebiscite now being taken by the B.M.A. What then are the implications, and what would be the consequences of a positive or negative answer?

In the first place we may note that it is not necessary to say now whether the profession should eventually participate in the service. The question is whether we want our negotiators to take a share in devising the regulations to be made under the Act. On this issue opinion will of course be divided. One group will hold that it is possible, within the framework of the Act, to draft regulations producing a service in which they could be content to work and able to work well. In this hope they will naturally want to see the wishes and the experience of the profession given the maximum consideration during this next phase, and they will answer "Yes" to the B.M.A.'s question. In so doing they will in no way commit themselves to joining the service later; for, if their hopes are unfulfilled they will still be able to say that, on seeing the Act in its entirety, they cannot join the service. Those in the other group, who believe that no regu-

lations, however favourable, could make service under the Act acceptable, will obviously not wish the profession to become involved in any further negotiations, and will answer "No." But there is much more finality about this negative answer, which can be given only by those who are firmly resolved to have nothing to do with the new service, however it may turn out. A negative answer from the majority will not prevent Mr. BEVAN from making his regulations, advised only by the officials of his Ministry: but it will remove the profession's main opportunity to improve the service. It is difficult therefore to see how the answer "No" could legitimately or logically be reconciled with reluctant acceptance at the latter end.

Yet there will be many who will wish—at whatever sacrifice—to answer "No," because they will feel that in so doing they are taking their one chance to protest against the Act. When the Bill first appeared we all found clauses that struck hard at familiar ways and customs. Many of us hoped to see these clauses disappear from the Act; but, though most are modified, all remain. What we have to ask ourselves is whether the modifications sufficiently mitigate the hardship of the original proposals. In many cases we believe they do. For instance, under the original provisions the only doctors with access to private beds in a hospital would have been the consultants working inside the service in that hospital; but now access is offered to all practitioners (not consultants only) associated in a paid or an honorary capacity with the hospital—an enlargement that alters the whole concept. Modifications made in the powers of hospital management committees, and concessions over hospital endowments, have gone far to satisfy the voluntary hospitals. As regards the general practitioner's lot—and this after all is what most closely affects the greatest number of doctors—opposition was aroused chiefly by (1) the abolition of sale and purchase of practices and the penal clauses inserted in the Bill to guard against concealed sale of goodwill, (2) the limitation of the doctor's choice of an area in which to practise, and (3) the payment of a basic salary. None of these provisions has disappeared, but each has undergone modification in the Act, or in definite undertakings given by the Minister. Parliament has insisted on abolishing the sale of practices, even though this has meant voting a considerable sum of money to compensate the owners of practice goodwill; but it has so modified the penal clauses as to protect bona-fide transactions, and it has made it clear that the local doctors, including those remaining in the practice, will be able to influence the choice of successors to vacancies. It has also agreed that full consideration shall be given to the wish of a doctor to have a son or other relation join or succeed him in practice, and has thus materially reduced the objections to the powers of "negative direction." The Minister resisted the House of Lords' amendment which would have made payment by capitation the sole ordinary method of remuneration, and basic salaries therefore remain a probable part of the practitioner's emoluments; but as they are not mentioned in the Act their amount and even their universal application could still be matters for negotiation. Also, we have the Minister's assurance that the

capitation fees and not the basic salary will be the major element of remuneration. Such modifications as these are not very great, but they certainly suggest that the Government wants to produce a practicable scheme. The passage of the Bill through the Lords was marked by a new atmosphere of constructive coöperation, which would improve results if continued.

Such arguments will give cold comfort to many. Thinking in terms of pre-war conflict rather than post-war reconstruction, they will regard them as appeasement, and will argue that there must be no compromise so long as any part of the Act is capable of being used or developed in such a way as to restrict clinical freedom or alter the relationship of trust between us and our patients. But those who take this view will do well to remember that any Act which sets out to assure a service to the people must contain some sanction for governmental use if unforeseen circumstances should threaten a breakdown of the service. Such a sanction was written into the National Health Insurance Act: it gave the Minister power to suspend N.H.I. regulations in a particular area, and institute there any form of service (not excluding a whole-time salaried service) that he thought appropriate. Yet during the last thirty years this power has only once been used, and the profession has been hardly aware of its existence. The opportunities that the new Act provides for professional participation in administration at all levels seem sufficient to ensure that no unjust use will be made in the future of the sanctions Parliament has now thought appropriate.

In this article we have concentrated on the immediate consequences of refusing further negotiations, and have said nothing about the more remote consequences that might be expected from a refusal by the profession to work the Act. We have tried to make it clear, however, that only an affirmative reply will give us the opportunity of seeing the whole structure shaped and completed under the most favourable conditions. Those who reject this opportunity will assume a heavy responsibility.

### The Artificial Kidney

THE cause of death in acute uræmia has not yet been discovered but there is little doubt that the accumulation of diffusible metabolic products plays some part in it. If such products could be removed from the blood-stream during the period of renal failure the patient might sometimes be kept alive until renal function was re-established.

The removal from the blood of these "retention products" has been attempted experimentally in the past by various ingenious means, such as employing the peritoneum as a dialysing membrane and the perfusion of isolated loops of gut. The withdrawal of blood, separation of the plasma, and return of the corpuscles to the subject (plasma phæresis) was tried by ABEL and his co-workers,<sup>1</sup> who also attempted extracorporeal dialysis of the blood.<sup>2</sup> The possibility of such dialysis has stimulated a good deal of research, but, apart from THALHIMER's use of an artificial kidney

for the reduction of azotæmia,<sup>3</sup> there have been few attempts at practical clinical application. Dialysis has, until recently, been chiefly handicapped by the lack of a harmless anticoagulant and the inherent difficulties in obtaining a suitable dialysing membrane and constructing a dialysis apparatus of sufficient capacity. Dr. W. J. KOLFF<sup>4</sup> and his colleagues in Holland have now apparently solved these problems, and the result is an "artificial kidney" which is sufficiently practicable for use in the wards. It is a pity that KOLFF has used this term for his instrument, for "artificial glomerulus" would more accurately describe its aims and function: but the more glamorous title will no doubt persist, so it should be pointed out that KOLFF is not its originator; the name appears to have been first used by ABEL in 1913.

The use of this artificial kidney is simple, once the appropriate patient has been selected. A glass cannula is introduced into the radial artery; the patient is given heparin, and a minute later blood is allowed to pass through a rubber tube to the machine. The machine contains a 'Cellophane' tube, 1-2 inches in diameter and 30-45 metres long, wrapped round a rotating horizontal cylinder, part of which is immersed in "rinsing" fluid. The blood, after traversing the "kidney" once only, is returned to the patient via a glass cannula fixed in a superficial vein. Air bubbles and clots are excluded from the reintroduced blood by a simple and apparently effective glass filter. The blood moves through the cellophane tube by gravity and is returned to the patient by pumping. The rinsing fluid, through which the cellophane dialysing tube is passed as the cylinder rotates, is a clean but not necessarily sterile solution of sodium and potassium chlorides, sodium bicarbonate, and glucose. The surface area of the dialysing membrane in the artificial kidney is about the same as that of the human kidney. The cellophane tube takes half a litre of blood, which is passed through in about four minutes, so that large volumes can be dialysed in a few hours.

KOLFF has reported results with his artificial kidney in 17 cases of chronic and acute uræmia, including cases of malignant hypertension with contracted kidneys, bilateral renal tuberculosis, acute glomerulonephritis, postoperation uræmia progressing to oliguria and anuria, bichloride of mercury poisoning, and uræmia following the use of chemotherapeutic substances. Only 2 of these patients survived, but the chances of survival were practically nil in the fatal cases, some of which, however, showed temporary improvement after dialysis. One of the surviving patients, who had developed the anuria after receiving sulphapyridine subsequent to a course of sulphamethylthiazole, might well have recovered in any case with appropriate treatment, which was duly administered. The other survival was remarkable and might be credited to the artificial kidney.

A woman of 67 was admitted to hospital with fever, jaundice, signs of acute cholecystitis, and almost complete anuria; the small quantity of urine passed was cloudy and contained red cells and much albumin. Cholecystitis and acute glomerulonephritis was diagnosed ("a hepatorenal syndrome, if you like," Dr. KOLFF remarked) and the patient was given sulphathiazole for

1. Abel, J. J., Rowntree, L. G., Turner, B. B. *J. Pharmacol.* 1913, 5, 275.  
2. Abel, J. J. *Ibid.*, p. 625.

3. Thalhimer, W. *Proc. Soc. exp. Biol., N.Y.* 1938, 37, 641.  
4. Kolff, W. J. *The Artificial Kidney*, Kampen, Holland, 1946.

2½ days. Her temperature fell, but the anuria persisted. After 8 days the blood-urea reached 396 mg. per 100 c.cm., the potassium rose "alarmingly," and the alkali reserve fell to 40 vol. per cent. Cystoscopy was performed and the right pelvis was washed out without effect (the left ureter was obstructed). The artificial kidney was then used and 80 litres of blood passed through it in 11½ hours. In this time 60 g. of urea was removed by dialysis and the blood-urea dropped to 121 mg. per 100 c.cm. and the potassium from 55 to 19 mg. per 100 c.cm. There was some clinical improvement but the urinary output continued poor for some days and the blood-urea rose again to 172 mg. per 100 c.cm. However, the urinary flow and concentration slowly improved and 2 months after the dialysis the patient was well. She was seen 5 months later in "excellent condition."

KOLFF is convinced that this woman would have died had she not been treated with the artificial kidney, but this opinion must be accepted with reserve in view of the remarkable recoveries from apparently hopeless situations reported in cases of acute renal failure developing in such conditions as blackwater fever. In his recent lecture to the Medical Research Society, however, reported on another page, KOLFF announced 3 more recoveries in 8 additional cases, including a child of thirteen years with acute glomerulonephritis following exposure, whose condition was considered beyond hope by the physician who sent her to him. It is evident that with increasing experience and confidence the clinical net is already being cast wider, and this should hasten the satisfactory assessment of results.

The substances removed by dialysis of uræmic blood have been carefully studied by KOLFF and his colleagues. The blood-urea concentration was uniformly lowered after dialysis, as will be seen from the table (adapted from KOLFF's book<sup>4</sup>).

BLOOD-UREA LEVELS (MG./100 C. CM.) BEFORE AND AFTER DIALYSIS

Specimen of blood	Case					
	12	13i	13ii	14	15i	15ii
Before dialysis	263	704	386	548	389	375
After dialysis	89	192	187	263	159	228

The maximum amounts of urea were removed from those patients in whom the blood-urea was highest before dialysis. Creatinine and uric acid were similarly reduced by dialysis. Provided the composition of the rinsing fluid in the bath was kept constant, the sodium content of the blood was altered little by dialysis; the serum-potassium level, which was high in some patients, was lowered by dialysis, and other substances present in the blood, such as sulphonamides, were partly removed. Where the subject was acidotic, small amounts of an appropriate solution of sodium bicarbonate were introduced intravenously before dialysis.

KOLFF has clearly shown that the rapid extracorporeal dialysis of blood in large quantities is a practicable proposition, and he has provided evidence indicating that in some cases such dialysis may tide a patient over a period of acute renal failure and keep him going until renal function is restored. He has asked himself the important and highly relevant question: "Are all the substances responsible for the clinical syndrome of uræmia being removed by dialysis?" and has supplied his own answer: "It is not one definite substance that causes the intoxication and

only in exceptional cases one definite substance will reach concentrations which would be toxic if it were alone. It is the sum of all the detrimental influences of all the retained substances which leads to uræmia. Up till now not a single substance is known to us which might participate in this intoxication and is not being removed by dialysis."

The importance of the artificial kidney in research is obvious, but its clinical scope has to be established. At the moment it seems that any form of acute uræmia might benefit from its use. Anyone who has had to watch with furious impotence the final desperate stages of anuric death in blackwater fever or traumatic shock will welcome its development. It is to be hoped that Dr. KOLFF's apparatus will be given an extensive clinical trial, particularly in those potentially reversible renal syndromes which MAEGRAITH and his colleagues<sup>5</sup> call "renal anoxia."

### Poliomyelitis in Mauritius

DURING the first five months of 1945 there were over a thousand cases of poliomyelitis among the 419,000 people of Mauritius—an attack-rate comparable with the 1916 outbreak in New York and the 1942-43 outbreak in Malta. An incidence of this magnitude in an island community offered exceptional opportunities for an epidemiological field study which were fully grasped by Professor SEDDON and his team,<sup>1</sup> who followed up over seven hundred of the cases and have carefully analysed the results. Their clinical observations are described in this issue.

Owing to the war very few people came to Mauritius between October, 1944, and April, 1945. It was therefore possible to exclude, with some certainty, the introduction of the disease from abroad. Another fact suggesting that the outbreak was an epidemic of an endemic disease was the relative immunity of older people, 95% of the cases being in children under ten years of age. The outbreak began soon after a cyclone had done much damage all over the island and at a time when intestinal diseases were increasing in prevalence. There was however no evidence that previous intestinal disease rendered individuals susceptible to poliomyelitis. Starting late in February, most of the cases occurred during the next 6 weeks, with a peak incidence in the third week in March. In towns there was usually a rapid rise and then an equally rapid fall in the number of cases, but in country districts the infection appeared to spread more slowly and mainly along the roads. In many places the first cases were the children of shopkeepers or lorry-drivers who had frequent contacts outside their own districts. In towns the attack-rates were lower at all ages than in rural areas, and in very densely populated places there was an inverse relation between the population-density and the attack-rate. It seemed therefore that the relative immunity of town-dwellers must have been acquired early in life and that it was to some extent increased by overcrowded living conditions. Boys were more often attacked than girls, and of the three main racial groups in the island the Chinese suffered more heavily than the Indians or Creoles. Greater opportunity for contact with strangers is

5. Maegraith, B. G., Havard, R. E., Parsons, D. S. *Lancet*, 1945, ii, 293.

1. McFarlan, A. M., Dick, G. W. A., Seddon, H. J. *Quart. J. Med.* 1946, 15, 183.

suggested as the explanation of differences in the sex and race specific attack-rates, the Chinese section of the population, though small in number, being almost all shopkeepers.

Contact—using the term in the widest sense and including all possible forms of transfer from cases or carriers—seemed to the observers of this outbreak to be the most important factor in the spread of infection. In nearly a quarter of the cases, direct or indirect contact with a previous case could be established. In families with a case, the proportion of adults engaged in occupations taking them away from their home district was significantly higher than in the population of their district as a whole. Except in one village, where an explosive incidence may have been due to infected ice-cream, no evidence was obtained that water, milk, or any widely distributed food had acted as a vehicle, and flies did not seem to be greatly concerned in the transmission of infection. It was thought that faecal spread was uncommon and probably less important than spread by pharyngeal secretions.

Observations on multiple cases in single households led to the important conclusion that the patients were commonly infectious early in the incubation period, which, judged from histories in which there was a short or limited period of exposure to infection, was the usual 8–14 days. This drew attention to the M-shaped or “dromedary” pyrexia exhibited by some patients—a transient fever with vague symptoms lasting a day or two followed a week or so later by the main feverish illness culminating in paralysis. There was reason to believe that this preliminary rise of temperature, sometimes seen within 4 days of exposure to infection, marked the beginning of infectivity. The rate of spread from village to village and the explosiveness of the whole outbreak were inconsistent with as long a time between exposure and the development of infectivity as the commonly accepted 8–14-day incubation period, and it was concluded that a frequent result of exposure to poliomyelitis virus is the development 1 to 4 days later of infectivity occasionally accompanied by a minor illness but not by paralysis; if paralysis develops at all, it appears a week or so later as part of a more clinically obvious illness. During the Mauritius outbreak there were only four cases of poliomyelitis with paralysis among the garrison troops who had been isolated as far as possible from the civilian population. But in the later stages of the outbreak at least two hundred of these troops had a mild “pyrexia of unknown origin.” Unfortunately, lumbar puncture was not done in any of these cases, but their minor illness may have been a non-paralytic reaction to infection by the poliomyelitis virus. Laboratory investigation has shown that some contacts excrete the virus from their pharynx or bowels, though they have so far shown no sign of illness or at most a trivial indisposition often regarded as an influenzal cold or gastric influenza. According to MCFARLAN and his colleagues<sup>1</sup> such minor illnesses, like the first limb of the dromedary pyrexia in some paralytic cases, are probably “illnesses of infection,” commonly occurring within 4 days of exposure, and these contacts are infectious a week or so before paralysis would be expected. This view is supported by GEAR and MUNDEL,<sup>2</sup> who mention

a boy who had poliomyelitis virus in his stool early in the incubation period and infected others at least 4 days before he became ill himself.

Events in Mauritius supported the idea that during an epidemic of poliomyelitis the obvious wave of paralytic cases is merely the trailing and comparatively non-infectious shadow of a much larger and more infectious wave comprising healthy persons excreting virus; abortive cases (i.e., examples of “illness of infection” which does not proceed to clinically recognisable poliomyelitis); and paralytic cases already in the incubation period, some of them showing the first hump of a dromedary fever. The spread of virus by the pharyngeal and faecal excretions of all components of this initial wave, which precedes the paralytic cases by at least a week, may explain many hitherto baffling features of poliomyelitis in small and large communities. It throws light, for instance, on the conclusion drawn by STOCKS<sup>3</sup> from a statistical analysis of the records of poliomyelitis in Lancashire during 1920–29—that for every recognised case at least one hundred other people became infected and were presumably immunised. None of this solves the problem of effectively controlling poliomyelitis in epidemic form, but if the chief factors in the spread of poliomyelitis are the secretions of the human pharynx and aerial transmission of virus, then the best prospects of control seem to lie in the development of protective inoculation and a search for the unknown factors which determine why most of those infected escape invasion of the central nervous system.

## Annotations

### DOCTORS STILL UNEMPLOYED

THE Government's postgraduate scheme for demobilised doctors was originally planned with two principal aims: it was to provide for young doctors some of the hospital experience they missed by their service, and to enable those who had planned to specialise to resume their interrupted training. For would-be specialists the way has now been eased by a relaxation of the conditions required of applicants for class III posts, and by a promise to increase both the tenure and the number of these posts. These extensions of the training scheme, like the new £1000-a-year appointments for fully qualified specialists which the Minister is encouraging hospitals to establish at Treasury expense, reflect concern that the greatest possible number shall be trained and retained in the specialties so as to meet the requirements of the new National Health Service; and if the new terms are fully applied, specialists, actual and potential, should have little difficulty in bridging the awkward gap between now and 1948.

No similar offer has been made to demobilised general practitioners, though their difficulties are also acute. Young graduates who were not established in practice before entering one of the Services can apply for six-months' class I hospital appointments; but many do not wish, and few can afford, to spend the next eighteen months in these or similar posts at the salary of a senior houseman. Mostly, therefore, they seek work in general practice, where their future lies. But when they apply to an agency they find themselves at the end of a long and almost unmovable queue. Principals, they are told, are biding their time until 1948, and are not wanting either successors, partners, or assistants. There is, indeed, evidence that this reluctance to take in

2. Gear, J. H. S., Mundel, B. *S. Afr. med. J.* 1946, 20, 106.

3. Stocks, P. *J. Hyg., Camb.* 1932, 37, 219.

new blood, which we noted some months ago,<sup>1</sup> has become more pronounced than ever. "I was told of a practice for sale the other day," said an agent; "I could have sold it for certain to any of several dozen doctors. The first one I offered it to bought it the next day." These unemployed doctors are not a true surplus; there are not too many but too few in practice. This was inevitable during the war because other claims came first, but today there is no such excuse.

Several ways of ending this artificial separation of doctor from patient have been proposed. It has been suggested, for example, that the limit of 2500 on the number of patients which a doctor may have on his panel list should be reimposed. This may commend itself as just and reasonable; but it is not enough. If, before 1948, the public is to have the fullest possible general-practitioner service, those now in practice must be further persuaded to share work of which they have more than enough with those that have none. A correspondent of the *Manchester Guardian* (Nov. 11) suggests an announcement that compensation under the Act will be paid at 1947-48 (not 1939) values, which would, he thinks, lead many doctors to employ assistants to enlarge their practices. The final alternative is active support from the Government. The Minister is understandably more reluctant to subsidise the general practitioner than the specialist, because the immediate benefits in training, and the remote advantage for the new service, are less obvious. But these doctors are mostly of the younger generation, and without any practical knowledge of civilian general practice. When the service comes into being the demands on the country's practitioners may be greater than ever before, owing to the large number of patients who for the first time will be offered free medical attention. It would help the service to get off to a good start if, in the meantime, these doctors were trained for their responsibilities by an apprenticeship under those who already have experience of practice.

The future service, we are told, is to concern itself more with preventive methods. For their success these depend on genuine understanding between the public-health and the clinical services—an understanding which has hitherto not been as close and cordial as it might. The Minister might therefore like to encourage some of those for whom a place in practice is not immediately found to spend the coming months gaining first-hand experience in the various departments of public health; he would thus be assured of a group of general practitioners having a particular understanding and sympathy for preventive practice. Those that are not absorbed into practice should certainly not be left to kick their heels until they are needed, as they will be, to help in the operation of the Act; to rest content with this continued unemployment is to accede to the attitude that the general practitioner needs no special knowledge or experience beyond what he has gained from undergraduate training and casual hospital appointments.

#### CHLORIDES IN CEREBROSPINAL FLUID

THERE still seems to be some doubt about the interpretation of chloride levels in the cerebrospinal fluid (C.S.F.) in the diagnosis of meningitis. Honor Smith,<sup>1</sup> in her recent paper to the Tuberculosis Association, rightly emphasised that there is no level characteristic of tuberculous meningitis.

Nearly twenty years ago, Linder and Carmichael<sup>2</sup> demonstrated that the fall in the C.S.F. chlorides in meningitis was associated with a fall in the serum of plasma chlorides, and the same approximate relationship between C.S.F. and plasma chlorides has been shown to hold for other conditions. For example, a low level of

serum chlorides is common in nephritis and constant in alkalosis, and in the latter condition the lowest C.S.F. chloride levels of all are met with. In infection in general, and in tuberculosis in particular, there is often a fall in the serum chlorides, and this is mirrored in the low C.S.F. chlorides, irrespective of whether there is meningitis or not. In the "meningism" associated with lobar pneumonia and other conditions C.S.F. chlorides of 650 mg. per 100 ml. and lower may be met with without any evidence of meningeal infection.

In true meningitis, as shown by raised protein and cell contents of the C.S.F., there is usually, though not invariably, a fall in the chloride level of the serum and hence of the C.S.F., and this fall is usually, though again not invariably, greater in tuberculous than in non-tuberculous meningitis, but the difference is a statistical one and may be misleading in an individual case. Allott<sup>3</sup> has shown that in about 50% of cases of tuberculous meningitis there is a C.S.F. chloride level of 640 mg. per 100 ml. or lower on first examination, whereas for non-tuberculous meningitis the 50% level is 675 mg. per 100 ml. Very low C.S.F. chloride levels are commoner in tuberculous than in non-tuberculous meningitis, and Allott found 25% of tuberculous but only 5% of non-tuberculous meningitis cases with levels below 600 mg. per 100 ml. on admission to hospital.

The cytology of the cerebrospinal fluid in the two main forms of meningitis is usually distinctive, the pyogenic form containing numerous polymorphs and the tuberculous form predominantly lymphocytes. But difficulties are sometimes met with here also, since in the early stages of tuberculous meningitis there may be only a slight rise in the cell content and more than half the cells may be polymorphs—a finding similar to that in poliomyelitis and virus encephalomyelitis. Tubercle bacilli can be found in smears in a fair proportion of cases of tuberculous meningitis if the C.S.F. is examined repeatedly, and they can be grown in culture from the majority, though, owing to the slow growth of the tubercle bacillus, the culture result is often obtained only after the patient's death. Notwithstanding these difficulties, the characters of the C.S.F. tend to change towards the "typical" finding of high lymphocytes and very low chlorides as the disease progresses; and most cases can be diagnosed with certainty by repeated examinations, even if the first specimen of fluid gives equivocal results.

#### SCIENTIFIC LIAISON BETWEEN NATIONS

UNTIL the first world war, science had been considered to be above the battle. The example usually given is that of Sir Humphry Davy visiting France at the height of the Napoleonic wars, and being honoured by Napoleon himself. From 1914 to 1918, however, the scientist was found to be such a vitally important part of the nation's war effort that this scientific internationalism broke down completely; only medicine escaped, and the doctor was still expected to treat friend and enemy alike. Between the two wars attempts were made by various organisations, notably the League of Nations, to bring together scientists from all countries, and the last few months has seen a heartening revival in such attempts—for example, the British-Swiss Medical Conference and the International Medical Conference in London. In a special number of *Chronica Botanica*, published in the autumn of last year, B. Cannon and R. M. Field review the aims and methods of international scientific relations, both past and future.

Their memorandum starts by emphasising that "war is a great stimulus to national, and to limited international, coöperative scientific research in most of the applied sciences." What is needed today, to quote Joseph Needham, is "an attempt to combine the methods

1. *Lancet*, 1946, i, 968.

2. See *Lancet*, Oct. 12, p. 528.

3. Linder, G. C., Carmichael, E. A. *Biochem. J.* 1928, 22, 46.

3. Allott, E. N. *Proc. R. Soc. Med.* 1945, 38, 275.

which the world of science has spontaneously worked out for itself in periods of peace with those which the nations have had to work out under the stress of war." To this end a questionnaire was sent out to the various international congresses, unions, and associations with a view to finding out how much exchange of information (other than for war purposes) had taken place during the war years between different countries, and how much post-war activity was anticipated by the congresses, &c. Most were of the opinion that international scientific relations are of great value in helping mankind towards a more settled form of existence. A few thought it would be better to revert to the old system under which individuals or societies arranged to meet among themselves; but, as Needham points out, the fallacy of this attitude is that the picture of world science looks very different when seen from Rumania, Péru, Siam, or China, than from such centres as Paris, London, or Washington. For hundreds of years the growth of science and technology has been most rapid in those countries with greatest access to raw materials; the upheavals and discoveries produced by the search for raw materials has been one of the profoundest causes of wars in the past. The memorandum emphasises this, and also the enormously increased bearing which science has on human welfare in normal peace-time activity. At the same time there is the paradox that the man in the street learns less and less about the advances in science owing to its increasingly technical language; and one of the most constructive suggestions made at the International Conference on Intellectual Coöperation at Havana in November, 1941, was that there should be a new class of "intermediary" scientists to convert a highly symbolised mathematical language into a literary form which can be understood by most men and women with an average general education and is at the same time scientifically accurate.

Perhaps the most urgent reason why scientists should meet together and collaborate is to avoid the suspicions which arise from a narrow nationalistic outlook. How necessary this is may be judged from the fact that in the past the Russian government, through its Academy, has preferred to communicate with individual American scientists rather than with their organisations. Scientific bodies work in ways which differ considerably, and one of the recommendations at the end of the memorandum suggests that "the foreign secretaries of the Russian Academy of Science, the Royal Society of Great Britain, and the National Academy of Sciences of the U.S.A. should explore the possibilities of an inter-Academy study of their international relations in those phases of science which are of benefit to mankind, and inimical to none."

#### EQUAL PAY

Two years ago a Royal Commission, with Lord Justice Asquith as chairman, was appointed "to examine the existing relationship between the remuneration of men and women in the public services, in industry and in other fields of employment; to consider the social, economic and financial implications of the claim of equal pay for equal work; and to report." Briefly, they find<sup>1</sup> that while equal pay is usual—and indeed harmless—in the professions (except nursing and teaching), it is unusual in the civil service and in industry; and while all the members favour its introduction into teaching, the civil service, and the Post Office, the majority feel unable to recommend it in industry and commerce. As to nursing, they content themselves with stating without comment the position since the Rushcliffe reports appeared. A note of thankfulness sounds in the remark of the majority that their terms of reference do not call them "to attempt any final summing-up

of the relative importance of ensuring exact justice between individuals on the one hand and oiling the wheels of economic progress on the other." In this disclaimer the minority—Dame Anne Loughlin, Dr. Janet Vaughan, and Miss L. F. Nettlefold—have no part, holding that "the claims of justice between individuals and the development of national productivity point in the same direction."

The commission note that for most of its advocates "equal pay for equal work" means a fixed rate for the job; it does not mean equal pay for equal value to the employer. The majority believe that the lower wages of women can be accounted for by lower efficiency; while the minority argue that the main cause of these low earnings is the exclusion of women from a number of trades in which, given opportunity and training, they would be efficient workers, combined with weak trade-union organisation. Some legal restrictions on night work, and, in some trades, on length of hours worked by women, reduce their value to employers; but, as the minority remark, medical evidence suggests that women are as well suited to night work as men, and restrictions on the length of hours worked will matter less as standard working hours are reduced. In the same way, the greater physical strength of men will have less importance as machinery is substituted for muscular power. It was alleged by some employers that women are less able to deal with "surprise situations" than men. Finally, it is admitted that absenteeism is commoner among women; but this is due, as all agreed, to the family responsibilities of women, and their attitude to employment, rather than to physical disabilities. The minority suggest that it is "both unfair and economically undesirable that an individual woman should be penalised, even if she is never absent, and an individual man benefited, even if his attendance is poor, because, on the average, men have a better record of attendance than women."

In any case, any difference in efficiency between the sexes is considerably less than the difference in wages—women often being paid only about 60% of the men's rate. There are even statutory wages councils which discriminate against women merely because it is customary in their trades; and cases of this sort, the commission believe, should be remedied by Government influence. It is worth recalling that professional women, already assured of the right to equal pay, were often given that right by strong organisations. They include doctors, dentists, physiotherapists, radiographers, university teachers, actresses working for ENSA, journalists, and some librarians. Nor was it always easy to enforce the principle, as medical history shows. But women in industry often have little sense of the value of organisation: the proportion of trade-union members among working men just before the war was 37%, among women 11%; by 1944 the figures were 61% and 29%.

The commission has produced a mass of valuable information and argument, and its failure to reach more unanimous conclusions is scarcely surprising in view of the intricacy of the subject. A serious practical objection to ensuring "exact justice" throughout industry is that, by and large, women have fewer dependants than men. To give them the same pay would raise their standard of living relatively to that of the married man and his wife and children. Already, despite income-tax reliefs and family allowances, the pecuniary penalties on marriage and parenthood are so severe as to be socially harmful, and, unless we are prepared at the same time to introduce adequate dependants' allowances for all workers, it might do more harm than good to equalise wages generally between men and women. The fact that men usually have heavier responsibilities at home is one of the reasons why the average employer, given a choice between a man and a woman at the same rate of pay, will usually prefer the man—which means incidentally that enforcement of equal pay for women

1. Report of the Royal Commission on Equal Pay. Cmd. 6937. H.M. Stationery Office. Pp. 220. 4s.

would increase any risk of unemployment for them. Since many women have expensive dependants, and many men have none, this habit among employers is only a very blunt instrument of social justice. Yet it is wielded occasionally even in the professions, where the custom of equal pay for equal work has sometimes been known to deprive women of appointments for which they were fit. We do not regret that custom, but it is insufficient by itself. As the commission point out, our present family allowances and income-tax rebates are insufficient; and we doubt if any effort to make remuneration equitable will get far without the inclusion of larger allowances for dependants.

### SYNTHETIC PENICILLIN

THE recent announcement in the press that penicillin G (I) has been synthesised in America, though accurate in fact, may have been misleading in emphasis, for the yield is very small.

During the war penicillins F and G (I and II) were obtained in traces by synthetic processes which were worked out simultaneously in Oxford and in the Merck laboratories in New Jersey, U.S.A. Secrecy had to be maintained at the time, but a joint monograph is shortly to be published. It was clear in the early stages of these investigations that the antibacterial product obtained was penicillin, but more evidence on this point was gathered by workers at Cornell University, who also obtained the product in a high degree of purity. Du Vigneaud and his colleagues<sup>1</sup> of the Cornell biochemical department have now described the synthesis of penicillin G, by the interaction of *d*-penicillamine and 2-benzyl-4-methoxymethylene-5(4)-oxazolone. There seems to be no likelihood that a way will be found of increasing the yield, and indeed the chances of any other reasonably cheap penicillin synthesis being developed are remote. On the other hand, the work done by British and American chemists may well lead to the preparation of new "unnatural" penicillin compounds which may have a little something that the natural products haven't got.

### 1942: THE TIDE TURNS

THE coincidence of the celebration of the fourth anniversary of El Alamein and the publication of the Registrar-General's report on 1942<sup>1</sup> had a certain significance, for 1942 marked the turn of the tide in the medical as well as the military sense. 1940 and 1941 were marked by all the vital statistical indications of the effects on national health of the strains of total war. Mortality from pulmonary tuberculosis, respiratory diseases, and cerebrospinal fever had risen considerably above their pre-war levels; the downward trends of infant and maternal mortality had been halted, and there was a rise in the civilian death-rate. Some of this mortality was due either directly to the air-raids, which caused 22,215 deaths in 1940 and 19,543 in 1941, or indirectly to the rise in infectious diseases resulting from the congested living and working conditions and poor diet inevitable at the time.

The recovery in our military fortunes which 1942 brought was associated with a striking improvement in the statistical measures of national health. The most sensitive indices of well-being—infant mortality and pulmonary tuberculosis death-rates—fell to record low levels of 51 per 1000 related live births and 542 deaths per million of the civilian population at all ages. Epidemic diseases, such as whooping-cough, measles, and scarlet fever, all had low mortality levels; cerebrospinal fever caused only 1143 deaths compared with the 2459 deaths of 1940. These results were at least partly the

result of the less harassing conditions of life suggested by the fall in the number of air-raid deaths to 3891, most of which occurred in the "Baedeker" raids on Bath, Exeter, and Norwich. The achievement for the first time of a death roll from diphtheria below 2000, however, can be fairly attributed to the Ministry of Health's immunisation campaign. A curious feature of these annual reports on the war years is the progressive decline, noted also in the first world war, in the number of suicides; from a pre-war annual average of 5000, the toll fell to 3416 in 1942.

The Comparative Mortality Index, which takes 1938 as a base line of 1.000 in the standardisation for age, was introduced in the 1941 report<sup>2</sup>; in that for 1942 it takes its place as a regular feature. From 1938 the trend in civilian mortality is clearly indicated by the C.M.I. Similarly the ratio of male to female mortality shows the disproportionate rise in mortality among the men of the civil population.

	C.M.I.	Male-female ratio
1938 .. .. .	1.000 .....	1.343
1939 .. .. .	1.022 .....	1.339
1940 .. .. .	1.171 .....	1.382
1941 .. .. .	1.070 .....	1.406
1942 .. .. .	0.942 .....	1.416

The Registrar-General's report for 1945 is in preparation, and we may look forward to a resumption of the complete and up-to-date reports of pre-war practice.

### ON THE STAFF

AT some hospitals junior honoraries are not distinguished from their seniors except, possibly, by an "assistant" before their titles. At many others the distinction is one not only of name but also of privilege: the assistant may, for example, be expected to see all outpatients, and may have under his personal charge only a few beds, the number depending on his principal's liberality. This practice is blessed by the years; but, as a correspondent indicated some months ago,<sup>3</sup> it is one that would best be abandoned. The division of duties is indefensible; work in the outpatient department no less than in the wards requires all the skill a unit can command; and there is much in favour of the care of the patient, after admission, being in the hands of the doctor who first examined him as an outpatient.

The assistant honorary, who, in any case, shares an equal weight of responsibility with others on the staff, should be rewarded at least by official recognition in the allocation of beds. St. Peter's Hospital for Stone, London, have now announced that the title of assistant surgeon is to be discarded there; all the honorary surgical staff will be called honorary surgeons and will control an equal number of beds, except perhaps for some slight advantage to one or two of the most senior. Junior honoraries elsewhere will hope that this example is not lost on other hospitals.

### THE SCOTTISH BILL

THE Bill providing for a comprehensive medical service for Scotland was published last week. Though the scheme as a whole follows the English model, there are several interesting variations. For example, the provision, equipment, staffing, and maintenance of health centres will be the duty of the central health department, and though the Secretary of State is empowered to delegate this function to local health authorities he is, it is stated, unlikely to exercise this power widely in the early years of the new service. The main differences between the Scottish Bill and the English Act are described in our parliamentary columns.

1. Du Vigneaud, V., Carpenter, F. H., Holley, R. W., Livermore, A. H., Rachele, J. R. *Science*, Nov. 8, 1946, p. 431.

2. Registrar-General's Statistical Review of England and Wales for 1942. Tables: part I: medical. Pp. 319. H.M. Stationery Office. 5s.

3. See *Lancet*, Sept. 28, p. 469.

3. *Lancet*, 1945, II, 350.

## Special Articles

### KIDNEY SUBSTITUTES

ADDRESSING the Medical Research Society at University College Hospital on Nov. 7 on the artificial kidney developed under his direction during the war years, Dr. W. J. KOLFF, of Kampen, Holland, said that the intention was to provide a means by which a uræmic patient could be tided over a phase of acute anuria, until diuresis and kidney function should return. Previous attempts at doing this by dialysis had failed because of the lack of a reliable drug to prevent clotting and of a suitable dialysing membrane; heparin and 'Cellophane' now fulfilled these needs. In all previous experiments the area of dialysing membrane had been much too small, and the quantity of blood required to be withdrawn from the body at one time much too great. It was this last problem which he and his co-workers had overcome.

Initial experiments indicated that what was wanted was a cellophane tube at least 10 metres long, and capable of taking at least 500 c.cm. of blood. Dr. Kolff then illustrated by photographs how this was done. After the patient had been heparinised, blood was led off through a glass cannula from the radial artery and passed through a hollow axle at one end of a horizontal revolving drum into 30-40 metres of cellophane tubing wound round the drum. When the blood entered the tubing it fell by gravity to the bottom of the first loop, and by rotating the drum it could be made to pass through the length of the tube from one end to the other. The lower part of the drum was immersed in a bath of special fluid, heated electrically to a constant temperature. On leaving the tube the blood passed through another hollow axle at the other end of the drum, and thence through the usual type of transfusion pump to a vein in the arm. A specially designed "bubble-catcher," placed between the pump and the vein, was very effective in preventing air-embolism, which had never occurred.

The composition of the fluid in which the cellophane tube was bathed during rotation underwent several changes with experience. The one at present recommended consisted of NaCl 0.6%, NaHCO<sub>3</sub> 0.2%, KCl 0.04%, and glucose 1-3%. The potassium content of the blood was occasionally raised in uræmic patients, but with long dialysis the potassium fall might be too great, unless some KCl was included in the fluid. About 4 mg. of the calcium in every 100 c.cm. of blood was in a readily dialysable state, and the blood-level was therefore usually lowered after use of the kidney. In one patient where the expected fall did not occur it was found that the tap water used contained 4 mg. of calcium per 100 c.cm., so that the blood and dialysing fluid were in equilibrium. Calcium could not be added to the fluid because CaCl<sub>2</sub> caused a precipitate of CaCO<sub>3</sub> when mixed with NaHCO<sub>3</sub>. Calcium loss was therefore made good by giving 2 g. of calcium gluconate intravenously—i.e., into the tube during dialysis.

#### CLINICAL USE

Dangers in the use of the artificial kidney were sometimes unavoidable. A leak or break in the cellophane tube could be repaired easily by stopping the drum. Clotting in the tube should not occur but had done when heparinisation was insufficient. Hæmolysis in the tube could be prevented by careful attention to the composition of the fluid, and especially by the addition of glucose. Damage to the erythrocytes during their passage should be minimised. Rigors were always a danger to a severely ill patient. For this reason the greatest care was taken with the surgical sterilisation and cleanliness of all parts of the kidney through which the blood flowed. Shock and pulmonary œdema were additional possible complications; each should be dealt with by appropriate

measures, including the addition or withdrawal of blood from the circulation. But failure of the left heart in these ill patients, who often had hypertension, was a common termination, quite apart from treatment with the kidney. In a heparinised patient bleeding was serious, if it occurred, and such a condition as a peptic ulcer might be a contra-indication to dialysis, except as a last resort.

Dr. Kolff then described early cautious clinical use of the apparatus, and went on to give typical case-histories. Statistical data were of little value when every uræmic patient was treated irrespective of a seemingly hopeless prognosis. As much as 263 g. of urea had been removed from the blood of one patient in one dialysis. Dr. Kolff gave a dramatic illustration of what this meant by pouring this quantity of urea on to the bench in front of him. Other retention products than urea were, of course, also removed by dialysis, and the electrolyte balance in the blood was adjusted in the direction of normality, so long as the correct composition of the dialysing fluid was maintained. Some drugs, including iodides, salicylates, and chemotherapeutics, were also dialysable, and some poisons could possibly be removed in this way. Among the first fifteen cases treated, one had survived, a patient with anuria following chemotherapy. It could not be said, however, that in this case recovery was due to dialysis, as the usual therapy alone might have been sufficient. Ten more patients had since been treated, with four survivals. A woman of 67 with acute cholecystitis and glomerulonephritis, and complete anuria, who before treatment with the kidney was fully expected to die, was one of the recoveries. The other three were a man with prostatic enlargement, stones in the bladder and in one ureter, and chronic cystopyelonephritis, and a girl of 13 and a man of 54, both with acute glomerulonephritis. The girl was comatose, with œdema, anuria, and bronchopneumonia; dialysis reduced her blood-urea from 364 mg. to 140 mg. per 100 c.cm., and diuresis set in during dialysis. The man was similarly very ill, with almost complete anuria, hiccups, mild œdema, and pulmonary congestion; his blood-urea was reduced from 324 mg. to 172 mg. per 100 c.cm.; in this case diuresis did not appear until 5 days later, and use of the kidney may well have prevented fatal toxæmia.

#### PERITONEAL LAVAGE

Turning to peritoneal lavage as an alternative to the artificial kidney, Dr. Kolff described the apparatus he had used. One of the main problems was to ensure absolute sterility of the fluid, because of the dangers of peritonitis. This was done by putting a small tank, with five litres of a solution of NaCl, NaHCO<sub>3</sub>, and KCl, inside a larger tank containing dextrose, CaCl<sub>2</sub>, and HCl. Both were then sterilised by boiling. After cooling, the large tank was tipped up on its side, the contents of the two tanks being thereby mixed while sterile, and without chemical change due to sterilisation. The fluid was then run into the peritoneal cavity through one catheter and out through another. The catheters were introduced by means of a trocar and cannula, or through a surgical incision.

Quite successful, though slower, clearance of toxic substances could be achieved by this method. The longest time a patient had been maintained under lavage at Kampen had been 36 hours, because of the danger of peritonitis at the site of entry of the catheters. An attendant must always be present, because the outgoing tube, no matter how constructed, constantly got blocked. This was dealt with by immediate reversal of the current of flow. Ten cases had been treated at Kampen so far. The last, a girl of 5 years with chronic nephritis and a daily output of only 2-2.5 g. of urea, had now been kept alive for 5 weeks, and had had five lavages; one began to ask how long this could be continued.



A further method of dialysis under trial was to isolate a loop of ileum surgically, bringing both ends to the surface of the abdomen and anastomosing the remaining intestine. It had been shown that perfusion of such a loop a metre long for 10 hours would remove as much as 5 g. of urea from the blood. Dr. Kolff concluded by foreseeing the time when a man in whom both kidneys had been removed might perform his nightly lavage, after going about his ordinary daily business.

### WOMEN DOCTORS IN WAR

At a meeting of the Medical Women's International Association, held in London from Sept. 19 to 22 under the presidency of Miss LOUISA MARTINDALE, F.R.C.O.G., women doctors from Belgium, Denmark, Finland, France, Great Britain, Holland, India, New Zealand, Norway, Sweden, Switzerland, and the United States described the work of their colleagues during the war.

#### IN THE FORCES

Dr. S. LAMOTTE (France) said that French medical women had won an uncontested place in the Army during the later campaigns. The occupation of France made it impossible to set up an officially recruited force, but a body of women doctors got together and worked with the French Army in France, North Africa, Italy, England, Alsace, and Germany—the A.F.A.T. (the French women's auxiliary army force), formed in North Africa in 1944, contained a medical corps of over 150. After the liberation the corps set up centres for refugee children and treated deported men in Germany. Dr. Lamotte herself later joined a biological and therapeutic research station of the medical corps which studied problems of malnutrition and infection.

Dr. LETITIA FAIRFIELD (London), one-time woman medical adviser to the War Office, said that medical women had been used almost interchangeably with men. The only difficulty that had arisen was over routine inspections in men's barracks. In the recruitment and training of the A.T.S. they had also been able to suggest points where the routine of the Army must be adapted for a women's service. Before the end of the war there were 600 women doctors in the Army. Dr. DOROTHY FENWICK (London) said that women doctors were given important work in the Air Force and were well received by their male colleagues. She herself covered 22,000 miles a year on visits of inspection, and every airwoman had the opportunity of consulting a woman medical officer.

#### RESISTANCE

Dr. FOG (Denmark) told how medical women in her country had secretly received weapons, helped and transported saboteurs, hid refugees and parachutists, and acted as couriers. Constant coming and going made consulting-rooms a safe place of rendezvous, visits to patients afforded a means of conveying information, ambulances and hospitals were often used to save Jews and others whom the Germans were seeking, and wounded saboteurs were kept in secret clinics and private houses. Many women doctors were discovered and sent to concentration camps for long periods. Dr. DROEVER BONNET (Holland) related how one woman doctor was a leader of the whole Dutch movement, and how another who used her house as a centre of the resistance was arrested and killed by the Germans. Yet another, as chief doctor in a German internment camp, was able to help some internees to escape.

Dr. ASTRID GULDBERG (Norway) told of ten women doctors who were imprisoned for their share in the resistance, and of one who went voluntarily with her Jewish patients to Germany, and has never been heard of again. Dr. DE BLAINVILLE (France) was arrested for her resistance activities in 1944 and sent to Fresnes prison, near Paris, and then to Ravensbrück, the biggest concentration camp for women in Germany, where there were 16,000 internees at one time with no medical attention. Huts were densely overcrowded, and infection was rife. Examination for pregnancy was conducted with no attempt at cleanliness, and prostitutes mingled with healthy women. Experiments were carried out on

the prisoners with the greatest cruelty. Many women were treated as guinea-pigs and then put to death.

#### RECONSTRUCTION

Dr. BERGEROT (France) said that 600,000 arrests were made in France during the war, and there was still no news of 250,000 people who were deported to Germany. There was an order in France that employers must take back their old employees, but this created difficulties because so many of the returning men were suffering from emotional instability, loss of memory, and physical deterioration. Dr. JEISLER (France) declared that the peak of delinquency and emotional disorder in children was reached in 1942, and had since lessened. The war had increased psychological disorders in children, but only among those who had already shown such tendencies. A few children had been found living wild in bands near the towns at the time of the wholesale deportations. Some, who had lost their parents or had seen them maltreated, wanted to avenge them. Jewish children had been particularly difficult. The surviving children of the deportees were like little savages. They had their own laws and their own chiefs and were brutal, but with patience they were gradually coming back to normal.

Dr. MIDDLEHOVEN (Holland) said that Holland had set up relief units, which had enabled them to combat in a short time the most cruel consequences of the hunger blockade. Tuberculosis and syphilis had increased alarmingly, and congenital syphilis was now not uncommon. The physical condition of the Dutch population of the Netherlands East Indies, who had been evacuated to Holland after the capitulation of Japan, was deplorable, and dispensaries for tropical diseases and nutritional deficiencies had been set up. She was impressed by the training and education which the children had been given by their mothers in the Japanese camps. They behaved much better than the Dutch children, who practically ran wild during the war years. Those who had collaborated with the Germans presented another grave problem. They were still in camps, their children had been taken from them and placed in homes or with foster parents, as camp life was not suitable for them, and it was feared that they would become infected with Nazi ideas.

The next international congress is to be held in Holland, in June or July, 1947, when the Place of Medical Women in Post-war Reconstruction will be the topic for discussion.

### MENTAL DEFICIENCY IN NORTHERN IRELAND

THE Mental Health Services Committee appointed by the minister of health and local government to investigate the problem of mental deficiency says in its report<sup>1</sup>:

"In Northern Ireland there is no Mental Deficiency Act, no institution, no community supervision, and there is only one special school (in Belfast), which is unable to meet even local needs. Apart from the inadequate provision made by the Education Acts and the Poor Relief Acts, the responsibility for dealing with mental defectives has not been placed by statute on any authority and, for the most part, these unfortunate people lead a hopeless existence at home, in Poor Law institutions, or in mental hospitals . . . we cannot over-emphasise the need for early action."

Ascertainment, the committee suggests, should be improved by placing on medical practitioners and on schools a statutory obligation to notify the mental-deficiency authority of suspected deficiency. Defectives should be dealt with by the ministry of health as the central authority, and by a regional authority composed of representatives from county and county-borough councils and other interested bodies; this regional authority should be responsible for ascertainment, the provision and administration of institutions, and the supervision of defectives in the community. Local mental-health committees should be formed to advise the regional authority and coördinate the activities of those interested. The mental-deficiency authorities should be either amalgamated or closely associated with

1. H.M. Stationery Office. 1s.

the authorities administering all the other mental-health services. It is proposed that the mental-deficiency authority shall be given compulsory powers to deal with all ascertained defectives.

"It is wrong to wait until the defective gets into trouble or runs foul of the law before affording him the care, supervision, and training which his mental condition requires and which it is in his own interests to receive. Mental deficiency is often hereditary, and we consider it wrong to leave any power in the hands of mentally defective parents. . . . It is not suggested that all defectives would be sent to institutions."

The committee favours a single colony with, eventually, 1000 beds, to be established within 20-30 miles of Belfast. A school should be included, where the opportunity of education might be extended not only to those unsuitable for ordinary or day special schools but also to the so-called ineducable defectives. Suspected defectives should be admitted for a short time to an observation unit which should not be in, but should be near, the colony. Defectives in the colony could be sent out on licence to a hostel, a private house, or their own homes. The provision of sheltered employment, the committee concludes, should be considered when mental-deficiency legislation is being drafted.

### NOBEL PRIZEMAN

THE award of the Nobel prize for 1946 in physiology and medicine to H. J. Muller, of Indiana University, will be welcomed by scientists all over the world. Muller's genetical work is widely known mainly on account of his spectacular demonstration in 1927 of the effects of X rays in producing mutations. His imaginative power at once enabled him to develop the discovery in collaboration with others, to plan further experiments, and to appreciate the evolutionary significance of the new knowledge. He focused attention on the essential property of the genic substance—namely, its ability not only to copy itself but, after being changed by mutation, to copy the alteration as well. Apart from the impressive contributions of Muller in the experimental field, his capacity to integrate many aspects of the subject has made him an outstanding figure in genetics. At the present time the medical importance of the knowledge of radiation effects on germ cells is becoming increasingly obvious, and Muller's work is now of more practical value than even he himself could have foreseen twenty years ago.

## Public Health

### Tuberculosis under the National Health Service

THOSE who have worked among the tuberculous hold that this disease presents a special medical problem and must be considered apart from other social diseases. Dr. Norman Tattersall, principal medical officer of the King Edward VII Welsh National Memorial Association,<sup>1</sup> fears that under the National Health Service Bill the need for unity of tuberculosis control is being lost sight of; chest cases are to be referred to the care of a chest physician, bones and joints to the orthopaedist, and other forms to the appropriate special department. Though he agrees that each special department must direct the treatment of particular phases of infection, yet tuberculosis is always an infectious disease combined with a social problem, and all forms must be subject to broad control of the disease, with the family and not the individual as the unit. "If this is lost," he writes, "we shall witness a reversal of the principle which has guided the development of the service ever since Sir Robert Philip opened the first dispensary in 1887."

Sir Edmund Spriggs, in a discussion of the same subject at the annual meeting of the association's board of governors, said that the Bill as at present drafted seems to hand over tuberculosis to general physicians, surgeons, and health visitors, though pulmonary cases would be protected to some extent by the fact that some of the new chest physicians would be former tuberculosis doctors. For some fifty years he has watched the development of the medical and surgical management of tuberculosis, and has concluded that it does call for special experience. "A doctor without that experience is no more able to do the best possible for a random

series of cases of tuberculosis than he is to perform a succession of varied operations before he has had surgical training." Among his reasons for regarding tuberculosis as a problem of its own he gave the following:

1. It is a general disease with local manifestations. The division into pulmonary cases and surgical cases, to be treated by physicians and surgeons respectively, is not wholly sound. At the North Wales Sanatorium, Dr. F. S. Hawkins and Dr. G. O. Thomas recently found pulmonary disease present in no less than a quarter of 143 so-called surgical cases. The complication might easily have been overlooked if the patients had been transferred to general surgical wards, beyond the supervision of a tuberculosis specialist.

2. Many tuberculous patients must be segregated, for their own sakes and that of the community.

3. They need treatment over a long period.

These last two considerations mean that tuberculous cases must be managed on a different plan from other diseases amenable to arrest and cure.

4. Pulmonary tuberculosis is the commonest chronic disease of young people. Other common chronic diseases, such as heart disease, arthritis, and arteriosclerosis, occur mostly in later life, and many of those affected are already of pensionable age; others by care and treatment may gain five or ten years of useful life. But every case of tuberculosis in a young person which is arrested, or better prevented, brings to the community 30-40 years of possible usefulness. The treatment of this disease, especially of early cases, thus has a high economic value. "It pays handsomely."

Lastly, Sir Edmund believes that, to get the best results, the care and reablement of the discharged tuberculous patient and of his whole family should be in the hands of specially trained health visitors who are in direct personal relation with the expert tuberculosis doctor. A liaison between the staffs of general hospitals and tuberculosis hospitals is desirable and will benefit both, but if the welfare of the patient is to be the first consideration there should not, in his view, be fusion.

### Paratyphoid in Sheffield

New cases of paratyphoid in Sheffield have now fallen to 1 or 2 a day, and it seems likely that the source of infection present in September and October has been eliminated, though it is still untraced and likely to remain so. The total number of cases to Nov. 12 was 141. The younger age-groups have been most affected throughout, and the illnesses have been of moderate severity, but with a remarkably profuse rash.

The authorities of Sheffield University felt that members of the staff and students should not be denied the protection by inoculation which has been so successful in the Armed Forces. Arrangements were made for T.A.B. inoculations to be carried out in the bacteriology department on four days of one week and four days of the succeeding week; 340 completed the course of two inoculations of 0.5 and 1 c.cm., and an additional 26 had one inoculation only. There were no serious reactions.

This is not a new departure in Sheffield, for immunisation against typhoid and against diphtheria was made available to students and staff who desired it during the war years 1940-43, and large numbers took advantage of the offer. In view of the changed situation it was not provided in 1944 or 1945. In all cases the immunisation was entirely voluntary and the diphtheria immunisation was naturally only given to Schick-positive subjects.

### Infectious Disease in England and Wales

WEEK ENDED NOV. 2

*Notifications.*—Smallpox, 0; scarlet fever, 1187; whooping-cough, 1549; diphtheria, 274; paratyphoid, 66 (38 at Sheffield); typhoid 6; measles (excluding rubella), 3374; pneumonia (primary or influenzal), 485; cerebrospinal fever, 40; poliomyelitis, 25; poliomyelitis, 2; encephalitis lethargica, 0; dysentery, 69; puerperal pyrexia, 117; ophthalmia neonatorum 63. No case of cholera, plague, or typhus was notified during the week.

*Deaths.*—In 126 great towns there were no deaths from enteric fever, 3 (0) from scarlet fever, 2 (0) from measles, 8 (1) from whooping-cough, 3 (1) from diphtheria, 31 (2) from diarrhoea and enteritis under two years, and 12 (1) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 273 (corresponding to a rate of 30 per thousand total births), including 38 in London.

1. Thirty-fourth Annual Report of the Association. Pp. 35.

## In England Now

### *A Running Commentary by Peripatetic Correspondents*

THOSE of us who have returned to England after some years overseas find it a very different country from the one we left. I am not referring to the physical changes of war but to the changed mental outlook. Long-continued shortage of all the luxuries and many of the necessities of life has lowered the standards of honesty. Even the most respectable people will go to extraordinary lengths to get a little extra "off the ration," and, since high taxation has made the investment of money for interest hardly worth while, people have taken to speculating in property to increase their capital. Car-dealing is the commonest form of speculation—one hears of people buying a new car for £600 and being offered £1200 as they drive it out of the garage—but there are many others. Professional dealers in goods are complaining that the amateurs are ruining their business. One obvious result of all this property changing hands is the creation of artificial shortages. Let us hope that the cry of "Every man for himself!" will no longer be heard when the home markets become stocked with enough goods for everyone. Otherwise I shall be off to the jungle, where the decencies are observed.

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Who will take up the cudgel on behalf of some of the most hardly hit victims of the world rubber shortage? As G.P.s of the pre-war days we used to see these now unhappy creatures at three, six, or even nine months' intervals and perhaps we scolded them gently for not visiting us more often; but it did not really matter. In those days Britain was supreme. We owned Malaya, and rubber was rubber; so if a few thoughtless ladies hung on to their ring pessaries for more than the usual three months we knew they were comfortable and did not greatly care.

Things are different now. These hapless women haunt our surgeries and monopolise our phones. "The ring you put in last week has slipped." "I can't walk. The backache is terrific." "The rubber has perished and I've only had it in a month." Many suffer in silence. They imagine that we will think they are complaining about nothing. Their housework becomes torture. Many cannot cycle. Others dare not lift a bucket of coal. At first we were inclined to blame ourselves. We fitted another ring and prescribed patience. But things did not improve and all round the story is the same.

Nowadays most rings are made of synthetic rubber. They are thinner than formerly. The rubber perishes quickly and they slip out of place easily. The victims are inarticulate. They will never write letters to the press or bombard their M.P. with demands for better service. But something should be done about it.

\* \* \*

One of your peripatetics, writing of a children's club in Holland, remarked that English boys are not normally afraid of the police. Nor are they—unless of course they have been "up to something." Anyone who wants to see relations between boy and bobby at their best should visit one of the clubs run by police in some of our great cities. Norwich started the idea more than 20 years ago.

Perhaps the most important point about these clubs is that they emphasise the friendly and helpful side of the policeman's attitude to the junior ranks of the population. Another thing is that a club (or anything else) under police management is likely to be efficient. They have the knack of doing a thing thoroughly and well if they do it at all. The prevention of crime is the first police function, and in no better way can they discharge their duty than by directing the energies and interests of the young into healthy channels and giving them the right sort of examples to imitate and the right sort of ideals to aim at. Boy is a hero-worshipper by nature, and—fortunately or unfortunately—he does not always select his heroes wisely. Saintliness does not in itself make any strong appeal to him. Even honesty, as such—sad to say—evokes no enthusiasm. He wants toughness in his hero, physical strength, and skill with the fist, the foot, or the gun. For this reason a good many of

the youngsters who are most likely to go wrong avoid such entirely admirable organisations as the Boys Brigade, Boy Scouts, and so on; and fear of too much discipline often keeps them away from the Cadet Corps.

It's just these little "tough guys," often from bad homes and an unhealthy environment, that are most likely to get into trouble—sometimes serious trouble leading eventually perhaps to a life of crime, unless something is done to pull them up. Police have special opportunities of making contact with these types, and it is less difficult to get them to come to a police-run club than an ordinary one, because the policeman has at least some of the attributes the lad looks for in his hero: he is a bit of a tough guy himself, and the boy knows that there will not be any sloppiness in a police club. There will be well-run games and good boxing, things to learn which may be useful, and even perhaps the chance of picking up a good job later on.

Though several of our big towns have such clubs, until quite recently the experiment had not been tried in London. What can be done in a self-contained compact community like Norwich or Swansea is not so easy to achieve in a vague inchoate area like Hornsey or Lambeth. However, a start has now been made at Croydon, which is within police London. An energetic police superintendent, backed by other officers and a strong local committee of enthusiastic Croydon citizens, has opened and is running a club for boys in a district where nothing much of the kind exists. The superintendent and his friends want to strike a slightly new note. Every boy is to be made to understand that he has got to give as well as take: he won't get all the fun and games for nothing. His payment is to be in the form of service; he must qualify in first-aid and life-saving, and he must learn all about his municipality and how it is run. He will be taken to see the wheels go round—on visits to the town hall, the power station, the gas works, the hospitals, and other local institutions—and he will be expected to know about every kind of local activity of a public and semi-public kind.

Later this club may experiment on lines that have been successful in American cities, where they have what they call a "junior police corps." Boys who have been club members and have fulfilled their obligations as such are allowed to join the corps; they are given a uniform, and on state occasions when something is happening—a convention meeting in the town, perhaps—they turn out and make themselves useful, running messages, parking cars, answering inquiries, and so forth. All this is good. Something for nothing is an unhealthy principle, and by giving a boy responsibilities you develop his character and at the same time give an outlet to the natural urge to excel and be a bit of a chap in the eyes of his young companions. Also of course the best hope for our local government is to attract into it more sound men with no axes to grind, and the best chance of achieving that is to rouse their interest at an early age.

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I agree with your peripatetic correspondent of Oct. 26 on the difficulty of judging the meaning of testimonials and personal letters, but I think he is wrong in interpreting, "He is an excellent teacher of the list type" as meaning, "You have been warned!" To my mind this means that the candidate is one who gives students lists of causes, symptoms, complications, &c., and usually simplifies the whole matter very much. Such a teacher is, as a rule, very popular and has a great following among students, especially if he is a good clinician. He tends to attract the poorer type of student, but gets many a man through his examinations when he would otherwise fail, and serves a useful purpose in the hospital.

At the opposite pole is the teacher who stresses the importance of principles rather than details which can be read in a textbook. He tries to make the student think for himself and not accept blindly what he is told, and rather emphasises difficulties instead of smoothing them away. This teacher has a smaller influence, but the better type of student follows him, and his educational value is much greater. Most teachers of course use both methods, but some rely more on "lists" and the others more on principles. Both kinds of teaching are necessary since the students, thank goodness, are not all of the same type.

## Parliament

### NATIONAL HEALTH SERVICE BILL

THE House of Lords on Nov. 6 considered the Commons' reasons for disagreeing with certain of the Lords' amendments. The LORD CHANCELLOR moved that the House "doth not insist" on the amendment which provided that the London County Council should delegate to the metropolitan borough councils the provision of maternity, child welfare, and home services. The Commons disagreed:

Because it is expedient that all the services provided under Part III of the Bill in any area should be the responsibility of a single local authority, and the appropriate authority, in the County of London, as in other counties, is the county council.

The effect of the amendment, Lord JOWITT said, would be to destroy the unitary basis of the services. Speaking on behalf of Lord Latham, he gave the assurance that the L.C.C. were fully aware of the necessity of avoiding undue centralisation, and on May 28 the council had declared that they would entrust day-to-day management of the local health services to area committees to which members of the metropolitan borough councils would be elected. Members of those bodies would also be elected to the statutory health committee of the L.C.C. The area committees were to have real and genuine executive powers.

Lord BALFOUR OF BURLEIGH welcomed this assurance as far as it went, but said it unfortunately did not go very far. This was a thing on which the borough councils felt just a bit sore. He hoped that Lord Latham and the L.C.C. would be a little better than their word this time and play the game.

The Lord Chancellor's motion was agreed to.

#### BASIC SALARY

On clause 33 (arrangements for general medical services), the Lord Chancellor moved that the House "doth not insist" on the amendment that the remuneration of doctors providing general medical service should be by the capitation method, save in exceptional circumstances. The Commons had disagreed:

Because it is inexpedient that the method of remunerating the doctors providing general medical services should be laid down in the Statute.

Lord JOWITT submitted that it was too restrictive to lay down the method of remuneration in the Statute. It had never been done in regard to national health insurance; it had always been left to regulations made after consultations with the profession. It was also, he suggested, inappropriate for the Medical Practices Committee to be the judge of "exceptional circumstances." It was for them to make recommendations to the Minister, upon whose shoulders lay the responsibility for securing an adequate service.

Lord LLEWELIN said that those who had supported the amendment were anxious to see that more consideration was placed on the relationship of patient to doctor than on the relationship of doctor to the State. But he recognised that there was quite a lot to be said for not putting in the Act the exact terms of the doctor's remuneration when the discussions between the Minister and the medical profession had not been concluded. Since the amendment was carried by their Lordships the Minister had stated that it was intended, unless in exceptional circumstances, that the salary should be a minor element and that the main part of the remuneration would be by capitation fee. The amendment, he thought, had been valuable in evoking that statement from the Government. He accepted the Lord Chancellor's motion as he did not wish at that stage to wreck the Bill.

Lord HORDER still felt that the principle which underlay this amendment had not been modified by the

Minister of Health, though he agreed that the position had been clarified. The statement made by Mr. Bevan was a statement of faith on the part of the present Minister, who could not, of course, speak for future ministers. If the capitation method was done away with at some future time, then the fear which had never been removed from the minds of the doctors would be intensified. The Minister's statement called for a little gratitude, though his colleagues in general practice were left rather cold by this small morsel of comfort which had been thrown to them. If the Minister wished to have the medical profession with him, as he said he did, then he might have gone further. It was still doubtful whether the doctors were going to come in willingly and enthusiastically to work this scheme. Lord HORDER hoped they would. It was odd, he suggested, that so much was said about the doctors' security when they said so little about it themselves. They were not dissatisfied with a certain amount of insecurity when they started, nor with a healthy spirit of competition as they went on.

Lord MORAN thanked Lord Jowitt on behalf of the profession for the reasonableness which he had shown in the discussions, but regretted that he had described this amendment as a blemish on the Bill. Even at this late hour Lord Moran thought it was fundamental that they should know exactly what was the doctors' attitude towards this proposal. The doctors found it very difficult to know why the political world was so anxious to provide them with security for which they had not asked. In his 25 years as dean of a medical school he had never once heard the question of security discussed. It was a fundamental belief throughout the profession that there was something profoundly wrong with a man if he could not make a livelihood in medicine. He would go so far as to say that this question of a basic salary was a figment of the political imagination and had no support in the facts of the doctor's life. As to the suggestion that the capitation fee led to abuses and undesirable practices, Lord Moran did not deny that there were isolated black sheep, but were they on that account to have the whole of the remuneration of all the rest of the honest members of the medical profession altered in a way which the profession almost unanimously felt might result in a deterioration of medical practice in the future? It was of enormous importance that the doctors should have confidence in the Ministry of Health, and that confidence would not be created if the political world impugned the honesty of the great body of the profession. Generally speaking, doctors did not believe that the zeal and fervour of the rank and file of the Labour party for the basic salary was inspired solely by solicitude for young doctors. They believed that it was an instalment which might be conveniently added to from time to time towards the introduction of a whole-time salary. He entirely accepted what Mr. Bevan had said in the Commons, but Ministers of Health came and went, and this principle remained as a basic faith on the part of the political party which had so often expressed it. If ever this basic salary did become a whole-time salary the effect upon the proficiency of the profession would be impossible to calculate. The Lord Chancellor's motion was agreed to.

At a later stage the Royal Assent was given to the Bill by Royal Commission.

### THE SCOTTISH HEALTH BILL

THE National Health Services (Scotland) Bill, introduced on the last day of the session, differs from the English Act as regards hospital endowments, the position of the teaching hospitals, and the provision of health centres.

The endowments of each voluntary hospital transferred to the Secretary of State for Scotland will pass, in the

first place, to the board of management responsible for the hospital, and the board will hold them in trust exactly as they were held before. The Secretary of State is required, however, to set up a Hospital Endowments Commission to review all endowments and make schemes for their future management. Such schemes may specify a particular purpose for which endowments are to be used, or may permit their use for any purpose related to hospital or specialist services or to research; and in making the schemes the commission is to take into account the spirit of the intention of the founder of the endowment as well as the interests of the hospital service generally. The commission will consist of a chairman appointed by the Secretary of State and other members appointed as he may determine.

It is made the general duty of the Secretary of State to provide hospital services for both physical and mental illness, but he is to entrust their administration to regional hospital boards and local boards of management. Five regional boards are contemplated, and it is intended that they shall enjoy a high degree of autonomy. There is to be no differentiation between teaching hospitals and other hospitals in the region; all are to come within the framework of the regional organisation. Each regional board will be composed of people chosen by the Secretary of State for their individual suitability, but before making the appointments he is to consult any university with which the hospital services of the area are associated, bodies representative of the medical profession, the local authorities of the area, and others concerned. Boards of management for individual hospitals or groups of hospitals are to be appointed by the regional board in accordance with a scheme drawn up by the board in consultation with the university, and approved by the Secretary of State. The scheme will specify the hospitals which are to provide facilities for medical teaching, and each board of management is to include members appointed after consultation with the local health authorities of its area, with the executive councils for general-practitioner services in its area, with the senior medical and dental staff of the hospitals concerned, and with the governing bodies of any voluntary hospitals that are to come under the board. The board of management of a teaching hospital will include nominees of the university and teaching staff. The Bill places a specific duty on the Secretary of State to make available for medical education such facilities as he considers necessary to meet all reasonable requirements, and these duties will devolve on regional boards and boards of management. In addition there is to be a medical education committee in each region, to advise the regional board. This will consist of members appointed by the universities concerned, with an equal number appointed by the regional board; and representatives of other bodies, such as the Royal Medical Corporations, will also be included where appropriate.

A main feature of the general-practitioner services is to be the development of health centres designed for general medical and dental services, for many of the special services of the local health authorities, and for outpost clinics of the hospital and specialist services: they can also be used as bases for health education. The Bill makes it the duty of the Secretary of State to provide, equip, staff, and maintain the new health centres, and though he is empowered to delegate this function wholly or partly to local health authorities, the summary issued with the Bill (Cmd. 6946) explains that "it is not intended to exercise this power widely in the early years of the new service."

The Highlands and Islands (Medical Service) Grant Act is repealed; so the Highlands and Islands Medical Service will lose its identity, becoming merged in the general framework. The disappearance of this distinctive Scottish service will occasion regret north of the Border.

## THE KING'S SPEECH

In opening Parliament last Tuesday the KING said that his Ministers recognise that the housewives of the nation have had to bear a specially heavy burden because of the shortages of houses, of foodstuffs, and of other consumer goods. It would be an urgent task in the new session to encourage an increase in the productivity of industry so as to raise the standard of living at home and expand the export trade. All necessary action would be taken to enable the school-leaving age to be raised next April. Legislation would be introduced for nationalising inland transport services and electricity supply, for the better organisation of a number of important industries, for the establishment of a Ministry of National Defence, for the continuation of national service, for dealing with compensation and betterment in relation to town and country planning, and for empowering local authorities to operate civic restaurants. "My Ministers," he said, "will do all in their power to increase the supply and variety of food and to see that it is efficiently and equitably distributed," and "will prosecute with the utmost vigour the task of providing suitable homes," ensuring that those most in need of it have first claim on new accommodation.

## FROM THE PRESS GALLERY

### Danger of Winter Famine in Germany

In the House of Lords on Nov. 6 Lord SALTOUN asked the Government what was being done to deal with the famine now prevalent in the larger cities of the British zone in Germany. When he was in Germany three months ago he found that the lassitude of the people in the streets was so obvious that anybody who moved with any briskness immediately caught the eye. The older children showed sunken eyes, drawn faces, and shrunken legs, sometimes with sores which were probably due to anæmia. He saw young children with faces that he could have covered with the palm of his hand. In spite of the all-pervading limey dust the population was incredibly clean, but all the time he was conscious of a sweetish sickly smell. A doctor whom he consulted said that it might come from a derangement of the liver caused by hunger. It was clear to him that the people were suffering from an advanced stage of malnutrition; he would call it famine. He was informed that there had been a considerable loss of weight amongst the population and that was borne out by his own observation. The population was incapable of a full day's work, and although men in heavy occupations were given supplementary rations many preferred not to work a full week because the ration did not compensate them for the expenditure of energy caused by the extra work. Young children got preferential diet and yet the infant mortality-rate had trebled in Hamburg over the figure in 1938. Hunger oedema was prevalent, and was as great among the better to do as among the manual workers. It was thought improbable that any mother could suckle her own children. Infectious diseases did not show any great increase, but tuberculosis had made enormous strides, especially recently.

Lord PAKENHAM, replying for the Government, admitted that the food situation in Germany was serious. The present ration of 1550 calories a day for the normal consumer, while sufficient to sustain life, was not sufficient to enable a man to undertake reasonable work for a long period. It was about half the German pre-war consumption, and a little more than half the present level of our own rations. None of us could feel complacent if 23,000,000 people for whom we possessed any share of responsibility were living at that standard. It was a heartrending affair, but it was a mess of the German people's own making. Nevertheless, it must be a constant preoccupation of the British Government to see how Germany could be enabled to consume more, or at least be prevented from having to consume less. There were four ways in which the problem could be tackled. The British zone could grow more food, and everything was being done to make that possible. The British zone could obtain more food from Eastern Germany. Thirdly, Germany could obtain more food at the expense of the people of this country. The question of whether to lower the British standard of living further in order to assist Germany was perhaps the hardest moral issue that the

British Government had had to face, and the Government were reluctantly but absolutely clear that nothing more could be done in that direction at the moment. To attempt to solve the problem along those lines by our own actions and by our own direct assistance would be to attempt an impossible task likely to bring down this country and Germany in common ruin. In the long run the food situation in Germany would be cured by the recovery of food-production in the world. In the short run everything hinged on what could be obtained from overseas—much of it at the expense of the British taxpayer.

### QUESTION TIME

#### Rheumatism Research

Mr. H. SUTCLIFFE asked the Lord President of the Council what was the estimated expenditure in Great Britain at the present time on research into the chronic rheumatic diseases; what proportion of this work was fostered by the Medical Research Council; and whether any increase or acceleration of such research could be achieved in the near future.—Mr. HERBERT MORRISON replied: I have no figures of expenditure from private sources such as the Empire Rheumatism Council and the Nuffield Foundation. Expenditure by the Medical Research Council directly on this problem is estimated at £3500 per annum at the present moment, but the figure is subject to considerable fluctuation as new lines of approach to the subject are opened up. It also takes no account of fundamental research of a more general kind which may indirectly throw light upon the problem.—Mr. SUTCLIFFE: Is the Minister aware that there is no type of disease in connexion with which further research is more urgently needed just now, and is not the contribution by the Medical Research Council altogether insignificant?—Mr. MORRISON: No, Sir, I do not agree. There is plenty of research being done otherwise, and the mere amount of money spent is not necessarily a guide to success. I have a feeling that probably the solution to this problem will be found some day by a sheer fluke when somebody is looking at something else which has nothing whatever to do with this particular problem.

Sir W. WAKEFIELD: Could the Minister arrange for greater publicity to be given to the very valuable work done by the Medical Research Council?—Mr. MORRISON: It is difficult to train scientists to adopt a proper and appropriate sense of publicity. I expect they get a bit frightened by the Opposition who object to any sort of publicity about anything.

#### Release of Army Doctors

Sir E. GRAHAM-LITTLE asked the Secretary of State for War if he was aware that doctors in the Forces overseas were suffering, as an example submitted showed, from uncertainty with regard to their release, occasioned by the issue at the end of 1945 of a Government statement reducing the ratio of doctors to 2 per 1000, which was contradicted by a later Army circular fixing the ratio at 2.75 per 1000; and if he would now inform the officers concerned of the actual position.—Mr. F. J. BELLENGER replied: The ratio of 2 doctors per 1000 troops was agreed under the conditions existing at the end of 1945 to enable the maximum number of doctors to be returned to civilian practice for the winter months. By that measure the Army alone was able to release 5600 doctors by the end of February. Present estimates, based on an overall cover of 2.75 per 1000 British troops, provide also for medical commitments other than those that can be considered a purely military responsibility and for military families overseas. The release programme for medical officers must depend upon the strengths and deployment of our Forces generally, and the dates for release of the various age and service groups are announced as soon as possible. The release of doctors is thus inevitably linked with the release programme for the Army as a whole, and whatever the percentage of doctors per 1000 may be, there must necessarily be some uncertainty for individuals until a definite programme has been announced. But there is no more cause for uncertainty in the minds of doctors than in the minds of any other members of the Forces.

#### Recruitment of R.A.M.C. Officers

Replying to a question, Mr. F. J. BELLENGER stated that he could not at present give accurate figures of the number of R.A.M.C. officers that will be required in the post-war Army. There were now 454 holding permanent regular, and 461 holding short-service, commissions in the R.A.M.C. After the end of the emergency the normal method of entry would probably be by short-service commission.

## Letters to the Editor

### THE REGIONAL BOARDS

SIR,—Now that the National Health Service Bill has become law, it is generally expected that the Minister of Health will shortly proceed to constitute the regional boards. Your leading article last week is therefore particularly opportune, but I wonder if you are right in your view that the function of these boards is primarily one of administration? It is true that, according to the Bill, regional hospital boards will be constituted "for the purpose of exercising functions with respect to the administration of hospital and specialist services," but it seems desirable to me that the boards should be concerned with broad lines of policy and that the detailed administration of hospitals should be left to the hospital management committees and to the house committees of individual hospitals which, it is clear from the discussions in the House, the Minister intends to use.

I would suggest that the prime concern of the regional board should be to organise a hospital and specialist service which will provide the best possible facilities and treatment for patients, so that they can obtain a complete medical service of the highest grade in hospitals readily accessible to them. If this suggestion be accepted, it would follow that the primary qualification of the chief executive officer of this board should not be, as Mr. Power holds, his experience of hospital administration, but rather his intimate knowledge of the medical aspects of hospital care. Such a knowledge might conceivably be possessed by an experienced hospital administrator, but this is unlikely unless he is also a medical man. It is, however, possessed by some medical officers of health who, by virtue of their office, have also had considerable experience of administration; indeed it is even possessed by some clinicians, although it would probably be unwise to take them away from clinical work. The chief executive officer should have advisers in the more important departments of medicine, in nursing, and possibly also in administration. It would probably be an advantage if these were part-time appointments. In addition to these advisers it might be advantageous to have an advisory committee in each of the medical subjects for which there was an adviser, or the advisers could combine to form one such committee.

My idea of a regional board, therefore, approximates to the "alternative" plan of your correspondent and is based on the regional organisation of the Emergency Medical Service. The sector organisation of the Emergency Medical Service had in one respect an advantage over the regional organisation, since the hospital officer had less independence than the sector officer because he was on the staff of the senior regional officer. Senior regional officers, who were regular civil servants, were usually first-class administrators and splendid colleagues, but they had to supervise all the regional activities of the Ministry of Health. Moreover, they did not possess first-hand knowledge of running a hospital, either on its administrative or medical sides; yet, by nature of their office, they could over-ride decisions of the hospital officer except in matters of medical treatment.

One other advantage that the regional boards will have is that they will be in a position to enforce their decisions on backward hospitals, whereas in the Emergency Medical Service the Ministry of Health only gave advice and a hospital could refuse to carry out the instructions of the hospital or sector officer. It speaks well for the hospitals of this country that the great majority accepted and loyally carried out the advice given them.

The chief executive officer will be appointed by the regional board, but the other key officer of the board—its chairman—will be appointed by the Minister. I would suggest that in almost every instance (perhaps in every one) the chairman should be a layman. There are experienced lay hospital administrators who could fill this position excellently, but in the majority of cases it would probably be wise to choose someone who had been chairman of a large voluntary hospital or of the hospitals committee of a large local authority. Such an

individual would be well versed in hospital procedure, but he should not be considered for the office unless he is also possessed of a judicial and well-balanced mind.

My views may not carry conviction either to my colleagues or the Ministry of Health, but I put them forward as a contribution to the discussion which your leading article seems certain to provoke.

Birmingham.

LEONARD G. PARSONS.

### THE SHACK PERIOD

SIR.—Your annotation of Oct. 12 (p. 534), discussing *The Hospital of the Future*, ends with the significant sentence, "Meanwhile hospitals could be making use of the shack period to concentrate on personnel." Certain it seems that with time we shall have the walls and organisation—probably fine ones, too—but it is men, and not the walls or the forms, that are going to decide the ultimate standard of service. This theme was taken up both by Sir Heneage Ogilvie and by Mr. George Perkins at the recent British Orthopaedic Association dinner.

It is generally agreed that the development of the mind needs the constant sharpening of wits on one another's whetstones. To see the work of others, to glean thoughts, the half thoughts from which so many others flow, is the best education for the doctor. Every progressive business man of substance is now sending his representatives abroad for that purpose. Surely it is time that this became part of the policy of the major hospitals.

The hospitals should not rely on and take advantage of the generous spirit and charitable heart of their staffs to keep themselves abreast at their own expense. A multitude of doctors, after years of work in the Services, find themselves financially unable to afford such travel. Rarely do they care to proclaim their financial embarrassment, and there follows the attitude of indifference, of *laissez-faire*; their spark of enthusiasm is smothered. Lambrinudi, in his wisdom, once remarked, "the trouble with doctors is that they are ashamed to admit that they are poor." The evening gossip columns, at regular intervals, delight in building up stories of the thousands of pounds those at the top of the tree are supposed to earn; they utterly mislead the public. This is well reflected in the salaries now being offered for some of the leading professorial chairs. The senior judge gets, so I am told, something like £5000 a year; he merely interprets the law, has to decide on a few squabbles, and is perhaps occasionally called on to decide on the life of often a worthless individual. Whoever heard of such a salary being offered to our leading men? We must not forget that not only is such a leader responsible for a large number of lives, but, by passing on his hard-gained knowledge, he directly influences the happiness and life of thousands of others. There is no branch of any work as exacting as medicine, and Mr. Perkins, in addressing some remarks to the Minister of Health, made a very eloquent plea for a "decent" salary; not only for the actual work of the doctor, but to enable him to have regular holidays in comfort, and return refreshed in mind and body. The older the doctor the harder he has to work, for time then brings its reward; the business man, in his ageing days, can usually recline and be but a bystander.

At present practically the only opportunities for sponsored travel are those offered by the Medical Research Council; their funds, as everyone knows, are woefully limited, and they can support merely those travelling for positive research and who are prepared to devote themselves to a long full-time job. I would plead, therefore, that major hospitals change their attitude; that they pay and encourage their staff to attend congresses, send them to different hospitals abroad, and, of course, to those in their own country as well. There is always the smug attitude that we have done very well without such sponsoring. But that is not true. All our surgical giants travelled regularly; for their fees were heavy, their competition slight, and they could afford it. I remember Arbutnot Lane saying to me in his later days, "I offer you two bits of advice—look after your health, and make it a rule to travel every year."

It may be said that hospitals cannot afford to pay for such travel. But that does not seem true, for I see

vast sums of money being expended on the establishment of occupational therapy centres and all the luxuries of reablement. These are pleasing to the administrator or the superficial eye of visitors, but, as every surgeon knows, they are but meretricious tinsel unless there has been careful thoughtful primary surgery.

This war revealed that in the growing generation we have a brilliant young team: men with imagination—"the mother of fact," as Moynihan called it. It would be far better to send some of these men to travel than to bluff ourselves that these crowded pseudo-appointments, which many now have, are to their advantage. We must not overlook also that such travel does other things: it builds friendship and promotes understanding between nations, and one of the outstanding lessons of the war was the value of the personal contact.

May we hope, too, that in the selection of personnel for the hospitals a broad generous vision will come to be developed; men will not be picked for their willingness to pay lip service, for their possession of personalities unlikely to be competitive, or even because they have been registrars so long that it would be hard not to elect them. Obviously the guiding principle must be the type of service that they will be able to offer to the hospital. I hope, too, that the large hospital will not forget that their staff have a wider responsibility, a duty to pass on their painfully gathered experience to colleagues. That needs active support through the provision of funds for ample secretarial assistance, good photographic departments, a good follow-up system. It is not for these men merely to cull the thoughts of others—"pick the plums from other people's platters." They have a moral obligation to repay.

London, W.1.

SOL. M. COHEN.

### PSYCHIATRY IN BATTLE AREAS

SIR.—Those who have had experience at regimental aid-posts will confirm the opinion of Major Haldane and Captain Rowley (Oct. 26, p. 599) that there is no need and no place for refined psychological methods in forward battle areas. Unless a R.A.P. is cluttered up with casualties or much exposed to the enemy it is a suitable place for the treatment of anxiety neuroses. Common sense and a sound judgment of character are the main requirements ("psychiatric intuition" is perhaps the same thing), and even combatant officers who know the value of rest, reassurance, and listening to other people's troubles have often successfully treated or prevented battle neuroses.

Many patients suffering from acute anxiety never reach corps exhaustion centres. Those who are the least predisposed to neuroses react best to treatment at the R.A.P., and thus an unduly large proportion of the weaker types is seen farther back.

Records were kept of the psychiatric work done at the R.A.P. of a field artillery regiment over a period of ten months spent in battle—from the invasion of Sicily to the Anzio beach-head. It was usually not difficult to assess a patient's condition and decide what to do with him while he was still in a highly strung state. As a rule the men led the conversation to the source of their trouble and then betrayed themselves by emotional reactions (tremor, quivering voice, tense look, &c.). What mattered most was not the cause of their anxiety—this was easy to guess—but how they coped with it. Life in battle is uncomplicated and so are neuroses; it helped, however, that all men in the regiment were personally known before going into action.

34 manifest cases of war neuroses were seen during the ten months. Of these, 3 were evacuated without thorough examination because there was no time to deal with them; 12 were evacuated because they were considered unsuitable for treatment at the R.A.P. or because conditions were too bad for them; 5 were evacuated because they failed to recover in a few days, or relapsed; and 2 were sent to a psychiatric centre for a further rest after they had improved at the R.A.P.

12 patients were successfully treated with rest, reassurance, and sedatives, without evacuation from the regimental area; one of these was soon killed, but all others withstood the stress of further battle without relapse. The patients who were never seen by a psychiatrist make up a third of the whole series, but only one

of them belonged to the group which formed the majority of Haldane and Rowley's cases, and was described as having a "low anxiety threshold" and "low anxiety tolerance."

Of the 22 men evacuated to psychiatric centres only 6 returned to duty in the front line, and this includes the 2 patients sent back for more rest. This seems to confirm the opinion formed in the 1914-18 war that a patient's chances of recovery diminish with every move away from the enemy, though it may simply mean that those who were not likely to recover were selected for evacuation.

It might be worth adding one observation. Although the amount of stress various men could withstand varied greatly, three conditions contributed to the origin of all battle neuroses: (1) prolonged danger; (2) vivid impressions of the effect of enemy weapons (narrow escapes, wounding, the sight of casualties, &c.); and (3) physical hardship (fatigue, lack of sleep, hunger, cold, sickness, &c.). There were no manifest neuroses without all three causative factors, though one or two of them often gave rise to mild psychological upsets.

B.A.O.R.

E. M. GLASER.

### PERFORATED PEPTIC ULCER TREATED WITHOUT OPERATION

SIR,—In this correspondence the serious question of mistaken diagnosis seems not to have been raised. In most cases the clinical diagnosis is confirmed, at laparotomy. In a few instances, however, not only is it found to be incorrect but the state of affairs is such as might well lead to disaster under a conservative régime. Most surgeons of experience must at some time have been deceived by a ruptured appendix exactly simulating a perforated ulcer. We have recently seen cases, confidently diagnosed as perforated peptic ulcer, which at operation proved to be ruptured appendicitis, perforation of the colon in carcinoma, in diverticulitis, and by foreign body, perforated Meckel's diverticulum, ruptured amoebic abscess, and ruptured ovarian cyst.

London.

K. E. BOND.

Portsmouth.

B. L. WILLIAMS.

SIR,—From the correspondence following Mr. Hermon Taylor's interesting paper of Sept. 28 it is evident that other surgeons have experience of the conservative treatment of perforated peptic ulcer. Moynihan, in his book *Abdominal Operations*, had no doubt that recovery by medical treatment alone was possible both in the acute and subacute forms of perforation. He records two cases under his care in which perforation had been diagnosed by competent medical men, and, operation being impossible because no skilled help was available, the patients were treated conservatively; the diagnoses were later confirmed by Moynihan himself at operation. Singer and Vaughan<sup>1</sup> in a paper entitled "Formes frustes" type of perforated peptic ulcer" record their radiological discovery of gas under the diaphragm indicative of recent and unrecognised perforation.

In 1939 I first treated a case of perforated duodenal ulcer by conservative means, being encouraged to do so for the reason which later moved Mr. Taylor—because in previous cases I had often found the ulcer soundly closed by omentum or adjoining viscera. The first case was a man of 40 years, 2 hours perforated, who recovered without complications and left the hospital in 18 days. In 1939 and 1940 fifteen cases of undoubted perforated peptic ulcer were treated conservatively, with two deaths. The cases were entirely unselected and were those admitted under my care to the surgical wards at the Essex County Hospital, Colchester. Gas was found under the diaphragm on several occasions but was not a constant finding, nor did the amount of gas bear any relation to the severity of symptoms and the patients' recovery. The age of the patients ranged from 25 to 57 years and the length of the history from 2 to 24 hours, and the average stay in hospital was 18 days. The two fatal cases were over 50 years of age and both had been perforated 24 hours; the first died in 13 days from a subphrenic abscess, and the second died an hour after admission to hospital from shock. The patients were treated on Sherren-Ochsner principles without aspiration

of the stomach, and except in one fatal case no residual abscess developed, but chest complications, including atelectasis, were common, though not so severe as in those cases submitted to operation. In this connexion I would draw attention to the danger of precipitating pulmonary oedema by the injudicious administration of intravenous saline, whether as part of conservative treatment or postoperatively.

There can be little doubt that in the past many medical men have treated perforated peptic ulcers by conservative measures, often without knowing the true state of affairs. One of my early cases was a general practitioner, who, under the impression that he was suffering from biliary colic, treated himself, and although the radiogram showed gas under the diaphragm such clinical improvement resulted from heavy dosing with morphine that the patient would not countenance surgery, and he was not pressed to do so.

It is no longer my practice to treat all cases of perforated peptic ulcer conservatively but to reserve the new method for those cases where one can safely conclude that only a minor leak has occurred or where a leak is threatened. If a recent meal has been taken the stomach contents are aspirated and continuous suction employed until there is evidence that the peritoneal reaction is receding and the rent has closed. In the more severe cases the conservative régime is used and supplemented by a small laparotomy under local or skilled general anaesthesia, preferably with gas, oxygen, and curare. Thus does the operation take its place in the planned campaign of treatment. The exclusively conservative treatment of all cases demands the finest clinical judgment on the part of the surgeon and may be the cause of profound anxiety to all those in attendance.

Mr. Taylor's paper records an advance in the management of perforated peptic ulcer and confirms the experience of other surgeons, but the prudence of Prof. Grey Turner, as expressed in his letter of Nov. 9, demands, as always, the highest regard.

Colchester.

RONALD REID.

### SUPRAPUBIC PROSTATECTOMY

SIR,—I was interested in Mr. Lane's description of a method of procuring curvature in a catheter (Sept. 14, p. 398). Over 35 years ago my quondam chief, the late Colonel Damer Harrison, used to thread the end of the gum-elastic catheter of those days twice through the eye of the metal stylet, after which, using the latter as a holder, he plunged the catheter into very hot water for a few seconds and then into cold water. This resulted in the catheter acquiring a degree of "temper" and a tendency to coil at the end, and greatly facilitated its passage where *coudé* or *bicoudé* instruments had failed.

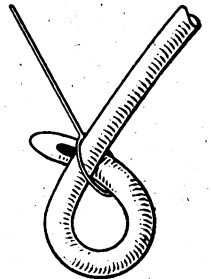
Public Health (Tuberculosis)  
Department, Liverpool.

JOHN P. CLARKE.

### GARCINOMA OF PROSTATE IN ANIMALS

SIR,—In his article of Oct. 19, Mr. Fergusson states, in regard to aetiology, that "Unfortunately the rarity of prostatic cancer in animals has so far prevented any confirmatory investigations." Veterinary publications undoubtedly support this view, but, though it is true of the larger domestic animals, it is certainly untrue of the dog. For the last two years I have been treating prostatic "cancer" in the dog with stilboestrol dipropionate, using the dose-rate first suggested in the human. I have records of over 40 cases of prostatic disease, a fair proportion of which are cases of gross prostatic hypertrophy assumed to be carcinomatous. I hope to publish these findings shortly in the veterinary press.

We have one great advantage over our medical confrères—that there is generally little difficulty in securing a necropsy in our cases. I have recently done necropsies on two dogs with testicular tumour (one was malignant with widespread abdominal metastases), and in both cases the prostatic tissue was negligible, resembling the prostates of castrated dogs. The feminising effect which



1. Singer, H. A., Vaughan, R. T. *Surg. Gynec. Obstet.* 1930, 50, 10.



is produced with this lesion in dogs has been fully discussed by Huggins and Moulder,<sup>1</sup> who suggest that these tumours are Sertoli cell type neoplasms. The necropsy on another case of testicular tumour which was operated on (castrated) two years previously revealed negligible prostatic tissue. In the entire series there was only one case where secondary metastases were demonstrated at post mortem from a neoplastic gland and these were confined to the inguinal lymphatic glands. I would suggest that in the dog there is a wide field for study of prostatic disease which will no doubt have its lessons for human medicine.

Blackburn, Lancs.

ALEXANDER H. HOGG.

### PSYCHONEUROSIS TREATED WITH ELECTRICAL CONVULSIONS

SIR,—Dr. Prestwich says that I wrote disparagingly of five minutes' psychotherapy. In fact I made no reference to five minutes' psychotherapy in my letter of Oct. 26, and his error of observation detracts from the value of his testimonial to Dr. Beaton's methods.

May I try to make my main point quite clear? In plain language, I suggest that it is time to call a halt to such irresponsible treatment of mental cases as that reported by Dr. Milligan; and by irresponsible I mean lacking due regard and respect for the personality of the individual patient. The very pertinent questions and criticisms of the presentation of the material and of the danger of permanent injury to the brain voiced by Dr. Tooley and Dr. Mather remain unanswered, but I will not pursue them, because even if all were fully answered this main objection would remain, as Dr. Atkin and Dr. Fordham have pointed out.

Both Dr. Prestwich and Dr. Milligan appear to hold that the sole aim of treatment with the psychoneurotic patient is the removal of symptoms; but it is much easier to remove the symptoms than to cure the disease. A bucket of cold water, a painful surgical illness, or exposure to war dangers will remove psychoneurotic symptoms in a considerable proportion of cases; a danger in real life can take precedence of a danger in the phantasy life (conscious or unconscious), and it is easy to believe that exposure to intensive electro-convulsive therapy may be for many patients not less alarming than aerial bombardment. Dr. Milligan ignores the fact that the symptom, inconvenient as it may be both to the patient and those about him, is the patient's attempt to adjust himself to the circumstances of his life. If, as Dr. Milligan believes, the intensive electro-convulsive treatment obliterates entirely the faulty electrical patterns in the brain, it must leave the patient either without his former awareness of the disharmony of his life (i.e., mentally deteriorated), or else having that awareness but lacking any means of dealing with it, and so more miserable than before. In these circumstances the treatment chosen may perhaps have been the most beneficial and convenient for the doctor, for the relatives, and for the public who have to pay for it, but certainly not for the patient; and such a choice is, I take it, contrary to the accepted code of medical ethics.

The alleged "resynthesis of the personality" along "correct lines" can only be described as a sheer impertinence. Dr. Milligan says that "it is of the utmost importance to adopt sound psychological principles in the rehabilitation and remoulding of the patient's personality during the recovery period. Mere obliteration of psychologically unacceptable patterns of thought and conduct is not sufficient, and the resynthesis of the personality requires much care and judgment"—just like that. We are asked to believe that the quickly repeated passage of an electric current through the brain miraculously selects and obliterates permanently the "faulty electrical patterns in the brain" responsible for unacceptable thought and conduct, leaving intact (after the confusion has cleared) all the apparatus required for normal function; and further that Dr. Milligan or his psychotherapeutic colleagues have been able, writing as it were on blank pages, to remould "along correct lines" the personalities of some 2500 (perhaps not all ex-neurotic) of the inhabitants of the district served by his hospital. Presumably they are

re-created in the image of the A.M.O., or perhaps according to a specification drawn up by the staff. Can the flight from reason go much further?

Convulsive therapy seems likely to take a permanent place in the treatment of melancholia; intensive convulsive therapy as practised by Dr. Beaton may prove useful in a few desperate cases which would otherwise require leucotomy; but I hope the Board of Control will be able to ensure that, if any attempt is made to repeat this experiment in a hospital under their care, a competent and independent assessment is made of the personality of each patient before and after treatment.

London, W.1.

J. NORMAN GLAISTER.

### HERNIA THROUGH THE LESSER OMENTUM

SIR,—In connexion with Mr. Leon Gillis's report in your issue of July 13 of a case of hernia through the foramen of Winslow into the lesser sac of peritoneum, the following case is of interest.

A guardsman, aged 34, gave a history of 4 days' severe right upper abdominal continuous pain with periodic added colicky spasms. There had been retching, but only in the last twelve hours had he been sick. The bowels had not been opened for three days, but during this time he had been in bed in sick quarters. There was no relevant previous history. He had never had indigestion.

On examination he was extremely muscular and well built. The whole abdomen was guarded, but in the right subcostal region and the right iliac fossa there was well-marked rigidity. Intestinal sounds were present but subdued. Nothing abnormal was detected per rectum. Temperature 99° F, pulse-rate 104 per min.

A leaking ulcer was diagnosed, and under gas-oxygen and ether anaesthesia an upper right paramedian incision was made. There was free fluid in the abdomen, and grossly distended small intestine was traced to a hole in the gastrohepatic omentum just to the left of its free margin.

The orifice was stretched digitally, and a large loop of gut, in an early stage of strangulation, was drawn out of the lesser sac of peritoneum. A few moments' treatment with hot saline packs showed its viability, but an early ulcerated area, where the margin of the orifice had pressed on the wall of the bowel, required oversewing. Two stitches were used to close the offending hole in the omentum, and the abdomen was closed.

The patient made an uninterrupted and rapid recovery. Seen three months later, he was in good health and was returning to his unit.

It was thought that the hole in the lesser omentum may have been due to some trauma, but on questioning the patient closely after the operation no such history could be obtained. His main sport was tug-of-war, in which he pulled in a champion team, but it is difficult to see how this exercise would have caused a rupture of the affected omentum.

Leatherhead Emergency Hospital. STANLEY O. AYLETT.

### TICK PARALYSIS

SIR,—A form of tick paralysis due to *Ixodes holocyclus* is of considerable interest and importance in the eastern coastal regions of Australia, causing paralysis and death among domestic animals and man. All domestic animals have been affected but dogs are the chief victims. There have been a number of human cases, some fatal (Hamilton, D. G. *Med. J. Aust.* 1940, 1, 759).

In your leading article of May 25 you stated that "salivary glands have been suggested as the source of the toxin, on the basis of hypertrophy of the alveolar cells observed during engorgement; this mechanism has not been confirmed, although it would explain (as does the ova hypothesis) the incubation-period." Investigations in Australia by Clunies Ross (*J. Coun. sci. industr. Res. Aust.* 1935, 8, 8) and by Ozer and Rickardo (*Aust. vet. J.* 1942, 18, 194) have shown that the salivary glands of the tick are sources of the toxin. Glands taken from engorged ticks and injected into mice produce typical tick paralysis. This method has been used to determine the titre of antitoxic serum from immune dogs. This serum is used for treatment of cases of tick paralysis in dogs, and has been used with success in several human cases.

HUGH McL. GORDON.

McMaster Animal Health Laboratory, University of Sydney.

1. Huggins, C., Moulder, P. V. *Cancer Res.* 1945, 5, 510.

## Obituary

### EDWARD NEWBURY THORNTON

K.B.E., M.R.C.S.

Sir Edward Thornton, formerly chief medical officer for the Union of South Africa, whose death was announced in our last issue, was born at Sporle, in Norfolk, in 1878. Educated at Cheltenham College, he took the Conjoint qualification from the London Hospital in 1902, after serving as an assistant medical officer in yeomanry hospitals during the Boer War in 1900-01. In 1903 he returned to South Africa to serve as a medical officer in Cape Colony, and seven years later, on the formation of the Union, he was appointed medical adviser to the Cape provincial administration.

In the war of 1914-18 he served as medical officer in the South-West campaign before coming to England to command the South African Hospital at Richmond, where he introduced a vocational training scheme which was later extended to all military hospitals in the United Kingdom. For his services he was appointed O.B.E. in 1917, C.B.E. in 1918, and K.B.E. in 1919.

In the following year he returned to South Africa to take up the appointment of senior assistant medical officer for the Union and of director of the medical services of its Defence Forces. In 1920 he visited Nigeria and in 1930 Uganda to advise their governments on plague. Two years later he became secretary for public health and chief health officer of the Union, and he held these posts till he retired in 1936. But as chairman of the Peri-Urban Areas Health Board he continued to serve the Union, and during the last war, as acting director-general of medical services, he fostered the use of occupational therapy in its military hospitals.

Especially interested in housing and in social medicine, Sir Edward published, with Manfred Nathan, K.C., an extensive commentary on the public-health, housing, and slum Acts of the Union, which is widely used as a reference book. He also sponsored the District Surgeons and Midwifery Act, which enabled the Union government to subsidise these services and made it possible for local authorities to introduce and extend them, especially in rural areas. A man of personal integrity and honesty of purpose, he had a real interest in all things concerning public health and social welfare, and he achieved much in the service of the people of South Africa.

A. J. O.

### LEROY UPSON GARDNER

M.D. YALE

Dr. L. U. Gardner, who died on Oct. 24, at the age of 57, had made himself a leader in experimental research in silicosis and had won an international reputation for his laboratory at Saranac Lake, in the Adirondack Mountains. Here, as director of the Trudeau Foundation, he was an outstanding figure among a famous team which included such men as Baldwin, Lawrason Brown, Heiser, and Sampson; and the little town owed much of its atmosphere of friendliness and earnest truth-seeking to his largeness of mind and integrity.

Born in New Britain, Connecticut, Gardner took his medical degree at Yale University in 1914, and after serving in the army medical corps he returned there as assistant professor of pathology in 1917. Two years later his long association with the Trudeau Foundation began when he was appointed pathologist at Saranac. In 1927 he became director of the Saranac laboratory and in 1938 director of the foundation. Three years before he had been awarded the Trudeau medal for his work on the pathology of tuberculosis and its relation to silicosis, and in 1940 he received the William S. Knudsen award for his research into the control of silicosis. In the same year Yale conferred on him the honorary degree of M.S.

Recalling a visit to Saranac, Prof. E. L. Collis writes: "Gardner had already embarked upon his research into the reactions of the human body to its environment, as exemplified by the inhalation of industrial dusts. First came silica, concerning which, although working independently of Kettle, he showed how, by animal experiments, whorled pulmonary fibrosis could be induced. Hardly a year passed without him giving further valuable additions to our knowledge on the pneumoconioses. He tackled asbestos dust and brought to light

its toxic powers. Hard, resistant carborundum—carbide of silicon—followed, only to be found innocuous. Then he studied the anthracosis of coal-miners and demonstrated its entity. But probably his most recent work on aluminium dust will be longest remembered to his credit. Here was a metallic dust which he found not only to be in itself harmless but to possess powers for rendering the deadly silica dust innocuous if inhaled with it, and even to assist in its elimination from the lungs if inhaled after the silica dust has already been deposited in the pulmonary tissues."

"Gardner gave the impression that he just couldn't help being a great man, but never that he was striving for eminence," writes A. I. G. McL. "In the States, where dynamic personalities are common, he appeared indolent by contrast—not with the indolence of a Sir Percy Blakeney, but with the massive calm of a Red Indian brave. But despite this apparent inertia his output was prodigious and of first-rate quality. Tall and commanding in presence, friendly and humorous, he was the ideal chief because he always had time for the problems of his staff. I remember a 20-mile night drive with rattling tyre chains at a temperature of 40 below to a medical meeting in another small town in the snow mountains. The papers read at the meeting were diverse and patchy, but Gardner summed them up at the end concisely with a warm friendliness which must have raised the temperature one or two degrees. His clear, strong, honest prose style mirrored his mind, and he had no use for the long or redundant word. Only recently I heard two people say of one of Gardner's statements—'Well, if Gardner says so, it must be right.' I think the remark would have pleased him."

### LUDWIG JULIUS BRUEHL

M.D. BERLIN

Prof. L. J. Bruehl, the well-known marine biologist, died at Muheza, Tanganyika Territory, on Oct. 11 after a distinguished and eventful career. Born at Breslau in 1870, he studied medicine at Berlin University, where he obtained his doctorate *summa cum laude* in 1898. From 1894 he was an assistant at the institute of physiology in that university, till in 1903 he was appointed to the newly founded Institute and Museum for Maritime Sciences in Berlin. There he built up the sea-fishery and other departments, becoming curator in 1909, a position he held until his retirement in 1930. During the first world war, while serving in a military hospital in East Africa, he was taken prisoner by the British in 1917 and repatriated under a Red Cross exchange system a month before the Armistice. In 1919 he was appointed to a chair at the institute and later became assistant director. He also held lectureships at the Landwirtschaftliche Hochschule and the Orientalische Seminar for tropical fishery. After his retirement he was appointed honorary professor at the Landwirtschaftliche Hochschule, but on account of his Jewish descent he was forced to leave Germany in 1934.

After he settled in Tanganyika his health began to fail, and in 1938 Hitler stopped his pension; but his fortitude and sense of humour remained firm.

## Births, Marriages, and Deaths

### BIRTHS

- BINTCLIFFE.—On Nov. 8, at Birmingham, the wife of Mr. E. W. Bintliffe, M.B.E., M.S., F.R.C.S.—a son.  
 BOLTON.—On Oct. 29, in London, the wife of Dr. Reginald Bolton—a son.  
 BOOG-SCOTT.—On Nov. 8, the wife of Dr. T. M. Boog-Scott—a son.  
 McLARDY.—On Nov. 4, in London, the wife of Dr. Turner McLardy—a daughter.

### MARRIAGES

- LOCKHART-MUMMERY—CRERAR.—On Nov. 5, in London, Hugh Evelyn Lockhart-Mummery, F.R.C.S., to Jean Crerar.

### DEATHS

- HOUGHTON.—On Nov. 7, at Farnham Royal, Bucks, Colonel George John Houghton, D.S.O., L.R.C.P.L., late R.A.M.C., aged 73.  
 HUXLEY.—On Nov. 5, Henry Huxley, M.R.C.S., of Shackleton, Godalming, aged 81.  
 KIRKLAND.—On Nov. 7, at Cheltenham, Robert Kirkland, M.B. GLASG., aged 88.  
 LINDSAY.—On Nov. 9, in London, John William Lindsay, M.B. ABERD., aged 71.  
 O'REGAN.—On Nov. 3, at Whitechurch, Glam, William Franklin O'Regan, M.B.N.U.I.  
 WILMOT.—On Nov. 6, Philip McKinnell Corbould Wilmot, M.B. Lond., aged 80.

## Notes and News

## APPOINTMENTS FOR EX-SERVICE SPECIALISTS

THE new arrangements for increasing the number of specialist hospital posts, which were outlined in a recent issue,<sup>1</sup> have now been officially announced. The aims, according to a Ministry of Health circular (202/46), are to overcome the difficulty of demobilised specialists who now cannot secure paid civilian appointments, and to obviate the risk of their loss to specialist service in the National Health Service. General hospitals in which the volume of work would justify an increase are invited to submit a proposal for the creation of additional posts for ex-Service specialists, at salaries of about £1000 a year; if the proposal is approved the Minister will make himself responsible for the cost of salaries and emoluments until the National Health Service comes into operation. Hospitals are asked to seek the help of the appropriate university in the selection of candidates from the short list chosen by the hospital authority or governing body. For the junior specialist the duration of senior B1 appointments, at £550 a year, is to be extended; the scope for further additions to their number is restricted, but as far as possible they are to be increased.

## MEN AND MEALS

WEARIED perhaps by the adequate but uneventful feeding of the past six years, Sir William Savage has been looking into the diet of our remote ancestors.<sup>1</sup> They hardly seem to have done much better. The men of Java, Piltown, and Peking had characteristics in common with the apes—small poorly developed brains, thick skulls, and teeth intermediate between the stout weapons of the gorilla and the more modest dentures now current. Their palates were large in proportion to their brain area, suggesting a crude not highly nutritious diet.

Progress at this time was probably slow in food habits, Sir William suggests, as in everything else. "Man ate anything he could get hold of and used sticks, stones and later shaped stones as aids to kill animals. He ate his food raw and chewed it well, giving up teeth as weapons of offence"—being rewarded for his forbearance by getting a lighter jaw. This kind of feeding probably went on for something like a quarter of a million years, by which time the old stone age (some survivals of which linger in backwaters today) had begun, and Neanderthal man, a brutal type, was occupying much of Europe. He had plenty of tools to help him to get food—axes, borers, scrapers, hammer stones, spears, assegais, bows, and at last harpoons. He grew no crops, however, and had no domestic animals bred in captivity. He used fire, but no cooking pots; so as a cook he probably stuck to the simple roast. But in the main his food was fish, fruits, grubs, shellfish, and wild honey, all gathered with great trouble. Food, indeed, was his predominant quest: a fish queue would have been child's play to him; he was never sure of the next meal.

The last traces so far found of the old stone age date from about 10,000 B.C., while the earliest traces of the new stone age are some 4000 years younger. In that short interval (as civilisation goes) man had taken a turn for the better in most things, including his diet. Cave-dwelling Neanderthal man is thought to be outside the direct line of ancestry of *Homo sapiens*, who now appeared, with his husbandry, his herds, his fine cooking pots, and his use of copper. Stone tools, now ground and polished, gave way without a break to bronze tools and weapons; dogs, cows, sheep, goats, and pigs were kept, and stalled in the pile-dwellings built in lakes. Barley, wheat, and millet were planted in the spring, and corn crushers and mealing stones were used. Peas were cultivated, and wild fruits used freely. These, with meat, fish, eggs of wild birds (no fowls were kept), milk, and honey made up a good enough diet; the bronze age hardly improved on it, though the domestication of the horse, better ploughs, hand-mills for grinding corn, and more cereals—oats, rye, and winter wheat—must have made food-getting easier.

The balance of these ancient diets may not always have been very good; Sir William remarks regretfully how often the grain-eaters in peaceful communities were overthrown by meat-fed nomads with no settled habits. Too much cereal, he points out, encourages dental caries and means calcium and vitamin deficiencies, especially for children. He ends

with some lively speculations about the ancient Israelites who, on one historic occasion, ate quails and died "while the flesh was yet between their teeth, ere it was chewed." The tired quails, he argues on good grounds, had fed thoughtlessly on hemlock before they were eaten in their turn.

## University of Oxford

Four scholarships, each of £100 per annum, have been endowed by Lord Nuffield for women studying medicine at Oxford. The scholarships will be tenable during the pre-clinical course, and, in the case of women proposing to specialise in obstetrics, gynaecology, or ophthalmology, also during the clinical course.

## University of Cambridge

The following degrees were conferred on Nov. 2:

M.D.—M. A. Rushton.  
M.B., B.Chir.—J. W. Ker (by proxy).

## University of Sheffield

Dr. D. R. Wood has been appointed lecturer in pharmacology, Dr. J. F. Goodwin research fellow and tutor in therapeutics, and Dr. Margaret H. Miller research assistant in medicine.

## Royal College of Physicians

The Croonian lectures will be delivered at 5 p.m. on Tuesday, Dec. 3, and Thursday, Dec. 5, by Dr. H. L. Marriott, whose subject will be Some Quantitative Considerations regarding Depletion of Tissue Fluid and Blood Constituents. The FitzPatrick lectures will be delivered at 5 p.m. on Tuesday, Dec. 10, and Thursday, Dec. 12, by Sir Arthur MacNalty, who will speak on the History of State Medicine in England.

## Royal College of Surgeons of England

A New Zealand industrialist has made an anonymous gift to the college for the endowment of a Commonwealth travelling professorship. The endowment will provide an income of about £2000 a year, and the benefaction is to be known as a gift from "a New Zealand Family." A Commonwealth professor will be appointed each year and will generally be a physician, surgeon, or scientific worker resident in Great Britain or in Australia or New Zealand. The appointing authorities are also empowered, however, to elect as professor a distinguished teacher from one of the other Dominions. He will be required to travel to Great Britain, or to Australia and New Zealand, or to any other Dominion, to assist in the advancement of medical science either by lecturing, teaching, or research.

## Royal College of Physicians of Edinburgh

At a meeting of the college on Nov. 5, with Dr. D. M. Lyon, the president, in the chair, the following were introduced and took their seats as fellows:

Dr. A. M. Gillespie (Edinburgh), Dr. A. M. MacDonald (Edinburgh), Dr. R. A. Miller (Edinburgh), Dr. G. O. Horne (Edinburgh), Dr. R. J. Kellar (Edinburgh), Dr. G. D. Malcolm (Bridge of Earn, Perthshire), and Sir Andrew Davidson (Edinburgh).

The following were elected fellows:

Dr. H. J. Parish (Petts Wood, Kent), Dr. P. V. Pritchard (London), Dr. R. C. Wood (Edinburgh), Dr. P. N. Bardhan (Ferozapore, Punjab), Dr. H. M. D. Shepherd (Shanklin, I. O. W.), Dr. J. A. Malloch (Edinburgh), Dr. J. W. D. Goodall (I.M.S.), Dr. John Mackay-Dick (R.A.M.C.), and Dr. D. M. Anderson (Brintree, Essex).

The following were elected members:

Dr. Albert Rabinowitz (Johannesburg, S.A.), Dr. Andries Brink (Germiston, S.A.), Dr. Walter Henderson (Edinburgh), Dr. J. H. D. Millar (Edinburgh), Dr. R. H. M. Ross (Darlington), Dr. L. S. Prasad (Bihar, India), Dr. N. S. Gordon (Edinburgh), Dr. G. H. Armitage (Cumnock, Ayrshire), Dr. M. M. Whittet (Glasgow), Dr. Elizabeth M. Hislop (Edinburgh), and Dr. Ian Wang (Edinburgh).

The Cullen prize for 1946 was awarded to Lieut.-Colonel W. F. Harvey. The Hill Pattison-Struthers bursaries in anatomy and physiology were awarded to Mr. M. C. Berenbaum and Mr. James Jackson; and the Hill Pattison-Struthers bursary in clinical medicine to Dr. J. L. Quartey-Vanderpujue.

## Royal Faculty of Physicians and Surgeons of Glasgow

At the annual meeting of the faculty Dr. G. B. Fleming was elected president; Mr. J. Scouler Buchanan, visitor; Mr. W. W. Galbraith, treasurer; Dr. A. L. Goodall, librarian; and Mr. Andrew Allison, representative on the General Medical Council. In addition to these office-bearers, the following were elected members of the council: Dr. John Gardner, Mr. A. B. Kerr, Mr. J. H. MacDonald, Dr. J. W. Macfarlane, Mr. E. G. Oastler, Mr. Charles Read, Mr. W. A. Sewell, Dr. W. R. Snodgrass, Mr. G. H. Stevenson, Mr. Matthew White, Dr. J. H. Wright.

1. *Lancet*, Oct. 26, p. 610.

1. *Archaeology and Food*. Presidential address reprinted from the *Proc. Somerset Archaeolog. Nat. Hist. Soc.* 1945, 91, 59.

**Scottish Universities By-election**

Mr. R. Scott Stevenson, F.R.C.S.E., has been nominated as Liberal Nationalist candidate. Mr. Walter Elliot, M.B., F.R.S., as already announced, is standing as a Conservative. The result will be declared on Nov. 29.

**London Medical Exhibition**

This exhibition, the 29th in the series, will be held in the new hall of the Royal Horticultural Society, Westminster, S.W.1, from Monday, Nov. 18, to Friday, Nov. 22. It will be open daily from 11 A.M. to 6.30 P.M.

**Victor Horsley Lecture**

Dr. F. M. R. Walsh, F.R.S., will deliver the seventh Horsley lecture at the National Hospital, Queen Square, London, W.C.1, on Wednesday, Nov. 27, at 5 P.M. His subject is to be the Contribution of Clinical Study to the Physiology of the Cerebral Motor Cortex, and Sir Alfred Webb-Johnson, F.R.C.S., is to be in the chair.

**Chemical Society's Centenary**

The Faraday lecture during the Chemical Society's centenary celebrations next July is to be delivered by Sir Robert Robinson, F.R.S., who is himself a past-president of the society. His work on electronic influences in organic chemistry is linked with the discoveries of Michael Faraday, in whose memory the lectureship was founded in 1867.

**Medical Conference in West Africa**

A conference is being held this week at Accra between British, French, and Belgian representatives, with Portuguese and Liberian observers, to arrange for the exchange of information and for coördination between the West African medical services.

**Nuffield Scholarships for Gold Coast Officials**

Scholarships in the academic year 1947-48 are to be awarded by the Nuffield Foundation to enable officers of Dominion and Colonial origin who are at present in subordinate ranks of the Colonial Service to qualify for promotion, particularly in branches where knowledge of medicine or biological subjects is required.

**Scholarships in Aid of Scientific Research**

The council of the British Medical Association is prepared to receive applications for the following research scholarships: an Ernest Hart memorial scholarship (£200), a Walter Dixon scholarship (£200), and four research scholarships (each £150). The scholarships are open to men or women undertaking research in any subject (including State medicine) relating to the causation, prevention, or treatment of disease. Preference will be given to members of the medical profession. Each scholarship is tenable for nine months from Feb. 1, 1947, and a scholar may be reappointed for not more than two additional terms. He may also hold a junior appointment at a university, medical school, or hospital provided the duties do not interfere with his work as a scholar. Applications must be made not later than Dec. 28, on a prescribed form, to be obtained from the secretary of the association, B.M.A. House, Tavistock Square, W.C.1.

**Joint Tuberculosis Council**

At the last meeting this council adopted a report suggesting the abolition of the present system of recording cases of tuberculosis, and proposing new definitions of such words as "quiescent" and "arrested." This report will not be published until the Ministry of Health has had an opportunity to consider it. Attention was drawn to the ruling that where family allowances are received by persons entitled to financial assistance under memorandum 266/T, the 266/T allowances must be reduced by the amount of family allowance received; and the council authorised a deputation to express to the Ministry the strong view that family allowances should have no effect upon allowances granted to tuberculous persons as such. Arising out of resolutions adopted at a previous meeting expressing alarm at the probable effect of the National Health Service Bill on the tuberculosis service, it was reported that a deputation representing the Joint Tuberculosis Council and the National Association for the Prevention of Tuberculosis had met Sir Wilson Jameson, who said that there was no intention to detach preventive work from curative work, and also gave assurances on other points. The council set up a special committee to consider the establishment of a Bureau of Tuberculosis Statistics, and decided to approach the Nuffield Foundation for assistance in the project.

**B.A.L. as Antidote to Mercury**

According to the British United Press, a two-year-old boy in Los Angeles who swallowed three tablets of bichloride of mercury has recovered completely owing to the administration of British anti-lewisite.

**More Potent Penicillin**

An American company, the Heyden Chemical Corporation, is now producing white crystalline penicillin which, it is said, can be stored dry for three years without refrigeration. According to a B.U.P. report, the potency of this product is the greatest yet developed commercially.

The Pharmaceutical Society has decided to ask the Ministry of Supply to release to the public stocks of quinine which have been held in chemists' shops during the war.

**Appointments**

BANNISTER, F. B., M.D. Lpool, D.A.: anaesthetist, Chester Royal Infirmary.  
 COLBECK, J. C., M.B. Lond.: E.M.S. area pathologist, West Riding.  
 HAINES, R. M., M.D. Lond.: director of pathology, Chelsea Hospital for Women.  
 MILLIN, T. J., M.B. Dubl., F.R.C.S.: genito-urinary surgeon, Chelsea Hospital for Women.  
 PABLOT, P. J., M.B. Lond.: medical officer, Colonial Service, Mauritius.  
 RAFTERY, L. M. N., M.R.C.S., M.R.C.O.G., M.M.S.A.: visiting gynaecologist, British Red Cross Society's clinic for rheumatism, London.  
 SHANNON, J. W., M.B. Lond.: medical officer, Colonial Service, Nyasaland.

**Diary of the Week**

NOV. 17 TO 23

**Monday, 18th****HUNTERIAN SOCIETY**

8.30 P.M. (Apothecaries' Hall, Black Friars Lane, E.C.4.) Mr. Hugh Linstead, Dr. G. H. Day, Mr. Arthur Mortimer, Mr. J. S. Walmsley: That the Advertisement of Proprietary Medicines is a Menace to the Public.

**Tuesday, 19th**

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.1  
 5 P.M. Dr. J. Calvert Spence: Care of Children in Hospital. (Charles West lecture.)  
 ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2  
 5 P.M. Mr. J. T. Chesterman: Specimens Illustrating Intestinal Obstruction. (Erasmus Wilson Demonstration.)  
 ROYAL SOCIETY OF MEDICINE  
 4.30 P.M. *Pathology*. (Westminster Hospital School of Medicine, S.W.1.) Demonstrations.  
 EUGENICS SOCIETY  
 5.30 P.M. (Burlington House, Piccadilly, W.1.) Prof. Tage Kemp (Copenhagen): Fifteen Years' Experience of Negative Eugenics in Denmark.  
 LONDON SCHOOL OF DERMATOLOGY, 5, Lisle Street, W.C.2  
 5 P.M. Dr. W. N. Goldsmith: Acneiform Eruptions.

**Wednesday, 20th**

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1  
 8.30 P.M. *Proctology*. Mr. A. Hedley Whyte: Proctology—Past and Present. (Presidential address.)  
 ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 23, Portland Place, W.1  
 3.30 P.M. Mr. C. W. A. Kimbell: Medical Aspects of Life in the Prisoner-of-war Camp.

**Thursday, 21st**

ROYAL COLLEGE OF SURGEONS  
 5 P.M. Mr. V. Zachary Cope: Actinomycoosis. (Erasmus Wilson demonstration.)  
 ROYAL SOCIETY OF MEDICINE  
 5 P.M. *Dermatology*. Cases will be shown at 4 P.M.  
 ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE  
 8 P.M. (London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1.) Laboratory meeting.

**Friday, 22nd**

ROYAL SOCIETY OF MEDICINE  
 2.30 P.M. *Epidemiology and State Medicine*. Dr. Robert Cruickshank, Dr. O. H. Lidwell, Mr. F. Courtney Harwood, Dr. Joyce Wright: Modern Methods in the Control of Airborne Infections.  
 5 P.M. *Pediatrics*. Cases will be shown at 4.15 P.M.  
 ROYAL INSTITUTION OF GREAT BRITAIN, 21, Albemarle Street, W.1  
 9 P.M. Mr. H. Osmond Clarke: R.A.F. Experiences of the Modern Treatment of Fractures. A film will be shown.  
 GENETICAL SOCIETY  
 5 P.M. (London School of Hygiene and Tropical Medicine.) Prof. Tage Kemp: Multiple Factors in Morbid Inheritance. Film: Fat Dwarf.  
 UNIVERSITY COLLEGE HOSPITAL MEDICAL SCHOOL, W.C.1  
 4.30 P.M. Dr. P. A. Owen (Oslo): New Factors Concerned in the Coagulation of Blood.  
 LONDON CHEST HOSPITAL, Victoria Park, E.2  
 5 P.M. Mr. T. Holmes Sellers: Surgery of the Heart.  
 LEEDS AND WEST RIDING MEDICO-CHIRURGICAL SOCIETY  
 8.30 P.M. Dr. Macdonald Critchley: Sir William Gowers—A Biographical Study.  
 ROYAL MEDICAL SOCIETY, 7, Melbourne Place, Edinburgh  
 8 P.M. Dr. J. McMichael: Heart Failure.

## ABSORPTION AND EXCRETION OF WATER THE ANTIDIURETIC HORMONE\*

E. B. VERNEY

M.A., M.B. Camb., F.R.C.P., F.R.S.

SHEILD PROFESSOR OF PHARMACOLOGY IN THE UNIVERSITY OF  
CAMBRIDGE

Oliver and Schäfer (1895) showed, in the anaesthetised dog, that the intravenous injection of extracts of whole pituitary gland raised the arterial pressure, the rise being of peripheral origin and lasting far longer than that after injections of extracts of the suprarenal medulla. Howell (1898) demonstrated that the pressor activity of extracts of the pituitary was derived solely from the posterior lobe, a fact confirmed by Schäfer and Vincent (1899). Schäfer and Magnus (1901) discovered that intravenous injection of extracts of the infundibular portion of the hypophysis into the anaesthetised dog produced "after a short latent period a remarkable and long-continued expansion of the kidney accompanied by a decided and often prolonged diuresis." Schäfer and Herring (1906) showed that the diuresis was essentially independent of the vascular change in the kidney, and that very often the diuresis was preceded by an inhibition of urine flow, even though the vascular conditions were throughout favourable to free secretion. Schäfer clearly recognised at this early date both the diuretic and the antidiuretic activities of postpituitary extract, and he postulated their inherence in two discrete substances.

Schäfer (1909) subjected the pituitaries of three dogs to mechanical injury or to partial destruction with a feeble thermocautery and found that in all a polyuria supervened during the 4-11 postoperative days over which the observations were made. These results gave the first clear indication of functional linkage between the kidney and the pituitary.

The clinical counterpart of these last experiments by Schäfer was revealed in Frank's (1912) observation of the frequent association of diabetes insipidus with injuries to the hypophysis; and, following Schäfer's interpretation of the results of his experiments on the dog, Frank expressed the view that diabetes insipidus in man was attributable to pathological overactivity of the pars intermedia. Von den Velden (1913) and Farini (1913), however, demonstrated the efficacy of injections of postpituitary extract in relieving the signs and symptoms of the human disease, and Von den Velden was clearly puzzled by the conflict between his results and the current interpretation of Schäfer's experimental findings. Since that time evidence has been gradually accumulating that the polyuria frequently observed to be associated with experimental or pathological lesions of the pituitary and hypothalamus is to be ascribed rather to lack of the postpituitary antidiuretic substance than to liberation or increased secretion of Schäfer and Magnus's diuretic substance, evidence which has culminated in the elegant demonstration by Ranson et al. (1938) that in the cat and the monkey diabetes insipidus is contingent on the complete degeneration or removal of the neurohypophysis.

There are two other conditions under which a profuse watery diuresis is observed: the perfusion of the dog's kidney in the isolated state (Verney and Starling 1922, Starling and Verney 1925), and the ingestion of a large volume of water by the normal mammal. The diuresis seen in the perfused isolated kidney is specifically inhibited by the addition of postpituitary extract to the perfusing blood, the fall in the output of water being accompanied by an increase both in the concentration of chloride in the urine and in the rate of chloride excretion. These effects of postpituitary extract are closely simulated by

switching the head of a dog into perfusion-parallel with the kidney, the inhibition of diuresis and increased excretion of chloride then depending on the presence of the pituitary in the perfused head (Verney 1926). There can be little doubt about the substantial correctness of the view put forward at the time, that the profuse watery diuresis exhibited by the perfused isolated kidney is due to the divorce of the kidney from the inhibitory influence of the postpituitary antidiuretic substance and has essentially the same aetiology as diabetes insipidus.

But it is particularly with the profuse watery diuresis following water ingestion that I wish to deal here. The importance of the experimental investigation of the processes underlying this phenomenon resides in the possibility of determining whether the postpituitary antidiuretic substance is a hormone in the full physiological sense—i.e., whether its secretion is continually varying according to the contemporary osmotic pressure of the arterial plasma and being as continually and reversibly engaged in determining the rates of water and chloride excretion by the kidney.

### LAG BETWEEN ABSORPTION AND EXCRETION OF INGESTED WATER

The response of the kidney to the ingestion of water can be accurately measured in bitches in which, by an earlier aseptic operation, the ureters have been extended to the exterior. When to such an animal, weighing about 10 kg., 250

c.cm. of water is given by stomach-tube, the resulting diuresis reaches a peak about 50 min. later. By the repetition of these observations on several animals a curve representing the group mean of the individual mean rates of secretion of urine is obtained, and the peak of this mean in experiments conducted by Klisiiecki et al.

(1933) lay accurately at 50 min. after the administration of the water (fig. 1).

The rate of absorption of water from the gut can be determined in the following way. When the excretion curves have been obtained, a further 250 c.cm. of water is given, and at a predetermined time after this the animal is rapidly rendered unconscious with chloroform and the heart immediately punctured through the chest wall; from the volume of water remaining in the gut the volume absorbed in the period between the giving of the water and the death of the animal becomes known. The results of ten such observations are shown in fig. 2, the time-element in each being taken as the interval between the mid-time of introduction of the water and the time of puncture of the heart. The absorption curve (fig. 2) reaches the 250 c.cm. level in 35½ min. Subtraction of the water-excretion curve (fig. 2) from the water-absorption curve gives the water-load curve (fig. 1), which represents the amount of water temporarily held in the tissues in excess of the optimal. The peak of

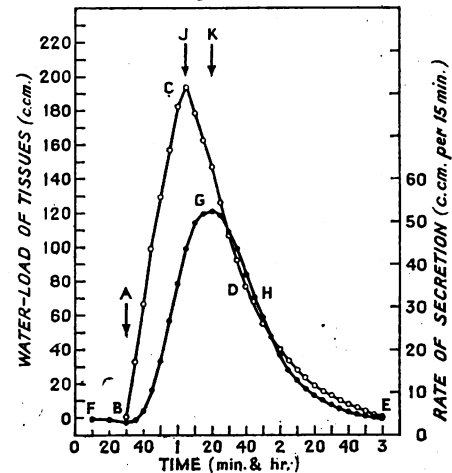


Fig. 1.—Response of dog's kidney to ingestion of water: F, B, G, H, E, the mean of the mean rates of secretion in 9 dogs; B, C, D, E, water-load curve; A, time of giving water. (Klisiiecki et al. 1933.)

\* Abridgment of the sixth Sharpey Schafer memorial lecture, delivered in Edinburgh on June 8, 1945.

the water-load curve precedes that of the mean rate of urinary secretion (fig. 1) by 15 min. If we regard the water-load curve as tracing the intensity of the stimulus to which the kidney eventually responds, we must conclude that there is a lag of 15 min. between the maximal intensity of stimulus and the maximal response by the kidney. The response by the denervated kidney runs exactly parallel with that of the innervated kidney. I shall consider later the significance of this 15-min. lag; in the meantime I wish to draw attention to the analysis of the inhibition produced by various agencies in the flow of urine during water diuresis, in particular to that of the inhibitory effect of (1) muscular exercise, (2) emotional stress, and (3) a rise in the osmotic pressure of the carotid arterial plasma.

**INHIBITORY EFFECT OF MUSCULAR EXERCISE ON WATER DIURESIS**

To ensure that the flow of urine from the urethra is accurately conforming with contemporary secretion by the kidney, it has been found desirable, in many of these investigations, to reduce the urinary conducting tract so far as possible to simple tubular form by excising the fundus of the bladder, thus eliminating any irregularities occasioned in the recorded flow by contraction and relaxation of the bladder's musculature.

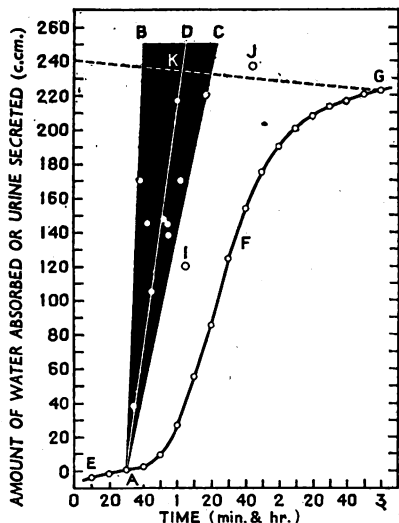


Fig. 2—Response of dog's kidney to ingestion of water: E, A, F, G, mean excretion curve, water having been given at A; white points represent volume of water absorbed from gut in allotted time; AKD, mean absorption curve (mean of lines from A through each white point). (Kilsiecki et al. 1933.)

then removed and the remnant closed with a single row of fine silk sutures. So far as Rydin and Verney (1938) were able to judge, such animals maintain health indefinitely; accuracy in following the rate of urine secretion is thus not made contingent on a shortening of the animal's period of survival.

It now became necessary to subject such animals to short periods of exercise and to measure continuously the effects of this procedure on water diuresis. For this purpose a moving platform was designed, the speed of which could be measured and suitably varied, the dog being tethered to the superstructure during the whole course of the urine-flow measurements.

We found that mild exercise—e.g., running at 6 m.p.h. for 4 min.—was usually followed by a well-marked and protracted inhibition of urine flow (fig. 3). During the first 2 min. of the period of exercise no fall in the rate of urine flow was observed; indeed, there was sometimes a small increase, and only during the second 2-min. period did a decrease begin, the rate falling progressively towards its lowest value. The cessation of exercise was apparently without influence on the

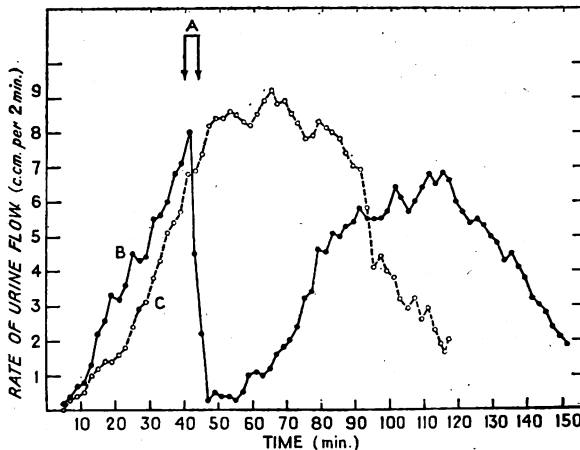


Fig. 3—Water-diuresis curves from a bitch, in which fundus of bladder was excised and urethral cannula implanted 10 days before, and 250 c.c.m. of water given at zero time: B, response on August 7, 1935; C, response on August 8 (response on August 6 was closely parallel with C); A, period of exercise, running at 6 m.p.h., during response B. In this and all similar figures, the rate of urine flow is plotted in the middle of the period to which it refers. (Rydin and Verney 1938.)

course of the decline, and the degree and extent of the inhibition varied widely in different animals in response to running at the same speed and over the same period. The longer inhibitions were always accompanied by an increase in the percentage of chloride and of nitrogen in the urine and by a contemporary increase in urinary pigment. The variability in the inhibitory responses to a constant amount of exercise, their apparent relation in any one animal to an emotional accompaniment, and their inception by events taking place early in the period of exercise made it desirable to divorce any contribution which short exercise might make to the inhibitory effect from that due to an associated emotion. We were able to do this in three ways.

**EFFECT OF EMOTIONAL STRESS**

First, it was easy to show that, if the animals were repeatedly exercised, the inhibitory response progressively diminished to final extinction. Muscular exercise, therefore, is not per se causally related to the inhibitory response; and the view that psychological factors are essentially involved is supported by the observation that inhibition has been noted on occasions when an animal resented undertaking the very exercise which had previously not elicited a response.

Secondly, if the exercise, the response to which had been extinguished by repetition, was combined with an

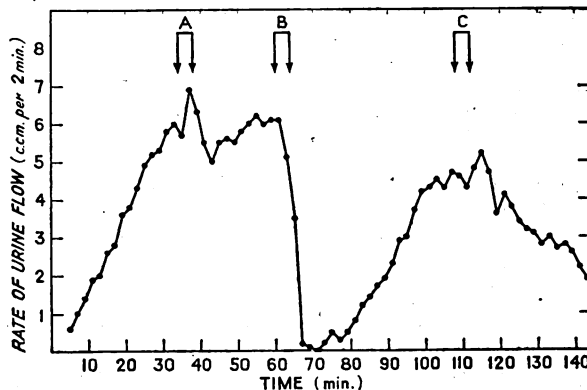


Fig. 4—Water-diuresis curve from bitch to which 250 c.c.m. of water was given at zero time. During periods A and C the bitch ran on the platform quite happily. During B the same exercise was given and the bitch frightened by the repeated soundings of a car-horn. (Rydin and Verney 1938.)

unfamiliar and ugly sound, the inhibitory response reappeared. In the experiment charted in fig. 4 the animal was subjected to three similar periods of familiar exercise (A, B, and C); but, whereas during A and C the exercise was simple, during B it was combined with the repeated sounding of a car-horn, to which the animal exhibited fright. There can be no question, therefore, that the inhibitory response which began during B was due not to the exercise but to its emotional accompaniment.

We were thus led, in the third place, to measure the effect of emotional stress alone. For this purpose a weak faradic current was carried to the subcutaneous tissues by surgically clean needle electrodes, and its strength was increased until the animal showed signs of resentment. Such a stimulus produced inhibitory responses indistinguishable from those already described, and in later experiments this simpler and more controllable form of stimulus has usually been used for the analysis of the resultant inhibition.

How, then, does emotional stress produce this inhibition? The first suggestion is that the inhibition is of vasomotor origin, with consequent constriction of the vasa afferentia and a fall in the glomerular capillary pressure, though the rise in the chloride concentration of the urine during the inhibition argues against such interpretation. The suggestion is, however, disproved by the

fact that after denervation of the kidneys the form of the inhibitory response is apparently unaltered. There is a rise in arterial pressure during the emotional stress; hence in the absence of any change in the composition of the blood it is reasonable to infer that, after denervation of the kidneys, at least no fall in glomerular capillary pressure results from the stress.

But, it will be said, adrenaline was released during the period of stimulus, and this adrenaline, especially after division of the renal nerves, led to vasoconstriction in the kidney. This perfectly valid criticism collapses when put to the test of the renal experiment. In fig. 5 are given the two responses to emotional stress in one animal. A month after the kidneys had

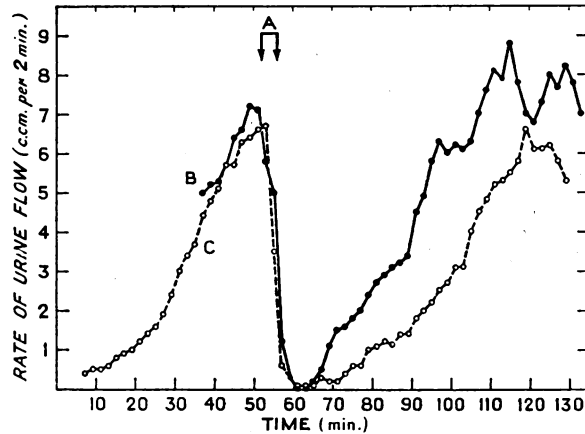


Fig. 5.—Water-diuresis curves from bitch (kidneys denervated) to which 250 c.c.m. of water was given at zero time in curve C, and at 31 min. in curve B. During period A the animal ran on the platform and was angered by noise. Curve B was obtained 1 day before, C 5 days after, the right suprarenal gland had been removed and the left denervated. (Rydin and Verney 1938.)

been denervated the response B was obtained. Next day the right suprarenal was removed and the left denervated. Five days later the response C was obtained. There is no essential difference between the forms of the two responses, and during the following 16 days seven other responses of similar type were obtained. If, then, we assume that the liberation, by emotional stress, of adrenaline from the suprarenals is mediated only by the gland's nerve-supply, and that no other agent is liberated in effective vasoconstrictor amount, we are led by these results to infer that the inhibitory response observed in the normal animal is conditioned neither by the secretion of adrenaline nor by a fall in the rate of renal blood-flow.

*Dissimilarity to the Inhibition Produced by Temporary Compression of the Renal Artery.*—The possibility of there being a causal relationship between changes in renal blood-flow and the inhibition of urine flow by emotional stress has also been questioned in another way.

A small compression unit was designed (fig. 6) which could be implanted by aseptic operation at the origin of the right renal artery, the left kidney being removed at the same time, and could temporarily arrest the renal blood-supply later without the animal being aware of the fact. The effect of this procedure on the course of water diuresis was determined. The implanted unit becomes snugly ensheathed in a thin capsule of fibrous tissue, and its presence is without apparent influence on either the animal's normal health or its survival period.

Fig. 7 shows the effects of 2½ and 3 min. periods of occlusion of the renal artery. On release of the compression the urine flow suddenly mounts to at least its

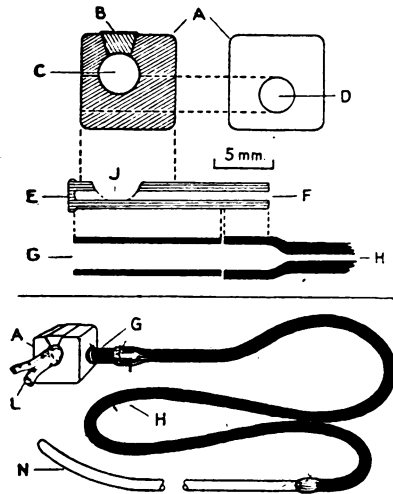


Fig. 6.—Compression unit for renal artery. In the upper part are shown the component parts of the unit; in the lower part, and on a smaller scale, the parts assembled: A, bakelite cube; B, wedge; C, channel for renal artery; D, channel for silver tube E-F; J, sector removed from silver tube; G, thin rubber tube; H, pressure-tube extension of E-F. To assemble these parts the thin rubber sleeve G is slipped over E-F into the position indicated, and the unit so formed is then passed through the channel D. Into this it fits tightly, and the circumference of the opening J corresponds in position to, and slightly outruns, that of the arterial channel C in its lower part. Round the sleeve G are tied two ligatures, one on either side of the bakelite cube, and the lumen F is filled completely with 0.9% NaCl. The pressure-tube extension H, already filled with saline, is now slipped over the open end of the silver tube and tied there securely. A fine needle is then pushed into the lumen of H near its lower end and a little fluid withdrawn with a syringe. The sleeve G thereby collapses into the sector J and frees completely the arterial channel C. N, thin steel rod; L, renal artery with its two primary branches. Before use the unit is tested and calibrated by determining the volume of fluid which it is necessary to inject into it to stop the flow of water perfused under a pressure of 140 mm. Hg through a length of rubber tubing temporarily resting in the arterial channel C. We have used two sizes of unit, the diameter of C being 3.5 mm. In the one and 4.0 mm. in the other. (Rydin and Verney 1938.)

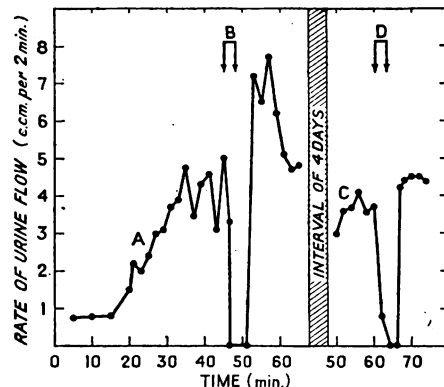


Fig. 7.—Effects of temporary compression of renal artery on water diuresis in normal dog. Each rate of urine flow is plotted at the end of the period to which it refers. In each experiment 300 c.c.m. of water was given by stomach-tube at zero time, a preliminary hydrating dose of 250 c.c.m. having been given 4 hours previously in the first experiment and 2½ hours previously in the second. B, D, periods of compression of renal artery. (Rydin and Verney 1938.)

rate before the artery was occluded; this takes place irrespective of whether the inhibition of urine flow is complete from severe compression or partial from moderate compression of the renal artery. The character of the response thus becomes sharply differentiated from

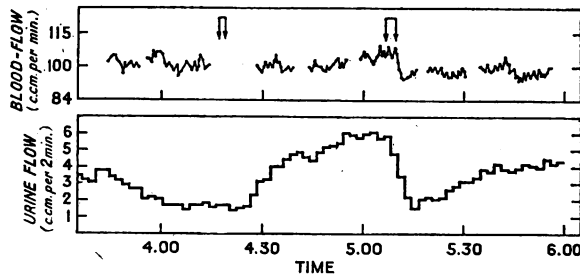


Fig. 8—Blood-flow and urine flow through denervated kidney in a dog subjected to emotional stress. Between the first pair of arrows 250 c.cm. of water was given by stomach-tube; between the second pair the animal was annoyed by mild faradic stimulation. (Cowan, Verney, and Vogt, unpublished observations.)

that resulting from emotional stress and supports the evidence already adduced for the view that the response to emotional stress is not determined by haemodynamic factors.

**Measurement of Renal Blood-flow during Emotional Stress.**—Some years ago Dr. S. L. Cowan, Dr. M. Vogt, and I decided to attempt the direct measurement of the blood-flow through the kidney during the inhibition from emotional stress, and the results demonstrated the essential correctness of the inference drawn by Rydin and myself from evidence of an indirect nature. The results have not yet been published, but Dr. Cowan and Dr. Vogt have very kindly allowed me to present the essential features † of the work which we did together.

We have used Rein's (1928, 1929a and b, 1931) thermostromuhr method, the thermostromuhr unit being a modification of that designed by him. It is made from a bakelite block and is a little longer than Rein's, so that the thermocouples are further from the ends, and the risks of small displacements of the unit and consequent variations of thermal contact with a wall of a blood-vessel are reduced. The heating and galvanometer leads are enclosed in very fine rubber tubes, and the whole unit can be sterilised by boiling. An approximate calibration of the instrument was made before use by placing a strip of artery inside it and perfusing this with defibrinated blood; and an accurate calibration curve was obtained, after the animal had been killed, by perfusing the renal artery in situ, a calibration which was facilitated by the addition of a little chloral to the blood to inhibit spontaneous contractions of the artery (Petersen 1936).

In the preparatory operation one kidney is removed and the stromuhr is slipped on the renal artery of the other close to its origin. The galvanometer leads are passed down one uterine horn, the heating leads down the other, and thence they pass through the uterus to the vagina, where they remain

† These were communicated to the Physiological Society on March 12, 1938.

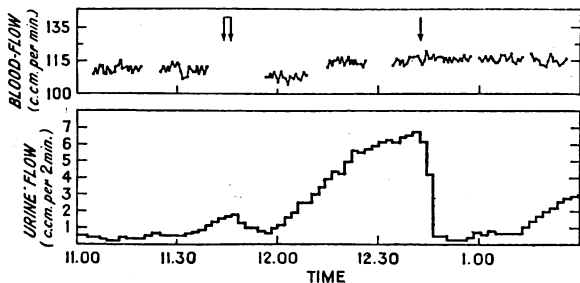


Fig. 9—Further observations on the animal from which the results in fig. 8 were obtained. Between the first two arrows 350 c.cm. of water was given by stomach-tube. At the third arrow 4 mU of postpituitary extract was given intravenously. (Cowan, Verney, and Vogt, unpublished observations.)

accessible for the purpose of future blood-flow measurements. The fundus of the bladder is excised and a self-retaining catheter left in the residual stump. The abdomen is then closed. Recovery is rapid and uneventful, and all our observations have been made on animals in a state of excellent health.

Fig. 8 shows the course of the renal blood-flow during an experiment in which an inhibition of water diuresis was produced by emotional stress. In this animal the stromuhr had been implanted on the right renal artery; the right suprarenal and the left kidney had been removed and the left splanchnic nerves divided at the same operation. There is a small fall in blood-flow, and it was found that this small fall might outlast the return of diuresis, but the fall was usually less than the changes in flow developing spontaneously in the course of an experiment. Such changes were of the order of 10% and were encountered even when the animal was standing still; they were unaffected by the giving of water by mouth or by small doses of postpituitary extract intravenously (fig. 9). An intravenous injection of adrenaline 10  $\mu$ g., on the other hand, produced a well-marked but transitory fall in blood-flow.

In connexion with this work two points must be emphasised. (1) By 4–5 days after the operation the unit had become snugly ensheathed in a thin fibrous capsule, which immobilised it on the arterial wall and so minimised any changes in galvanometer deflection from variations in thermal contact between the thermo-

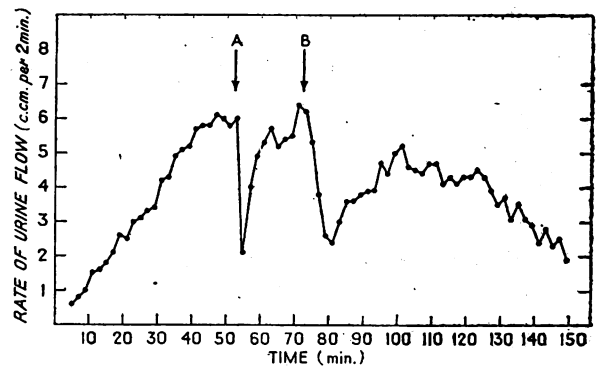


Fig. 10—Water-diuresis curve from bitch in which both kidneys had been denervated 16 days before and 250 c.cm. of water given at zero time. At A, 1 c.cm. of 0.9% NaCl containing 0.02 mg. of adrenaline HCl; and at B, 1 c.cm. of 0.9% NaCl containing  $10^{-5}$  c.cm. of standardised postpituitary extract (10 U/c.cm.) was injected intravenously. (Rydin and Verney 1938.)

couples and the arterial wall. The unit remained so protected and immobilised during the final calibration, which was carried out immediately after the animal had been killed. (2) The health of the animals on which our observations were made was in every respect excellent. These results, then, afford direct evidence for the view that the inhibition of water diuresis by emotional stress is independent of changes in renal blood-flow, the small changes observed being incidental rather than causal.

**Comparison of Inhibitory Response to Emotional Stress with that to Intravenous Injection of Adrenaline and of Pituitary (Posterior Lobe) Extract.**—These facts having been established, it became of interest to compare the inhibitory effect of transient emotional stress with that of the intravenous administration of the two endogenous agents, adrenaline and postpituitary extract. Curves typical of the effects of these two drugs are shown in fig. 10, and the forms of response remain true to type in whichever order they are elicited on the plateau of diuresis. The response to adrenaline, by its sudden fall and almost equally sudden recovery, is quite unlike that to emotional stress. When, however, the response to emotional stress is compared with that to postpituitary extract, so close a correspondence is obtained



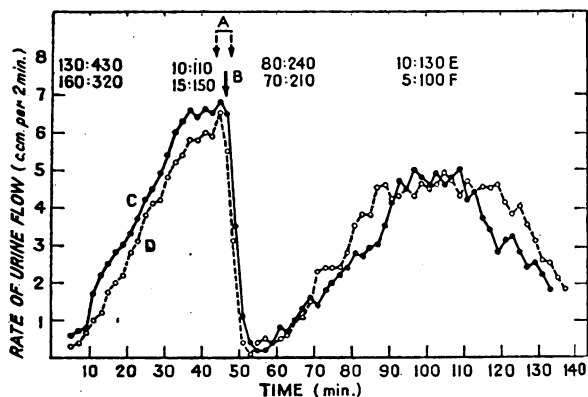


Fig. 11—Water-diuresis curves from bitch, curve C being obtained on Nov. 21, curve D on Nov. 25, 1935. The kidneys had been denervated on Oct. 14; right suprarenal gland removed and left denervated on Nov. 15. At B, during the course of C,  $5 \times 10^{-4}$  c.cm. of postpituitary extract (10 U/c.cm.) was injected intravenously. At A, during the course of D, the animal was angered by noise. E, chloride (as NaCl) in mg./100 c.cm. urine, and nitrogen in mg./100 c.cm. urine, at four periods during the course of experiment C; F, corresponding figures during the course of experiment D. (Rydin and Verney 1938.)

both in the courses of urinary water and in those of urinary chloride and nitrogen as to encourage the belief that the two phenomena have the same immediate cause. Indeed, with a suitable dose of postpituitary extract the two responses are indistinguishable (fig. 11), and with each there is a latent period of some 2 min. before the inhibitory response begins. Such a dose of postpituitary extract leaves the arterial pressure unaffected, and the absence of change in renal blood-flow (fig. 9) gives to this agent an additional qualification for identity with that responsible for the inhibition from emotional stress.

But a resembling relationship between phenomena does not carry the conviction of causal identity, and it became imperative to obtain direct evidence on the question of such identity by measuring the response to emotional stress before and after removal of the posterior lobe of the pituitary. This has been attempted by O'Connor and Verney (1942), and we have used Aschner's (1912) original method of approach to the pituitary through the basisphenoid.

*Effect of Removal of Posterior Lobe of Pituitary on Inhibition of Water Diuresis by Emotional Stress.*—The results we obtained were unequivocal, in that the response to emotional stress after removal of the posterior lobe of the pituitary was very much reduced when compared with that before removal. Assay, in terms of postpituitary extract, of the responses before and after removal of the posterior lobe showed that only about

5% of the antidiuretic function of the neurohypophysis, as expressed in the inhibition by emotional stress, remained when the posterior lobe had been removed. Before removal of the posterior lobe the response to the stimulus was closely matched by that to 5 mU of postpituitary extract injected intravenously (fig. 12), and a month after removal of the posterior lobe the response to the same stimulus had a value of about 0.1 mU (fig. 13), the average postpituitary equivalent of ten such tests being 0.2 mU.

In these experiments removal of the posterior lobe was followed by an increase in the daily output of urine from a preoperative value of about  $\frac{1}{4}$  litre to a value of 1-2 litres for the first 2-4 days. The increase then gradually subsided, and the output of urine was apparently normal from about a week after the operation. Polyuria following operative interference with the pituitary was reported as an occasional manifestation by Vassale and Sacchi (1892) and Gemelli (1908), but Schäfer (1909) first linked its appearance with the actions of posterior-lobe extract on the kidney. More

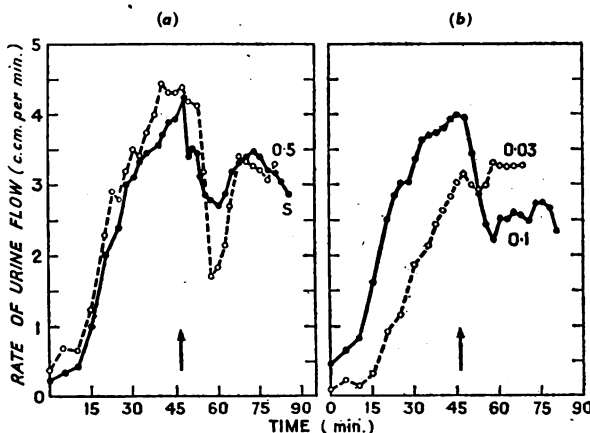


Fig. 13—Estimation of amount of antidiuretic substance liberated in response to 40 sec. emotional stimulus of same strength in same bitch as in fig. 12 but 1 month after removal of the posterior lobe: (a) inhibition resulting from emotional stimulus compared with that from 0.5 mU injected during the curve of the previous day; (b) inhibitions from 0.1 mU on the day after the curves of (a) and from 0.03 mU on the day before the curves of (a). (O'Connor and Verney 1942.)

recently the temporary polyuria has been observed by Fisher et al. (1938) working on the cat and by Pickford (1939) working on the dog. As much as 95% of the antidiuretic activity of the neurohypophysis, as assessed in the emotional inhibition of water diuresis, can be abolished without producing such an impairment in the

animal's ability to conserve its tissue water as would be expressed in a permanent increase in urine flow.

*Probable Pathway through which Emotional Stress Operates.*—A study of the inhibition of water diuresis by emotional stress has, then, led to the demonstration of the release of antidiuretic substance from the posterior lobe of the pituitary when a suitable stimulus is given to the normal animal. Now, Pickford (1939) has shown that, in the atropinised dog, acetylcholine produces a temporary inhibition of water diuresis, an inhibition which no longer develops after removal of the posterior lobe. The percentage of chloride in

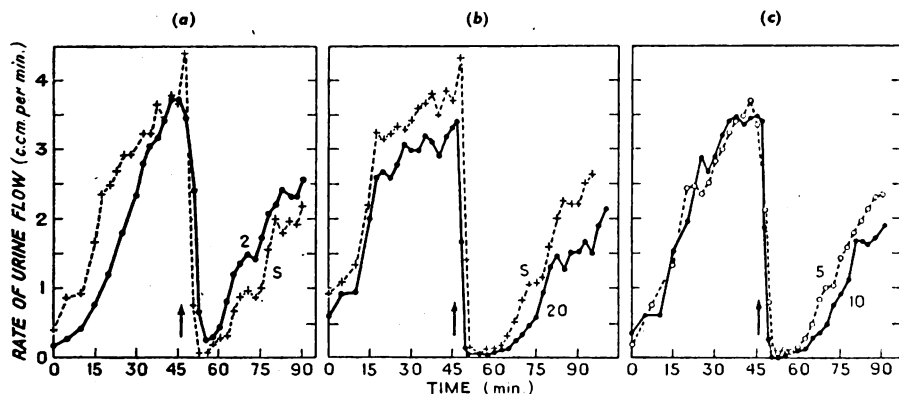


Fig. 12—Estimation of amount of antidiuretic substance liberated in response to 40 sec. emotional stimulus before removal of posterior lobe in bitch weighing 11.2 kg. Dose of water=300 c.cm. Stimulus and injection were given at the arrow: (a) inhibition produced by emotional stress (graph S) is compared with that resulting from intravenous injection of 2 mU (graph 2); (b) another inhibition from an equal stimulus (graph S) is compared with that from 20 mU (graph 20); (c) inhibitions resulting from 5 and 10 mU. (O'Connor and Verney 1942.)

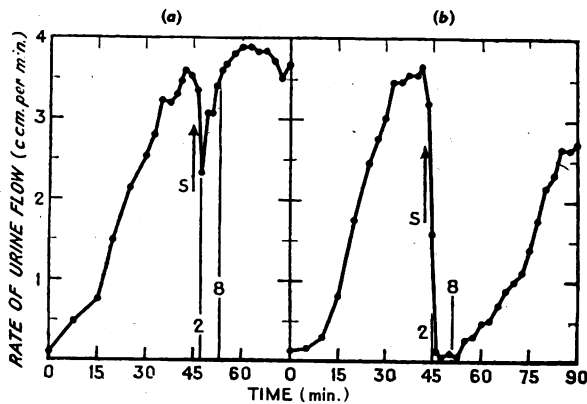


Fig. 14.—Water-diuresis curves of dog weighing 10 kg.: (a) August 21, 1942, before operation; S, 60-sec. faradic stimulation. Oct. 28, 1942, denervation of the kidneys and suprarenals. (b) Nov. 24, 1942; S, 60-sec. faradic stimulation. (O'Connor and Verney 1945.)

the urine and the rate of chloride excretion rise during the period of inhibition of the diuresis; and there can be little doubt that the acetylcholine is producing these changes in the excretion of water and chloride by stimulating directly or indirectly the hypothalamic neurones whose axons pass down the stalk to the posterior lobe and by whose activity the pituitary antidiuretic substance is released. Equally, there can be little doubt that emotional stress produces such release by similar involvement of the hypothalamic nuclei.

*Effect of Increased Activity of Sympathetic System on Inhibition.*—Before leaving the subject of the inhibition of water diuresis by emotional stress, I wish to refer briefly to the relation of increased activity of the sympathetic system with this inhibition. O'Connor and Verney (1945) have found that with many dogs the response to emotional stress during water diuresis is a sharp short inhibition, that this rapid inhibition is abolished by section of the splanchnic nerves and denervation of the kidneys and suprarenals, and that then the long slow inhibition of pituitary origin invariably appears. Fig. 14 shows the rapid response of sympathetic origin, and the slow response of pituitary origin which appeared after section of the splanchnics and denervation of the kidneys and suprarenals. The slow inhibition thus revealed could be prevented by the injection of adrenaline just before the application of the faradic stimulus.

There are two possible explanations of this: either the adrenaline is interfering with the action of released pituitary antidiuretic substance on the kidney, or it is preventing the release of this substance. That the latter is the correct interpretation was shown by the fact that adrenaline did not diminish the inhibition produced by postpituitary extract. Moreover, if the adrenaline is injected 30 sec. after instead of 30 sec. before the faradic stimulus, the full inhibition of pituitary origin appears. The irregular appearance of the slow inhibition in normal dogs is thus explicable in terms of non-release of antidiuretic substance from the posterior lobe owing to increased sympathetic activity during emotional stress. The action of adrenaline in this regard is not specific, since tyramine in equipressor doses is just as effective, and it seems probable that an increased cerebral blood-flow is the common factor in preventing the release of antidiuretic substance.

Now, Rydin and Verney (1938) had observed that an inhibition of the pituitary type followed the removal of small volumes of arterial blood from animals subjected to section of the splanchnics or to a combination of this with abdominal sympathectomy, conditions which we now see to be peculiarly favourable to the release of antidiuretic substance by emotional stress. May it not be that in states of low sympathetic tone in man, associated perhaps with pathic stimuli and with hæmorrhage, the

conditions are equally favourable to the prolonged secretion of antidiuretic substance by the pituitary? If that is so, the beauty of the fitness of distantly evolved processes for recruitment to the current accidental need for the conservation of such water as is in excess of that required for essential excretory work by the kidney becomes immediately manifest.

The demonstration, in the normal animal, of the release of pituitary antidiuretic substance by the artificial means of faradic stimulation of sensory nerves and receptors, and the fact that this release may be caused by such mild disturbance of the central nervous system as comes within a physiological range—even the anticipation of a nocuous stimulus which the animal has previously experienced may be effective—encouraged an attempt to determine whether the secretion of this substance was not continuously varying with, and under the direct control of, some factor in the animal's internal environment, to the maintenance of which factor within a narrow physiological range the renal secretion of water and of chloride would specifically contribute.

(To be concluded)

## LUNG LESIONS IN SKELETAL TUBERCULOSIS

REVIEW OF 500 CASES

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THE association of bone and joint tuberculosis with pulmonary lesions of the same aetiology has been recognised for many centuries, but reliable data were not available until the last few decades, with the advance in the pathology and radiological interpretations of tuberculous lesions. Papers by different authors have been published, all of which prove the intimate relation between pulmonary and extrapulmonary tuberculosis.

The present series comprises 500 cases of skeletal tuberculosis in patients admitted to the Royal National Orthopædic Hospital, Stanmore, during the last three years. These patients, generally resident in London and the home counties, were admitted irrespective of the severity of the skeletal lesion, provided they were known to have no open pulmonary tuberculosis. It is therefore a selected series of patients without tubercle bacilli in their sputum, but with recent development of skeletal tuberculosis. No old cases or readmissions were included.

The diagnosis of the tuberculous nature of the bone or joint lesion was made by the orthopædic surgeons in charge of the cases on typical clinical and radiological findings, by isolation of the tubercle bacillus from pus or granulation tissue, and by biopsy of tissue removed from the diseased part or its draining lymph-glands. Any case where the tuberculous nature of the lesion was in doubt was excluded.

Once the diagnosis of the skeletal lesion was made, each case was submitted to an investigation of the respiratory system. This included history of past and present symptoms referable to the chest, present signs in the chest, radiological investigations, sputum examination when available, and sedimentation-rate. In some cases gastric lavage and guinea-pig inoculation were also done. All the cases were reviewed, clinically and radiologically, at three-monthly intervals. A post-mortem examination was carried out on 4 out of 8 patients, who died while in hospital, to confirm the clinical findings in the respiratory system.

### FINDINGS

Of the 500 cases, 287 were males and 213 females. They were subdivided, irrespective of sex, into five-year

groups up to puberty; adolescence and early working life were taken together (15-24); the remainder were divided arbitrarily into those below and those above 40.

Age-group (yr.)	Males	Females	Total
0-4	39	26	65
5-9	47	29	76
10-14	36	20	56
15-24	77	69	146
25-39	64	49	113
40 plus	24	20	44
Total	287	213	500

To give a more complete picture of the material under consideration, the tuberculous skeletal lesions from which these patients were suffering are analysed in table I. The number of patients is smaller than the number of lesions because of multiple lesions in the same patient.

**Past Symptoms Referable to Respiratory System.**—Of these the only two to which clinical significance could be attached were the history of past sanatorium treatment and that of an acute attack of pleurisy.

**Past sanatorium treatment** for pulmonary lesions was undergone by 26 patients, 5% of the total number. In some cases the skeletal lesion developed as late as twenty years after the pulmonary lesion. In others it preceded the latter by 1-3 years. The majority, however, came on within three years of discharge from the sanatorium. Only 4 received collapse therapy, 3 thoracoplasty, and 1 A.P. Of the 26 patients who received sanatorium treatment, 12 had no active pulmonary

TABLE I—ANALYSIS OF TUBERCULOUS SKELETAL LESIONS

Age-group	Spine	Sacro-iliac	Hip	Knee	Ankle	Wrist	Elbow	Shoulder	Others
0-4	24	1	18	16	3	2	0	1	2
5-9	20	0	41	10	5	0	0	1	1
10-14	10	1	24	10	5	2	0	1	0
15-24	67	15	26	25	7	2	2	3	7
25-39	61	10	8	15	5	3	2	2	12
40+	24	1	9	9	1	0	1	2	2
Total	206	28	126	85	26	9	5	10	24

lesion clinically or radiologically when examined in the course of this investigation.

**Pleurisy.**—43 patients had an attack of pleurisy which preceded the skeletal lesion by an average of two years, the longest interval being twenty years. In some cases it was delayed 1-6 years after the onset of the skeletal lesion. Of the total number, 4 were bilateral. 24 of the 43 cases still showed active pulmonary lesions when examined.

**Present Symptoms Referable to Respiratory System.**—In view of the selected series of cases, such symptoms were meagre. Cough was present in 12%, expectoration in 4%, and hæmoptysis in 1%.

**Physical signs in the chest** were present in 12% of the patients and varied greatly in degree.

**Sputum tests** were positive in 6 patients, who were transferred immediately to a sanatorium.

**Gastric lavage and guineapig inoculation** were carried out in a small unselected series of cases. Of 64 tests, 18 were positive. The number of tests and results according to age-groups were as follows:

Age-group (yr.)	No. of tests	No. positive
0-4	13	3
5-9	6	2
10-14	5	1
15-24	25	7
25-39	10	3
40 plus	5	2
Total	64	18

The organisms isolated from the sputum and gastric lavage were in all cases of the human type.

**Sedimentation-rate.**—The extrapulmonary lesions were usually responsible for the high readings obtained. Occasionally one could attribute the high sedimentation-rate to the pulmonary lesion, but on the whole this

objective test was of no value in determining the activity or otherwise of pulmonary shadows.

**Radiological Investigation.**—The history, symptoms, signs, and bacteriological investigation were of little assistance in determining the presence of early lung disease. It was necessary, therefore, to rely on the radiological appearances for the diagnosis of pulmonary lesions and their classification. Radiograms were taken on admission and repeated at three-monthly intervals. Where required, penetrating and lateral films were taken to assist in the evaluation of doubtful shadows in the A.P. films. In children a negative result of radiography of the chest was not taken as final. Radiography was repeated after an interval of 3-6 months, and in a few

TABLE II—DISTRIBUTION OF TUBERCULOUS LESIONS

Age-group	Primary complex			Hæmatogenous foci only	Bronchogenic tuberculosis	Normal
	Lung and glands	Glands only	+hæmatogenous foci			
0-4	35 (54%)	16 (25%)	4 (6%)	0	0	10
5-9	31 (41%)	22 (29%)	5 (7%)	4 (5%)	0	14
10-14	13 (23%)	12 (21%)	3 (5%)	2 (4%)	0	26
15-24	4 (3%)	3 (2%)	6 (4%)	58 (40%)	2 (1%)	73
25-39	1 (1%)	0	0	39 (34%)	7 (6%)	66
40+	0	0	0	10 (24%)	7 (16%)	27
Total	84 (17%)	53 (10%)	18 (4%)	113 (23%)	16 (3%)	216

the primary lung infiltration, which was not visible in the first radiogram, became apparent in the later ones. In the same way progression of the disease in mediastinal glands produced in a few months mediastinal shadows easily identifiable as pathological on the later radiograms. Activity in patients with negative sputum and gastric lavage was judged partly by the appearance of the radiological shadows in the first radiogram and partly by the regression or progression of these shadows in later radiograms. Only cases fulfilling the above criteria were included among those taken as showing active pulmonary lesions. Calcified lesions were interpreted as normal.

Of the 500 patients, 284 (57%) showed active intrathoracic lesions. The percentage of lung lesions in the younger age-groups is 84, diminishing to 40 in the older age-groups, as shown by the following analysis:

Age-group (yr.)	Total	No. affected
0-4	65	55 (84%)
5-9	76	62 (82%)
10-14	56	30 (54%)
15-24	146	73 (50%)
25-39	113	47 (42%)
40 plus	44	17 (40%)
Total	500	284 (57%)

**Types of Lesion.**—As might be expected, primary infection of the lung and enlargement of the draining lymph-glands was common in the early age-groups, whereas hæmatogenous foci were seen at all ages, but especially in adults. The bronchogenic type of tuberculosis was seen infrequently, partly because these cases were denied admission to the hospital and partly because the bone lesion, being a result of a hæmatogenous dissemination, is more likely to be associated with other hæmatogenous foci in various parts of the body, including the lungs. Table II summarises the type of lesion found in the different age-groups and the percentage of that particular lesion in each age-group.

Table II shows that 31% of the patients showed one or other component of the primary complex, 27% showed hæmatogenous lesions, and 3% showed bronchogenic lesions. If these figures are analysed further, according to the total number of patients in the different age-groups, it becomes obvious that:

- (1) The commonest lesion in patients under 15 years of age is the primary complex present in 70%.

- (2) The younger the child, the higher is the percentage of those showing the primary complex.
- (3) The younger the child, the more likely is the radiogram to show not only the large mediastinal glands but also the primary lung infiltration.
- (4) The commonest lesions in adolescents and adults are the hæmatogenous foci, present in 40% of the patients over 15 years of age, only exceptions showing one or both components of the primary complex.
- (5) The small number of patients with the bronchogenic type of tuberculosis are found in the older age-groups.

The significance of these findings is discussed below.

**Localisation of Pulmonary Lesions.**—Table III summarises the localisation of the pulmonary lesions discovered and shows that the primary lung infiltration and the adult type of tuberculosis were, on the whole, unilateral, whereas glandular enlargement and hæmatogenous foci were usually bilateral.

TABLE III—LOCALISATION OF PULMONARY LESIONS

Lesion	No. of cases	Right upper zone	Right lower zone	Left upper zone	Left lower zone	Bi-lateral
Primary lung infiltration	84	21 (25%)	27 (32%)	20 (24%)	16 (19%)	0
Glandular enlargement	154	33 (22%)		43 (28%)		78 (50%)
Hæmatogenous foci	131	21 (16%)	4 (3%)	33 (25%)	1 (1%)	72 (55%)
Bronchogenic	16	5 (31%)	0	7 (44%)	0	4 (25%)

**Radiographic Appearances of Lesions.**—Most of the primary lung infiltrations presented ill-defined fluffy patches of consolidation leading up by excessive bronchial and vascular shadows to the hilar region. In a smaller number of cases, well-defined shadows were seen, varying in size from a few millimetres to complete involvement of the whole lobe. If healing has taken place, calcification may be seen in these lesions. In one case cavitation occurred in the primary lung infiltration.

The glandular enlargement varied in shape in different individuals. In some it presented a local tumour projecting from the mediastinal shadow or hilum, and in others the enlargement was more diffuse, producing a generalised widening of the mediastinal shadow. These shadows were at times connected by increased bronchial and vascular markings to the primary lung infiltration. Within the shadows calcium deposits may be seen in the form of either granules or larger masses.

The hæmatogenous foci, usually small, varied in size from about 2 to 10 mm. in diameter. They were round or oval, although rectangular shadows running out from the hilum to the periphery of the lung were observed in a few cases. Although in most cases these opacities were ill defined and not homogeneous, a fair number were uniform in density and sharply demarcated from the surrounding normal lung tissue. The lesions, generally multiple, were situated in the upper few centimetres of the lungs at their periphery. In 3 patients they were universally distributed as in typical miliary tuberculosis, and in 10 only one opacity was found. In most of these cases it was well defined and placed in the infraclavicular zone. As these shadows were found in adults, and as the draining glands were not enlarged, they were taken to have originated endogenously from hæmatogenous implantation. Their origin from exogenous reinfection was considered unlikely in view of the simultaneous presence of other hæmatogenous lesions and their pathological course. A feature commonly seen with apical foci was the well-marked reticulation leading down towards the hilum and not associated with enlarged mediastinal glands. These were interpreted as vascular and lymphatic shadows accentuated by drainage of infected areas.

The bronchogenic type of tuberculosis showed the familiar features and will not be enlarged on.

**Course of Disease and Prognosis.**—Of the 284 patients who showed active pulmonary lesions, 75% have healed or are healing, 15% remained stationary, and 10% got worse. In most cases healing took place by absorption, calcification, and fibrosis, leaving behind stationary radiological shadows which were assumed to be healed. The reticulation leading from apical foci towards the hilum was usually the last to disappear. On the other hand, spread of pulmonary lesions is either by direct extension or by a new hæmatogenous dissemination, terminating in 3 cases by miliary tuberculosis.

As can be seen from the foregoing, the prognosis of the pulmonary lesions in patients with skeletal tuberculosis is good. Radiologically patients have improved or healed, although no active treatment was given for the lung lesions.

**Intrathoracic Complications.**—Collapse of part or a whole lobe occurred in 4 patients, aged 2, 3, 4, and 18; in 2 of these collapse was due to enlarged mediastinal glands, and in 2 to paravertebral abscesses encroaching on lung tissue.

Pleural effusion developed in 10 patients while in hospital. In 4 it was bilateral, and all the patients are alive and well; 3 of the patients who developed pleurisy showed active pulmonary lesions.

Tuberculous empyema was found in 3 cases. It was localised and chronic, producing only mild general symptoms.

Paravertebral abscesses have burst into the pleural cavity in 4 cases: 3 penetrating into the lung and forming bronchopleural fistulae in 2 cases and a lung abscess in 1. The abscesses originated in 2 cases from dorsal lesions, in 1 from a cervical lesion, and in 1 from an upper lumbar lesion.

Tuberculous pericarditis occurred in 1 patient, who is slowly recovering.

**Necropsies.**—8 patients with positive radiological findings in the chest died. Of these, 5 died of tuberculous meningitis, 2 of pulmonary extension of tuberculous disease, and 1 of pleuropulmonary fistula as a result of the extension of a mediastinal abscess.

Necropsies were carried out on 4 of these. In 3, aged 4, 10, and 21, a primary complex was found in the lung. In the fourth, aged 18, only hæmatogenous foci were present, thus confirming the clinical findings.

A caseating Gohn's focus, about 1 cm. in diameter, discovered in the child aged 4, was not visible in any of the previous radiograms, including one taken a week before death.

#### DISCUSSION

In determining the status of the respiratory system in extrapulmonary tuberculosis the radiological findings were naturally of paramount value. It is not, therefore, surprising that the main theoretical and practical points arising out of this investigation should be based on these findings, which are discussed in the following paragraphs. Certain other points of interest, however, which have come to light from the history and other investigations carried out on the patients, will be commented on at the end of this discussion.

**Incidence.**—The radiological findings in this series confirm the intimate relation between pulmonary and extrapulmonary tuberculosis, as found by other investigators (table IV).

Almens and Flesch-Thebesius (1923) reported on 100 children with extrapulmonary tuberculous lesions, 53% of whom showed pulmonary lesions. MacKinnon (1924) reported 20 cases with pulmonary lesions out of 30 patients with extrapulmonary tuberculosis. Ragolsky (1929) reported that there were pulmonary lesions in 48 children out of 104 and in 62 adults out of 96 studied. Unfortunately, his figures include calcified and active lesions.

Hecker (1931) found 63.6% of children with extrapulmonary lesions to have pulmonary lesions also. Snyder (1933) examined a series of adults and children with extrapulmonary

lesions; 37.3% of the adults and 44% of the children had pulmonary lesions. Reischer (1934) reported on 240 cases with extrapulmonary tuberculosis, 124 (51.7%) of which showed evidence of active lung disease.

Meng and Chen (1935) reviewed 100 cases of extrapulmonary tuberculosis and found 47% of them to have pulmonary lesions. Peters (1937) reviewed 95 cases, 60% of whom had pulmonary lesions; and Marienfeld (1939) found 24 out of 74 with active lung lesions. Rosencrantz et al. (1941) reported 118 patients with pulmonary lesions out of 160 with extrapulmonary lesions.

Tepper and Jacobson (1943) reported 79 cases with lung lesions out of 100 non-pulmonary tuberculous patients. Unfortunately, here again healed lesions were included. Vaccarezza and Gomez (1940) studied 420 cases of hæmatogenous tuberculous disease, and found 90% of them with pulmonary disease of the same ætiology.

In the present series 57% of all the patients showed one or other form of active pulmonary disease, a figure well in agreement with those of the authors just reviewed. This high percentage of pulmonary lesions in patients presenting themselves with skeletal tuberculosis emphasises the generalised nature of tuberculosis. Further evidence of this point was provided by the bacteriological investigations of the renal tract and post-mortem material. The urine of 100 patients was examined microscopically, culturally, and by guinea-pig inoculation for tubercle bacilli, which were found in 16 cases. In most of these intravenous pyelography was done, and tuberculous lesions in the kidneys were demonstrated.

The few necropsies done in this series confirmed the presence of pulmonary lesions in 4 out of 8 patients and multiple tuberculous lesions in all. A larger series of necropsies on patients who died of skeletal tuberculosis was reported on by the American Orthopedic Committee in 1933; 37% of cases thus examined showed active pulmonary lesions.

The multiplicity of the lesions thus found confirms the modern conception of the natural history of tuberculosis. The importance of searching all organs liable to tuberculosis, wherever the original manifestations appear, cannot be over-emphasised.

*Type of Lesion.*—A further point of interest is the variability of the lesion found in the lungs at the different ages. The commonest lesion in children under 15 years of age is one or other component of the primary complex, whereas later in life this lesion is seen only rarely in association with skeletal tuberculosis. Instead, the hæmatogenous type of tuberculosis is found in the lungs, with no evidence of the whereabouts of the primary lesion responsible for that dissemination.

Table II shows that the younger the child, the more likely are the primary lung infiltration, enlargement of the draining mediastinal glands, and the bone lesion to be found at the same time in the same patient. In the older child the advance of the tuberculous process from lung to glands into the blood-stream and bone is slowed down. By the time the skeletal lesion is manifested clinically, the primary lung infiltration has healed, and the enlarged mediastinal glands remain as the only evidence of the natural course of the disease. Many children and adults succeed in localising the infection to the chest. The thoracic lesion may or may not produce clinical symptoms, but in either case partial healing has taken place. A period of well-being then follows, lasting a variable number of years. With the advent of puberty and economic hardship, the primary lesion is reactivated. A series of pathological processes is started, culminating in hæmatogenous invasion and implantation in skeleton, lung, or kidney, singly or in combination.

It appears, therefore, that the skeletal lesion in children follows quickly the primary lung infiltration and is thus a true post-primary infection. In most adults, on the other hand, the skeletal lesion does not soon follow the primary infection, nor is it a recrudescence of a quiescent post-primary bone lesion. In all probability it results from a reactivation of some other quiescent focus in the body (probably a quiescent primary lesion) which causes blood-stream dissemination of tubercle bacilli and their implantation in bone and lung. This will explain the presence at the same time of the primary complex in the lung and skeletal lesions in children, and the absence of these lesions and the presence of hæmatogenous lung foci in adolescents and adults, especially in the age-group 15-24, as these are exposed to hormonal and economic factors tending to reactivate quiescent primary lesions and to precipitate blood-stream dissemination.

The bronchogenic type of tuberculosis was found in only 16 cases, partly because skeletal tuberculosis, being of hæmatogenous origin, is more likely to be associated with that or an earlier type of lung lesion, and partly because in these cases the lung lesion is the clinically important one and as such is likely to be treated in a sanatorium for chest diseases and not in an orthopædic centre.

*Source and Root of Entry of Tubercle Bacillus.*—A chain of events similar to that portrayed above will take place if the primary infection is extrapulmonary (mouth or gut). There is no doubt that this was so in many cases of this series, but it is a remarkable fact that such a high proportion should show their primary infection to be in the respiratory tract (see table II). This forces one to the conclusion that skeletal tuberculous infection in children in this part of England at the present time originates from primary tuberculosis in the respiratory tract, this acting as a source of organisms for dissemination by the blood and implantation in the skeleton. As the primary infection is a respiratory one, it obviously enters the lung by inhalation. This points to the human type of tubercle bacillus as the causal organism derived from human pulmonary cases.

The same process can be said to have taken place in adults, although here no direct radiological evidence is available of the route of entry. As has been pointed out, there is reason to believe that the tubercle bacilli responsible for adult lung and skeletal lesions originate in a reactivated primary infection acquired in childhood. There is no occasion to doubt that most of these were respiratory ones, as they have been proved to be in the children of this series. This is further supported by necropsies on children who died of tuberculous meningitis, an extreme example of hæmatogenous dissemination. Blacklock and Griffin (1935), who examined 241 children after death from tuberculous meningitis, found 74% with primary complexes in the

TABLE IV.—ASSOCIATION OF PULMONARY AND EXTRA-PULMONARY TUBERCULOSIS

Investigator	No. of extra-pulmonary cases	No. of pulmonary cases
<i>Adults</i>		
MacKinnon (1924) .. .. .	30	20 (66%)
Ragolsky (1929) .. .. .	96	62 (64.5%)
Snyder (1933) .. .. .	51	22 (37.8%)
Reischer (1934) .. .. .	240	124 (51.7%)
Meng and Chen (1935) .. .. .	100	47 (47.1%)
Peters (1937) .. .. .	95	57 (60%)
Marienfeld (1939) .. .. .	74	24 (33%)
Rosencrantz et al. (1941) .. .. .	160	118 (73.7%)
Tepper and Jacobson (1943) .. .. .	100	79 (37.3%)
Vaccarezza and Gomez (1940) .. .. .	420	378 (90%)
Total adults .. .. .	1366	931 (68.1%)
<i>Children</i>		
Almens and Flesch-Thebestus (1923)	100	53 (53%)
Ragolsky (1929) .. .. .	104	48 (46%)
Snyder (1933) .. .. .	41	18 (47.4%)
Total children .. .. .	245	119 (48%)
Total adults and children .. .. .	1611	1050 (65%)

lungs. Prof. G. B. Fleming (1943) analysed 100 cases with tuberculous meningitis and found 80 with primary lung infections.

The conclusion that the infecting organism is the human type of tubercle bacillus is supported by the bacteriological investigations carried out on this series by Dr. H. Schwabacher under the auspices of the Medical Research Council. The tubercle bacilli obtained from the sputum and gastric lavage were typed and, as was expected, were found to be of the human variety. More interesting and conclusive are the results obtained from typing the tubercle bacilli derived from pathological material of the skeletal lesions (pus, synovial fluid, &c.) in 88 patients. Of these, 83 (94%) were of the human variety and only 5 bovine.

It can thus be seen that the clinical, bacteriological, and pathological findings all point to the fact that most extrapulmonary tuberculous lesions in this part of England are due to the human type of bacillus, originating from contact with human cases and finding access to the body through the respiratory tract. Milk from infected cows cannot be considered any longer an important source of infection in extrapulmonary tuberculosis, presumably owing to the fact that almost all milk marketed in London and the home counties is pasteurised.

**Diagnosis.**—Besides the above considerations arising out of the routine study of pulmonary radiograms in skeletal tuberculosis, a great deal of help can be derived from it in the diagnosis of doubtful skeletal lesions and in the prognosis of the established disease. When the tuberculous nature of a skeletal lesion is in doubt, one may discover a pulmonary lesion whose nature is not in doubt. It can then be assumed that both lesions are of the same aetiology. On the other hand, a negative pulmonary radiogram is of little value in the adult, but its diagnostic importance increases in the younger age-groups, in whom up to 84% are expected to show pulmonary lesions, the absence of which will throw doubt on the tuberculous nature of the skeletal lesion.

**Prognosis.**—The prognosis of a tuberculous lesion can be judged partly by its rate of development from the time of infection to the time of clinical manifestations. If a radiogram of the chest shows the lung and glands to be involved (primary complex), one can assume a rapid advance of the disease from the primary lung infiltration into the draining glands and thence via the blood-stream to the skeletal lesion. The prognosis will correspondingly be poor. In those with a better prognosis the lung infiltration would have been absorbed or calcified, and the draining glands, although enlarged, would show various degrees of healing. Not only is the first radiogram of the chest valuable in estimating the previous course of the disease, but also routine three-monthly radiograms will follow the development of the pulmonary lesion while the patient is under treatment. These usually run a course parallel to that of the skeletal lesion. They will thus confirm the prognosis as judged from the radiograms of the extrapulmonary lesion.

**Prevention.**—With the knowledge of the source of infection, the route of entry, and the factors liable to cause reactivation of quiescent lesions, a scheme can be formulated for the prevention and control of extrapulmonary tuberculosis:

- (1) Elimination of the source of infection by efficient treatment of sputum-positive cases. If this is impossible, contact with children should be avoided.
- (2) Early diagnosis and treatment of the primary infection.
- (3) Maintenance of body resistance to prevent spread of disease and reactivation of quiescent lesions.

The first and third of these are obvious and need no further comment. The second, however, is worthy of emphasis, as so many authorities have expressed doubt about the desirability of treating the primary infection in children. Although in most of these the infection will

run a benign course, some will develop extrapulmonary tuberculosis. It is felt, therefore, that early treatment of the primary infection will pay the community with a great reduction in morbidity and mortality of extrapulmonary tuberculosis.

The pulmonary radiological findings have thus provided evidence for many theoretical considerations and practical help in the diagnosis, prognosis, and treatment of extrapulmonary tuberculosis. Other points of interest arising out of the history and other investigations carried out on these patients will now be considered.

**Sanatorium Treatment.**—As was pointed out, 26 patients had undergone sanatorium treatment. In 4 of these cases collapse therapy was instituted. The remainder

TABLE V—INCIDENCE OF PLEURAL EFFUSIONS

Onset in relation to skeletal lesion	No. of cases of pleural effusion	Bilateral effusions	Positive radiograms
Before .. ..	43	4	24
During .. ..	10	4	4
After .. ..	4	0	2
Total .. ..	57	8	30

were treated on general lines and responded in complete healing of 12 of the remaining 19 patients. Those not completely healed are progressing favourably. These facts suggest that the pulmonary lesions were either the primary complex in children or the hæmatogenous type of lesion in adults; both likely to be associated with skeletal tuberculosis and both responding well to general lines of treatment. This conclusion was supported by the few radiograms of the chest obtained from some sanatoria and by the films of those cases still showing active lesions.

The favourable prognosis in this type of pulmonary lesion is emphasised by the large number of patients (12) showing normal lung fields within a few years of sanatorium treatment. It was, however, surprising to find the skeletal lesion developing unfavourably in these 12 cases, as usually the skeletal and the lung lesions follow the same course. Two factors may have been responsible: (1) the delay in the diagnosis of the tuberculous nature of skeletal symptoms—these were usually diagnosed and treated as rheumatism, which implied an added strain on bone or joint; (2) the development of cold abscesses in relation to the skeletal lesion, which soon became secondarily infected. In this connexion it should be emphasised that any skeletal symptoms in a patient known to have tuberculosis must be considered of the same aetiology until proved otherwise. Repeated radiography and clinical evaluation are essential if these cases are not to be wrongly diagnosed.

**Pleurisy.**—Table v summarises the incidence of pleural effusions in this series before, during, and after the development of the skeletal lesion, and the pulmonary findings in these patients.

The number of patients who had pleurisy is thus 57 (12% of the whole series); 8 of these effusions were bilateral. Of these bilateral cases, only 1 patient has died of miliary tuberculosis, and 2 others have shown a semi-miliary type of lesion, which has, however, regressed slowly to complete absorption. The gloomy prognosis attributed to bilateral effusions cannot, therefore, be maintained.

It is worth while to emphasise the scarcity of pleural effusions in the younger age-groups. Only 2 patients had pleurisy in the 5-9 and 1 in the 10-14 age-group. The explanation of this fact is obscure. Pleurisy can thus be said to be an early manifestation of tuberculous infection which may terminate in pulmonary or extrapulmonary lesions. This conclusion has obvious implications to those engaged in the prevention and detection of all types of tuberculosis.

**Signs and Symptoms.**—The present history and the physical signs are of little help in determining the presence of a lung lesion. The lesions are minimal and no signs or symptoms are to be expected.

**Sputum and Gastric Lavage.**—Only 6 patients had sputum positive for tubercle bacilli, partly because of the hæmatogenous nature of the pulmonary lesion and partly because no positive cases were admitted. The result of gastric lavage and guineapig inoculation, however, came as a surprise. The question arose whether positive gastric-lavage cases could be retained in the same ward as non-tuberculous patients. This problem was rather urgent in the children's ward, where non-tuberculous orthopædic cases were kept together with the tuberculous ones. To determine the point, 3 positive gastric-lavage cases were left in the general ward among the non-tuberculous cases. No special precautions were taken. The non-tuberculous cases were Mantoux tested. The positive were excluded, and the negative were tested at three-monthly intervals until discharged. 18 Mantoux-negative cases were in the ward, and the average length of stay was six months. No cases became positive while in the ward. It was therefore concluded that tuberculous pulmonary lesions producing tubercle bacilli in such small numbers as to require a guineapig inoculation of gastric contents to demonstrate their presence are not a clinical source of infection and can be left safely in contact with non-tuberculous cases. This policy has been followed since that time in this hospital, and no tuberculous case has developed as a result.

#### SUMMARY

The respiratory tract of 500 patients with skeletal tuberculosis was investigated. Of these, 284 (57%) had active pulmonary lesions.

The type of lesion varied according to age. The primary complex was found in most of the children, and hæmatogenous foci in adults.

The respiratory tract thus appears to be the route of entry of the tubercle bacillus even in skeletal tuberculosis.

The infecting organism is therefore most likely to be, on clinical grounds, the human type from human open pulmonary cases. Milk infected with bovine tubercle bacilli, in this part of England, can no longer be considered an important source of skeletal tuberculosis, presumably because of its pasteurisation.

The clinical findings were confirmed bacteriologically by typing the tubercle bacilli obtained from pathological material derived from the skeletal lesion.

The skeletal lesion in most children originates soon after the primary infection. In most adults it is due to reactivation of quiescent tuberculous foci resulting in blood-stream dissemination and subsequent implantation in bone and lung.

The importance of routine radiography of the chest in the diagnosis and prognosis of skeletal tuberculosis is emphasised.

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## ANURIA TREATED BY RENAL DECAPSULATION AND PERITONEAL DIALYSIS

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A CASE of incompatible blood-transfusion, followed by uræmia, was unsuccessfully treated by all the commonly recognised methods, and finally yielded to decapsulation of the kidneys, the associated uræmia being relieved by the use of the peritoneum as a dialysing membrane.

Incompatible blood-transfusion is followed by reactions which fall into three phases. The immediate reaction develops shortly after the transfusion is begun and varies in intensity with the amount and rapidity of the injection and the sensitivity of the patient. In the more severe cases immediate death takes place, and in the less severe there is a rigor with a bursting headache, tingling in the limbs, pain in the back, great shortness of breath, precordial pain, and sometimes a sense of impending death. If the transfusion is immediately abandoned, the donor cells are lysed, there is hæmoglobinæmia, transient jaundice, and hæmoglobinuria, and the patient after the first shock makes a steady recovery. However, if much incompatible blood is given, the reaction may be much more severe, and it is usual for the patient to pass a moderate quantity of wine-coloured urine containing hæmoglobin (Hb) or acid hæmatin.

The second phase is a latent interval in which the patient improves clinically but passes a very small amount of urine. The third phase is that of renal failure and uræmia, and is followed either by the re-establishment of urine flow and recovery or by death in uræmic coma.

General opinion in the past has been that the anuria is caused by the mechanical blockage of the renal tubules by precipitated blood pigment, the donor's blood being lysed and the Hb excreted through the kidneys, where, in the presence of acid urine, it is deposited as insoluble acid hæmatin. In rabbits the urine is always alkaline and hæmoglobin is excreted unchanged and without renal damage. Baker (1937) stated that the Hb must either pass out through the glomerular filter or be excreted by the tubules; in either case it arrives in the lower convoluted tubules, where the urine is concentrated. In the presence of a sufficiency of salt and in an acid medium the Hb is deposited as acid hæmatin, which is seen microscopically as a brown granular precipitate. Baker concluded that, with a concentrated urine which precipitates Hb, there were three possibilities, depending on the amount of Hb excreted and on the degree of concentration of urine: (1) with a considerable Hb excretion and a very concentrated urine, there is a massive precipitation of hæmatin in the renal tubules, which packs down in masses, causing permanent blockage leading to complete anuria; (2) with a moderate amount of Hb or a more dilute urine, the precipitate is less copious and produces a temporary obstruction, which is followed by the gradual extrusion of hæmatin casts and diuresis; (3) with still less Hb or a very dilute urine, a little hæmatin is precipitated in the renal tubules and is easily passed out, often as granular casts, and no gross functional damage to the kidney results.

Trueta et al. (1946) have discovered that the renal blood-flow is profoundly influenced by nervous stimuli, the result of central or peripheral action by various noxious agents, and have shown in experimental animals

that under certain conditions the renal circulation continues through the medulla while the cortex is ischaemic and the urine-flow completely suppressed. These workers, who were investigating the mechanism of crush syndrome, suggest that urine suppression due to sulphonamides, incompatible blood-transfusion, Weil's disease, and some forms of nephritis is due to a defence mechanism by which the cortex of the kidney is excluded from the circulating toxin by an intrarenal vascular shunt. While this recent work is of profound significance, the generally accepted view today is that renal suppression resulting from incompatible blood-transfusion is caused by the blockage of the renal tubules by massive deposits of haematin crystals.

Post-transfusional anuria leads either to death in uraemic coma or to diuresis and recovery. As salvation lies in diuresis and nothing else, treatment has consisted of the ingestion of huge quantities of fluid, of alkalisation of the blood in the hope that the obstructing acid haematin may dissolve, of washing out the renal pelvis with hot lotions, and of spinal anaesthesia to exclude nervous stimuli and so relieve the renal vascular spasm. Finally, decapsulation of the kidneys has claimed a few triumphs. In the case here recorded the various therapeutic measures were tried in order with, so far as possible, clear-out intervals to observe their separate effects.

In the third or uraemic phase of suppression the blood-urea level rises daily, and it seems reasonable to assume that, since the renal damage may be reversible, any measures which would tide the patient over uraemia and avoid the fatal coma while the blocked kidneys cleared might be life-saving. Unknown to us, the use of the peritoneum as a dialysing membrane was investigated in experimental animals by Putnam in 1923, and the method had actually been used clinically by Seligman et al. (1946) to relieve uraemia. These workers treated with success a case of sulphathiazole renal suppression by irrigating the peritoneal cavity with large quantities of a specially prepared solution. After fourteen days of virtually complete anuria renal function was fully restored, but not before large quantities of urea had been removed from the blood by peritoneal dialysis. A method similar to that described by Seligman et al. was used in the case here reported.

#### CASE-RECORD

A married woman, aged 37, was admitted to hospital on March 17, 1946, with anaemia due to menorrhagia, and a blood-transfusion was advised as she had not responded to ordinary remedies. The patient's blood and her husband's having been grouped and reported to be A2 and O4 respectively, a blood-transfusion was started by slow intravenous drip at 5.30 P.M. on the 21st.

After 30 c.cm. of blood had been given, the patient felt hot and very short of breath and complained of pain in the lower abdomen. Something like a rigor developed, and the patient vomited, but 5 minims of adrenaline was given and the transfusion completed, a total of 350 c.cm. of blood and 80 c.cm. of citrate solution being given. During the night there was further vomiting and some diarrhoea.

Next day premature menstruation had started, and 350 c.cm. of wine-coloured urine with a heavy deposit was withdrawn by catheter. In view of this danger signal rectal glucose saline was begun, and the patient was catheterised at 6 P.M., when 120 c.cm. of clear urine was withdrawn.

As the patient had vomited all fluid taken by mouth, 2% sodium bicarbonate in water was substituted for the glucose saline per rectum. In all, about 1200 c.cm. of fluid was absorbed from the rectum, and 1 drachm of sodium bicarbonate was given by mouth every hour during the day, but most of it was returned.

The patient meanwhile developed herpes of the lip, headache, and restlessness. Both specimens of urine were acid and contained large quantities of albumin and blood.

On the 23rd it was reported that the patient had had a fair night, and she was catheterised at 6 A.M., when 120 c.cm. of cloudy yellow urine was withdrawn. The rectal drip was continued, and the patient took 2500 c.cm. of fluid by mouth and

an hourly dose of 1 drachm of sodium bicarbonate, but about half the fluid was vomited. An intravenous drip of 5% glucose in water was started in the morning and continued during the next few days. Further catheterisation in the late afternoon yielded 60 c.cm. of clear urine.

On the 24th the general condition remained unchanged; but, as thrombophlebitis had started in the arm, the cannula was changed to the left leg. The intake of fluid by mouth was 2500 c.cm. containing 17 drachms of sodium bicarbonate, but the patient vomited about 600 c.cm. In twenty-four hours 2500 c.cm. of glucose in sterile water was given intravenously, and the patient passed 60 c.cm. of clear urine.

Oedema of the face, ankles, and hands now appeared, but the lungs were clear and the bowels freely open. The blood-urea level was 120 mg. per 100 c.cm., and the urine acid and containing albumin. The blood-grouping was reinvestigated and it was found that the patient's group was O4 and the husband's A2.

On the 25th the patient had some epistaxis and menstrual loss. About 2000 c.cm. of fluid was retained by mouth, and a similar quantity of intravenous glucose saline was given in twenty-four hours. The patient perspired a little and had a slight rigor, and catheterisation produced 70 c.cm. of clear urine.

On the 26th the patient's general condition remained the same, but she was rather more drowsy, and the administration of glucose in water was continued, 3000 c.cm. being given intravenously and about 1300 c.cm. by mouth.

At this juncture one of us (R. R.) saw the patient and, recognising the possibility of arterial spasm as a factor in the suppression, gave a light 'Percaïne' spinal anaesthetic up to the level of the 6th dorsal vertebra. The cerebrospinal fluid was clear and not under increased pressure. This manoeuvre had no beneficial effect, as only 30 c.cm. of urine was recovered during the next twelve hours. The blood-urea level had risen to 153 mg. per 100 c.cm.

On the morning of the 27th there was little alteration in the patient's general condition, but the oedema had increased, and there was definite renal tenderness on both sides. On this day 100 c.cm. of sodium sulphate 4% was given intravenously, together with gr. 7.5 of caffeine sodium benzoate. This treatment was repeated later in the day, but without avail. The total fluid intake by oral and parenteral routes was about 3000 c.cm. By next day there had been no response to diuretics, and the fluid intake was continued by mouth. In all about 40 c.cm. of urine was withdrawn by catheter. The blood-pressure was 170/100 mm. Hg.

On the 28th the patient was transferred to the Essex County Hospital, Colchester, and on admission she was somewhat vague and drowsy but answered questions moderately well and seemed comfortable.

She was pale and had slight cyanosis of the lips, especially on effort. Her face and eyes were puffy, and there were pink patches on her cheeks. There was well-marked oedema of the hands and one arm. The cranial nerves were normal; the optic disks were not seen. There was good chest movement, and nothing abnormal was detected in the cardiovascular system. There was considerable oedema on the back of the trunk, and both lung bases were dull, with diminished air entry as far up as the angle of the scapula. The abdomen was slightly distended and the skin oedematous, and there was dullness in the flanks but no more definite signs of ascites. There was well-marked renal tenderness on both sides behind and in front.

On the 29th patient's and donor's blood were examined, and a cross match showed agglutination; the patient's blood was Rh-negative, and no anti-Rh bodies were found in her serum. The blood-urea level was 253 mg. per 100 c.cm., plasma-chlorides level 0.47 g. per 100 c.cm., plasma-protein level 6.5 g. per 100 c.cm. A blood-count showed no abnormality; Hb 82%.

Cystoscopy showed a normal bladder and orifices, and catheters were passed up to both renal pelvis. Hourly washing with saline solution was started but soon caused pain and did not relieve suppression.

By 9 P.M. the patient's general condition was deteriorating; she was more pale and drowsy, with considerable oedema of the face and subcutaneous tissues in general. Renal tenderness was very marked; and, as no benefit had accrued from all the treatment so far tried, it was decided that the only hope lay in decapsulation of the kidneys.

*Operation.*—Under gas-oxygen-ether anaesthesia (Dr. Douglas Clendon) the patient was turned on her left side and the right kidney rapidly exposed by an incision through the



12th rib bed. Oedema of the skin, muscle, and perinephric tissues was very pronounced. Decapsulation was performed. The patient was then turned over and a similar operation done on the opposite side. Both kidneys presented the same appearance: about twice the normal size, dark blue, and as firm as a tennis ball but less elastic. The capsules seemed very tense, and pale-blue friable kidney bulged through the lines of incision owing to increased intracapsular pressure. The left kidney almost exploded and pieces of friable tissue were taken for microscopy. Both wounds were sewn up with through-and-through interrupted steel-wire sutures, and the perinephric space was drained.

At the end of the operation the patient's general condition was satisfactory, and a small incision was made into the peritoneal cavity at the extreme anterior end of the left renal incision, and into this a self-retaining Foley catheter was inserted. To this was attached a dripper arrangement whereby twice-normal saline solution with penicillin was run into the peritoneal cavity at the rate of 60 drops a minute.

On the 30th the patient's general condition was poor, and she was more drowsy. During the night 2500 c.cm. of twice-normal saline had been run into the peritoneal cavity, and the patient complained of distension and some pain.

There was obvious ascites, and at 10 A.M. the catheter was disconnected from the dripper flask so that the ascitic fluid could run out into a receptacle. This fluid, which escaped with much relief to the patient, was lemon-yellow, turbid, slightly alkaline, and slightly glutinous, and amounted to 1860 c.cm. It contained a fifth of its volume of albumin; a deposit of pus with occasional red cells; urea 0.255 g. per 100 c.cm.; and chlorides 0.526 g. per 100 c.cm.

By next morning the patient was passing water freely, and the general oedema was melting away, the facial changes being most marked, and moist sounds had disappeared from the chest. During this day 350 c.cm. of urine was collected, and much passed into the bed from the bladder and the operation wounds. The blood-urea level was 200 mg. per 100 c.cm.

In the first twenty-four hours following decapsulation 4000 c.cm. of twice-normal saline was introduced into the peritoneal cavity, and 1860 c.cm. of fluid was withdrawn.

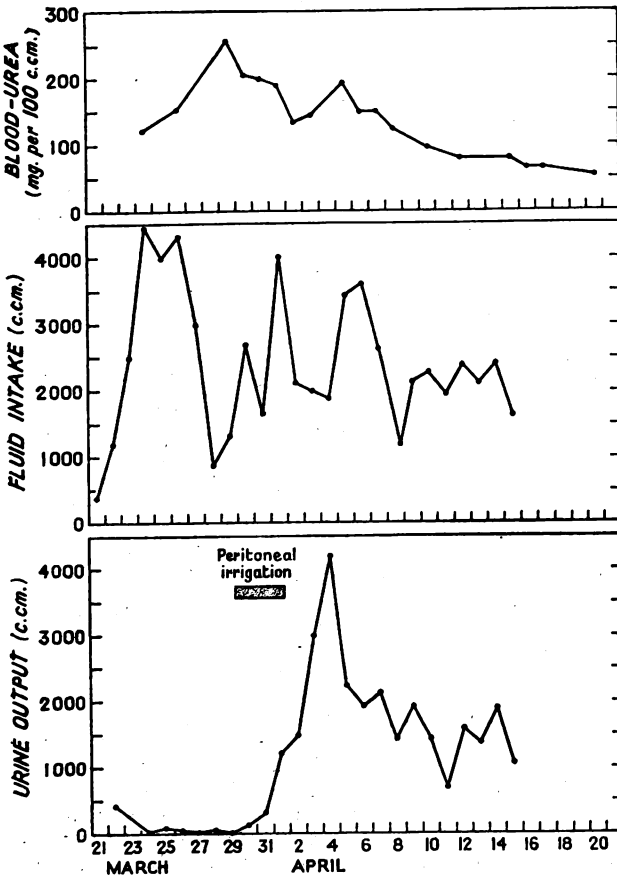


Fig. 2—Chart of fluid balance and blood-urea.

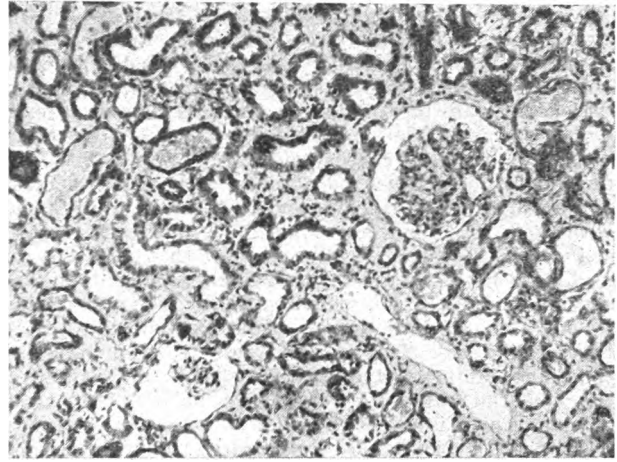


Fig. 1.—Section of renal cortex, showing oedema, with occasional small foci of polymorphs and round cells in the interstitial tissue; degeneration of the tubular epithelial cells; and blockage of some tubules with a brown granular pigment. Haematoxylin and eosin. (x95.)

urea content of the efflux was 255 mg. per 100 c.cm., indicating that 4.7 g. of urea had been eliminated by dialysis through the peritoneum.

In the next twenty-four hours 3000 c.cm. of twice-normal saline was run into the peritoneal cavity, and 660 c.cm. of fluid was recovered, but there was a considerable unmeasured leakage round the tube. The urea content of the efflux was 262 mg. per 100 c.cm., indicating that 1.73 g. of urea had been eliminated through the peritoneum.

Thus in the first forty-eight hours of peritoneal irrigation 6.4 g. of urea was recovered in the collected efflux, and it is certain that more urea was eliminated, because much fluid was lost by leakage round the peritoneal catheter.

Next day the patient's general condition was very much improved, and the blood-urea level was 200 mg. per 100 c.cm. A further 1800 c.cm. of twice-normal saline was introduced into the peritoneal cavity, and only 30 c.cm. of fluid was recovered, but there was probably considerable leakage.

By this time the tube had become blocked or sealed off, so it was removed. From the small incision clear serous fluid leaked for five or six days. The blood-urea level on this third postoperative day was 180 mg. per 100 c.cm. and on the fourth postoperative day 130 mg. per 100 c.cm.

Clinically the patient had improved beyond all expectation. She was bright, her skin was in much better condition, and the oedema had disappeared. She was no longer drowsy, was cooperative, and took food and drink by mouth.

Blood-urea estimations were carried out daily, and the blood-urea level rose sharply after drainage of the peritoneum had ceased to be effective, and it continued to rise for three days before it began to fall coincidentally with the increase in urine output and in urinary urea.

By April 23 the patient's blood-urea was 30 mg. per 100 c.cm. and the urine urea and chloride estimations were normal, and a week later the patient was discharged, having made a full recovery.

DISCUSSION

This case is another example of the well-known picture of anuria due to mismatched transfusion. Uræmia is not a sufficiently broad term to define the consequences of urinary suppression because not only is urea accumulated in the body but also other nitrogenous substances, water, salts, and perhaps many more substances are retained, to which are also added those materials introduced therapeutically. The rise in blood-urea level is a gross and obvious change, and to this too much attention may easily be accorded. Though not so readily detected, changes in the delicate balance of blood chemistry and water metabolism must not be overlooked, especially when they come under the influence of peritoneal dialysis, lest measures to reduce the amount of blood-urea may so disturb general metabolic processes that life is endangered rather than protected by the enthusiastic therapist.

In the treatment of anuria, whether due to mismatched transfusion, sulphonamide blockage, "crush syndrome," or other cause, first place has been given to the administration of huge quantities of fluid, often containing sodium chloride and alkalis, and by this procedure much water and salts are added to the body fluids already embarrassed by the kidney failure. The disturbance of osmotic pressure causes oedema, and the retention of phosphates and other substances may cause acidosis and a fall in serum-calcium level. At first the body can withstand the abnormal conditions, but later certain changes in the blood chemistry show that stability can no longer be maintained. In our case the patient had severe general oedema, which was probably not without its effect on the pulmonary, cardiovascular, and central nervous systems. This oedema was nowhere more severe than in the kidneys exposed at operation; and, whatever the essential cause of anuria, we believe that renal oedema, which is so clearly shown in the microscopical section (see fig. 1), further embarrassed the blood circulation. The section of the kidney shows the typical picture of tubular damage and deposits of pigment, and oedema is also very obvious. We feel that this last factor has been given too little consideration in the past, and that efforts to produce diuresis by forcing the fluid intake may be a two-edged weapon.

With regard to the local treatment of the kidneys, beyond general efforts to promote diuresis, we think that in our case none of the procedures adopted before decapsulation had any beneficial effect, and that the operation was justified by the subsequent diuresis. The expansion of the kidneys following section of the capsule was most impressive, and suggests that the relief of tension was an important factor in renal recovery.

We believe that the use of the peritoneum as an excretory organ played an important part in the recovery, the beneficial results being shown by the steady fall in blood-urea level while the peritoneal irrigation was efficient, and by the large quantity of urea—i.e., 7 g.—recovered from the peritoneal efflux. Unfortunately much of this efflux was lost, and the true efficiency of the method could therefore not be measured. The fact that after the failure of peritoneal irrigation the blood-urea level rose and then fell again with increasing diuresis is further evidence that the peritoneum allows easily diffusible substances, such as urea, to pass from the circulating blood into an artificially created ascites. Taking as a conservative estimate the amount of urea eliminated by this method in forty-eight hours as 6.4 g., and knowing the blood-urea level to be at that time 200 mg. per 100 c.cm., we can assume that, the blood-volume being 5 litres, roughly 3.2 litres of the blood were cleared of urea in two days. During this period the patient's blood-urea level fell from 200 mg. to 136 mg. per 100 c.cm., a drop of 64 mg. per 100 c.cm. On the assumption that the patient's blood-volume was 5 litres, this change represents a fall in the total blood-urea of 3.2 g., and the discrepancy between this figure and the 6.4 g. eliminated by peritoneal dialysis and urea in the urine is explained by the mobilisation of urea from the tissues into the blood.

The accompanying table and fig. 2 show the changes in fluid intake and output and in blood-urea level during most of the patient's stay in hospital, and it can be reasonably inferred that the use of the peritoneum as a dialysing membrane had an important influence in reducing the blood-urea level before the establishment of diuresis. One of the most interesting points shown by the pathological findings is the rise in blood-urea level after the peritoneal irrigation became inefficient owing to blockage of the tube. Possibly the introduction of 7 litres of twice-normal saline into the peritoneal cavity reduced the volume of the intravascular fluid by osmotic pressure, and that affected the kidney by

## FINDINGS IN BLOOD AND URINE

Date	Plasma chlorides (g./100 c.cm.)	Urine chlorides (g./100 c.cm.)	Plasma protein (g./100 c.cm.)
March 29 ..	0.47	..	6.5
" 30 ..	0.47	0.59	..
" 31 ..	0.59	0.88 0.94 0.46	6.45
April 1 ..	0.67	0.46 0.24 0.46	6.1
" 4 ..	..	0.35	..
" 6 ..	0.59	0.38	..

Period of peritoneal irrigation lasted from March 30 to April 1 inclusive.

relieving oedema. The state of the kidneys at operation and the diuresis after relief of intracapsular tension make it possible that any reduction of general oedema by the twice-normal saline introduced into the peritoneum would have an especially beneficial effect on the kidneys. That the amount of intravascular fluid was decreased is not considered likely, because of the 4000 c.cm. of fluid put into the peritoneal cavity in the first twenty-four hours only 1860 c.cm. was recovered. As there was not much leakage at this time, much of the twice-normal saline must have been absorbed, and this is supported by the rise in the level of plasma and urinary chlorides (see table).

In our case peritoneal dialysis was effected by inducing an artificial ascites; but, except for the first twenty-four hours, very little of the introduced fluid was recovered from the peritoneal cavity. The fluid was slightly turbid and alkaline, and contained a fifth of its volume of albumin, with pus and occasional red cells, which shows that twice-normal saline irritates the peritoneum. From the blood-stream 6.4 g. of urea was cleared, and there is no doubt that changes in chlorides and other substances took place, the exact extent of which we could not determine. We considered the possibility of introducing two tubes into the peritoneal cavity so that a continuous stream might flow through, but thought such a procedure might gravely upset the general metabolism, and we were unwilling to take any risks in a patient who was apparently on the way to recovery.

We publish this paper not only as a chronicle of the treatment of a case of post-transfusional suppression of urine but also as the record of a clinical experiment which, owing to the pressure of events, could not be carried out with anything like proper scientific precision, but which nevertheless has lessons for the future. First, we believe that the massive intake of fluid recommended in the treatment of renal suppression is not without danger, and that generalised and more especially localised renal oedema may embarrass rather than encourage the return of renal function. Secondly, we have found that the commonly recommended local treatments to the kidneys were useless, except decapsulation, which in our case proved to be the deciding factor in recovery. Thirdly, we have found that peritoneal irrigation is effective in reducing the blood-urea level when it is raised abnormally high, but how long the irrigation can be maintained we do not know. Our conclusions support those of Seligman et al. (1946), to whom, so far as we know, goes the credit of introducing this method of treating uræmia. The method appears to be particularly suited to cases of reversible renal damage where there is a reasonable hope that the kidneys may recover sufficiently to support life.

Our irrigating tube became blocked soon after treatment was initiated, and this may be due to our use of twice-normal saline, which seems to have set up a

considerable peritoneal reaction, and it is probable that adhesive peritonitis finally put an end to the treatment. In the future it may be that fluids will be devised which will enable irrigation to be continued longer.

Finally, though this method appears to be satisfactory in reducing the blood-urea level, its effect on the delicately balanced metabolism must not be forgotten, because the irrigating fluid is in such close contact with the vascular bed that changes may take place through the peritoneal membrane so rapidly as to endanger the patient's life. Until further evidence, clinical and experimental, is forthcoming about the changes which take place through the peritoneum, the method should be used with the greatest care and only when other and more simple procedures are likely to prove ineffective.

## SUMMARY

Incompatible blood-transfusion may be followed by anuria and uræmia.

Post-transfusional anuria leads either to death in uræmic coma or to diuresis and recovery. Treatment therefore aims at diuresis.

In the present case various forms of such treatment were given, including alkalis, plenty of fluids, both by mouth and intravenously, spinal anaesthesia, diuretics, and renal decapsulation.

Finally, twice-normal saline solution was given intraperitoneally by drip injection, and later the fluid was drained off. By this method much urea was eliminated by dialysis through the peritoneum, with relief of uræmic symptoms. The patient fully recovered.

We wish to thank Prof. John Beattie, of the Royal College of Surgeons, for encouragement and valuable criticism.

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## ACUTE INFECTIOUS MONONUCLEOSIS COMPLICATED BY ENCEPHALOMYELITIS

REPORT OF A CASE

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ONLY about a dozen cases of acute glandular fever (infectious mononucleosis) exhibiting central nervous complications have been described. Johansen (1931) reported "serous meningitis," and Epstein and Dameshek (1931) "involvement of the C.N.S." in glandular fever. Johansen's case presented meningeal signs, but the cerebrospinal fluid (C.S.F.) showed very little change. Epstein and Dameshek's was a typical case of glandular fever, except that the cerebral symptoms overshadowed the general disease; and even here the C.S.F. showed only an increase in cells (lymphocytes) and little increase in the protein content. Tidy (1934) mentioned the possibility of meningeal complications. Viets and Watts (1929) reported aseptic meningitis, and Schmidt and Nyfeldt (1938) meningo-encephalitis as complicating glandular fever. During an epidemic of mononucleosis Halcrow et al. (1943) investigated 296 cases, among which only 5 patients had meningeal symptoms severe enough to require lumbar puncture. In 4 cases the C.S.F. pressure was increased; 3 out of 4 had a cell-count of more than 5 cells per c.mm., and 1 had a normal cell-count. Landes et al. (1941) described central nervous manifestations, their case being especially interesting because of the cell-protein dissociation. Fledelius (1935) reported paresis of the inferior rectus muscle of the left eye.

An unusual case of infective mononucleosis with varied nervous complications was seen recently in this hospital.

## CASE-RECORD

A girl, aged 10 years, was admitted with a history of having had, three weeks before admission, a sudden swelling of her cervical lymph-glands, accompanied by general malaise. She was not seen by a doctor but was put to bed for a week, after which she complained of general weakness. Her mother noticed at this time a slight swelling of her eyes and face. The patient was seen at the outpatient department of a hospital, where "acute tonsillitis" was diagnosed and the mother was advised to put the child back to bed. Two or three days later the patient had several attacks of vomiting without apparent cause; after three more days she tried to get up again but felt too tired, her general condition and appetite being poor. On the day before admission she again had repeated attacks of vomiting, and pain developed in legs, thighs, and shoulders. She was seen by a doctor, who sent her here with a tentative diagnosis of acute rheumatic fever.

On admission her general appearance was poor; facies thin and sallow; tongue furred but moist; fauces clean; tonsils neither enlarged nor inflamed; slightly enlarged lymph-glands in both posterior triangles of the neck, especially on the left side. No displacement of trachea. Nothing abnormal detected in the cardiovascular system, lungs, or abdomen. No meningeal signs, no muscular weakness. Temperature normal, pulse-rate 96, respirations 20 per min. The movements of all limbs were good, but there was slight pain in joints and muscles on brisk movement. A provisional diagnosis of subacute articular rheumatism was made.

*Investigations.*—Throat swab: Klebs-Löffler bacillus not isolated; gram-staining of film and culture showed mainly *Strep. viridans* and no hæmolytic streptococci.

Erythrocyte-sedimentation rate (E.S.R.): 4% in 1 hour.  
 Blood-count: red cells 5,310,000 per c.mm., Hb 96%, colour-index 0.91; white cells 5500 per c.mm. (neutrophil polymorphs 13.5%, lymphocytes 82.5%, large mononuclears 4%).

Radiography of chest: no pulmonary lesion evident.

Urine: nothing abnormal detected.

In the 5 days after admission there was little change in her general condition. Muscles and joints were still aching, but the temperature was not raised. On the 6th day there was an evening pyrexia of 99° F.

On the 7th day the patient was lethargic, refused food, complained of pain in both hips and shoulders, would not sit up, lay on her right side, and was very reluctant to move about, but had no vomiting, photophobia, or squint. Examination revealed neck rigidity and a bilateral positive Kernig's sign. Lumbar puncture gave a clear C.S.F., under increased pressure, containing 9 lymphocytes and 6 red cells per c.mm.; total protein 400 mg. per 100 c.cm.; a large excess of globulin; chlorides 740 mg. per 100 c.cm.; no tubercle bacilli or other bacteria; culture was sterile. It was then thought that the case was possibly one of tuberculous meningitis.

On the 8th and 9th days there was no change in the general picture. Evening pyrexia of 99° F. During the night of the 9th day there was a transient diplopia lasting half an hour. On the 10th day there was diplopia for an hour.

On the 11th day neck rigidity was still well marked; Kernig's sign positive; and muscular power of right arm weaker than left. The biceps, triceps, and supinator reflexes were present and equal on both sides; upper abdominal reflexes present, lower weak; ankle jerks and plantar responses doubtful. No squint, headache, or incontinence. Hyperæsthesia and hyperalgesia of muscles of thighs and calves. Optic disks showed no papilloedema, exudate, or hæmorrhage. Temperature 99° F in the evening. Lumbar puncture gave clear C.S.F. under a pressure of 110 mm. H<sub>2</sub>O, containing 5 lymphocytes and 67 red cells per c.mm.; total protein 400 mg. and chlorides 790 mg. per 100 c.cm.; culture sterile.

The 12th day followed a quieter night; not so much pain now, but all the above-mentioned signs were more pronounced than before, and in addition there was a general weakness of the muscles of the trunk; patient could not sit up even if supported. The shoulders were apparently weaker than the other parts. The right knee jerk and both ankle jerks were absent. Acute poliomyelitis was now considered as the diagnosis.

This condition continued until the 17th day, when patient felt better and could move her trunk and legs very slightly, but Kernig's sign was still positive. A white-cell count gave 3400 leucocytes per c.mm. (neutrophil polymorphs 25%, eosinophil polymorphs 1%, basophil polymorphs 1%, lymphocytes 68%, large mononuclears 5%). Paul-Bunnell test positive (1-256).

General movements improved still more on the 18th and 19th days. Lumbar puncture showed again a clear c.s.f., under a pressure of 100 mm. H<sub>2</sub>O, containing 5 lymphocytes per c.mm.; total protein 250 mg. per 100 c.cm.; a moderate excess of globulin; chlorides 740 mg. per 100 c.cm.; culture negative. Wassermann and Lange reactions negative.

On the 25th day patient could sit up unaided up to 45°-60°, moving both arms well and without pain, but could not extend legs on flexed thighs. Hyperalgesia still present; right knee jerk and both ankle jerks absent.

Improvement continued on the next two days, and a white-cell count gave 4000 leucocytes per c.mm. (neutrophil polymorphs 27%, eosinophil polymorphs 6%, basophil polymorphs 1%, lymphocytes 61%, mononuclears 5%). E.S.R.: 7% in 1 hour.

On the 34th day all signs were rapidly disappearing, but knee and ankle jerks not yet present. Paul-Bunnell test positive only up to 1-32. The patient was attempting to stand but still had some pain on doing so. Lumbar puncture on the 35th day gave a clear fluid, under pressure of 85 mm. H<sub>2</sub>O, containing 2 leucocytes per c.mm.; total protein 100 mg. per 100 c.cm.; a slight excess of globulin; chlorides 725 mg. per 100 c.cm.; culture sterile.

On the 40th day right knee jerk and both ankle jerks now very weak; patient able to walk slowly with legs divaricated. On the 44th day jerks normal and equal, patient walking much better. On the 49th day gait almost normal. A white-cell count gave 5000 leucocytes per c.mm. (neutrophil polymorphs 23%, eosinophil polymorphs 1%, lymphocytes 69%, large mononuclears 7%).

On the 51st day gait was normal and the patient was free from all symptoms.

#### DISCUSSION

This case appears to be one of glandular fever in which the central nervous system was severely affected, followed by complete recovery. The Paul-Bunnell test was strongly positive (1-256) at the height of the nervous affection and became barely positive when the neurological signs had practically gone. Of particular interest is the fact that during the whole course of the disease there was a persistent leucopenia. At no time were the white cells more than 5500; the lowest figure was 3400. The mononuclears were never more than 7%, the maximal lymphocytosis was 82.5%. Tidy (1934) writes: "It is evident that the virus of glandular fever transiently affects all the blood-forming tissues—and no single blood picture is typical of the disease."

The c.s.f. never contained more than 9 lymphocytes per c.mm., even when the protein was 400 mg. per 100 c.cm. One might perhaps deduce that the small increase of white cells in the c.s.f. (and the consequent cell-protein dissociation) was aetiological related to the leucopenia. This relationship, however, has still to be proved, just as much as the reputed relationship between the increase of leucocytes in the blood and in the c.s.f. On the other hand, the protean manifestations of the neurological lesion point to the fact that the brain and the spinal cord were involved. This should therefore be considered as a case of encephalomyelitis complicating an acute mononucleosis of a rather unusual type.

Had the sheep-cell agglutination test not been performed, the cause of the illness might have been missed. It is certainly worth while having a Paul-Bunnell test done in all cases showing acute neurological manifestations without apparent cause.

#### SUMMARY

An unusual case of glandular fever exhibiting widespread involvement of the central nervous system is described. The signs and symptoms were of the type seen in encephalomyelitis. Complete recovery followed.

I wish to thank the Medical Officer of Health, L.C.C., and Dr. J. O. Reid, medical superintendent of Highgate Hospital, for permission to publish this case.

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## REPEATED ABORTIONS, MISCARRIAGES, AND STILLBIRTHS

### VALUE OF ANTISYPHILITIC TREATMENT

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THE incidence of repeated abortions, miscarriages, or stillbirths is low.<sup>1</sup> The 54 cases reviewed here are the total number encountered in three years in the antenatal department of the Rotunda Hospital, during which time the hospital was responsible for 15,780 deliveries,<sup>2</sup> making the incidence in this series less than 0.4%.

In 1924-27, during the assistant mastership of Dr. N. McI. Falkiner, the present master of the Rotunda Hospital, it was the practice of the hospital to treat syphilitic mothers at a special clinic in the antenatal department. Excellent results were achieved in patients with a positive Wassermann reaction and a history of repeated stillbirths. The report on the blood reaction of some of the patients suspected of having syphilis was doubtful, the result reading "doubtful positive, please repeat" or "doubtful negative, please repeat." These patients were given full antisiphilitic treatment, as if their blood reaction had been positive, and most of them gave birth to live babies.

It then occurred to Dr. Falkiner that a patient with a history of repeated abortions and a negative Wassermann reaction might respond equally well to full antisiphilitic treatment, and from that date this treatment has been applied to all cases with a history of repeated abortions, whether the Wassermann reaction is positive or not. The present 54 cases were seen and treated by me during my period as assistant master (May, 1941-44).

Antisiphilitic treatment with organic arsenicals is not without attendant risks, and in 1941-44 some cases of severe jaundice after treatment with these drugs were reported in private communications. It was therefore decided to change to 'Bisoxyl,' which carries far less risks and does not seem to be any less effective in preventing stillbirths.

#### MANAGEMENT

The routine management of cases of repeated abortion, miscarriage, or stillbirth is as follows:

*Investigation.*—After the careful recording of the patient's general and marital history, including a statement of the frequency of intercourse and the time of the menstrual cycle at which intercourse mostly takes place, a complete general medical examination is made, with special emphasis on syphilis, diabetes, and hypothyroidism. This is followed by gentle bimanual examination to exclude malposition and malformation of the uterus and by inspection of the cervix with a bivalve speculum to exclude laceration, &c. Finally, specimens of blood and of breast fluid are taken for estimation of the Rh factor.

1. Abortion is used to mean expulsion of the ovum before the time of the formation of the placenta (i.e., during the first 3 months); miscarriage when expulsion takes place after the formation of the placenta but before the 28th week; stillbirth for expulsion of a dead fetus after the 28th week.
2. Falkiner, N. M. Clinical Reports of Rotunda Hospital, 1941-44.

**Treatment.**—The patient is given general advice on antenatal care. One vitamin E tablet twice daily, one calcium tablet thrice daily with milk, and iodised table salt instead of ordinary table salt are prescribed. The patient is instructed to avoid excessive exercise, especially at what would otherwise be her menstrual periods, and to rest every afternoon in bed for two hours.

As routine antenatal care, at each weekly visit her weight is charted, her blood-pressure is estimated, her urine is tested for albumin and sugar, and she is given antisyphilitic treatment, consisting of intramuscular bisoxyl 2 c.cm. weekly for eight weeks, followed by six weeks' rest, continuously throughout pregnancy.

**Contra-indications** are recurrent toxæmia and foetal death due to blood-group difference (Rh factor).

COMMENT

The table shows that 54 patients had previously had 249 pregnancies but had produced therefrom only 55 live babies, which constituted a salvage-rate of only 22%.

After antisyphilitic treatment these 54 patients produced from 54 pregnancies 49 live babies—a salvage-rate of about 90·7%.

Case	Age (yr.)	Previous pregnancies				Week of pregnancy when first seen	Treatment	Result
		Abor-tions	Miscar-riages	Still- births	Live births			
1	42	1	2	1	1	28	As	F.T.A.
2	30	..	..	2	1	30	..	F.T.A.
3	42	9	..	9	4	26	..	F.T.A.
4	25	1	..	1	..	32	..	F.T.A.
5	28	2	..	..	1	28	..	F.T.A.
6	36	1	5	1	3	28	..	F.T.A.
7	38	..	2	..	..	24	..	F.T.A.
8	30	1	..	1	..	28	..	F.T.A.
9	28	6	..	1	1	6	..	Abor. at 10 wk. F.T.A.
10	25	..	..	2	1	28	..	F.T.A.
11	..	..	..	3	4	6	..	F.T.A.
12	..	..	..	2	..	16	..	Mac. at 38 wk. F.T.A.
13	29	..	2	..	..	16	..	F.T.A.
14	34	1	1	4	2	20	..	F.T.A.
15	28	..	..	2	..	26	..	F.T.A.
16	32	..	..	3	2	32	..	Prem. alive, at 36 wk. F.T.A.
17	33	..	..	1	3	32	..	F.T.A.
18	27	1	1	1	1	28	..	F.T.A.
19	29	..	2	3	1	24	..	F.T.A.
20	36	3	1	2	4	28	..	F.T.
21	29	4	..	..	1	18	..	aneceph. F.T.A.
22	27	4	1	..	..	19	..	F.T.A.
23	27	..	..	2	..	34	..	F.T.A.
24	32	2	..	..	1	32	..	F.T.A.
25	30	2	..	4	2	20	..	F.T.A.
26	41	1	..	2	..	28	..	F.T.A. ces.
27	..	..	1	3	..	16	..	F.T.A. ces.
28	27	3	..	..	..	13	..	F.T.A.
29	25	8	..	..	..	12	..	F.T.A.
30	32	2	..	4	..	10	..	F.T.A.
31	24	..	..	2	..	31	..	F.T.A.
32	32	3	..	..	..	8	..	F.T.A.
33	30	1	..	1	..	9	..	F.T.A.
34	37	1	..	4	2	34	..	F.T.A.
35	42	4	..	4	6	32	..	F.T.A.
36	40	3	..	3	1	32	..	F.T.A. ces.
37	35	2	..	..	..	12	As and Bi	F.T.A.
38	32	..	..	1	1	6	..	F.T.A.
39	34	2	..	..	1	6	..	F.T.A.
40	38	4	1	..	..	8	..	F.T.A.
41	31	1	..	1	..	28	..	F.T.A.
42	28	2	..	..	..	6	..	F.T.A.
43	25	2	1*	..	..	12	Bi	F.T.A.
44	35	1	..	..	1	8	As and Bi	F.T.A.
45	36	1	..	4	1	8	..	F.T.A. ces.
46	21	3	..	..	1	14	..	F.T.A.
47	34	1	..	1	1	20	..	F.T.A.
48	..	4	..	..	..	9	Bi	F.T.A.
49	27	..	1	..	1	36	..	Baby alive Normal at 34 wk. F.T.A.
50	22	..	3	..	..	14	..	F.T.A.
51	29	1	..	..	2	16	..	F.T.A.
52	33	1	1	1	1	8	As	Abor.
53	36	2	..	..	2	..	..	F.T.A.
54	32	..	..	2	1	..	As and Bi	F.T.A.

The Kahn reaction was negative in all cases. The Wassermann reaction was weakly positive in case 2, a trace positive in case 49, doubtful in case 5, and negative in the rest. As=arsenicals. Bi=bisoxyl. F.T.A.=full term, alive. Abor.=abortion. Mac.=macerated fetus. Ces.=caesarean section (lower segment). \* Ectopic pregnancy.

There were 4 caesarean sections. This high rate is explained by the fact that these patients were treated primarily with the object of producing a live baby.

It is not suggested that the patients with a negative Wassermann or Kahn reaction were syphilitic; but the father may possibly have had syphilis partially treated, untreated, or fully treated.

SUMMARY

A history of habitual abortion, miscarriage, or still-birth is often found in patients with no serological evidence of syphilis.

Good results can be achieved by treating these patients exactly as if they had syphilis.

Medical Societies

FAMILY PLANNING ASSOCIATION

ON Sept. 21 and 22 this association held in London a conference, under the chairmanship of Mr. A. S. PARKES, SC.D., F.R.S., on Infertility.

Rôle of Hyaluronidase in Fertilisation

Dr. G. I. M. SWYER recalled that the ovum of mammals, when freshly ovulated, was still surrounded by the cumulus, whose disintegration was an essential preliminary to fertilisation. McClean and Rowlands had demonstrated in 1942 that the enzyme hyaluronidase, whatever its source, was capable of denuding freshly ovulated rat ova. Rowlands in 1944 had suggested that the hyaluronidase in semen was derived from the spermatozoa, and that the sperms in an inseminate produced sufficient hyaluronidase to break up the cumulus rapidly and so permit penetration and fertilisation by one of their number. By adding hyaluronidase to diluted suspensions of rabbit spermatozoa, Rowlands had produced fertilisation with about a sixth of the minimum sperm concentration required in controls not receiving the added hyaluronidase; this suggested that the infertility of oligospermic semen might be due to an insufficiency of hyaluronidase. Dr. Swyer had developed an accurate viscosimetric method for the quantitative assay of hyaluronidase; and he showed figures proving a close statistical correlation between the sperm count and the hyaluronidase content in human semen. A similar relationship could be shown for the semen of other animals, although the absolute hyaluronidase content varied widely among different species. Calculations showed that the differences in hyaluronidase content in these species could account for the variation in the minimum sperm counts required for fertility. He described experiments in rabbits showing that up to 12 hours after mating or instilling hyaluronidase solutions into the vagina hyaluronidase could be recovered in washings from the lumen of the fallopian tube. He had also induced ovulation in female rabbits by an injection of gonadotrophin, which had been followed 7 hours later by an intravaginal injection of hyaluronidase; after a further 5 hours he had recovered denuded ova and had identified hyaluronidase in the tubal washings. From the fallopian tubes of control animals, given the gonadotrophin injection and distilled water per vaginam, ova within their cumuli and no hyaluronidase had been recovered. Trials were to be made on humans of the effect of hyaluronidase in sterility due to oligospermia. The hyaluronidase would be administered as a tablet or solution placed in the vagina before intercourse, or by addition to the husband's semen which would be artificially inseminated.

Antigenic Properties of Spermatozoa

The CHAIRMAN said that when spermatozoa were injected into an animal of a different species the recipient's blood was found to contain antibodies which could be demonstrated in vitro. The resulting antiserum reacted in high dilutions with spermatozoa of the species against which it had been raised, and in lower titres with the spermatozoa of other species. An antiserum prepared in a sheep against rat spermatozoa agglutinated in vitro the spermatozoa of the rat; less strongly those of the guineapig, rabbit, and dog; and slightly those of the human. It was difficult to show that antispermatozoal

immune-bodies had any effect *in vivo*. For example, the passive immunisation of male guineapigs with large quantities of a potent antiserum prepared by injecting guineapig spermatozoa into a rabbit did not affect the condition of the epididymal spermatozoa, nor the production of spermatozoa by the guineapig testis. The evidence on the possibility of active iso-immunisation of an animal was conflicting. Positive results had been based mainly on complement-fixation tests. He himself, using as a criterion the *in-vitro* agglutination of spermatozoa, had consistently failed to find antibodies against rabbit spermatozoa after injecting rabbit spermatozoa into rabbits. Furthermore, this treatment had affected neither the sperm count and fertility of male rabbits nor the fertility of females. With vaginal insemination in female rabbits, a weak antibody response had sometimes been evoked, but only against heterologous spermatozoa, and less regularly than with injection by other routes. There was thus little experimental support for the theory that sterility in humans might result from injection of heterologous spermatozoa; and there was still less evidence of its production by natural or artificial insemination; among 13 women whose failure to bear children was inexplicable in terms of anatomy, physiology, or pathology the serum of only one showed a trace of antispermatozoal activity *in vitro*.

#### Artificial Insemination

DR. MARGARET HADLEY JACKSON and Mrs. CLARE HARVEY discussed their results with artificial insemination in infertility, using semen obtained from the husband, and compared the results with those where a donor's semen was used. Their cases had been carefully selected to exclude couples who appeared at all likely to produce children unaided; all the selected cases had been practising intercourse without contraception for at least

two years. Artificial insemination with the husband's semen was practised 165 times on 40 selected patients of whom one received as many as 32 inseminations and others only 1. There resulted only 2 pregnancies, one of which terminated in a miscarriage and the other in a live birth. Of these 40 women, 15 who were subfertile received donor semen mixed with the husband's semen, and 5 were finally treated with donor semen alone. All the 15 husbands of this series had had repeated semen tests, of which 40% were unsatisfactory in some, and 60-100% in the majority. From 41 inseminations with donor semen mixed with the husband's semen there resulted only 2 pregnancies, of which one led to a live birth and the other to a miscarriage. Of the 5 women who received donor semen alone (the total number of inseminations being 27) none became pregnant. In 7 of these 40 women pregnancy subsequently occurred as a result of normal intercourse. In another series of 34 selected cases of infertility, artificial insemination with donor semen of high quality was performed on 254 occasions. There resulted 17 pregnancies, with 13 live births, 1 stillbirth, 1 miscarriage, and 2 which had not yet ended. They concluded that artificial insemination with the husband's semen did not yield good results, and that natural intercourse was more likely to be successful.

#### Habitual Abortion

DR. RAYMOND CROSS described the series which is reported elsewhere in this issue. A lively discussion followed, in which the lack of controls in Dr. Cross's experiment was criticised and the statistical significance of his results questioned. The dangers of using toxic substances without urgent indications was stressed. Other speakers claimed excellent results in the treatment of habitual abortion with simple measures, such as rest in bed or even injections of distilled water.

## Reviews of Books

### Gynaecological Endocrinology for the Practitioner

P. M. F. BISHOP, D.M. Oxf., lecturer in applied physiology, Guy's Hospital. Edinburgh: E. and S. Livingstone. Pp. 124. 7s. 6d.

IN this small useful book the endocrine control of the menstrual cycle is briefly discussed and the various sex hormones available for therapy and their methods of administration are set out. Dr. Bishop dismisses the natural oestrogens with the remark that they "have only one disadvantage—they are expensive"; and goes on to describe all treatment with oestrogens in terms of stilboestrol. Many practitioners, however, still have a not entirely unfounded prejudice in favour of the natural oestrogens. He rightly stresses the dangers of continuous oestrogen therapy, and notes that very different doses are needed and can be tolerated in different physiological and pathological states: for instance, low dosage is needed during the menopause and high dosage during pregnancy. He mentions the uncertain results at present obtained with gonadotrophins, and gives a short account of pregnancy tests and hormone assays. Guterman's pregnanediol colour-reaction test might with advantage have been discussed; though its value and accuracy are not yet fully established, it promises to be clinically helpful both in detecting a tendency to abort and possibly in establishing the time of ovulation. Tables listing the various commercial products by name and giving their dosages and current prices are convenient. Dr. Bishop has remained nicely detached and free of dangerous enthusiasms, and has packed a great deal into small space.

### The Nervous Child

(5th ed.) HECTOR CHARLES CAMERON, M.D. Camb., F.R.C.P., consulting physician to the children's department, Guy's Hospital. London: Oxford University Press, Pp. 252. 10s. 6d.

IN this book, first published in 1919 when child psychiatry in Great Britain was in its infancy, much of the original writing remains; and since it was based upon clinical observation of the behaviour of nervous children, and the attitude of their parents and nurses towards them, it has stood the test of time. Not only in the chapter on disturbances of metabolism but

throughout the book, the psychosomatic conception of illness and the interplay of mind and body in child health are well portrayed. Sound advice is offered on the healthy upbringing of children and on the management of nervous symptoms. New material includes additions to the sections on enuresis, on night terrors, and on habitual vomiting of infancy. Both the plea to the psychiatrist in his dealings with children "to remember how often the nervous disturbance is erected upon a physical basis," and the statement that "the hygiene of the child's mind is as important as the hygiene of his body, and both are studies proper for the doctor" are timely. The book is intended primarily for the guidance of the medical practitioner, but can be recommended to any who are concerned in the practice of child health.

### Surgical Nursing and After-treatment

(9th ed.) H. C. RUTHERFORD DARLING, M.D., M.S. Lond., F.R.C.S., surgeon, Prince Henry Hospital, Sydney. London: J. and A. Churchill. Pp. 694. 12s. 6d.

FOR some 29 years this book has filled an important place in the teaching of the nursing profession. Mr. Darling has been thorough—keen to embody every little advance, every little change or trick, in the passing years. But as Schiller observed "an artist may be known rather by what he omits." The tired nurse, working for examinations in her spare time, must have the crop winnowed for her: she does not need to know about "cardiac energy" or the "shock" index, about old-fashioned Kimpton tubes or paraffined methods for blood-transfusion, or even about somebody's pet method of packing the rectum. What nurse sees a Phelps's box used, or a petticoat tube for secondary hæmorrhage, or a Bavarian or Delbet splint? If the doctor likes to order some particular old-fashioned method, let him explain to her how to use it. The book is too full for the present State course: the 700 pages make it longer than the shorter surgery textbooks for medical students. The nurse's mind is no sponge, and there are limits to the amount that she should be expected to absorb in her scanty studying time. It would be far better to concentrate on selected details of the management of the cases she usually encounters: and in fact the book does give a good account of postoperative diet and other nursing points. It has real merits, but it does not show the nurse the way through the wood.

# THE LANCET

LONDON: SATURDAY, NOV. 23, 1946

## The Small Ones

THE Act provides that on the appointed day all voluntary and public-authority hospitals shall be transferred to the Minister of Health, except those he does not require for the National Health Service. Just what does this mean? The definition of a voluntary hospital is very wide, including as it does "any institution for the reception and treatment of persons suffering from illness" which is "not carried on for profit," and it thus comprises a variety of institutions ranging from the big general hospital to the small holiday-home which completes the treatment of the sick by giving them a holiday at the seaside. Between these extremes come a large (though unknown) number of small establishments, of which there is as yet no central record. Most of these are homes either for the convalescent or for the chronic sick. Generally they are self-owned, and many of the people who manage them are still unaware that the National Health Service Act has any bearing on their activities.

What will be the best way of dealing with this mass of minor institutions? Unlike the hospitals they have no expensive apparatus and technical staff, and their chief asset is the devotion to the sick which inspires their management. This is a more delicate flower to preserve than the technical attributes of the big hospitals, but it is very well worth preserving. There is grave risk of its withering and fading under detailed control, and it seems to us that the intervention of authority should here be kept to a minimum. Where, as in hospitals, medical excellence is the main criterion, there is need of enough central influence to ensure the full use of scientific resources; but lower in the institutional scale, as technical efficiency grows less important and human relationships—"atmosphere"—more important, the advantages to be expected from such influence decrease. The smaller institutions intended for rest and recuperation will, we imagine, require control only so far as the safeguarding of public funds is essential, and may otherwise be left to themselves with only such distant supervision as an occasional official visit affords. A travelling accountant and visits from time to time by official visitors (both medical and lay) would be enough to ensure that proper standards are kept up, leaving the institutions themselves to build up their own particular methods of keeping the patients happy and contented. For this is the essence of the treatment which most of these homes exist to provide. Many of them, at least, are intended for patients who have done with medicine and now need only the natural stimulants—fresh air, exercise, good food, and pleasant occupation—to restore them to the state of health necessary for facing their daily work and troubles.

Whether or not it takes them over, the State will become responsible to some extent for these places, if only because their demise would throw their work

back on the State itself. Cannot the maternal genius of unselfish people be left to preside over them, while the Ministry contents itself with the fatherly duties of watching over the little ones and paying the bills?

## Streptomycin in Non-tuberculous Infections

STREPTOMYCIN, which was introduced by SCHATZ, BUGIE, and WAKSMAN<sup>1</sup> in January, 1944, as likely to be valuable in a variety of infections, is still known at second hand only to most doctors in this country, and it has been heralded chiefly as a potential weapon in the conquest of tuberculosis. But American reports make it clear that its proper assessment in tuberculosis will take a long time. Meanwhile evidence of its benefits in other conditions is accumulating, and a committee of the National Research Council<sup>2</sup> has lately reported on its use in 1000 miscellaneous cases.

Originally streptomycin was measured in terms of its activity against *Bact. coli*, but since the hydrochloride and sulphate salts have become available a microgramme of the pure streptomycin salt has been taken as equivalent to one unit; a gramme of the pure substance is then equal to 1,000,000 units. The streptomycin salt is a light yellow powder, usually supplied in ampoules. It is very soluble in water, and comparatively thermostable, though over long periods it is desirable to store it in a refrigerator. It is most commonly given by intermittent intramuscular injection. Intravenous administration produces a much higher initial concentration in the blood-stream, but after about 2 hours the blood-level falls below that attained by the intramuscular injection of an equal quantity. With ordinary dosage by either route traces of the drug can still be found in the serum after 10–12 hours. Injection into the muscle is painful at the time and for 24–48 hours afterwards, and a persistent ache may be felt at the site of repeated injections. The addition of procaine minimises the initial discomfort. The drug has sometimes been given in dilute solution by intravenous drip, but this route is generally undesirable because of possible toxicity, either of the drug or its impurities. It is not significantly absorbed by mouth, and this route is used only when the intention is to reduce the bacterial content of the intestines. Absorption from the respiratory tract after inhalation is also negligible. After parenteral administration it reaches peritoneal, pleural, and intraocular fluids, but not collections of pus, such as in empyemata. It also appears in the bile, and in the foetal circulation and amniotic fluid. Normally the concentration reached in the cerebrospinal fluid after systemic injection is low, but there is some evidence<sup>3</sup> that a much higher concentration develops in meningitis. Nevertheless it is usually given intrathecally as well as systemically in meningitis; and indeed into pleural and peritoneal cavities also, when local infections make it desirable.

Dosage varies widely, and attempts are made to relate the blood-level to the sensitivity of the organism concerned. In general 2–4 g. is given daily intramuscularly, usually 4-hourly. Intrathecally, 25–100 mg. in 5–10 c.cm. of saline once in 24 hours is suffi-

1. Schatz, A., Bugie, E., Waksman, S. A. *Proc. Soc. exp. Biol.*, N.Y. 1944, 55, 66.
2. Keefer, C. S., Blake, F. G., Lockwood, J. S., Long, P. H., Marshall, E. K., Wood, W. B. jun. *J. Amer. med. Ass.* 1946, 132, 4.
3. Adcock, J. D., Hettig, R. A. *Arch. intern. Med.* 1946, 77, 179.

cient. For oral use 2-3 g. per day, given at 6-hourly intervals, is required. Excretion is mostly by the kidney, and 60-80% of the dosage is normally found in the urine within 24 hours of administration. Therapeutic levels in the urine are therefore easily obtained. Many factors relating to dosage are still imperfectly understood. For example, several investigators have reported a rapid increase in resistance to streptomycin *in vivo*, and WELCH and colleagues<sup>4</sup> have found experimentally in mice infected with typhoid that certain concentrations of streptomycin injected intraperitoneally actually increase the fatality-rate. The tolerance of bacteria to the drug may be increased four to eight times in the presence of blood or serum. A patient often varies in his rate of absorption, distribution, and excretion: and it is always uncertain that two patients with the same infection will react alike. Assessment of sensitivity of an organism *in vitro* often seems to bear little relation to the clinical response to what ought theoretically to be adequate dosage. It is not surprising that the duration of treatment required is also very variable: in general it is from 5 to 14 days.

Judging by the results of the American investigators in their 1000 cases, highly satisfactory results may be looked for in various kinds of gram-negative meningitis and septicæmia, if treated early, in tularæmia, and to a rather less extent in urinary-tract infections. In the treatment of meningitis they agree with CAIRNS and colleagues<sup>5</sup> that when treatment is delayed there is little prospect of benefit. Limiting factors in urinary infections include the presence of mixed organisms, irremovable local lesions, variations in sensitivity of organisms, and sometimes the development of extremely rapid resistance *in vivo*. The results in typhoid, salmonella infections, and brucellosis are disappointing—"no dramatic results have been observed in any of these infections." In pulmonary infections with Friedländer's bacillus or *H. influenzae*, and in peritonitis from gram-negative infection, the results are difficult to assess but sufficiently encouraging to justify further extensive trials. Much work has also been done with experimental disease in animals; syphilis in rabbits and plague in mice have both proved susceptible to streptomycin, though in syphilis it is much less effective than penicillin. One report of success in experimental brucellosis in guineapigs<sup>6</sup> is unfortunately not paralleled in man.

Toxic reactions to streptomycin are comparatively frequent, the overall incidence in the National Research Council's 1000 cases being 20%. Headache, flushing, fever, and vertigo are among the commonest complaints, apart from local pain and irritation at the site of injection. Skin rashes are also common, developing mostly during treatment. They are erythematous, urticarial, maculopapular, or even hæmorrhagic in type, and may persist for a week or longer. If treatment is continued after the appearance of a rash much care is required, as other signs of sensitisation may appear. Neurological effects are the most disturbing of the toxic manifestations,

although they tend to develop late and with large doses only. BROWN and HINSHAW<sup>7</sup> report that caloric stimulation and turning tests show gradual impairment of labyrinthine function during streptomycin therapy, and that deafness and tinnitus may result from a toxic action on the cochlear apparatus. The disturbance of equilibrium may be permanent, but may be relieved by the development of compensatory balancing mechanisms. Deafness tends to recover with cessation of treatment, and may in some cases be the result of the primary disease. The incidence of toxic reactions begins to rise sharply when a daily dose of 1 g. is reached, and when the daily dose is 4 g. or more the incidence reaches 60%.

The groundwork of investigation has been successfully planned and put into effect in America, but there is much to be done before we know as much about streptomycin as about penicillin. Distribution of supplies in this country is likely to follow the pattern cut for penicillin—a gradual widening of availability as more of the drug is made and as knowledge becomes precise enough to ensure that supplies are not wasted. Meanwhile streptomycin is bound to be exceedingly scarce. In Berlin today some relief from the shortage of penicillin is being sought in the extraction of the drug from the urine of patients who have received it. This was done here also in the early days, and it was then remarked that passage through the body removed impurities responsible for febrile reactions. The evidence that 60-80% or even more of the total dose of streptomycin may be excreted in the urine prompts the suggestion that methods of urinary extraction should again be explored.

### "I Was There"

THE campaign in Burma, so well described in the official account,<sup>1</sup> taught several medical lessons of more than temporary value, both in epidemiology and in the treatment of traumatic injury. Except for the war in the Gran Chaco no major campaign of modern times has been fought in the tropics, and the application of the lessons learnt in temperate and subtropical climates raised several interesting points. Heat-stroke, inseparable from the deserts of the subtropics, was seldom seen; an annual rainfall of 200 inches concentrated into three months was no bar to active warfare; snake-bite was little more than an old wives' tale. The proportion of infected wounds was very high but gas-gangrene was rare; the streptococcus was an uncommon infecting agent but the staphylococcus replaced it only too efficiently. The major problem of the surgeon was evacuation, and in the early campaigns in the Arakan it was necessary to move the wounded man, from ambulance to ferry to ambulance to train, twenty-one times before he reached a general hospital. Air transport for casualties had been used before, but never had its effects, on surgery and on morale, been so striking as in 1945. A soldier wounded by the Irrawaddy might be flown out in a light aeroplane from a 200-yard strip cut in the jungle. Within a few minutes he was in a C.C.S., located at a strip long and firm enough to take a Dakota air ambulance. The same

4. Welch, H., Price, C. W., Randall, W. A. *J. Amer. pharm. Ass.* 1946, **35**, 155.

5. Cairns, H., Duthie, E. S., Smith, H. V. *Lancet*, August 3, p. 153.

6. Live, I., Sperling, F. G., Stubbs, E. L. *Amer. J. med. Sci.* 1946, **211**, 267.

7. Brown, H. A., Hinshaw, H. C. *Proc. Mayo Clin.* 1946, **21**, 347.

1. The Campaign in Burma. H.M. Stationery Office. Pp. 175. 2s.



evening he was in bed in a general hospital in Comilla 500 miles away. The system had a flexibility that allowed for almost any peculiarities of weather or terrain, and established welcome liaison between the line and the base. The consulting surgeon was as likely to be found at a main dressing-station as in his office.

Infectious diseases were prevalent enough, but, with one exception, they were those common to other theatres of war. Malaria, as always, had local peculiarities which had to be learnt before it could be overcome. Mepacrine, administered under strict discipline, had by 1945 reduced this menace to insignificance, and the Australians in New Guinea showed that the incidence might have been even lower. The war ended too soon for 'Paludrine' to receive a field trial. Dysentery of both kinds was, as in most theatres, the most distressing and intractable of camp-followers, and the gradual lowering of its incidence reflects great credit on the "hygiene wallahs." The syndrome of anæmia, lethargy, and diarrhoea, which came to be known as "para-sprue," remained an unsolved problem to the end. Infectious jaundice was as common as elsewhere. The only disease of which few had had experience and which might have been a problem of the first magnitude was scrub-typhus. This was never conquered, but enough

was learnt of its natural history to make its incidence trivial among the other hazards. A comparison of the health of captured Japanese with that of our own troops was a great testimonial to preventive medicine and the value of the various research teams associated with the Allied forces.

Where the war in Burma differed radically from all others was in the revolution in the supply services. General WINGATE had suggested sending stores "down the chimney, like Father Christmas," and that was done. It was an inspiring sight to see the aeroplanes leaving Hathazari loaded with everything which the Army might need, down to the daily newspaper, *S.E.A.C.*, whose editor has written the official account. Bandages, splints, mepacrine, and penicillin went up in the aeroplanes that brought the wounded back.

Of morale it is hard to speak. Military circles will continue to argue the value of the airborne penetrations by the Chindit columns, but no-one has yet found praise enough for the men who made them. It is perhaps characteristic of the morale in Burma that WINGATE's last message—"One day you will be proud to say 'I was there'"—became the nickname of a species of hat<sup>2</sup> not recognised in the dress regulations of the Indian Army.

2. An overgrown and amorphous deerstalker of quilted drill.

## Annotations

### PERSPECTIVE

"HAS anybody heard any good news lately?" Mr. Donald McCulloch put this question to last week's Brains Trust; and there was silence. To the British people good news would be a welcome tonic, for things are not as most had thought to find them nearly eighteen months after the end of the war. Measuring our present utilitarian habits against the distant pre-war life by its chances for variety in food and scene and clothing and a hundred other intrinsically unimportant items, we see that the old standard is still far beyond reach. In the wider sphere, too, those who spoke of, and believed in, the moulding of a better world as the first task to which the nations should turn their hands now find such talk strangely hollow against a background of international bickering. Yet these disappointments have given rise to no spirited questioning and to no incisive call to action; for we are touched with the same malaise as after the first world war—a fatigue of which we were largely unaware during the struggle itself.

If, in surrender to this exhaustion, we are indifferent to our own affairs, we are perhaps doubly careless of others'. Hungry Germany is a case in point, though here there is the excuse that tales of famine have so long been part of the daily news that they no longer carry their former impact of shock and urgency; as with the war-time casualty lists, the implications of the printed word are obscured by constant repetition. Moreover, though there is general want, there is not yet stark famine in Germany; subsisting on a basic ration that has wavered from about 1500 to under 1000 calories, the western German still lives in the narrow borderland that divides malnutrition from frank starvation. The newspapers, on which we largely rely for our knowledge and judgment of human events, though they have conscientiously reported this state, have been hindered in giving it full weight by the poor news-value of the subject. Fires and murders, battles and burglaries—these, having beginning, incident, and climax, lend themselves to graphic description. Famine or near-

famine has no such definite phases; its drama is reserved for those who see and those who suffer; the plot varies little from Monday to Friday, or from Cologne to Chungking; and its dénouement in swollen numbers of sick and dead make chilly reading.

Nowadays even the sober accounts which come out of Germany are often suspect. Were there not for nearly four years stories of terrible want in western Europe, which were ended only when the liberating armies found that, except in Holland and a few towns elsewhere, conditions had almost all along been tolerable? Some recall the Germans' buxom health in the early days of occupation, their well-stocked larders, and their weekly trips to the country from which they returned laden with produce. Having been the best-fed people in Europe for five years, so the argument runs, they can now best afford to starve; and anyhow the official ration is not the only regular source of food. These contentions take no regard of the fact that the initial advantage was lost last winter; and that since then the country folk have had no further surplus for the town-dwellers who form the bulk of the British zone's population. For all except the lucky few who have the money to buy in the black market the official ration is now the total ration. The final argument is that the German people alone are answerable for their present predicament. Even this is hardly correct, for we assumed the reins of government and thus, by implication, responsibility for the people we govern; it is we who, by agreement with the other occupying powers, have divided the country into discrete sections so that there has been no free exchange of manufactured goods from the urban west for food from the rural east; and it is we who, following the Potsdam agreement, have so reduced the economic strength of our zone as to cripple its purchasing power. "Eighteen months after the surrender," writes an *Observer* correspondent,<sup>1</sup> "the German inhabitant of the British zone faces a second winter of hunger and cold without the stocks of food, fuel, and clothing he had a year ago, weakened by six months of starvation-rations, and with a feeling of utter hopelessness, despair, and bitterness."

1. Nov. 17.

### PENICILLIN IN ACUTE NEPHRITIS

THE generally accepted view of the lesion in acute glomerulonephritis—Ellis's type 1 nephritis—does not encourage the hope that the condition would be benefited by sulphonamides or penicillin. The sulphonamides, despite enthusiastic early reports, have in fact provided no substantial advantage, and their toxic effects are often serious. The freedom of penicillin from this disability, and the clinical impressions of benefit, such as that recorded by Moncrieff,<sup>1</sup> together with the observed relationship of infection to nephritis, call for further investigation of its effect. From experience with 25 cases, 10 of them afebrile, Sen<sup>2</sup> concludes that in children with febrile conditions associated with nephritis penicillin may minimise the illness by dealing with the focus of infection. Furthermore, even in afebrile cases he has noted a rapid increase in urinary output, and general clinical improvement; and he suggests that penicillin has a direct influence on the kidney itself, whereby the illness is shortened. Unfortunately he has not been able to observe a control series, and the information he gives about the original infection and the clinical condition is incomplete. At present the claim must be regarded as unproved, but a carefully controlled assessment is clearly desirable.

### BRITISH NATIONAL HEALTH INSURANCE

THOUGH compulsory insurance against sickness and accident was instituted in this country on a national scale at so comparatively recent a date as 1911, voluntary health insurance had by that time been operating for several centuries. The social guilds of the Middle Ages, whose records, collected in 1388-89, may be studied in the Public Record Office in London, provided cash benefits to their members in time of sickness; and after the guilds had been suppressed by Henry VIII new agents of voluntary health insurance appeared in the friendly societies. Some steps had even been taken towards compulsory health insurance. In 1697 a scheme of health insurance on a compulsory basis was published by Daniel Defoe; and in 1786 the Rev. John Acland, rector of Broad Clyst, Devon, worked out a scheme of compulsory health insurance, which, embodied in a Bill, was introduced into the House of Commons in 1787 but failed to secure a second reading. In 1757 a statutory obligation to insure against sickness was imposed on coal-heavers working on the Thames; and in 1792 a similar scheme was applied in the coal trade on the Wear.

Prince Bismarck was the first to cause a national scheme of compulsory health insurance to be enacted, though local schemes had then been long in operation in Germany. His scheme, which, it was said, was introduced to trump the long suit of the Social Democratic Party, became law on May 31, 1883, and came into operation on Dec. 1, 1884. In 1909 it was studied on the spot by Mr. Lloyd George, who, in his Budget speech of that year, spoke of it in glowing terms:

"And a superb scheme it is. It has saved an incalculable amount of human misery to hundreds of thousands and possibly millions of people who never deserved it. Wherever I went in Germany . . . men of all ranks, sections, and creeds of one accord joined in lauding the benefits which have been conferred upon Germany by this beneficent policy."

Mr. Lloyd George added that the Government intended to bring in a scheme of national health insurance. It was brought in as part of the National Insurance Bill, which, introduced into the House of Commons on May 4, 1911, and, drastically amended to meet the criticisms of the medical profession, received the royal assent on Dec. 16, 1911.

The scheme as presented to Parliament was based on the German model, and contained provisions to which the medical profession strongly objected. At the insistence of the British Medical Association many amendments were made, the most important of which were: (1) the administration of medical benefit was transferred from the approved societies to specially created insurance committees containing representatives of the medical profession; (2) all registered medical practitioners were given the statutory right to have their names placed on the list of doctors undertaking the medical care of insured persons; (3) insured persons were given the statutory right to choose, and change, their insurance doctors subject to acceptance by the doctor; (4) in every insurance-committee area a local medical committee was to be formed, recognised by the Government as representing the medical profession of the area, and charged with certain important administrative functions. As a result of these provisions, which embodied principles for which the German doctors had long been contending, the medical profession has co-operated with the Government in the administration of the British system, whose operation has been free from the embittered disputes between the profession and the administrative authorities that had been not uncommon in Germany. The B.M.A., in their evidence submitted to the Royal Commission on National Health Insurance, not only recommended the continuance of the health-insurance system but urged that it should be extended to include the dependants of insured persons and to provide a wider range of service. The royal commission, reporting in 1926, recommended that such extensions should be made, "as and when opportunity offers and funds become available"; but, being impressed with the difficulty of retaining the insurance principle in a service of wider scope, added: "The ultimate solution will lie, we think, in the direction of divorcing the medical service entirely from the insurance system and recognising it along with all the other public health activities as a service to be supported from the general public funds."

The change foreseen by the royal commission is now on the eve of accomplishment. The Insurance Medical Service, as a separate service, will soon be a thing of the past; it will be merged in a complete National Medical Service. The British health-insurance system is undergoing a profound change. A new period in its history is opening, and the time is propitious for a comprehensive review of the system—a review that should include an account of the sources from which it sprang and of its actual working and development, and an appraisal of the measure of success it has achieved. Mr. R. W. Harris has presented such a review in his book *National Health Insurance in Great Britain 1911-46*,<sup>1</sup> which will be found very useful by students of health insurance, whether in this country or abroad. Mr. Harris has unique qualifications for writing on the subject. As a civil servant he was associated with the late Mr. W. J. Braithwaite in helping Mr. Lloyd George to steer the National Insurance Bill through Parliament, a task involving preparations for the reception of innumerable deputations and the answering of innumerable inquiries. He was one of the first-appointed members of the staff of the English Health Insurance Commission, and became an assistant secretary in the Ministry of Health; and since his retirement from the civil service he has been chairman of the medical service subcommittee of the London Insurance Committee. His book embodies an experience of health-insurance administration extending over 35 years and will be of permanent value. The narrative of events is not carried further than September, 1945, and no account is given of this year's legislation, though the circumstances leading up to it are discussed

1. Moncrieff, A. A. *Lancet*, 1944, ii, 706.

2. Sen, S. *Amer. J. med. Sci.* 1946, 211, 289; *Indian Physician*, 1946, 7, 151.

in a way that throws light on present difficulties and controversies. There are, however, some curious omissions, including the lack of an index. No reference is made to Henry Ratcliffe, who was the first to place friendly-society finance on a sound actuarial basis, or to Sir Robert Morant, without whose administrative genius and immense driving power the health-insurance system could hardly have got under way in the short seven months allotted for the purpose.

#### HOW LONG DEAD?

THE scientific aids towards identifying a person found dead have increased enormously in number and efficiency in the last few decades, but Simpson<sup>1</sup> shows that they have not made easier the job of assessing the time of death. X rays, blood-groups, dentition, estimation of height from a small piece of limb bone—all these are invaluable in deciding on the victim's identity, but tell us nothing about the hour of death. Simpson holds that the most reliable guide is the steady fall in temperature which takes place up to twenty-four hours after death. Under average conditions about 2.5° F is lost each hour for the first six hours, and 1.5°–2° F for each of the next six hours. Calculations based on these figures may be hopelessly upset by extremes of temperature, the amount of clothing the man was wearing, ventilation, and environment—thus a body in a river will reach the temperature of the surrounding atmosphere much more quickly than one on dry land. If parasites, such as fleas or body lice, are present, the entomologist may help by finding out whether these creatures are still alive, and, if so, how long it takes to revive them. Adipocere may hinder rather than help, for the hydrogenation of body fat is notoriously variable; it may take place in three or four weeks (with warmth), or may be delayed well beyond the four to five months which is the average for this country. The onset of rigor mortis and of post-mortem staining are of little use in placing the time of death accurately. All in all, Simpson seems to place most reliance on body temperature. "It is never too late," he says, "to measure the temperature in the hope that, though 'the body is cold,' it may still register a few degrees above that of the surroundings." He quotes as an example a murder at Hastings where the body temperature was still 7° F above air temperature, after eighteen hours in the snow, and this made it possible to fix the time of death within an hour.

#### VARIOUS OPINIONS ON B.C.G.

SEVERAL months ago the Ministry of Health received from bodies interested in the prevention of tuberculosis a memorandum recommending the supply and use of B.C.G. in this country<sup>1</sup>; and the Minister has lately announced that B.C.G. is to be manufactured in this country. This may make it possible to undertake the controlled investigation for which workers here have hoped, and it will be well to take account of some of the pitfalls and possible disappointments indicated by a recent report from America. Levine and Sackett<sup>2</sup> vaccinated with B.C.G. a series of young children from tuberculous families in New York City. No child above the age of one month was accepted unless the tuberculin test and radiological and clinical examinations were negative; with parenteral vaccination, 85% became tuberculin-positive. At first an attempt was made to control the study by dividing the children into two equal groups—those to be vaccinated and those to be used as controls—a physician being assigned to vaccinate half the cases; and between 1927 and 1933 altogether 990 children were studied in this way. The results were impressive, for there were only 3 deaths from tuber-

culosis amongst the vaccinated compared with 18 among the controls; in other words the number of deaths from tuberculosis was four times greater (3.38%) in the control group than in the vaccinated group (0.68%). Experience showed, however, that selection was taking place; there was a tendency to inoculate the children of the more intelligent and coöperative parents and to keep the children of the uncoöperative parents as controls.

From 1933 onwards alternate children were vaccinated, the selection being made before they were assigned to pædiatricians. Since some children had to be withdrawn from the investigation, the number of controls and vaccinated differed. Altogether 1094 children were studied, of whom 566 were vaccinated (all intracutaneously with 0.15 mg. B.C.G.) and 528 were controls. The tuberculosis deaths among the vaccinated were 8 (1.41%) and among the unvaccinated controls also 8 (1.51%). The possible effects of parental coöperation, economic conditions, racial distribution, exposure, lost cases, and percentage of autopsies were all assessed, but without the discovery of any factor vitiating the comparison. It was found that, among the children segregated in hospital for three months before and three months after vaccination, there were among the 91 vaccinated 1 death, and among the 96 controls 3 deaths, from tuberculosis; in the former group the child who died, though born of a mother who died of tuberculosis, was never exposed, whilst in the latter group one child who died had not been exposed as far as was known. Levine and Sackett regard it as dangerous to take children into hospital during the first three months of life; but they consider that, when a child is admitted, B.C.G. may have some protective value. They conclude that B.C.G. must be judged by the results in children vaccinated at home; and as a public-health measure they rate it below removal of the tuberculous subject from the home.

The Scandinavian countries, on the other hand, from long experience have no doubt of the value of B.C.G., which is being increasingly used. In Denmark, for example, the number of vaccinations has crept up from 82 in 1934 to 40,000 in each of the last two years. The tuberculosis dispensaries are being overwhelmed by this extra work; and at a recent meeting of the Danish Association of Tuberculosis Doctors<sup>3</sup> it was suggested that general practitioners, whose interest has hitherto been lukewarm, should be offered courses of instruction so as to win their active participation. While the administration of the vaccine seems to be plain sailing, its production demands constant skill and attention. Dr. K. A. Jensen, who has been culturing the strain since 1927, has found considerable difficulty in keeping it on the narrow path of therapeutic rectitude. "The ideal," he said, "is never reached. The man who is to cultivate the B.C.G. strain and keep it at a level of suitable virulence has a very responsible post. If the virulence falls, so will the percentage of persons becoming tuberculin-positive after vaccination . . . if the strain become too virulent, the number of complications will rise. Both events would be equally unfortunate, since each would bring B.C.G. into disrepute." In Denmark the vaccine has been cultivated on Sauton medium, with subcultivation about every two weeks.<sup>4</sup> The slow loss of virulence after repeated subcultivation was formerly corrected by several passages on bile-potato medium; but of late years the same effect has been obtained by more frequent transfers on the Sauton medium (every 7–10 days), thus corroborating experimental evidence that virulence depends essentially on the rate of growth on Sauton medium. Dr. Holm,<sup>4</sup> who heads the tuberculosis division of the State Serum Institute, is satisfied with the absolute safety of the vaccine. Its use is

1. Simpson, K. *Science Progress*, October, 1946, p. 713.

1. See *Lancet*, July 27, p. 138.

2. Levine, M. I., Sackett, M. F. *Amer. Rev. Tuberc.* 1946, 53, 517.

3. See *Nord. Med.* Sept. 20, 1946, p. 2134.

4. Holm, J. *Publ. Hlth Rep., Wash.* Sept. 6, 1946, p. 1298.

now being extended beyond those particularly at risk to others, including all tuberculin-negative soldiers in the Danish army; and the present trend is towards the vaccination of all school-children. This year a tuberculosis survey has been initiated for the population of Copenhagen, to include tuberculin-testing and vaccination of all the tuberculin-negative aged 15-35 years.

#### DOSAGE OF CURARE

THERE are now on the market two preparations of curare for use in anaesthesia, one amorphous and one crystalline; both depend for their activity on *d*-tubocurarine chloride but they differ in potency, the amorphous preparation 'Intocostrin' having about a quarter of the activity of the pure crystalline material. This difference is a source of danger and might result in serious accidents. There is also some evidence of wide variations in individual reactions, depending to some extent on the patient's state of health. Thus in one otherwise healthy man with a recent perforated gastric ulcer as little as 5 mg. of the crystalline material produced adequate muscular relaxation, and 15 mg. would probably have been a considerable overdose. The anaesthetics committee,<sup>1</sup> jointly appointed by the Medical Research Council and the Royal Society of Medicine, are considering the standardisation of curare. Meanwhile they recommend that dosage should be based on the individual reaction to an initial small injection rather than on any dose/weight ratio. In the average healthy adult this initial dose could be 10-15 mg. of crystalline *d*-tubocurarine chloride or 40-60 mg. of intocostrin.

#### ADVERTISEMENT OF PROPRIETARY MEDICINES

LAST Monday the Hunterian Society met at Apothecaries' Hall, under the chairmanship of their president, Dr. J. B. Cook, to debate: That the Advertisement of Patent Medicines is a Menace to the Public. Mr. Hugh Linstead, M.P., speaking for the motion, admitted that the busy practitioner would be in difficulties if everyone had to come to a doctor for simple remedies. There had been great improvements in the materials and the advertisement of proprietary medicines since the Royal Commission of 1914. Nevertheless, much remained to be done. Advertisers obeyed the letter rather than the spirit of regulations; mention of "cure" was prohibited by newspapers, but "abolish," "kill," and other terms suggesting cure still appeared. There was still no control over postal advertising. There were too many worthless medicines on the market; prices were excessive; the disclosure demand was too often made the occasion for concealment; scientific terms were misused to mislead the ignorant; and advertisers played on fear. The Ministry of Health should shoulder the task of control as in Canada, where there was prohibition of the sale of proprietary medicines associated with claims for cure, or for which false, misleading, or exaggerated claims were advanced.

Dr. G. H. D. Day could not recall a single instance in which use of these medicines had delayed recourse to medical attention. The patent-medicine addict was the frustrated doctor-addict. These medicines did at least renew hope; and "an act of faith can alleviate symptoms, restore function, arrest disease, and promote healing." The sick man wanted a bit of magic. There existed in the patient a deep sense of the need for sacrifice. There was, too, an ineradicable impression that if the best was to be obtained it must be paid for. When the panel system came in the sale of patent medicines had soared; it would now again increase, because this was the only remaining altar on which to make a sacrifice. Notwith-

standing all this, Dr. Day opposed their advertisement; for this had an element of duality. In childhood, fears were projected on to the bogymen; now these were to be transferred to halitosis and B.O. Patients were willing to accept this as punishment for their guilt-feelings. "What have I done to deserve this?" was often heard. Advertisements suggested that ill health was the common lot; and the sales depended on the creation of ill health. The outrageous cost could be forgiven, for it offered a chance for expiatory sacrifice; but the advertisements could not be forgiven, because they increased the storehouse of anxiety and unhappiness.

Mr. Arthur Mortimer, a director of the Beecham Group, opposing the motion, admitted that a few proprietary-medicine manufacturers work under reprehensible conditions; the reputable section of the trade would like to stop this. The difficulty in the control of advertisements was that the railways permitted advertisements which the newspapers refused. Any exaggeration was simply "puff" by manufacturers justly proud of their product. And was it right to stop all advertisement because a few exaggerated? So long as the proprietary-medicine trade was rendering service—and there was nothing wrong with most of it—it should be allowed to advertise. The industry would welcome legislation on the lines accepted by Canada if it was going to help.

Mr. J. S. Walmsley, secretary of the Proprietary Association, insisted that proprietary-medicine advertising was informative rather than persuasive. The value of advertising was in its results; no manufacturer could afford to advertise unless his product benefited the patient. The advertisement of proprietary medicines was more closely controlled than any other form of advertising; and the quality of advertising had improved enormously since 1939.

In other speeches it was suggested that the present conciliatory attitude of the trade is due to the manufacturers having seen the red light. A large majority supported the motion.

#### MEALS AND THE ELECTROCARDIOGRAM

SURPRISINGLY little is known about the effects of food on the electrocardiogram. Simonson and his colleagues<sup>1</sup> have now studied the findings in twelve healthy young adults before and after standard mixed meals and high-fat meals of 942-1548 calories. The significant changes in the limb leads were an increase of heart-rate; an increase of  $K_{QT}$  (i.e.,  $QT/\sqrt{R-R}$ ); a decrease of the T waves, the Q-T interval, and the duration of mechanical systole; and an increase of the amplitude of QRS. In the chest leads the T wave became more positive in  $CF_1$ , while in  $CF_2$  and  $CF_4$  it was decreased. Frequent but inconstant changes were noted in the P wave, while there was little change in the P-R and QRS intervals, the Q wave, or the S-T segment. These changes were noted half an hour after the meal and were still present an hour after the meal. The next question to be investigated is the effect of a meal on the abnormal electrocardiogram.

#### TWO STAGES?

TUESDAY'S *Times* contained a letter from Sir Henry Bashford, late medical adviser to the Treasury, suggesting that the Government should postpone provision of general-practitioner services under the new Act until the hospital services are working satisfactorily—in perhaps five years' time. "Meanwhile let general and panel practice go on as before." From such a source this proposal commands attention; but it would be idle to ignore the public dissatisfaction it would cause, and the difficulties it might create in administration of the new insurance scheme and in resettlement of ex-Service doctors.

1. The committee consists of: Dr. C. F. Hadfield (chairman), Prof. F. H. Bentley, F.R.C.S., Dr. C. Langton Hewer, Mr. R. Vaughan Hudson, F.R.C.S., Mr. Harold King, D.Sc., F.R.S., Prof. R. R. Macintosh, D.M., Mr. F. C. Macintosh, Ph.D., Dr. M. D. Nosworthy, and Dr. G. S. W. Organe (secretary).

1. Simonson, E., Alexander, H., Henschel, A., Keys, A. *Amer. Heart J.* 1946, 32, 202.

## Special Articles

### CONFERENCE ON MENTAL HEALTH

#### SOME PROBLEMS OF TODAY

At its first meeting, with Prof. J. M. MACKINTOSH in the chair, the conference, held in London on Nov. 14 and 15 by the Provisional National Council for Mental Health, discussed how to apply to the civilian population war-time experience of neurosis and backwardness in the Forces.

#### The Lessons of War

Dr. J. R. REES (medical director, Tavistock Clinic) said that the recent war gave us an opportunity of confirming much that was learned in its 1914-18 predecessor; but if little that is completely new has been learned of the nature and treatment of acute war neuroses, there have been considerable advances in prophylactic psychiatry, and in team-work among psychologists and sociologists. Large groups of men and women under discipline, sharing a common purpose and selected to some extent before admission to the Services, can of course be more easily managed than the free and more heterogeneous group in industry and the general community; but experiments done in the Army have some bearing on civil life, and methods can be adapted to meet civilian problems. In the first place, many men and women with long histories of minor neurotic difficulty gave first-rate service in the Army, and some were healthier and fitter than they had been as civilians. Those who had never been able to adapt in civil life were clearly unlikely to adapt easily to the challenges presented by the Army. It is no light matter to be uprooted from home, business, and friends, and all familiar grooves, and to be placed in an almost exclusively masculine environment, without privacy, and with what seems the complete loss of a carefully built-up individuality. Separation from home was by far the most potent single predisposing factor in psychiatric wastage; and, by study of the personality problems associated with it, it should be possible to lay down standards which would apply to such things as population-shift in civil life.

Some 15% of all passing through the General Service Selection (established in 1942) were referred by the interviewing officers to Army psychiatrists, either because of low intelligence or because they seemed unstable. Since the other Services had prior choice, the Army took a considerable part of the "psychopathic tenth" of the population. Many neurotic men, by selection, were kept out of combat, where they would have broken down and injured the morale of others, and were given work at the base, on the lines of communication, and in units which were not likely to see much fighting. Many who had come in before selection started and who did break down were admitted to hospital and helped up to a point—there was no time to achieve "cure." Those who could not be returned to their own units on discharge were fitted into jobs in line with their civilian interests and skills; and this plan, time-absorbing as it was, paid a handsome dividend. A high proportion of them gave good and willing service without any further breakdown. They were not cured, but they were able to be and feel useful, and to remain stable.

Effects of selection were specially remarkable, he said, among mental defectives. The dull man holds up training, and realising his inferiority he becomes anxious, breaks down, possibly malingers. What little malingering there was in the Army was largely among dullards, and some 70% of occupants of military prisons were men below the median on the intelligence scale. Eventually many of the most backward men were employed solely on manual labour, and worked contentedly. With good officers and N.C.O.s they became smart and reliable, with lower sickness- and crime-rates than good units of the field force.

Selection of officers proved most fruitful. Intelligence, character, and personality were assessed with increasing certainty, and psychological testing and interviewing found good men who would not otherwise have been accepted. If we can choose good officers he thinks it likely that good directors of industry, good schoolmasters, and good doctors can be chosen with even

greater success. Training, moreover, can be fitted to capacity. The Canadian Army successfully used three-speed training—for the below-average, the average, and the above-average groups. Finally, much was learned about group-structure and group-therapy which must have a civilian application.

Dr. G. R. HARGREAVES (chief medical officer, Unilever Ltd.) said that mental-health work is done best by a team; and the pattern of the Army team proved to be the same as that of the civilian child-guidance unit. The work was partly detective—a study of the neurosis when it had already been acquired; and partly preventive—an examination of the social setting of the illness. Dullness, he noted, is often a social rather than a clinical problem. The industrial revolution largely destroyed the village community with its mixture of classes: nowadays people live in concentration camps—in suburbs or in housing estates. The small mixed community has gone, and the only two groups to which most people belong are the family unit and the work unit. The only effective integrated group to which the working man belongs is to be found in his industry; and industry has the great opportunity of carrying over the lessons in mental health learned in the Forces.

Dr. F. J. S. ESHER (medical officer, Sheffield mental-welfare service) said that he had tried placing a group of dull people in appropriate jobs, and on interviewing some 30-40 later had found them happy and doing well. Some have married happily: many defective girls, he said, keep good homes and look after their children well.

Dr. REES, summing up this part of the discussion, remarked on the importance of collaboration between vocational-guidance centres and the people who knew what jobs are available.

#### EMPLOYMENT OF THE HANDICAPPED

Dr. T. F. MAIN (medical director, Cassel Hospital) recalled that low intelligence is not the only problem of the mentally handicapped: they must also face failure, perplexity, loneliness, and fear of competition in the industrial field. Reading and writing are difficult, which means failure to follow the news, confusion, and insecurity. Human relations are not easy, and the dullard may cling to his own poor kind and marry among them. Many find a pattern of life which suits them, doing humble blind-alley jobs; but they are often in money difficulties because even an intelligent person would find it hard to handle similar responsibilities on like wages. They need a counselling service to which they can turn for advice on housing, rents, clothing, food, maternity services, education, and health. Without it they are often timid, unhappy, inefficient, ailing, despairing, sullen, and delinquent, and sometimes criminal. If their handicap is severe they may be helped by colony life, or by the new opportunities under the Disabled Persons Act. But those with less obvious handicaps are not easily identified. They don't walk into outpatient departments complaining of limited capacities. However, difficulty in holding a job is common in their records; and free expert medical assessment and advice might be offered to any worker who has consistently shown slowness in learning or difficulty in holding jobs, even if the overt reason for unsettlement is ill health. Fear of stigmatising the mentally handicapped could be avoided if the same assessment were offered to workers in other difficulties—to those with poor vision, for example.

Many dullards are relieved to find someone who will discuss their handicap practically and without patronage; and if this can be coupled with practical measures to find them suitable work they are grateful. If the present chronic flirtation of the Ministry of Labour and the psychiatric services is to ripen into an organised engagement and a solid marriage, he said, these, their children, will enjoy being legitimised. They have a high potential value in industry because they can happily undertake work which would bore the intelligent—manual work of a simple repetitive kind in a stable industrial background is the kingdom of the dullard. They need help in the settling-in period, so that they get a sense of "belonging" to the job and their fellows.

The epileptic, the schizoid, the obsessional, the depressed, and the hysteric also need special help—a sheltered transitional period before they return to

independent effort, opportunities for settling domestic problems, for learning about social institutions, and for trying their hand at the kind of job they will eventually do. This technique has been used successfully in the resettlement of returned prisoners-of-war.

He described the case of a man on the disablement register whose difficulties had been recognised for 4½ years, during which the Ministry of Labour had found him 46 jobs. He had taken up a great deal of the time of the Ministry, the local workers of the Provisional National Council, the disablement rehabilitation officer, and his doctors, but none of these experts in treatment, reablement, and employment had ever met together on his case. Industrial case-conferences are needed, and the Ministry of Labour might offer examination, and get a recommendation for action, from a team including the D.R.O., a social worker, a general practitioner, and a psychiatrist. Recommendations for jobs should be matched to known opportunities, and associated with a system of settlement operating not only in reablement centres but in industry.

Mr. R. E. GOLL (Ministry of Labour) said that the mentally handicapped form 20% of all types of disablement needing help; this figure is probably too low, however, for people are not ready to come forward with this type of disability. The Ministry are trying to get better ascertainment with the help of social workers. He noted that, on the advice of doctors, reablement centres are not taking psychiatric patients unless their disorders are mild; but the Ministry hopes to take over some of the civil resettlement units from the Army, as well as some of their staff to develop them. Sheltered factories, under the Disabled Persons Corporation, will take the more severely disabled, a large proportion of whom, it is hoped, will be refitted for industry. One of the difficulties at the Ministry has been due to the interpretation by lay staff of written medical reports; it is now hoped to set up a medical interviewing service, and also a diagnostic centre where patients can be observed for a time and assessed.

In the subsequent discussion a social worker said that of 4000 mentally handicapped patients in Birmingham over 60% are employed, including many of low grade. There are plenty of routine jobs for them in the factories of the city, and an aftercare system has been active since 1901; but even so, much work is needed to get these good results. Subnormal people are easily put off, and every grievance has to be investigated at once.

#### Community Care

At the afternoon session Mr. P. BARTER (Board of Control) took the chair, and Prof. AUBREY LEWIS opened a discussion on community care in relation to the extended powers of health authorities under the National Health Service. He regretted that the authority responsible for community care will usually be different from that responsible for hospitals and clinics, but hoped that the same doctors, psychologists, and mental-health workers as are employed by the regional authorities may also be able in some cases to work for the local authority on a part-time basis, so ensuring continuity of personal care for the patient. He referred to Dr. C. P. Blacker's report, *Neurosis and the Mental Health Services*, as the vade-mecum of those who execute, and the bible of those who plan, the mental-health services. The National Health Service Act provides the means whereby his recommendations could be made actual, provided enough people of the right kind can be found to work in it. Children will demand much attention, but the elderly will soon make up the bulk of people needing psychiatric care, and their demands may drain time and effort which might otherwise be spent on younger people—a dangerous situation. Psychiatric outpatient departments must be more numerous, flexible, and generously staffed, and must concern themselves more with following up, and with the use of social resources. The psychiatrist, the general practitioner, the psychologist, the psychiatric social worker, the nurse, the health visitor, and the personal manager or welfare officer all have their place in the care of the mentally ill.

Professor Lewis believes that boarding out of patients might be used much more freely in the care of mentally ill patients: it is practised successfully in France,

Germany, Scandinavia, Switzerland, and the United States. He quoted the finding of Miss Crutcher that success depends on the amount of time given to the care of these patients by psychiatric social workers. In the long run it offers an economy in the cost of mental services, and—more important—means for many incurable patients an increase in happiness.

During the last twelve months some 5500 patients have been referred by civilian agencies to the aftercare service offered by the Provisional National Council—a striking illustration of the need for a national mental-health service. But there must be economical use of our present resources in trained people: the social workers of each region should be attached to the mental-health services of that region, and the activities of the Provisional National Council should be a part of the health service rather than a separate social service or a part of the social services provided by the local authority. Four factors set limits to what we may hope to achieve: (1) the number of trained people available; (2) the state of public opinion and knowledge about mental health; (3) the state of expert opinion and knowledge; and (4) the intimate dependence of mental health upon the social fabric. In view of the general shortage of manpower, Professor Lewis thinks economical use of the people already in the field, and better training of those now entering it, will provide the necessary staff better than competitive efforts to attract more young men and women into these careers.

Dr. W. S. MACLAY (Board of Control) suggested that the various authorities in a region should collaborate and use each other's officers. He hoped the officers who take over the duties of the relieving officers will make use of specialists in the home whenever their help is desirable. He mentioned that transfer to hospital can be frightening for the patient: care on the journey is not always satisfactory. The patient should be attended by trained nurses from the hospital to which he is going. In order to prevent confusion in the use of psychiatric social workers, he suggested that the patient should be under the care of the hospital social worker as long as he is attending outpatients, and should be transferred to the local-authority social worker only when he no longer needs the help of the hospital.

Dr. THOMAS BEATON (St. James Hospital, Portsmouth) said that in his city the mental-health service covers the whole field, and he was nervous lest the new Act should separate the community service from the hospital service. Dr. DORIS ODLUM thought the local authorities have a special opportunity in the field of prevention, and since early diagnosis means better results she would like local authorities to set up adequate outpatient clinics, staffed by psychiatrists and social workers. Mr. BAINBRIDGE thought ascertainment is better achieved through the local health authority than through hospitals. Dr. E. CUNNINGHAM DAX (Netherne Hospital) had some concrete plans for the elderly. He had analysed the histories of 250 patients over sixty, and had found that 80% either die or are discharged within six months of admission to hospital. He suggested that hospitals offering six months' care might be provided for patients over sixty; while something more like a home-from-home might be provided for the 20% who still need care at the end of that time.

#### THE MINISTER'S VIEW

Mr. ANEURIN BEVAN, Minister of Health, said that the duty of the Ministry has been to put at the disposal of mental-health workers the best possible administrative apparatus, and to leave them to use it. Some feared that the Minister would impose his "almost illimitable ignorance" on the technical workers in their special fields, but it was not his business to dictate how they should use their special knowledge—only to put the best kind of facilities at their disposal. The new scheme should extend, not reduce, voluntary activities. He reminded the meeting that ours will be the first nation to remove financial anxiety from between doctor and patient—and a financial anxiety neurosis is as bad as any other. The different organisations under the health scheme will be coördinated by the fact that the M.O.H., the general practitioner, and the specialist will all be common users of the same facilities: and access to those facilities cannot be denied to any citizen. A variety

of administrative agencies does not destroy the unity of the health service as a whole; the patient has only to show his need of assistance, and it is our privilege to give it to him. Mr. Bevan believed we must have psychiatric centres in our general hospitals, so that patients will seek help for mental illness as readily as they will for any other kind. Aftercare and continued assistance are also essential, so that people get the right things to do in the right sort of company. We have a social conscience nowadays, and we must create a social machine to serve it.

The second day's discussions were largely concerned with educational problems.

## ROYAL COLLEGE OF SURGEONS

### NATIONAL HEALTH SERVICE ACT

At the annual meeting of fellows and members held on Nov. 13, Sir ALFRED WEBB-JOHNSON, the president, gave a brief address on the National Health Service Act. With regard to hospitals, he said, considerable concessions had been made: the State had taken over the hospitals, and a monopoly in hospital services was thus created, but concessions had been made in the direction of more freedom of control to the management. The provisions with regard to the appropriation of trust funds had also been modified to a considerable extent, and the funds would, as far as possible, be used solely for the benefit of the hospitals. Concerning specialist practice and the restrictions put upon doctors who were not in the public service, the college had fought for the principles expressed at its meetings. A confused and rather ill-informed debate on the matter had taken place in the House of Lords, and he read a correspondence which, following the debate, he had had with the Lord Chancellor. The Lord Chancellor had accepted an amendment designed to allay anxiety lest those specialists who did not join the public service might be debarred from treating their patients in hospitals privately.

Mr. C. F. BEARE felt that there was still ambiguity in the amendment which the Lord Chancellor had accepted. He moved, and Mr. DICKSON WRIGHT seconded, the following resolution:

That this meeting of fellows and members of the Royal College of Surgeons urges the council to do its utmost to prevent the penalisation of private practice by the restriction of the medical staffs of hospitals to those who take part in the State Medical Service.

Dr. H. GUY DAIN said that, as far as he could see, if and when the State owned all the hospitals it would mean the end of private specialist practice. If they assented to the implementation of the Act in its present form they would immediately have to invite their private patients into newly established nursing-homes outside the Service, and even then the Act gave the Minister power to take over anything he liked, including, of course, such nursing-homes. Dr. Dain had feared for some time that consultants and specialists had not properly realised the implication of ownership of hospitals by the State.

The PRESIDENT said that the Lord Chancellor's assurance and the Minister's confirmation of it went some way to relieve anxiety. Members of the Negotiating Committee would, however, try to clear up the point that had been raised. They would continue to fight for the freedom of the profession.

The resolution was put to the meeting and 26 voted in its favour. Mr. LAWRENCE ABEL thereupon called attention to the fact that a quorum (30) was not secured and asked whether the President would consider calling a special meeting to discuss the matter. Mr. R. T. PAYNE supported this view and said that he was appalled at the attitude—or absence of attitude—of the hospitals.

The council has since decided that a special meeting of fellows shall be held on Nov. 29.

### Buckston Browne Dinner

At the Buckston Browne dinner of fellows and members held at the college on Nov. 14, Sir Alexander Fleming, F.R.C.S., F.R.S., received the college's honorary gold medal, which has been awarded only 20 times in 144 years. Introducing the medallist, Sir HENEAGE OGLVIE, senior vice-president, said that Fleming's discovery of penicillin when his culture was contaminated

by a mould was no more an accident than Newton's discovery of gravity when the apple dropped in his orchard.

The PRESIDENT, welcoming The Guests, described Mr. Bevan, who had lately paid a four hours' visit to the college, as a colleague with whom "we've got to get together and talk over these extraordinary activities of Parliament and see whether we can't make sense of them." The appeal for £250,000 for restoration and development of the college had so far, he said, produced £143,000, and wonderful opportunities lay ahead: in September the number of attendances at lectures already totalled over 9000. He was now able to announce the endowment by a New Zealand industrialist of a Commonwealth professorship of some £2000 a year enabling clinicians in the Dominions to come in contact with their colleagues in this country (see *Lancet*, Nov. 16, p. 737). This gift had been made to the College of Surgeons, but the donor wanted representatives of other bodies to help in appointing the fellows, who would generally be physicians, surgeons, or scientific workers resident in Great Britain, Australia, or New Zealand. The King had expressed his interest in the scheme, and the Prime Minister had described it as a munificent and far-sighted gesture showing "real appreciation of the needs of medicine, science, and the British Commonwealth."

Viscount ADDISON, F.R.C.S., Secretary of State for the Dominions, spoke of the need for exchange of high-ranking teachers between the Dominions and this country, and of the development of postgraduate study in London, which, he believed, had a finer set of teachers than any other city in the world.

Mr. ANEURIN BEVAN, Minister of Health, thought the New Zealand gift even more wonderful in its symbolism than in its content. In his visit to the college he had seen young men from very many countries "who had come to sit at the feet of our own teachers in London," and he felt that there was here an opportunity for something quite unique. The Government were exceedingly eager that postgraduate medical education should be developed, and would give every assistance in their power. In his period as Minister of Health "which is bound to be long and successful" he looked forward to a fertile association with the college.

Mr. W. J. JORDAN, High Commissioner for New Zealand, expressed his conception of Great Britain as "the centre of things," and Mr. J. A. BEASLEY, High Commissioner of Australia, touched on the various levels—sporting, political, scientific, medical—at which the people of the Commonwealth could learn to feel themselves part and parcel of one another, "tied together by something greater than can be written."

Mr. THEODORE GODDARD, as legal agent for the endowment of the new professorship, said that the donor's one object was closer contact within the Empire.

## YES OR NO ?

### SOME PRESS REACTIONS

THE British Medical Association last week invited all registered medical practitioners to answer the question: "Do you desire the Negotiating Committee to enter into discussions with the Minister on the regulations authorised by the National Health Service Act?" The following are extracts from comments since published in the press:

#### *British Medical Journal*

What will be the position if the Negotiating Committee is instructed not to enter into discussions with the Minister on the Regulations and Orders of the National Health Service Act? The Minister, it is true, could proceed to make these Regulations and Orders with, presumably, the advice and assistance of the minority in favour of discussions. There can be no doubt, for example, that in this he would have the support of the Socialist Medical Association. He would, however, not have the indispensable support of the constituent bodies of the Negotiating Committee. The answer "No," backed by a substantial majority, would make the Act inoperable, and further legislation would be necessary to secure those principles the medical profession considers to be fundamental to its professional existence. But for the Negotiating Committee to be strongly armed in any conflict that might arise as a result of a negative answer the majority would

have to be substantial and firm in its purpose. It is, of course, obvious that if the medical profession was so set against the Act that it felt unable to work under it such a decision would in no sense be illegal or in the nature of a strike. Doctors do not strike. They will always continue to serve the sick public. An Act is not necessary to make them do this. It would simply mean that they would not serve the sick public within the framework desired by the Government of this country. The Minister fully recognises the right of the individual medical man not to enter the Service, so a decision not to enter into it would be strictly legal and honourable.

DR. GUY DAIN (*chairman of council, B.M.A.*)

We have just learned that a strong and concerted action will force the Minister to do something which he was entirely unwilling to do. The threat—it was no more than the whisper of a threat—that insurance practitioners would resign if he would not agree to implement the Spens Report brought him to heel at once. Here we have an opportunity of saying that we will not take any part in a service that does not concede our principles. Why should we not get our principles accepted as well as the conditions of service? The conditions will have to be argued afterwards anyhow. Why not insist on our principles being established, by an amending Act or whatever it may be, before we agree for a moment to talk on terms and conditions? We should be no worse off; indeed we should be infinitely stronger in talking about terms and conditions if we had first by our own efforts secured the acceptance of our principles. . . .

We want to put into the Act the right of every doctor to come in, and the right of appeal to the courts from the Minister's decision to take us out of the service; we want removed from the Act the State ownership of hospitals, the embargo on the buying and selling of practices, all direction of general practitioners, and the salary element in general practitioners' remuneration; we want altered the procedure of election on to the councils and committees so that we may nominate our own representatives instead of the Minister choosing them all, and in that way we may curb dictatorship in the service. (*Brit. med. J.* Nov. 16, p. 747.)

MR. HENRY SOUTAR (*late president, B.M.A.*)

To me it is intensely disappointing that the association should now refuse to assist in the completion of a project to which they themselves gave birth, the great conception of a universal medical service for the whole nation, and it is of grave import that they should resist the implementation of what is now the law of the country. If they persist in their refusal it only means that they will have no share in the control of a great enterprise, for I am certain that the medical profession will never refuse to serve the nation. The points at issue are of secondary importance, upon many of them there is no general agreement, and they furnish no possible justification for the statement that the liberty of medicine is at stake. I trust that doctors throughout the country will refuse to be led into an untenable situation which could only bring discredit upon us all. (*Times*, Nov. 19.)

#### Medical Press

What would be the effect of the decision "no"? This, of course, is primarily a matter for a Constitutional lawyer, and it is a field into which we would not presume to enter. But in the mind of the ordinary man or woman it would surely be tantamount to a decision not to cooperate with the Minister in the working of the new Bill, which again would be tantamount to a refusal to accept the decision of Parliament. In our view, for what it is worth, to vote against negotiations would be a very perilous course for the profession to take. . . .

Technically, perhaps, as the *British Medical Journal* emphasised in its Editorial of November 16, it would not be a strike. "Doctors do not strike. They will always continue to serve the sick public. An Act is not necessary to make them do this. It would simply mean that they would not serve the sick public within the framework desired by the Government of this country."

But if not, as we have said, technically a strike, such action would so very closely approximate to a strike that it might be hard to detect the difference, and we would certainly not expect the general public to make such a delicate differential diagnosis. It would almost certainly be construed as a defiance of Parliament, and it might well initiate a struggle in which no support from any responsible political quarter could be expected. (Nov. 20.)

#### The Times

With the ballot form sent to each doctor are enclosed the comments on the Act of the joint committee of the medical organizations which has been negotiating with the Government. This disappointing and somewhat partial document has nothing to say in praise of an epoch-making measure beyond a grudging acknowledgment that "the constructive proposals of the profession are reflected in certain sections of the Act." It contains no appreciation of the very substantial concessions to the interests of doctors which Mr. BEVAN either took over from Mr. WILLINK or later introduced or of the difficulties of carrying compromise any farther. The Act is assailed for its wide divergence from the "principles" laid down by the negotiating committee, without any awareness that this set of apophorisms and demands is in part rejected by a great many who are not Socialists and have no desire to "nationalize" medicine. . . .

The Act is not perfect, but its main principles have the approval of the public, whose interest in the medical services is greater even than that of the doctors. It offers unprecedented opportunities for doctors, indeed for all health workers, to participate directly in the planning and management of their own service. A refusal to use those opportunities would exasperate public opinion, arouse the anger of those supporters of the Government in Parliament who are by no means happy about some of Mr. BEVAN's concessions to professional interest, and might force the Government and local authorities to make the attempt of introducing a salaried service at least in some areas. The conflict in which the B.M.A. engaged the Government in 1911 and 1912 stirred up much ill-feeling against the doctors, even though the B.M.A. then fought with greater justification and on stronger ground. Dr. DAIN remarked at Exeter the other day that "those of us who have been in national health insurance practice have been quite unconscious of any restriction on our freedom." This was not the language of 1912, when the health insurance scheme was about to be launched and the medical profession stood, as now, on the threshold of great changes. Is it not conceivable that in the future the leaders of the medical profession will be speaking of the Act of 1946 as Dr. DAIN now speaks of the Act of 1911? (Nov. 15.)

#### Evening Standard

Certainly the National Health Service Act is open to question in individual details. Certainly there are dangers to be sedulously guarded against, of clogging medicine with the bureaucratic apparatus of departmental control. Yet the broad principles on which the Service is to be based command general assent and are for the general welfare. Moreover, the measure has now become law, enacted by the elected legislature of the British people. The supremacy of Parliament is not open to the challenge of the doctors. . . . Effective government in a democratic country must be entirely dependent on the loyalty with which the minority carry out the decisions of the majority. The B.M.A.'s leaders have had ample opportunity to state their case. . . . Now they should have the honesty to acknowledge that the fight is over. By persisting in stubborn faction they will forfeit the sympathy and respect of the people. (Nov. 16.)

#### INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED NOV. 9

*Notifications.*—Smallpox, 0; scarlet fever, 1323; whooping-cough, 1590; diphtheria, 314; paratyphoid, 30; typhoid, 5; measles (excluding rubella), 3987; pneumonia (primary or influenza), 601; cerebrospinal fever, 46; poliomyelitis, 21; polioccephalitis, 1; encephalitis lethargica, 2; dysentery, 65; puerperal pyrexia, 125; ophthalmia neonatorum, 57. No case of cholera, plague, or typhus was notified during the week.

*Deaths.*—In 126 great towns there were no deaths from measles, 1 (0) from an enteric fever, 2 (0) from scarlet fever, 8 (0) from whooping-cough, 2 (0) from diphtheria, 57 (5) from diarrhoea and enteritis under two years, and 16 (2) from influenza. The figures in parentheses are those for London itself.

Grimsby reported the fatal case of an enteric fever. There were 9 deaths from diarrhoea and enteritis at Liverpool.

The number of stillbirths notified during the week was 262 (corresponding to a rate of 26 per thousand total births), including 26 in London.



## In England Now

### *A Running Commentary by Peripatetic Correspondents*

QUITE a short residence in South Africa immunises one against surprise at anything the medical profession may say or do. Consequently the announcement of the South African Medical Council, as reported in the morning paper today, that articles in the medical press must be unsigned hardly interfered at all with the downward progress of one's breakfast egg. One merely wondered whether it was going far enough—the S.A.M.C., I mean, not the egg. Should we not walk around masked, the better to preserve our anonymity? No, perhaps not, for I have never noticed any eclipse of a surgeon's personality by his cap and mask—rather the contrary.

With my experience of unit censorship I'm just the man for the job of rendering anonymous the textbooks in the library. And what fun I should have with that book on surgery by X and Y. Mr. Y, who called me rude names in my Conjoint surgery—and I failed—will be radically excited with the scissors. Mr. X, whom I met later in the M.B. viva, was charming throughout and gave me a pass mark. His name shall receive merely a token stroke with the blue pencil.

Last night the medical superintendent of one of the Chinese hospitals came to my rooms and said: "This is the day the managers hold their quarterly meeting. There's a feast for the staff afterwards. Why not come along?" I gladly went. "Don't," he advised, as we neared the place, "eat much of the first few courses. If you do, you'll never get through the meal. Well, here we are. This is the nurses' dining-room."

Some fifty girls and a dozen men rose to their feet at our entrance and looked towards me in respectful silence. I began to feel a little like a god. My host introduced me in Chinese. I don't know what he said, but everyone suddenly burst out laughing and bowed me in with enormous grins. I stopped feeling like a god and sat down on a couch next to a rather pretty nurse. I opened my mouth to frame a halting Cantonese "Hallo," but a waitress smartly plugged the gap with a cigarette. Another lit it, a third handed me a glass, a fourth half filled it with whisky, and a fifth added a grudging hint of water. "There!" said the rather pretty nurse. "Now you're all right." Thenceforth we discussed each other happily in English.

Ninety minutes later I stood up just the least bit deliberately in response to a general move towards the food. By this time the rather pretty nurse had become quite beautiful; so had the other forty-nine; and the men appeared as bold Apollos set in a field of lovely Daphnes. The meal was served at small round tables, and the Daphnes, as Daphnes always will, tended to bunch into strong, protective groups. Five minutes' good clean fun was had by all while the bold Apollos sorted the Daphnes out. I kept close tag on the rather pretty nurse, for she, dear girl, had promised to help me wield the chopsticks. How would the matron of my own grave hospital have borne the sight of her carefully cultured chicks dodging in squeaking ecstasy round the furniture, hotly pursued by the board of management?

And goodness, how those girls did eat! Shrimps and oysters, bamboo shoots and pineapples, all mixed up into one glorious dish; fried rice and nuts and mushrooms; shark's fin soup; boiled chicken; plovers' eggs; roast duck (the duck was cooked to a limp rag—we only used the gravy); boiled frogs (tasting like rabbit); fried fish; fat pork (soft as a jelly-fish); fried prawns; *pêche Melba*; and green tea. As each enormous dish was placed on the table out shot a baby forest of chopsticks, and in a matter of seconds the platter was empty, every scrap transferred to the bowls from which we ate each course in turn. I had the special protection of a waitress who did the preliminary forage work for me. Had my Daphne done this she would never have salvaged a morsel for herself. Not till the centre dish was empty could she afford to rest and guide my awkward sticks.

Meanwhile the managers were hard at work. After the first keen appetite was dulled they started on the healths. These were intensely personal affairs. A man would charge his glass, pin-point his victim, run up to him, and loudly shout the toast. Then it was "bottoms

up" without the option. I, as the only stranger there, came in for more than my fair share of bottoms up. I strove to uphold British honour and prestige by keeping a glass of water tinged with soya sauce at hand, ready for instant draining.

At length the feast, starting in busy silence, rising to noisy merriment, sank to a stage of sleepy satisfaction. Two or three managers arose and bade farewell. They had a business dinner to attend elsewhere. One of the housemen went to the piano. "Now," thought I, "some Chinese music; just to round things off." First he played "Onward Christian Soldiers," then "Abide with Me." All sang. A few more hymns, until, in deference to popular demand, this Oriental evening closed to the strange sound of over fifty Eastern voices chanting with sentimental joy: "My Little Grey Home in the West."

The Hetherington report on domestics, the Rushcliffe report on nurses and midwives, the Spens report on medical practitioners, the Askwith report on public-health medical officers, and the National Joint Council agreements on various staffs are playing pranks in local-government circles. Maids often get more than assistant nurses; the intake of student nurses is falling because girls can make more, and think they have a better time, working in shop or office where their leisure is not tampered with; and various medical auxiliaries regard each other with some asperity because there is a £10 difference between their basic salaries.

The poor old Askwith horse, however, has already more jockeys than it was ever meant to carry. Designed for medical officers in the health service, the scales are already being adopted by other local-authority officers as levers to salary promotion. Why, it is argued, should the medical officer of health have more than the gas engineer or the treasurer—so up goes the salary of these officials. Why, says the town clerk, should the deputy town clerk have less than an assistant medical officer of health—so up goes the deputy town clerk's salary. It all seems very illogical, but there it is.

So now, in these days of the closed shop, and feeling somewhat insecure as a medical officer of health, I am thinking of joining the County Clerks' Trade Union, or, better still, that of the Chief Electrical Engineers, just to see if I too can bestride an alien nag and ride home to win £300 a year.

It is one A.M. again, and I am facing what always seems to me one of the worst half-hours in the G.P.s life. Twenty minutes ago, bathed, relaxed, and rejoicing in my newly donned winter woollies, I was at peace. Nineteen minutes ago I was listening to an anxious voice saying, "The wife's hot and cold all over, doctor. Can you come at once? I think it is serious." Long experience has taught me that when such a summons comes to obey is the lesser of two evils. If I don't go I spend the rest of the night either reproaching myself for my unkindness or visualising the patient dying of some obscure complaint which I alone could cure. If I go my conscience lets me alone. But having gone, why is it so difficult to make an unbiased diagnosis at midnight? The patient is dyspnoeic. She says she is in agony and can't speak. The pulse is rapid but of good volume. It looks like the old story of "wind with wind up," but I can't be sure. However, I prescribe bicarbonate, sugar, and water and retire downstairs to drink a cup of tea with the husband, who miraculously seems to have forgotten his worries and starts to tell me about his new job on the railway. To a layman and to a better doctor the thing would be finished and forgotten. But it is not like that with me. Back in bed the darkened room seems to clear the mind and call up forgotten diagnoses. I recall a case where, having reassured the relations and told them there was no cause for worry, I was accosted next morning by those selfsame relations. "Can we have the certificate, doctor? We want to get the funeral over before the weekend." In my mind's eye I see our coroner no longer his usual kindly self but full of scathing comments on the folly of spot diagnoses at midnight.

But time marches on. It is now one thirty and the husband has not phoned again. My medicine must have worked. The patient is asleep and will not die tonight and perhaps now the half-hour is over I too may be permitted a little rest.

## Letters to the Editor

### THE TEACHER'S INCOME

SIR,—Lord Beveridge has put on record<sup>1</sup> his opinion that the medical profession should be paid more than the university teaching profession because the medical profession has to work harder at less regular hours and must deal with a proportion of unattractive patients.

Both of us who sign this letter have had experience of the university teaching profession and we feel that Lord Beveridge's statement calls for some discussion. How much more would Lord Beveridge pay the medical profession than the university teaching profession? A reasonable case can indeed be presented in favour of compensating for disturbed nights and disagreeable patients—although, among medical university teachers, pathologists and bacteriologists might claim that their work was often physically disagreeable and sometimes dangerous. But, on the whole, university medical teachers would not seriously object if their clinical colleagues were paid something extra for disturbed nights.

But in calculating the difference, account must be taken of demands on the "leisure" hours of university teachers that are made by carefully studied, often complicated, experiments and extensive scientific reading—both essential activities for a teacher who means to serve his students faithfully and make any progress in his profession. What must be avoided is perpetuation of the economic gulf which now divides university teachers from their clinical colleagues—with whom, in our teaching hospitals, they work daily on equal terms, sharing responsibility and contributing at least as much to the care of the sick.

In the past, university teachers have philosophically accepted that professors alone could hope to reach an income which was only slightly less than that of a moderately successful general practitioner and perhaps about one-fifth of that earned by a successful consultant in the same hospital. This unfair distinction was the outcome of blind economic force, and it was not their habit to be distracted by the chaotic values of the market-place.

But we stand now in face of a planned medical service, and the university teachers may feel less philosophic if Lord Beveridge and the planners decide to perpetuate the financial penalty upon academic workers. The market-place may please itself, but it will not do for the State to set a comparatively low value on the services of those who are to train its doctors, serve its great hospitals, and lead its medical thinking and research. Lord Beveridge may be right in asking for some difference in favour of clinicians, but the difference must not be of the order that now divides lecturers and professors from practitioners and consultants, or it will have a serious bearing on the quality of graduate who may be attracted to teaching and research when practice (in and out of hospital) becomes decommercialised and therefore more likely to attract men of academic outlook.

Aberdeen.

JAMES W. HOWIE.

Leeds.

GEORGIANA M. BONSER.

### CORONARY DISEASE

SIR,—In your number of Nov. 9 Professor Ryle suggests that the incidence of coronary disease is some 3 $\frac{1}{2}$  times greater amongst professional men than amongst so-called working-class men. Observations made in the Post Office a few years ago are fully in accordance with this. But when, in discussing its aetiology, he states that "the amount of mental work and emotional stimulation now possible in the course of a single day is something far in excess of anything experienced by our ancestors," and that this may be an aetiological explanation, I would venture to express a doubt.

Here he appears to associate himself, in respect of coronary disease, with many others who assert that there is an increase in neurosis and nervous instability and that this is due to the increased "pace and pressure" of modern existence. But in respect of both these assertions it is surely not possible to make any accurate com-

parisons. The data do not exist. Yet, as regards the alleged increase of nervous disorders, any even casual reading of seventeenth- and eighteenth-century novels, diaries, and correspondence suggests that vapours, swoonings, and a liability to dissolve into tears were as common then amongst young women and men—and indeed very possibly commoner. And amongst rural and other populations that did not keep diaries or write letters or get written about, was there not—on existing evidence—at least as much anxiety and obsessional and other neurosis, due to beliefs in witchcraft, the evil eye, and a flaming hell after death—to say nothing of the fear of physical violence, hunger, and a savage penal code?

Did not the Elizabethan day, whether in court or country, navy or counting-house, contain at least as many stimuli to mental activity and emotion as today? Is life in London now, for all its "pace and pressure," fuller of malign influences upon body and mind than the London of Hogarth's Gin Lane or the London of Pepys? If motor-buses travel at 30 miles an hour in our suburban lanes, it is at least through lanes that are free from highwaymen. If the wireless fills the country cottage all the evening, it is at least to that extent ousting ignorant gossip or the solitary brooding begotten of local superstition. And has this alleged increase in "pace and pressure" of modern life imposed upon the human nervous system anything comparable with the burden that anaesthesia, for example, has lifted?

London.

H. H. BASHFORD.

### NURSING

SIR,—Discussion of the nursing problem is apt to obscure the fact that at least three aspects require consideration: (1) the needs of the patient; (2) national allocation of man-power; (3) the nature of the work to be done by nurses and their suitability and training to do it.

In my judgment, (1) should be thrashed out in each of the regions of the National Health Service, by mixed committees representing everyone concerned—patients and the health team (i.e., doctors, nurses, domestic workers, dietitians, almoners, physiotherapists, occupational therapists, technicians). A directive and terms of reference might profitably come from the Ministry of Health to keep discussion within bounds. There might result surprising repercussions on staffing. The second aspect would require man-power budgets from each profession and trade making demands on the national man-power pool. Claims would have to be reconciled and dovetailed by the Ministry of Labour and National Service and should lead in every field to much-needed research on optimum use of man-power, methods of education, and adjuvants to labour. The third aspect will obviously be modified by the results of (1) and (2) but it seems certain that most recruits to the "nursing services," as defined, will eventually consist of carefully selected women (and some men) of the right temperament and of moderate educational attainments, with a percentage of able women, and perhaps men, who must become highly qualified to teach, organise, and direct the service as a whole.

For many years hospitals have aimed at recruiting near-matriculated and matriculated girls as probationers. A high proportion of these entrants leave the nursing services, and the best of those who remain feel frustrated because their status is permanently inferior to the other matriculated students who become doctors, teachers, almoners, secretaries, &c. The reason is partly that their training and preparation actually are inferior in content, as you point out, to other professional disciplines, and partly that the medical profession, except a minority, have never been prepared to accept nurses as colleagues.

The stimulus to these remarks is the suggestion in your issue of Oct. 26 of a "medical dean of nursing" who should "feel himself or herself to be as much responsible for the proper training of the nurses as the dean of the medical school is for his students."

It has been my good fortune lately to meet several deans of nursing schools—all nurses—in the flesh. I have also had much information from Mrs. B. A. Bennett, chief nursing officer of the Ministry of Labour and National Service, recently back from an extensive tour in the United States of America and Canada.

At Vanderbilt, Yale, Toronto, and several other university centres there are deans of nursing schools who are professors

1. *Hansard*, Oct. 9, par. 94; see *Lancet*, Oct. 26, p. 596.

of nursing and hold precisely the same academic rank as their fellow deans in other faculties. At Vanderbilt the school of nursing is one of the seven independent schools of the university with its dean at its head. It has its own financial resources and makes its own annual budget. Since 1935 all costs and responsibilities relating to nursing education and nursing service have been separate. A director of nursing services (a nurse) is in charge of the hospital nursing service, and each ward unit has a head nurse in charge. The superintendent of the hospital (a medical man) is responsible to the dean of the medical faculty, and the director of nursing services is responsible to him.

The school of nursing employs a full-time staff of clinical instructors (nurses), who are members of the faculty, not of the hospital staff, and also utilises the services of the professors and lecturers of the faculties of medicine and science (for which it pays). The dean estimates the exact number of hours of clinical experience in all nursing and public-health fields that she requires for her students and requisitions these from the services concerned. The director of nursing services, on her side, knows how much clinical assistance she can expect from the students, and plans staffing accordingly.

The hospital provides maintenance (room, board, and laundry) for the students at a hall of residence in return for their clinical work in the wards, and to cover the "freshman" period of ten months while students do not enter the wards the school pays the hospital a "blanket" sum for freshmen's maintenance. Students of nursing mix with students in other faculties (*Amer. J. Nursing*, 1946, 46, 550).

Mrs. Bennett came back greatly impressed by and envious of what she had seen but convinced that Britain must work out its nursing problems on its own lines. Neither do I suggest that we want uncritically to import American and Canadian methods. But we do contend that unless and until the "profession" of nursing to which so many people pay lip service has its own faculty with an intellectual discipline as satisfying and as exacting as [that of other faculties it is not in truth a profession.

Moreover, I believe that if a university school of nursing could be started on experimental lines it would immediately attract students of the quality required, who would have the courage and the imagination and initiative to realise that their concern would be to break away from tradition if necessary, and not to rest until the needs of all patients—acute and chronic, the young and the old—for nursing service and for health education were fully met. Believing this I cannot think that a "medical dean of nursing" would be an advantage to us. To quote Emily Davies in the pioneering days of the women's colleges: "We are really obliged to Convocation for their kind intentions in offering us a serpent when we asked for a fish, though we cannot pretend to believe that serpents are better for us."

London, W.2.

G. B. CARTER.

### MALIGNANT GRANULOMA OF NOSE

SIR.—Mr. Hargrove and his colleagues (Oct. 26, p. 596) state that the cause of this condition is unknown. I think it may be linked up with cutaneous gangrene.<sup>1</sup> There has also been an interesting paper on bony changes associated with tropical ulcer.<sup>2</sup>

It is significant, I think, that Mr. Hargrove's case responded to penicillin, since this has been found effective by others.<sup>3,4</sup> Even more significant is the account from the Mayo Clinic of spreading osteomyelitis of the cranial bone.<sup>5</sup> The work was based on the report by Williams and Heilman<sup>6</sup> that a micro-aerophilic short-chained streptococcus is responsible for the malignant type of osteomyelitis; the Mayo Clinic workers found this organism sensitive to penicillin. Meloney recommended a special active preparation of zinc peroxide, while I have found powdered potassium permanganate effective.<sup>1</sup>

St. Margaret's Hospital, Epping, Essex. FRANK MARSH.

1. Marsh, F. *Lancet*, 1945, i, 739.
2. Brocklebank, J. A. *Brit. J. Radiol.* 1943, 16, 221.
3. Leacock, A. *Brit. med. J.* 1945, ii, 765.
4. Grimshaw, C., Stent, L. *Lancet*, 1945, i, 434.
5. *Proc. Mayo Clin.* 1944, 19, 480.
6. Williams, H. L., Heilman, F. R. *Arch. Otolaryng., Chicago*, 1937, 25, 196.

### TUBERCLE BACILLI IN CEREBROSPINAL FLUID

SIR.—In your report (Oct. 12, p. 528) of the September meeting of the Tuberculosis Association, Dr. Honor Smith is reported as saying, "unfortunately, tubercle bacilli could seldom be found in the cerebrospinal fluid" (in cases of tuberculous meningitis). I must dissent from this view. Examining fluids in our own laboratory, we have not failed, for several years past, to demonstrate the tubercle bacillus in every case of tuberculous meningitis coming under our care. Nearly always the first (and only) specimen drawn by lumbar puncture yields the organism; rarely, examination of a subsequent specimen is required. I would indeed go so far as to say that the bacillus may *almost invariably* be found before death in the cerebrospinal fluid from a case of tuberculous meningitis, provided only that the searcher is both adept and persevering. NIGEL W. ROBERTS.

Hull City Isolation Hospital, Cottingham.

### EXCISION OF THE HEAD OF THE PANCREAS

SIR.—In your admirable editorial on excision of the head of the pancreas (*Lancet*, Sept. 14, p. 386) the present position is concisely set out.

Whipple has clearly shown the advantages of the one-stage operation and has enumerated the objections to using the gall-bladder for the relief of biliary obstruction. The main steps in the operation, as outlined in recent excellent papers by Whipple and Pannett, are: (1) relief of biliary obstruction; (2) diversion of gastric emptying from the duodenum to the jejunum; and (3) division and removal of duodenum and head of pancreas, with anastomosis of residual pancreas to jejunum. These steps should be taken in this order. In discussing the first step you refer to the use of the gall-bladder for this purpose as "an unavoidable expedient in the two-stage operation." May I be permitted to disagree, and to suggest that it is possible to join the common bile-duct to the jejunum without increasing the difficulty of the subsequent steps? Moreover, while it would appear foolish always to adhere rigidly to a one-stage operation, yet the patient might well be able to stand more than mere relief of the obstructive jaundice at the first stage. The deciding factor must always be the patient's general condition and how well he will stand up to the anaesthetic and operation. This cannot be accurately forecast in every case, so one should be guided in deciding how much to do by the progress of the operation. It may often be possible to carry out the first two steps (described above) at the first operation, thus helping to equalise the two stages.

If a long jejunal loop is turned up through the transverse mesocolon, the divided common bile-duct can first of all be anastomosed to it. The distal end of the bile-duct, divided low down behind the duodenum, is securely closed with interrupted silk sutures. Then, if the patient is faring well, the stomach is divided through the pyloric antrum, the distal end closed with silk sutures, and the proximal end united to the jejunal loop well beyond the biliary anastomosis. If the patient is still doing well, the third and biggest step may be attempted. This needs careful consideration and fine judgment since, once begun, it must be completed.

These remarks are based on recent experience in operating on a man, aged 70, with very severe obstructive jaundice due to carcinoma of the head of the pancreas proper. After careful preoperative investigation and preparation, his abdomen was explored with the intention of performing as much as possible at the first stage, should two stages be necessary. The procedure described above was followed, but it was thought wise to stop at the end of the second step. This left room for anastomosis of the residual pancreas to the jejunal loop between the biliary and gastric junctions at the next stage. Unfortunately there was a delay of over two months before this next stage could be attempted, owing to threatened strangulation of a large right inguinal hernia, and an operation for a strangulated left femoral hernia, followed by uræmia due to retention of urine. Despite this delay, no undue difficulty arose from the steps of the first operation; but considerable difficulty was caused by adhesions, fat, and friable veins, especially

in isolating the mesenteric and splenic vessels. In spite of this the operation was completed satisfactorily, though, unfortunately the patient died on the second day from heart-failure.

ALAN SHORTER.

Mount Vernon Hospital, Northwood, Middlesex.

### THE PLEBISCITE

SIR,—Now that the National Health Service Bill has become an Act, it is only at grave risk to their whole future that members of the medical profession can postpone any longer becoming acquainted with the essential features of the measure and making up their minds with a view to appropriate action. This might not have been an easy matter in any circumstances, but it has been made unnecessarily difficult by the confusion of the issue due to the early agreement of the leading political parties and the (probably now repentant) executive of the B.M.A., without a mandate from the representative body, to adopt the principle of a "comprehensive" and centrally controlled service for the nation. By this arrangement before the "fight" began, all they wanted was handed on a plate to the plotters, and all that followed was merely a wordy conflict waged over the whole field of relatively unimportant details. The final act of folly would be to negotiate a settlement on the basis of regulations which the Minister of Health and his successors could alter at will to suit their convenience or at the behest of party bosses behind the scenes.

Above the din of propaganda it is difficult to hear the still small voice of truth; but one thing which must not be missed is the fact that what Parliament has passed is practically an enabling Act giving the Minister of Health dictator powers over those who join the new service. An examination of the Act will reveal that it is an instrument admirably designed for the enforcement of a hidden policy. In this connexion it should be observed that it is a centrally controlled organisation with comprehensive powers over great masses of persons and is therefore potentially an instrument of aggression, a secret weapon, a mechanism of dictatorship, capable of being used for the regimentation of the medical profession and of the public whom it serves, prepared in advance against the day when a minority political group, having seized power, is in need of a means to impose its policy upon the people of this country.

In face of all this, what should our policy be—appeasement? No. "He is a foolish man who thinks he can appease a wolf."

The plebiscite—this is not the crucial decision; this is OPPORTUNITY writ large. To answer "No" can do no individual doctor any harm, now or in the future. On the contrary, it may save him from the crucial dilemma, at a later stage, of having to choose between enslavement and the risk of starvation for himself and his dependants. It may save the profession and the nation from a great deal more besides.

Bexley, Kent.

E. U. MACWILLIAM.

SIR,—May I, through your columns, appeal on the widest grounds to all members of our profession to answer "Yes" to the "plebiscite" sent us by the secretary of the British Medical Association? The Bill has become the Act. The nation has decided that it will have a National Health Service, and in this Act has laid down the general principles under which this should be organised. It is now the time for the details to be filled in by cross-table discussions between representatives of those who serve and of those whom we are to serve. This is not a time in which to hesitate in the service of the State, or for those who have been appointed representatives of all the leading medical bodies in the country to leave, with their work half done, the plough to which they have been called to put their hands. Let us by our votes tell them we think that they should go on.

London, S.E.1.

T. B. LAYTON.

SIR,—I am enough of a Socialist to believe that all diagnosis and treatment should be available to everyone. Thus far I am sure that most of the profession agree whole-heartedly with Mr. Bevan. But before giving our co-operation in running a new health service we must be sure how large a proportion of those involved, the public and the doctors, will suffer, and what are the compensating gains.

It is clear that better financial backing is needed for the hospitals, and this can surely best be provided by the State. A measure of control of spending is clearly necessary; I am not qualified to discuss the proposed method of exercising this control. With regard to the general practitioners, it appears to me that the chief reason for the undoubtedly better treatment of the more wealthy patient is that his doctor can afford to spend more time with him. The rich man's doctor has fewer patients and they pay more. The doctor in a working-man's practice must have more patients since he is paid less for each. Improvement can only be obtained by restricting the working-man's doctor to fewer patients (and clearly more doctors will therefore be required) and by paying him more. Mr. Bevan is already pressing the medical schools to take more medical students. He has, however, refused to make the increases in payment to the panel doctor suggested by the Spens Committee. The alternatives to which the panel practitioner will eventually be driven, then, if a capitation basis for payment survives, are either to give up some of his patients and reduce his standard of living (this is what trade-unions call "dilution") or to attempt to continue his unsatisfactory existence as at present, not having the time to do his work as he would wish. His decision will be helped perhaps by the "indirect direction" of other doctors into his practice; the unemployed doctor, perhaps newly qualified, will probably have the alternatives of accepting this direction or unemployment. Mr. Bevan's assurance that his power would be used with benevolence does not carry as much weight as it might have done had he accepted the Spens Committee's recommendations. It would appear that "dilution" with a reduced standard of living is the proposed order of the day for panel doctors.

Incidentally, Mr. Bevan proposes that he (and his successors in office) should in future take over the G.M.C.'s disciplinary powers, and he considers that a right of appeal to the law-courts would be unnecessary. The Minister can do no wrong. The inclusion of such a clause in the Act is in my opinion sufficient for its rejection by the profession out of hand—but then I am perhaps still obsessed by the abstracts of freedom and justice for which we fought.

The only course open to us is to refuse to work the scheme, even though many of us stand to gain by working it. Who was it sold his birthright?

When Mr. Bevan consults the profession (and he might first consult the *Concise Oxford Dictionary* to find the meaning of the word) he will find that our aims are much the same as his. Then we can start again. I hope we shall.

London, N.W.3.

WILLIAM DUNHAM.

\*\* In the heat of the controversy over the insurance capitation fee: our correspondent may have forgotten that on July 22 Mr. Bevan promised to apply the findings of the Spens Committee to the remuneration of practitioners in the National Health Service. If the profession agrees to consultation with the Minister on terms of service under the new Act it will be able to base its final decision on specific proposals rather than unhappy suspicions.—ED. L.

### PSYCHONEUROSIS TREATED WITH ELECTRICAL CONVULSIONS

SIR,—From the back row of the gallery may I applaud Dr. Glaister's letter in last week's issue? As one who has occasionally worked as a locum in mental hospitals, I am quite certain that the operative factor in some patients who have lost their symptoms after E.C.T. is fear—the age-long restrainer of all animal life.

I am too ignorant to form an opinion on the frequency of this, but Dr. Jan Frank<sup>1</sup> has reported that 600 patients who had undergone a course of E.C.T. all, without exception, dreaded it; he also said that the sight of the apparatus inspired fear in others. But Dr. Milligan brushes all this nonsense aside: "Many correspondents have raised the spectre of fear in reference to E.C.T., and it is high time that this was laid, once and for all."<sup>2</sup> That settles it of course—in Dr. Milligan's mind. But it leaves one with a nasty feeling that even if Dr. Frank were only half right there are Belsens within our gates.

1. *Proc. R. Soc. Med.* 1945, 38, 317.  
2. *Brit. med. J.* 1946, 1, 735.

Dr. Frank found that after a certain number of convulsions patients reached a plateau level of over-politeness, or in English they were well cowed; and I suppose it could be argued that therapeutic terrorism and scientific bullying are justified by their results; but to call the process an altering of "faulty electrical patterns in the brain" is silly. If these words have some occult meaning which space did not allow him to impart, then I shall apologise to Dr. Milligan. Meanwhile, perhaps you will allow me to copy him in recording my belief that the page in the history of our mental hospitals which is being written now will present a pattern of considerable lividity.

Beckley, Rye.

C. G. LEAROYD.

### THE REGIONAL BOARDS

SIR,—The letter from Sir Leonard Parsons last week is extremely opportune. It is based on great experience and is entirely helpful.

Since the population of regions may run to 3 million, boards will be quite unable to manage the day-to-day affairs of district and smaller hospitals, and, in view of their extensive commitments, it is pretty certain they will avail themselves of the help of the great body of experienced people now engaged in settling the current affairs of those hospitals.

It seems to me the boards must be mainly "administrative"; but does that preclude their preoccupation "with broad lines of policy"? If rightly chosen it may well be an enlightened and imaginative administration. If we judge by the success of the great boards and "authorities" of recent creation, controlling activities in other spheres, it looks as though democracy was beginning to appreciate the importance of leaving supreme control to those with a lifetime's experience of the actual working of an undertaking and giving them a free hand to choose their own administrators. As we well know, only those who *do* the work understand its complications and requirements. It is for them to tell the administrators *what* they should provide, and explain how *not* to do it. The administrators will find the right way to do it. Experience of hospital boards shows that proposals from a medical committee for improvement of service to the public or for the betterment of patients, based on informed opinion and lucidly presented, are very rarely rejected by a lay committee. If not at once accepted on some ground of general policy or finance, even then they are merely postponed until conditions can be created in which they may be implemented.

It is then of the greatest importance that action should be initiated by professional counsel. As Sir Leonard says, it will be for the administration, and its executive officers, to find the best way of attaining the end desired.

Medical advisory committees should be constituted, if not before, at least simultaneously with the boards. In several regions temporary bodies serving just that purpose already exist. They have done a great deal of admirable work, much of which can be studied in published reports but should be more widely known.

In addition, many of the specialist associations have devoted a lot of time and thought to the preparation of plans for regional services, and fortunately some of the plans are based on experience derived from successful working of such schemes under the Emergency Medical Service. That service had far less power and fewer resources than will be at the disposal of the boards.

When boards first sit all this information will be available for their guidance, but much more on the same lines could be done to simplify their task. There are, for example, places where forward-looking people have considered in detail what will be the duties of a local management committee in regard to a group of hospitals. Is it not highly probable that a board will thankfully accept, at least in broad outline, plans so prepared? Ought not the same sort of activity to be initiated everywhere? Will it not be the fault of the profession—medical, dental, nursing, social service—if a newly constituted board has to begin by gathering with great expenditure of time and trouble information and advice that ought to have been prepared by us in advance?

With regard to the choice of officials it is to be hoped that no one pattern will be adopted for all regions.

No-one yet knows what is the best plan. Nothing but good can come from diversity of method in the early stages. Who knows for certain whether the chief administrative officer should be a layman or a medical man? Why not try both plans if the right individuals can be found?

London, W.1.

E. ROCK CARLING.

## Medicine and the Law

### No Fee, No Damages

A RECENT decision in the Dublin courts may have surprised those who study the liabilities of hospitals. Daniel Walsh went to the Cork District Hospital to be operated upon for varicose veins. He complained that some of the anæsthetic was somehow allowed to enter his eye. The judge found that the patient went into the hospital with two good eyes in September and was discharged in January with the sight of the left eye gone. Walsh sued the South Cork board of assistance. The board denied negligence and further pleaded that they owed him no duty. The judge held that, as Walsh was a non-paying patient, he was not entitled to recover from the board, even if there had been negligence.

One would like to see the full statement of the grounds of the decision. The courts of Eire are presumably still administering the common law. It is difficult to find any analogy in English decisions. In an old case, where the facts had nothing to do with medical treatment (*Shiells v. Blackburne*, 1789), a judge expressed the following view: "If a man applies to a surgeon to attend him in a disorder for a reward, and the surgeon treats him improperly, that is gross negligence and the surgeon is liable to an action. The surgeon would also be liable for such negligence if he undertook gratis to attend such person, because his situation implies skill in surgery. But if the patient applies to a man of a different employment or occupation for his gratuitous assistance, who either does not exert all his skill or administers improper remedies to the best of his ability, such person is not liable." This case is still cited in modern textbooks.

The liability of a public body for mistakes made by the employees or professional men whom it chooses is, of course, a more complicated matter than the liability of doctor to patient. These problems perhaps will diminish when State insurance covers all accidents and when the State health service includes nearly all medical practitioners.

### The Foundling's Birth Certificate

A letter in the *Times* on Oct. 29 and subsequent correspondence have again drawn attention to the unhappy consequences of the disclosure in birth certificates that the person to whom the certificate relates is illegitimate or a foundling. It has been suggested in several quarters that the certificate should omit details which may thus cause pain and prejudice. The proposal would require legislation. The Registrar-General has powers of prescribing forms, but he is obliged by statute at present to see that certain facts are furnished on a birth certificate. Only an Act of Parliament can authorise him to cause something less to be furnished.

There may be no chance, in the existing conditions of streamlined law-making, for the necessary Bill to be introduced. The suggested reform of the foundling's certificate is just the kind of matter which a private Member of Parliament might have taken up. For the past eight years, however, no private Member's Bill has been permitted. The attention recently aroused might usefully lead to the general overhaul of our registration laws. They date from 1836. The world has moved since then.

## Parliament

## FROM THE PRESS GALLERY

## Winter in Germany

SPEAKING in the debate on the King's Speech Mr. A. EDEN said that, though the Government claimed that in Germany they had won a victory in the battle of last winter, it was clear that the battle of this winter would be infinitely sterner. The Lord President of the Council had told the House on May 23 that the United States government had agreed that there should not be a starving British zone in Germany side by side with an American zone getting assured supplies. Both zones should have the same standard of rationing and the same degree of assurance that their supplies should not suddenly come to an end. Now there was a desperate food crisis in our zone. How, Mr. Eden asked, did that square with the assurance which Mr. Morrison got from the American government last May? Mr. Eden could understand the food position becoming desperate next spring, but it was impossible to conceive how it could become desperate now, after a good local harvest, unless there was maldistribution, which meant bad administration.

Mr. J. HYND, the Chancellor of the Duchy of Lancaster, freely admitted that there had been delays and difficulties inseparable from a quadripartite administration. Maintenance of the present health standards of the German people, low as they were, and the regular distribution of rations, low as they sometimes had to be, had been something of a miracle. He agreed that we were facing another grim winter, but he did not share Mr. Eden's apprehensions that the battle of this winter was going to be as difficult as that of the last. He attributed the sudden excitement and publicity regarding the German food situation to two factors. First, United Kingdom reserves had run down and shipments were in arrear, so that there was no question of switching British shipments to Germany as in the past. Secondly, local-government representatives had assumed responsibility for collection and distribution of food, and, having seen the statistics, they were shocked at the situation which they had to face. Another factor in the situation was that the Government had deliberately increased the ration to 1550 calories a few weeks ago. The reason was not that we had more stocks, or more food in sight, but because the situation in Germany made that action inevitable. It would have been inhuman to expect the Germans to live, produce, or do anything whatever on 1000 calories. In spite of the difficulties, Mr. Hynd continued, they had every reason to expect at least 80% overall of the 1550 calories ration—at any rate until the end of this month. By that time he hoped that the conference with our American allies would have produced the answer. The German harvest had been quite good in the circumstances, and had produced  $1\frac{1}{2}$  million tons of grain, which was being collected and threshed as expeditiously as possible and consumed currently.

As to the question whether common ration standards and pooling resources would operate, and whether the agreement reached by the Lord President of the Council last March was to be operated, Mr. Hynd hoped he would not be pressed in the matter because implementation of that policy was being discussed at the present time, and unless it were carried out it would be impossible to achieve any kind of progress in the development of the British zone or British and United States zones.

Dr. BARNET STROSS felt that the world food situation could hardly be worse. He had hoped that Sir John Orr would have succeeded in his ambition to bring about a World Food Board. Today a little over half the people in the world had less than 2250 calories, less than a third had over 2750 calories. In the world at any time there were apparent food surpluses in some areas and great need and famine conditions in others. Where surpluses seemed to exist there had been no control and planning. Recent developments in America had caused despondency and disappointment. But if America threw away wilfully her opportunity of leading the world that did not mean that Britain and the Commonwealth and every other country willing to combine with us should not say that there was no reason why people should die unnecessarily when there was a food glut in many parts of the world.

## QUESTION TIME

## Full-time M.O.H.s

In the House of Lords on Oct. 28 Lord MERTHYR asked the Government in how many county districts in England and Wales medical officers of health were still permitted to engage in private practice; in which counties these districts were situated; and what steps were proposed to be taken to ensure that the whole country was served by full-time medical officers without further delay.

The Earl of LISTOWEL replied: There are 511 county districts in England and 111 in Wales where the M.O.H. is not restricted from engaging in private practice. All counties except three have formulated arrangements to secure that as vacancies occur doctors appointed shall be restricted from engaging in private practice. Steady progress was being made before the war in securing the appointment of whole-time M.O.H.s, but acute shortage of medical man-power interrupted the process. A number of county district councils whose proposals for full-time permanent appointments had on that account to be deferred are now putting them forward again. These proposals have to be considered in the light of changed circumstances—for example, the proposed modification in the duties of the M.O.H. under the National Health Service proposals—and in some instances it is necessary to discuss with the authorities concerned whether any alteration of the original arrangement is desirable. The Government are in full accord with the view that the employment of full-time medical officers of health throughout the country is an object to be attained with all practicable speed.

## Hospital Staffs

Mr. E. A. HARDY asked the Minister of Labour whether, in view of the fact that the London Provincial Council had failed to implement the recommendations of the National Joint Council for Hospital and Institution Staffs, he would give an assurance that any decisions reached by the Provincial Council would date from the pay-week in which April 1, 1946, fell.—Mr. GEORGE ISAACS replied: The date from which any decisions of the London Provincial Council should operate would be a matter for the council. I have no authority to intervene.—Mr. HARDY: In view of the widespread complaints of shortage of hospital staffs, is the Minister aware that such staffs in this country are seething with discontent because of the failure of the National Joint Council, which was set up in 1945, and that, despite the recommendations made in March this year that it should operate from April 1, nothing has been done so far as the London Provincial Council is concerned? They have never had a meeting.—Mr. ISAACS: The council is in some difficulty as to its constitution, and I have no power to intervene, although I am exercising what little influence I possess to speed up its establishment.—Mr. A. EDEN: Is it true that this council has never even met?—Mr. ISAACS: The London Provincial Council has not met because there is an argument as to the basis of its constitution.

## Continuation of Unrra Supplies

Replying to questions, Mr. E. BEVIN stated that the Government had decided not to support the continuation of UNRRA after the completion of its present programme of operations, which will last well into 1947, largely because, in their view, the problem will then be no longer one of relief. The needs of countries are not uniform and it really becomes a question of balance of payments which will have to be taken into account. The fifth session of the council adopted a resolution to go into this problem of balance of payments, and the Government, in view of their own limited resources, cannot pledge themselves to undertake any further liability except in cases of proven need.

## Cereal Exports to Europe

Replying to a question, Mr. H. A. MARQUAND stated that the quantity of grain and grain products sent from the United Kingdom to all European countries was 116,400 tons in the six months ended September, 1946, of which 70,200 had gone to Germany.

## Physiological Experiments on Cats at Oxford

Mrs. LEAH MANNING asked the Home Secretary whether his attention had been called to the dismissal of the appeal by a professor of physiology, Dr. E. G. T. Liddell, against his conviction for causing unnecessary suffering to cats at Oxford University; and whether he would consider withdrawing his certificate to experiment.—Mr. C. EDEN replied: Dr. Liddell has not been guilty of any offence or irregularity in the performance of experiments, and after reviewing all the

circumstances I have come to the conclusion that I should not be justified in withdrawing his licence. It is, however, essential that proper care shall be taken of animals kept on laboratory premises, and I am taking up with the appropriate authorities the question of improved arrangements for supervising the care of animals at the laboratory in question.

#### The Disabled in Industry

Mr. SIDNEY SHEPARD asked the Minister of Labour the number of disabled persons employed in industry; and what percentage this number represented of the total employed.—Mr. GEORGE ISAACS replied: I estimate that the number of registered disabled persons in employment on Sept. 17 last was about 590,000, which would represent approximately 3.76% of the total employed population at that date. This of course understates the real percentage of disabled persons in employment, as many of them have not yet registered.

#### British Penicillin Production

In answer to a question, Mr. JOHN WILMOT said that the present rate of production of British penicillin is about 360,000 mega units a month. During September export licences were issued for about 149,000 mega units.

### Obituary

#### LOUIS EDWARD BARNETT

KT., C.M.G., M.B. EDIN., F.R.C.S.

Sir Louis Barnett, a founder and past-president of the Royal Australasian College of Surgeons and emeritus professor of surgery in the University of Otago, died in Dunedin on Oct. 28 at the age of 81.

The son of the late Alfred Barnett, of Wellington, he began his medical education in New Zealand and was among the earliest students at the Otago medical school in 1883. He graduated M.B. at the University of



Edinburgh with first-class honours five years later, and after holding a house-appointment at the Middlesex Hospital, London, he took the F.R.C.S. in 1890. The following year he returned to New Zealand to become surgeon to the Dunedin Hospital and acting lecturer in surgery at the University of Otago. His appointment as lecturer was confirmed in 1896—at a yearly salary of £125—and in 1909 he was appointed to the chair which he occupied till 1924. After his retirement he endowed the chair in memory of his son Ralph, who had

been killed in the first world war. From 1914 to 1918 Sir Louis himself served with the R.A.M.C. and N.Z.M.C. as consulting surgeon with the rank of lieutenant-colonel, and he was appointed C.M.G. in 1918.

Barnett had made a special study of hydatid disease and was chairman of the New Zealand Hydatid Research Committee. For ten years he was also chairman of the Otago branch of the British Empire Cancer Campaign, and he had probably done more than any other New Zealander in rousing public opinion to the need for encouraging cancer research. It was largely through his efforts that the radium institute was set up in Dunedin.

"Generations of medical graduates," writes our New Zealand correspondent, "will remember Sir Louis Barnett as a careful, thorough, painstaking surgeon, and a kindly man. He remained a pioneer, and in spite of difficulties and discouragements helped to found and establish the Otago school and the Australasian college. His interest in his work persisted to the end, and I have two letters, written within a few weeks of his death, acknowledging and commenting on case-records of hydatid disease, of which he collected nearly 2000. He remained the registrar-in-chief for the college until he died, and the shaky handwriting told of a daily fight against oedema. Many of his old students attended his last public appearance a year ago, when he spoke once more on hydatid disease at the college meeting in Dunedin."

Sir Louis married in 1892 Mabel Violet, daughter of the Hon. James Fulton, a member of the Legislative Council of New Zealand. One of their sons, Mr. Geoffrey Barnett, F.R.C.S., is in practice in Dunedin.

#### JOSEPH SHAW BOLTON

D.SC., M.D. LOND., F.R.C.P.

Dr. Shaw Bolton, former director of the West Riding Mental Hospital at Wakefield, and emeritus professor of mental diseases in the University of Leeds, died at Beaconsfield on Nov. 12.

Born at Whitby in 1867 he was educated there at Spring Hill School and took his Inter. B.Sc. Lond. while working as a pupil to the local doctor. After two years spent as an unqualified assistant in a private asylum and in a general practice in Manchester, he graduated B.Sc. at the age of 21, and was able to fulfil his father's condition that he must have saved £100 before he could go to University College, London. Here in 1894 he graduated M.B. and was awarded the gold medal, Atchison scholarship, and Filliter exhibition, and the following year took his M.D. He spent three years in Birmingham as assistant lecturer in physiology before becoming pathologist under Sir Frederick Mott at Claybury, and he held the post of senior assistant medical officer at Hellingly and later at Rainhill before he was appointed to Wakefield in 1910.

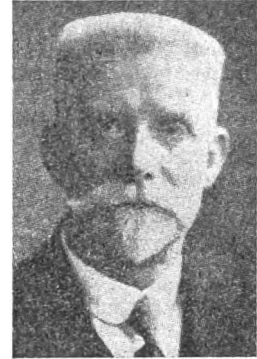
On his appointment, Shaw Bolton's anatomical and physiological investigations into the cerebral functions of the brain were already well known, and he was recognised as a worthy successor to such men as Bevan Lewis, Ferrier, Crichton-Browne, and Maudsley who had made Wakefield a centre of scientific progress and research. In July, 1914, he published his magnum opus, *The Brain in Health and Disease*, which he described as an attempt to settle the question of cerebral function on the old-established bases of anatomy and physiology and of histological and clinical pathology. Appearing as it did on the eve of war the book never received the attention it deserved, for by the time the war was over a new school of psychiatry had arisen. Shaw Bolton remained its courageous and doughty opponent, and in his *Myth of the Unconscious Mind* (*J. ment. Sci.* 1926, 72, 25), he expressed freely and frankly his views on the Freudian school.

"When Shaw Bolton came to Wakefield," writes M. J. McG., "he found two hospitals—one an acute or admission modern hospital opened in 1900 and the other an old building, many parts of which remained more or less as when the building was opened in 1818. His predecessor's great achievement was the building of the admission hospital, but to Shaw Bolton was left the far more difficult problem of modernising the old building and making the whole hospital one administrative unit. An active and energetic man, his policy was to get things done and not to waste time talking about them. At times indeed he got the work done first and then asked the permission of the committee, permission which was always granted, perhaps with a grumble or two. But Shaw Bolton was a Yorkshireman and had to deal with a committee of Yorkshiremen, and I think they understood and appreciated each other."

In 1910 Shaw Bolton was Goulstonian lecturer of the Royal College of Physicians, and the years that followed brought many other distinctions—Maudsley lecturer in 1925, president of the Royal Medico-Psychological Association in 1928, Henderson Trust lecturer in 1933, hon. D.Sc. of Leeds in 1934, Lumleian lecturer in 1935. "But he regards them all," wrote J. K. J. in 1936, "with complacent detachment as accidents in course of loved work; he is only roused to reminiscent enthusiasm by recollections of his early battle to gain footing in a medical school, to get permission to marry as an assistant medical officer, and to establish the first university diploma in psychological medicine."

Shaw Bolton retired in 1933 but quickly re-emerged to become medical superintendent of Buckinghamshire Mental Hospital for an interregnum of six months.

S. R. T. and I. S., who joined the staff of the hospital at this time, write: "We found the temporary chief a



most impressive yet congenial person—reddish bearded, hair en brosse, reminding one rather of Captain Kettle—obviously enjoying his return to daily clinical work with all the relish of a retired master mariner taking the bridge once again. He had the sure and confident touch that marked the school of psychiatry to which he belonged. Strong and decisive when the occasion demanded, he had a notable humility about his own painstaking and valuable contributions to knowledge. A vivid personality with a keen sense of humour, he was no stickler for outward pomp. If there was a job to be done, he would get it done in the shortest and most efficient way. He did not hesitate, for example, to take up his abode in a patient's single room off one of the wards and to use the 'office' as his dining-room, living-room, and consulting-room; for this was the simplest and most efficient way of keeping himself on the spot in reasonable comfort. Untroubled by concessions to orthodoxy, he was adaptable to an extraordinary degree, yet he never lost command of a situation, nor one iota of his dignity. His association with the Bucks Mental Hospital was brief, but it was decisive and a landmark in the history of the hospital. The visiting committee, in recognition of his services, appointed him as their honorary consulting physician, and for some years after his final retirement in 1935 he maintained active interest in the hospital and many congenial contacts with its staff."

Dr. Shaw Bolton leaves his widow with two sons and a daughter. The elder son is a doctor who played football for England, and his daughter is also a doctor.

#### HARRY ROBERTS

L.M.S.S.A.

ON Nov. 12 death removed from our midst, at the age of 75, one of those rare members of our profession who are much more than mere doctors. Harry Roberts combined an inborn faculty for good doctoring with a clear vision of what medicine stood for in terms of the Common Health and a passionate love of Mother Earth and all the gifts she holds for her children. These were, indeed, the three aspects of his life and work—doctor, humanist, and countryman.

Harry Roberts was born at Bishop's Lydiard, in Somerset, in 1871, was educated at Taunton and Bristol,



and pursued his medical studies at St. Mary's Hospital medical school, whence he qualified L.S.A. in 1895. He had married in 1892. After practising at Hayle, in Cornwall, for eight years, he moved to London, and for two years, living at Vauxhall Mansions, he dabbled in politics, being attracted to various Labour groups and causes, and becoming one of the leaders of the Tariff Reform movement. He flirted with the Fabians, whose society had been founded in 1886, and it looked as though he would forsake medicine as

a career for the political arena. In 1905, however, he returned to practice at Aldgate, and, eight months later, moved to Stepney, where he became a very successful and popular general practitioner, continuing in active work there for nearly forty years.

He built up an enormous clientèle. The introduction of the National Insurance Act in 1912 brought panel patients to his surgery in flocks: in 1924 there were more than 10,000 names on his books. He was at this time helped by four assistants and by a secretariat of able women. There were always two doctors on duty, and the practice was organised to the last degree of efficiency. The Ministry of Health was wont to send inquiring Americans and others anxious to see the panel scheme in action to Stepney for an ocular demonstration.

During a long and active life Roberts's literary output was enormous. As early as 1904 he was editing Walt Whitman and Thoreau for English readers. He had published *The Sayings of Jesus* in 1903. (Forty years later he attempted something on similar lines, but more ambitious, *The Philosophy of Jesus*, written in collabora-

tion with a medical colleague.) He began to appear in literature as a sociologist as early as 1892, three years before he qualified as a doctor, with a small book on *Population and Social Reform*. This was followed by *Constructive Conservatism* (1913) and a more serious effort, *National Health Policy*, in 1923.

Roberts's efforts to bridge the gap between academic medicine and the popular demand for help on general hygienic lines produced what was probably his most successful work, *Everyman in Health and Sickness*, published by Dent in 1935. He was arranging for a modernised edition of this book at the time of his death. *Euthanasia* appeared in 1933 and *The Troubled Mind* in 1938. His contributions on kindred lines in the journals were very numerous. As a reviewer he was in great demand, as the columns of the *Times Literary Supplement*, the *Spectator*, and the *New Statesman* testify. He was an incisive but admittedly fair critic.

The third aspect of Roberts's life and work was known to thousands who never came across him as a doctor nor realised that the "green fingers" which he possessed in all matters connected with the soil and its products were also at his command when the sick person needed him. In 1908 he built a house to his own design high up in the Hampshire "hangers," and lived here and in busy Stepney the double life with which his many friends became familiar. His books on the country life sufficiently proclaim his activities. But many years before this he had revealed this side of his nature. *The Chronicles of a Cornish Garden* and *Old Fashioned Flowers* appeared in 1901, *The Tramp's Handbook* and *The Still Room Book* in 1903. In 1915 he published *All about Gardening*. Roberts enjoyed the distinction of being the only author with two volumes to his credit in the *Britain in Pictures* series: he wrote *Rebels and Reformers* in 1942 and *English Gardens* in 1944. He was an authority on gipsies, brewed excellent cider, made large quantities of saleable pot-pourri, and knew all that could be done with the compost-heap without making a god of "humus."

He was as good a talker as writer. There were few men and women "in letters" who did not visit him at Oakshott, and his correspondents were even more numerous than his guests. He was at endless pains to avoid giving offence and was quick to redeem the lapse when it occurred. Of the "little, nameless, unremembered acts of kindness and of love" that measure a good man's life his host of friends can testify abundantly.

Roberts suffered a severe attack of congestive heart-failure in 1942. He recovered as the result of much care on the part of devoted friends. As the result of equal care he lived a fairly active life until his sudden death whilst sitting at his writing table. His was a virile, restless, and dynamic soul, but he was highly constructive and sane in his outlook and he achieved much in a field that was new when he entered it—the field of Social Medicine. When H. M. Tomlinson heard of his friend's death he said: "But he's more alive still than most of us." The comment makes a fitting epitaph for one whose spirit lives and whose work endures.

"... Whose liberal virtues freed his fretting soul  
To see life steady and to see it whole."

So his friend Horace Horsnell wrote of Harry Roberts about the time of the 1914-18 war. It is a nutshell picture of a man as humane and rebellious as Thomas Wakley, as witty as Falstaff, as various as Cleopatra; shrewd, too, and with a gift for lifelong friendships.

Long ago he bought a beech-filled valley in Hampshire, where he and his friends used to go to camp, and to plan a house. In time they put up huts in the woods, and stayed there often. At last the imagined house began to grow, half-way between the valley and the crest of the hanger.

At first it was like an ancient manor house—a single great room with an open fireplace—but over the years more rooms clustered about it, until, within the last decade, his sister added a bathroom. Roberts was indignant. "Now it's like anybody else's house," he complained. But it was not. Oakshott had a special quality, quite indescribable, created by Harry Roberts and those who shared it. A friendly house, full of friendly people, where the cooking was done brilliantly (Roberts was an expert, and



so were his companions) in the intervals of discussion on war, society, and art, where helpers from the village were spoken of as retainers, lest anyone should fancy them serfs, where little cats grey as squirrels blew about like smoke, and where Roberts and the good company who sought him talked, heard music, and joined—earnestly or casually—in the work of house, farm, and garden.

He was a good neighbour; the town hall at Petersfield was built largely through his efforts; and during this war he founded a local youth club, and then helped the young people to take over the full responsibility for it.

He was like no other landowner. Once he discovered in an old map a forgotten right-of-way crossing his land; he hurried out to clear the path and put up inviting notices. The other end of this path crossed the land of a farmer who was far from sharing his enthusiasm. They corresponded, and for a week the farmer was Roberts's blackest villain; then he went to see him and came back cheered and pacified. The farmer was a splendid fellow: it was true he didn't want hikers going straight through the farmyard, but was perfectly willing to open an alternative route.

This was characteristic: Roberts had only to see and talk to an opponent to recognise his good points and give generous credit for them. Implacable over principles, he was always sympathetic to persons. That is why his death has robbed so many of a great friend.

He leaves a son and daughter, three grandchildren, and two great-grandchildren. M. N. J.

#### NIKOLAI BURDENKO

News of Colonel-General Burdenko's death has swiftly followed his resignation, because of ill health, from the presidency of the Soviet Academy of Medical Sciences. As surgeon-in-chief to the Red Army, member of the Supreme Soviet, and director of the Moscow neurosurgical institute, he was a great figure in Soviet life as well as in Soviet surgery.

Born in 1873, the grandson of a serf, he served in a Red Cross detachment during the Russo-Japanese War and received the Soldier's Cross of St. George for bravery. In 1904 he graduated in medicine at the University of Dorpat, and four years later he was appointed to a chair there. Postgraduate work in Pavlov's laboratory followed, and during the 1914-18 war he served as a consultant surgeon, becoming chief of the Russian army medical service in 1917. In 1924 he went to Moscow with the task of establishing the first Soviet neurosurgical institute. Here he built up a strong team of neurologists who derived from Pavlov's school.

Burdenko himself specialised in the surgery of the central nervous system, and under his leadership the Army service for injuries of the brain and cord was extremely well organised, with interchangeable teams from front line, through the base hospital, to convalescence in the Far East. Among his colleagues he was especially honoured for his operations for tumours of the third and fourth ventricles and in the pituitary and posterior cranial fossa. A British surgeon who watched him operating in 1943, when his powers were admittedly already impaired by his physical disabilities, found his technique less advanced than that obtaining in the neurosurgical clinics of this country or America. But there was no doubt of the devotion, esteem, and respect which Burdenko's vital personality and stimulating teaching had inspired among the professoriate and the "young men," and of the influence he exerted on the medical profession throughout Soviet Russia. The medical service he did so much to foster accomplished great things for the Red Army.

### On Active Service

#### CASUALTY

Flight-Lieutenant RAYMOND GEORGE BLACKLEDGE, previously reported as missing, has now been presumed to have died about Jan. 20, 1945, while a prisoner-of-war in Japanese hands. Born in 1912, he studied medicine at Oxford University and St. Thomas's Hospital and graduated B.M. in 1937. After holding house-appointments at St. Thomas's, the Radcliffe Infirmary, Oxford, and the Miller General Hospital, Greenwich, he was commissioned as flying-officer in the medical branch of the Royal Air Force Volunteer Reserve in September, 1940.

## Appointments

ANTONIO, R. F., M.B. Edin.: M.O., Gold Coast.  
 BEAL, J. R., M.D. Manc., D.P.H.: senior tuberculosis officer, Northumberland County Council.  
 CLOUSTON, G. S., M.D. Lpool, D.P.M.: psychiatrist, West Suffolk and Ipswich Education Committees.  
 LITCHFIELD, J. W., B.M. Oxid, M.R.C.P.: physician i/c outpatients, St. Mary's Hospital, London.  
 MUIR, CLEMENT, M.B. Edin., M.R.C.P.E., D.P.H.: principal assistant M.O., Surrey County Council.  
 PRESTON, J. R., M.B. Glasg., D.P.H.: M.O.H., Sutton Coldfield.  
 READ, M. T., M.C., M.R.C.S.: M.O., Malaya.  
**London County Council Assistant Medical Officers on Central Administrative Staff:**  
 AUSTIN, F., M.R.C.S.  
 CRAN, E. M., M.B. Aberd., D.P.H.  
 HARRISON, T. H., M.R.C.S.  
 PEET, E. L., M.D. Durh., L.D.S.  
 THOMSON, R. T., M.B. Glasg., D.P.H.

## Diary of the Week

NOV. 24 TO 30

### Sunday, 24th

**FAMILY PLANNING ASSOCIATION**  
 10.30 A.M. (Gas Industry House, Hyde Park Corner, S.W.1.) Conference. (1) Experience of some Local Authorities in Providing Contraceptive Advice within the Terms of the Ministry of Health Memoranda; and (2) Clinical Problems in Contraceptive Technique and the Atypical Cases.  
 2.30 P.M. Developments in the Treatment of Subfertility and their Application to Clinics.

### Monday, 25th

**ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1**  
 5.30 P.M. *Odontology*. Mr. D. Greer Walker: Severe Infections of the Mandible. Prof. M. A. Rushton: Regional Osteitis Fibrosa Affecting the Facial Bones.  
**MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1**  
 8.30 P.M. Mr. W. M. Mollison, Dr. Philip Cloake: Diagnosis and Treatment of Aural Vertigo.

### Tuesday, 26th

**ROYAL SOCIETY OF MEDICINE**  
 5 P.M. *Medicine*. Dr. E. B. Ford, Mr. Aleck Bourne, Dr. Kenneth McFadyean, Mr. Justice Humphreys: Birth Control: Some Medical and Legal Aspects.  
**LONDON SCHOOL OF DERMATOLOGY, 5, Lisle Street, W.C.2**  
 5 P.M. Dr. H. Gordon: Limitations of X-ray Therapy in Dermatology.  
**EDINBURGH POSTGRADUATE BOARD FOR MEDICINE**  
 5 P.M. (Royal Infirmary.) Mr. D. M. Douglas: Experimental Approach to Surgery.

### Wednesday, 27th

**ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1**  
 3.30 P.M. Miss Barbara Low: Juvenile Delinquency.  
**NATIONAL HOSPITAL, Queen Square, W.C.1**  
 5 P.M. Dr. F. M. E. Walsho, F.R.S.: Contribution of Clinical Study to the Physiology of the Cerebral Motor Cortex. (Victor Horsley lecture.)

### Thursday, 28th

**UNIVERSITY OF LONDON**  
 5 P.M. (University College, Gower Street, W.C.1.) Sir Joseph Barcroft, F.R.S.: Flora of the Alimentary Canal.  
**ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2**  
 5 P.M. Mr. R. W. Raven: Diseases of the Pharynx and Oesophagus. (Erasmus Wilson demonstration.)  
**ROYAL SOCIETY OF MEDICINE**  
 8 P.M. *Urology*. Mr. R. H. O. B. Robinson: Problems of Renal Lithiasis. (Presidential address.)  
**MEDICO-LEGAL SOCIETY**  
 8.15 P.M. (26, Portland Place, W.1.) Mr. Ivor Back: Murder of Miss Gilchrist.  
**MIDDLESEX COUNTY MEDICAL SOCIETY**  
 3 P.M. (Chase Farm Hospital, Enfield.) Cases will be shown. Mr. J. A. Dunlop: Prevesicular Prostatectomy.  
**SOCIALIST MEDICAL ASSOCIATION**  
 7.30 P.M. (296, Vauxhall Bridge Road, S.W.1.) Dr. F. Avery Jones: Social Aspects of Peptic Ulcer.  
**LONDON SCHOOL OF DERMATOLOGY**  
 5 P.M. Dr. A. D. Porter: Vitamin A in Dermatology.

### Friday, 29th

**ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS, 58, Queen Anne Street, W.1**  
 5 P.M. Dr. J. F. Loutit: Rhesus Factor.  
**ROYAL SOCIETY OF MEDICINE**  
 5.45 P.M. *Endocrinology*. Cases will be shown at 5 P.M.  
**LONDON CHEST HOSPITAL, Victoria Park, E.2**  
 5 P.M. Dr. J. R. B. Hern: Asthma.

### Saturday, 30th

**MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES, 11, Chandos Street, W.1**  
 2.30 P.M. Dr. J. A. W. McCluskie: Cardiovascular Syphilis.

In our leading article on the Artificial Kidney last week (p. 720) "plasma phæresis" should read "plasmaphæresis" from  $\pi\lambda\acute{\alpha}\sigma\mu\alpha + \acute{\alpha}\phi\alpha\iota\rho\epsilon\iota\varsigma$  (=removal).

## Notes and News

### LONDON MEDICAL EXHIBITION

THE exhibition, the first since 1938, was held this week in the Royal Horticultural Society's hall. The displays were an excellent reminder of the many war-time innovations. Medicines on a stand all look much the same; but in the various new gadgets there was much to draw the eye of the casual visitor. Plastics, as might be expected, are coming to the fore—for example, in the manufacture of stethoscopes; they are also being used for aspherical magnifying glasses, which are light and fairly cheap, and magnify three or four times without distortion over a large area, so that there is little discomfort in reading with them. For the ophthalmologist there is, too, a new rotary drum to hold trial lenses in much less than the normal compass. For eye and ear work there are droppers from which the fluid is obtained by warming the container in the grip; the number of drops is easily controlled, and the solutions are said to remain virtually sterile for at least two to three years. Then there are new devices for the liberation of penicillin and other antibacterial agents as a fine vapour into the air of ward or office. Perhaps the most interesting exhibit was a prototype electrically operated machine for the automatic control of respiration; clinical trials are reported to have proved its value in intrathoracic operations. The rhythm, rate, and depth of respiration can be readily controlled, and intrabronchial suction is possible. The machine, which is simple and light, should have a future as a resuscitator—by the sea, in the wards, and even in ambulances.

### DENTAL DEADLOCK

THE Joint Advisory Dental Council has expressed its willingness to reopen discussions with the Minister of National Insurance on the fees payable for insured persons. At present dentists are doing no work under N.H.I. on the grounds that they cannot provide a satisfactory service on the fee scale offered by the Minister. In Parliament on Oct. 25 the Minister suggested that the approved societies could not afford the higher scale proposed by the Dental Council; the council does not agree with this view but is willing to discuss the point and put forward means of solving the difficulty.

### A PHARMACIST'S VIEW

SPEAKING in London on Oct. 21, Mr. Hugh Linstead, M.P., secretary of the Pharmaceutical Society, said: "Running through proprietary medicine advertising there is a general disparagement of the medical profession. . . . It is a commonplace of testimonial advertising that the general medical practitioner is disparaged, and by implication the National Health Service. . . . There are at present far too many completely worthless medicines being sold to the public. I am quite certain that far too many advertisements skate on the very thin ice of creating fear. . . . I think that varying standards should all be amalgamated and the proprietary medicines industry might very well set up a council of public men . . . who . . . might be prepared to pass the proprietary medicine brought before them. I think you must have a register of medicines and makers . . . you must have a prohibition against false and fraudulent claims." Formulas, he concluded, should be laid down by the advisory committee and not by the manufacturer.

### A SCIENTIFIC NEWS-LETTER

ANY publication that helps to spread the scientific outlook among general readers deserves a hearty welcome. *Science To-Day*<sup>1</sup> sets out to do this in a weekly news-letter of eight small pages, giving the layman the why and wherefore—not thrusting sensational items, to be gaped at as nine-day wonders, before a goggle-eyed audience. The first four pages contain news items, mostly culled from the current technical journals; the remainder are given up to a background article reviewing some larger subject of topical interest. The early issues mention such widely different topics as fish migration, radar, nuclear physics, Giacobini-Zinner meteors, penicillin, thyroid chemistry, cosmic rays, curare, gas turbines, and calculating machines. The doctor who likes to keep in touch with the growing points on the tree of knowledge will enjoy this little journal.

1. Edited by A. W. Haslett, M.A., 104, Clifton Hill, London, N.W.8. Annual subscription 30s.

### THE CHURCHES' COUNCIL OF HEALING

THE third of a series of lectures arranged by the Churches' Council of Healing is being given at Denison House, 296, Vauxhall Bridge Road, London, S.W.1, on Dec. 11 at 7 P.M., when the Rev. J. Crowlesmith, secretary of the Methodist Society for Medical and Pastoral Psychology, will speak on Possibilities of Coöperation between Doctors and Clergy in the Healing of the Sick.

Since the purposes of this council are not generally known, it may be useful to note here that the late Archbishop Temple, who founded it, was deeply anxious to reconcile religion and science, and especially the practice of medicine and the practice of religion. "His chief aim" (writes a doctor interested in the work) "was to bring together the many branches of the modern divine and spiritual healing movement on the basis of an acceptance of the assured results of modern science and a belief in the value of divine healing. By this means he believed that a real unification of all the forces that make for health and healing may be achieved, and in particular that the healing work of the medical profession might be united to an equally important healing mission of the Christian Church in all its branches."

Such a synthesis of aims could hardly have been conceived, much less approached, in the last century; but in modern medicine the non-physical factors are assuming increasing importance; and the materialist hypothesis, our correspondent suggests, has itself been placed on the defensive. "Doctors are asking by what philosophy they shall guide their practice. Ordinary people are asking a similar question." The movement initiated by the Archbishop aims at "integrating the humanist tradition characteristic of modern scientific medicine with the 'supra-humanist' tradition characteristic of the Christian Church. This integration seems to have been achieved without the sacrifice of the truths and values either of scientific medicine or religion. The practice of divine or spiritual healing is conceived as being the *completion* of the work of modern medicine and not as a *substitute* for it."

This interpretation of the work of the Council of Healing is in line with a resolution adopted in the Lower House of Convocation of York on Oct. 17, asking Dr. C. F. Garbett, the Archbishop, to appoint a joint committee to consider the use of psychology in the pastoral office of the clergy and "the steps needed to regularise the work of priest psychologists." The *Manchester Guardian* (Oct. 9) pointed out that this recalls a resolution passed in the Upper House of Convocation in 1938, welcoming "the movement for developing consultation and coöperation between clergy and doctors, especially medical psychologists."

### SCOTTISH MENTAL HOSPITALS' PATHOLOGICAL SCHEME

THIS scheme has now become a division of the pathology department of Edinburgh University. The board's 48th annual report indicates that the change has reduced the annual expenditure under the scheme; the surplus revenue is to be made available for research to those employed by the contributing hospitals, and possibly to others.

### MIDGET HEARING AID

Messrs. Amplivox Ltd., of 2, Bentinck Street, W.1, have produced a new hearing aid which they call the 'Omnipac' and which they claim is the smallest in the world. As the name suggests, the whole mechanism is compactly made up in one case from which runs the lead to the earpiece. The case measures 4 in. × 2½ in. × 1 in. and weighs complete with batteries 10 oz. This relatively midget size has been achieved by a new miniature valve and miniature batteries of high output. It is claimed that the low-tension battery, costing 1s. 6d., is of revolutionary design, giving an unlimited shelf life with a life of 30 hours on continuous load, while the high-tension battery costs 3s., has a shelf life of months, and lasts 100 hours on load. There is also a new type of ear-phone which can be used with the aid, requiring no head-band and fitting comfortably in the meatus. The performance of the aid is most satisfactory and as good as any standard valve-amplifying instrument. An additional unit can be supplied for use with a telephone which plugs into spare sockets on top of the aid. This is a useful and successful device. The instrument marks a definite advance in construction. It sells at 21 guineas, the telephone unit costing 2 guineas extra.

**DELAY IN SUPPLY OF SPECTACLES**

THE Faculty of Ophthalmologists recently appointed a subcommittee, on which the manufacturing opticians were represented, to investigate the delay in the supply of spectacles. It is anticipated that in twelve months the accumulation of orders which is causing the delay will have been dealt with and that deliveries will be back nearly to normal; but it was agreed that in the meantime six suggestions should be published for the consideration of prescribing surgeons and opticians. The council of the faculty believe that the adoption of these suggestions would result in an immediate improvement in the situation. The suggestions are as follows:

1. Except in cases of genuine medical urgency, avoid priority orders.
2. Unless there are good reasons for the contrary, avoid prescribing  $\frac{1}{8}$  powers, and  $\frac{1}{4}$  powers over 4D.
3. In the lower ranges, covering the "stock powers," prescribe flat lenses; except in the case of bifocals, which are more easily obtained in toric form.
4. Avoid ordering tinted lenses wherever possible. When ordered, give alternative tints.
5. Where possible, indicate on the prescription that a variation of  $\frac{1}{4}$ D up or down is permissible. It is suggested that this should be done by the sign " $\pm 0.25$ " on the prescription.
6. Avoid prescribing prisms unless really necessary. All prescriptions including a prism, other than those that can be dispensed by decentration, demand special grinding.

**MOBILE EXHIBITIONS OF NURSING**

To encourage nursing recruitment, the Ministry of Labour and National Service have launched two mobile exhibition vans, which are to visit villages and the smaller towns. The exhibition, which consists of cheerful and informative photographs of nurses in various stages of training, at work and at play, is mounted on and inside a very large trailer, drawn by a tractor on the roof of which a loud-speaker is mounted. Inside, besides more pictures, there is a small comfortable interviewing room, whose cork-lined walls are sound-proof. Here the prospective candidate for nursing can talk to one of the technical nursing officers of the Ministry, and also, thanks to collaboration promised by local hospitals, with a young nurse in training in the region. The loud-speaker microphone is in this little room, and a gramophone beneath it can be used to broadcast music. During the next month these vans will tour the southern and south-western regions, near Reading and Salisbury. In launching one of the vans on Nov. 13, Mr. George Isaacs, the Minister of Labour, noted how much thought and hard work had gone to the making of the exhibition. It should help to maintain the rise in nursing recruitment which has gone on since the beginning of the century; and if the interviews are well conducted, as seems likely, it may also help to reduce the present high wastage of recruits.

**PSYCHOLOGY OF STUDY**

A CORRESPONDENT signing himself "Ex-Service M.O." wrote asking advice on the best method of preparing for an examination while carrying on with a full-time job. His letter appeared in THE LANCET of August 31, p. 312. Dr. W. H. Perry now writes from Vancouver, saying: "I would refer your correspondent to a little book, *Doctor in the Making*, by A. W. Ham and M. D. Salter, of the University of Toronto, published by J. B. Lippincott and Co. It is very pleasant reading and while designed for the junior undergraduate can be very helpful to those preparing for higher examinations; particularly those of us who, on account of the recent unpleasantness, have suffered a severe and prolonged interruption of our study habits."

**RADIOLOGICAL PROTECTION**

THE 6th edition of the recommendations of the British X-ray and Radium Protection Committee, lately reprinted in booklet form, contains a new appendix including a section on X-ray examinations under general anaesthesia. The committee has never maintained that there are no risks in radiological work, but it has always held that these can be largely avoided by observance of its 67 recommendations. The booklet is obtainable on application to the hon. secretaries at 32, Welbeck Street, London, W.1. The Medical Research Council has lately set up a Protection Committee as a subcommittee of the Research Committee on the Medical and Biological Applications of Nuclear Physics; the main function of this committee will be to initiate research into new methods of protecting the staffs of establishments now being organised for the large-scale production of radioactive isotopes.

**Royal College of Surgeons of England**

At a meeting of the council on Nov. 14, with Sir Alfred Webb-Johnson, the president, in the chair, the honorary gold medal of the college was awarded to Sir Alexander Fleming, F.R.S., in appreciation of his distinguished work and particularly in recognition of his discovery of penicillin.

It was reported that the trustees of the Sir Halley Stewart trust had made a grant to the college for a research fellowship, and Mr. H. Fletcher Lunn, anatomical curator, was appointed as the first fellow. Dr. R. J. Last, anatomical curator, was elected as the first Bland-Sutton research scholar.

It was reported that the special trustees had elected Mr. F. H. Masina as a Proffit research student for the investigation of the pathology and treatment of carcinoma of the bladder.

Mr. Alan Perry (London), Sir Heneage Ogilvie (Guy's), and Mr. R. M. Handfield-Jones (St. Mary's) were elected members of the court of examiners. The Hallett prize was awarded to Mr. R. P. Melville, of the University of Sydney. H. K. Ford (Epsom College and the London Hospital) was nominated as the 54th Jenks scholar.

It was decided to hold a meeting of fellows on Friday, Nov. 29, at 5 P.M., to discuss certain aspects of the National Health Service Act.

Mr. Ian Aird, professor of surgery in the British Post-graduate Medical School, was elected ad eundem to the fellowship of the college. Diplomas of membership were granted to the candidates named in THE LANCET of Nov. 9 (p. 701) as having qualified to practise, with the exception of 5 who had previously been granted membership.

Diplomas in medical radiodiagnosis, in medical radiotherapy, and in child health were granted, jointly with the Royal College of Physicians, to the candidates named in THE LANCET of Nov. 9 (p. 701).

**Society of Apothecaries**

The society's gold medal in therapeutics will be presented to Sir Alexander Fleming, F.R.S., and Sir Howard Florey, F.R.S., on Thursday, Nov. 28, at 8 P.M. The presentation will be followed by a soirée.

**Addison Lecture**

Prof. E. C. Dodds, F.R.S., will deliver the first Addison lecture at Guy's Hospital on Monday, Dec. 2. His title is *Stories of Endocrine Research*. Tickets may be had from the secretary of the medical school, Guy's Hospital, London, S.E.1.

**Princeton's Bicentenary**

Honorary degrees were conferred on Sir Henry Dale, O.M., F.R.S., and Sir John Orr, F.R.S., at the bicentennial celebrations of Princeton University.

**Public-health Teaching in Croydon**

Last spring the Royal Institute of Public Health and Hygiene arranged that doctors undergoing courses of instruction in preventive medicine should attend for 2½ days each week at Croydon, where they gain practical experience of all the departments working under the local authority.

**London County Council**

At its meeting on Nov. 19 the council appointed Dr. A. A. W. Petrie, the senior medical superintendent in their mental-health services, to be their medical adviser on mental health. Dr. Petrie will be seconded for part of the time from Banstead Hospital to headquarters staff to fulfil his new duties. He succeeds Dr. R. M. Stewart, who has retired.

**The Basic Nursing Course**

The London County Council have endorsed the resolution adopted by the Association of County Medical Officers of Health providing for a two-tier system of nurses' training with opportunities for advancement from the lower to the upper tier. The resolution which has also been endorsed by the County Councils Association (see *Lancet*, Sept. 28, p. 462) proposes that—

There should be a basic training of two years for all nurses, some of which period should be spent in nursing the chronic sick. This training should be essentially practical.

After that training, and on passing their appropriate examinations, the designation should be "Qualified Nurse."

A substantial number of nurses should receive further training in order to qualify them for positions of ward sister and higher. The appropriate designations to be selected later.

The L.C.C. are reserving their views on the designations to be used and other details ancillary to the application of the principle.

**Medical Sheriffs**

Dr. J. Emrys Jenkins has been appointed sheriff for Breconshire, and Dr. E. Wyn Jones sheriff for Caernarvonshire.

**Medical Society of London**

The Lloyd Roberts lecture will be delivered on Monday, Dec. 16, at 8.30 P.M., by Sir James Chadwick, F.R.S., who is to speak on Atomic Energy.

**Mass Radiography in Tasmania**

The Tasmanian government proposes, with the help of mobile mass-radiography units, to have the chest of every civilian radiographed periodically—possibly once in every five years.

**Edinburgh University Club of London**

A reception is to be held at the May Fair Hotel, W.1, on Thursday, Dec. 5, from 6.30 to 8 P.M., in honour of Sir John Fraser, the principal. The hon. secretary is Dr. Bruce Williamson, 12, Wimpole Street, W.1.

**London University Conservatives**

Dr. W. J. O'Donovan has been appointed provisional chairman of the University of London Conservative and Unionist Graduates Association, which is to hold its first post-war meeting at 11 A.M. on Saturday, Nov. 30, at King's College, Strand, W.C.2.

**Congress of School and University Hygiene**

This congress is to be held in Paris from June 25 to 29, 1947, under the auspices of the ministries of national education and of public health. At the congress the Société Française d'Hygiène Scolaire will propose the formation of an international association to be charged with the organisation of periodical congresses and the establishment of liaison between doctors engaged in this branch of medicine. The secretary-general of the congress is Dr. Pierre Delthil, 46, Rue de Naples, Paris, 8°.

**International Congress of Military Medicine and Pharmacy**

At the invitation of the Swiss Government the eleventh congress is to be held at Basle from June 2 to 7, 1947. The principal subjects for discussion are the resuscitation of the wounded, the prophylaxis of epidemics, methods of determining the concentration of hydrogen ions, the evacuation of casualties, and the contribution of the medical officer to the morale and physique of soldiers.

**Contact Lens Society**

The society, which is open to both medical and non-medical membership, has been formed, under the presidency of Prof. Ida Mann, for the study of contact lens work in all its aspects. The joint secretaries are Mr. A. G. Cross and Mr. G. H. Giles, to whom inquiries should be directed at 65, Brook Street, London, W.1. The first scientific meeting will be held there at 5.30 P.M. on Jan. 20.

**More Scientists Needed in the United States**

It will take five or more years to make up the shortage in scientists created by the war, according to Dr. Thomas Parran, surgeon-general of the United States Public Health Service. The federal government is offering fellowships to encourage doctors to engage in medical research.

**B.C.G. in U.S.S.R.**

A member of the tuberculosis institute of the Medical Academy of the U.S.S.R. has informed British United Press that in the past two decades about 3 million babies have been immunised against tuberculosis with vaccine of the Calmette type. Good results are also claimed with older children and adolescents, and it is stated that in protected children the incidence of tuberculosis is only a third of the incidence in children before B.C.G. vaccination was used.

**Nobel Awards**

The first half of the Nobel chemistry prize has been awarded to J. B. Sumner, of Cornell University, for his discovery of the crystallisability of enzymes; the second half has been awarded jointly to W. M. Stanley and J. H. Northrop, both of the Rockefeller Institute for Medical Research, Princeton, for researches into the purified production of enzymes and virus proteins.

**Prescriber and Dispenser**

The National Health Service Act means a 99.9% separation of dispensing from the hands of the prescriber, according to Mr. Thomas Reid, a member of the Pharmaceutical Society's council. No longer, he says, will the doctor's chauffeur, or any other unskilled person, act as a dispenser. "My own prophecy is that under the new health service the doctor will again become a competent writer of prescriptions."

**Association of Industrial Medical Officers**

At a meeting of the Scottish group, to be held in the Institute of Hygiene, Glasgow University, at 3 P.M. on Wednesday, Dec. 11, Prof. T. Ferguson and assistants will give a symposium on Occupational Medicine. Medical practitioners are invited to attend.

**Welfare Foods**

Potassium iodide is to be added to the vitamin A and D tablets made for issue to expectant mothers. Each tablet will now contain potassium iodide 0.13 mg., vitamin A 4000 I.U., vitamin D 800 I.U., and calcium phosphate B.P. 250 mg. In future the Ministry of Food cod-liver-oil will be "cold-cleared," so as to improve its appearance and remove its tendency to cloud in cold weather.

**New Fracture Bed**

A new type of bed for patients with multiple fractures has been devised by Howard Hughes, an American pilot, who was recently admitted to a Los Angeles hospital with multiple fractures, and burns prohibiting the application of plaster. The bed has a "spinal" mattress, divided into six independent sections, each 5 in. square; these are mounted on screw-jacks, worked by cranks within easy reach of the patient, who, by adjusting them, can raise or lower the sections, so that the spine is brought into any desired curvature.

**Return to Practice**

The Central Medical War Committee announces that the following have resumed civilian practice:

Dr. F. DUDLEY HART, 152, Harley Street, W.1 (Tel.: Welbeck 6919).

Mr. J. STEWART HESLOP, F.R.C.S., 8, St. John Street, Manchester, 3 (Tel.: Blackfriars 2166).

Dr. H. EVERLEY JONES, O.B.E., 11, Park Road West, Wolverhampton.

Dr. JOHN S. PARKINSON, 10, St. John Street, Manchester, 3 (Tel.: Blackfriars 4311).

Dr. J. GRAHAM SCOTT, 11, Wexford Avenue, Johannesburg, S. Africa.

Academician Nikolai Anichkov was last month elected president of the Soviet Academy of Medical Sciences, following the retirement of Academician Nikolai Burdenko, who has since died.

Mr. Kenneth Carter, M.P.S., has been appointed secretary of the Therapeutic Research Corporation of Great Britain.

Messrs. Burroughs Wellcome & Co. have opened an office at 18, Merrion Square, Dublin.

**Births, Marriages, and Deaths****BIRTHS**

- BULLEID.—On Nov. 8, at Midsomer Norton, the wife of Dr. A. H. Bulleid—twin daughters:  
 BUTLER.—On Nov. 10, the wife of Flight-Lieutenant Kenneth Butler, M.B.—a son.  
 EVANS.—On Nov. 10, in London, the wife of Dr. M. L. H. Evans—a son.  
 EXNER.—On Nov. 10, the wife of Dr. G. G. Exner—a daughter.  
 GLAISHER.—On Nov. 4, the wife of Dr. C. Glaisher—a daughter.  
 HINDS HOWELL.—On Nov. 13, in London, the wife of Dr. A. Hinds Howell—a daughter.  
 HOVENDEN.—On Nov. 9, the wife of Dr. T. G. Hovenden—a daughter.  
 LANGTON-LOCKTON.—On Nov. 12, the wife of Dr. Phillip Langton-Lockton—a daughter.  
 MANSON-BAHR.—On Nov. 8, at Nairobi, Kenya, the wife of Dr. P. E. C. Manson-Bahr—a son.  
 MARSHALL.—On Nov. 14, at Carshalton, the wife of Dr. T. S. Marshall—a son.  
 WYLIE.—On Nov. 14, the wife of Squadron-Leader W. D. Wylie, M.R.C.P.—a son.

**MARRIAGES**

- WHYTE-CARRINGTON-WARD.—At Karachi, India, Lieut.-Colonel D. G. C. White, D.S.O., R.A.M.C., to Patricia Carrington-Ward.

**DEATHS**

- ALLAN.—On Nov. 7, Flying-Officer Charles King Allan, M.B. Glasg., aged 23.  
 BOLTON.—On Nov. 12, at Beaconsfield, Joseph Shaw Bolton, D.Sc., M.D. Lond., F.R.C.P.  
 BROWNLIE.—On Nov. 12, at Edinburgh, James Law Brownlie, M.D. Glasg., M.R.C.P.E., D.P.H., F.R.S.E.  
 DANIELL.—On Nov. 10, at Brighton, Edgar Percy Daniell, M.R.C.S., aged 86.  
 GWYNNE-JONES.—On Nov. 15, Howell Gwynne-Jones, C.V.O., M.R.C.S.  
 LOMAS.—On Nov. 15, in London, Henry Lomas, M.D. Vienna, M.R.C.S., D.P.H.  
 LYNDON.—On Nov. 14, Arnold Lyndon, O.B.E., M.D. Lond., of Grayshott, Hindhead, Surrey, aged 85.  
 MURRAY.—On Nov. 13, at Wokingham, John Gawler Murray, L.R.F.P.S., aged 78.  
 ROBERTS.—On Nov. 12, at Oakshott, Harry Roberts, L.M.S.S.A., aged 75.  
 SULLY.—In November, at Durban, South Africa, Albert Max Sully, M.R.C.S., aged 81.

## CARDIAC SIGNS IN YOUNG ADULTS

WITH SPECIAL REFERENCE TO FUNCTIONAL MURMURS \*

GEOFFREY BOURNE

M.D. Lond., F.R.C.P.

PHYSICIAN IN CHARGE OF CARDIOGRAPHIC DEPARTMENT,  
ST. BARTHOLOMEW'S HOSPITAL, LONDON

DURING the last six years I have examined a large number of young adults cardiologically at the request of three medical boards. This paper is based on a careful analysis of about a quarter of them, 308 in all, of whom 224 had normal hearts and 84 organic heart disease.

The cases were selected by the boards, which contained different medical practitioners. The extent and type of this selection clearly varied from board to board, and from doctor to doctor; so the results described are no criterion of the distribution of cases in the normal population. It is probably true, however, that the recruits referred provided a good indication of the type of case suspected by a doctor of having some cardiac abnormality.

I made a full clinical examination, followed by radiography in the anteroposterior and the right and left oblique positions. Where the pulmonary conus seemed to be unusually prominent, a barium swallow was also done, and the size of the left auricle thus carefully checked. An electrocardiogram was not taken as a routine, since it was early found that it yielded little additional information except in selected cases.

When the hearts of young people are examined, various conclusions may be reached:

- (1) The heart is found to be perfectly normal both functionally and physically.
- (2) A normal physical state is associated with cardiac symptoms.
- (3) Though function is perfect, signs of disease are present.
- (4) Both function and the physical state are clearly deficient.

The first and fourth of these possibilities do not raise any question as to the state of the heart.

The second group contains people with what is usually known as effort syndrome. Here there are definite symptoms, the most common of which are apparently due to excessive sensitivity of the heart both on the sensory and the motor side. Certain other symptoms and signs are also present which have no direct association with the heart. In effort syndrome palpitation, fatigue, and shortness of breath follow an amount of exertion which does not produce them in normal people. Further, symptoms of nervousness, sweating, and giddiness, probably of vasomotor origin, are frequent. The sweating is usually a cold sweat, affecting the body locally rather than generally. It is seen particularly in the axillæ, on the palms of the hands, and on the forehead, and is excessive. The heart in such cases is often clearly normal, except that its abnormal response to exercise and emotion easily provokes tachycardia. Vasomotor signs resulting from postural change are common, a raised pulse-rate and a lowered blood-pressure following the change in position from the horizontal to the vertical.

In the third group—a large one—signs suggesting some cardiac abnormality are present without any symptoms. This is the group in which diagnosis is often difficult but which is from the point of view of the State very important because admission to the Services or to any pensionable position is likely to involve expense, if a person with organic heart disease is accepted. These slight abnormalities, or suspected abnormalities, are the basis of this paper. They fall into certain well-defined clinical groups.

## SIZE OF HEART

In the investigation of a cardiac patient the size of the heart is the most important single fact. If the heart is enlarged, it must be regarded as diseased, whether such disease is past or present. If the heart is normal in size, it may be concluded, especially in the young, that disease is probably absent. If the heart is of the small longitudinal type, well below the average, no organic disease is present.

In many excited but healthy young adults the position of the apex-beat is deceptive. This, especially in athletic individuals, is often so forcible that its position seems to be in the midclavicular line or external to it. Here accurate radiography is the only means of determining whether the heart is enlarged or not. There are two methods—a film taken at a distance of 6 ft., or measurement by orthodiagram. Of the two, the orthodiagram is probably more accurate, since it is possible to measure the heart either in systole or in diastole as desired. The commonest method is to define the outer border of the heart in diastole, both to the left and to the right, and to measure the interior diameter of the thorax on both sides at the end of an easy inspiration. The vigorously beating heart above described is found by such measurement not to be enlarged, in spite of the apparently abnormal position of the apex-beat.

## HEART SOUNDS

The heart sounds described below were present in every case in young adults whose hearts were regarded as normal both clinically and radiologically, and whose blood-pressure was within normal limits. (Such functional or physiological murmurs and unusual sounds may also, of course, coexist with the murmurs of organic valvular disease.)

The heart sounds introduce many difficulties into diagnosis. Abnormalities occur in the first and second normal heart sounds, and in the presence sometimes of a physiological third heart sound. Furthermore, murmurs and adventitious sounds are very common, and these in their turn present problems.

The *first heart sound* is often muffled or impure, particularly when it is loud and when the heart is beating excitably or vigorously. It may occasionally be reduplicated. The most important single point about the first heart sound is its musical pitch. When the first heart sound is loud but low-pitched it is normal, and when the pitch is raised, approximating more to the quality of the second sound, there is suspicion of abnormality.

The *second sound* is chiefly investigated at the base of the heart. Reduplication is present fairly frequently at the pulmonary base, and is of no special significance. Such reduplication may vary with respiration, chiefly appearing during inspiration.

The *third sound* is a physiological phenomenon, but it is not very easily heard and is only present in a small proportion of cases—about 15% of my 308 cases. It is audible at the apex and is a single distant sound. It is heard after the second sound, which it follows at the same interval in any particular case. It is often more audible in the left lateral position and in the last half of expiration. It is apt to disappear during inspiration. It is more easily heard when the heart is beating slowly.

This sound is important, for it may be loosely described as a mid-diastolic murmur and may suggest mitral stenosis. The points to be emphasised are that the sound is short and detached, and that it is associated with no presystolic murmur and with no distant diastolic rumble. Moreover the first sound is of normal pitch, whereas in mitral stenosis the pitch is raised. Radiography of such patients commonly reveals a heart which is rather small than large, in which there is no increase in the size of the

\* Read to the Torquay Medical Society on March 21, 1946.

pulmonary conus. The third heart sound may also be heard in diseased hearts, particularly where there is ventricular dilatation secondary to hyperpiesis; in some cases of mitral stenosis; and in patients with an early stage of heart-block. In the first of these examples the additional sound is probably related to the first sound and not to the second. It has been found to coincide with auricular systole. In mitral stenosis the diastolic murmur may suggest a third heart sound, but there is usually a definite underlying distant diastolic rumble also, especially in the left lateral position. After the first stage of heart-block, where the P-R interval is prolonged, auricular systole may in this way become unusually audible. It is clear that the cases of third heart sound described above belong to none of these three groups.

#### MURMURS

Various murmurs and abnormal signs may give rise to difficulty in diagnosis.

*Systolic Murmur.*—The systolic murmur heard at the pulmonary base alone is not very frequent. There were only 6 examples in the 224 normal cases of the present series. But a systolic murmur at the pulmonary base conducted down the left border of the sternum to the apex is common, and the series contains 36 examples (16%). This murmur may be associated with a sensation which gives to the examining hand almost the impression of a systolic thrill, but radiography shows a perfectly normal heart, with no increase in size of the pulmonary conus. This murmur is louder when the subject is lying down and may be present only in this position. If, when the stethoscope is placed first at the apex (so that the apical systolic murmur is the first to be heard), the pulmonary systolic part of the murmur is louder than that heard at the apex, the murmur is unlikely to be organic in origin. The possibility of organic disease diminishes in proportion to the number of these functional murmurs present.

A systolic murmur heard at the apex alone is also common, with 25 (11%) in this series. The murmur was not conducted, and frequently was absent when the patient was standing, and often it disappeared during full inspiration.

The third systolic murmur of importance was that heard at the apex and heard even more loudly towards the axilla during inspiration only. There were 23 examples (10%) in the series. During expiration this murmur disappears, and it is therefore called a cardio-inspiratory systolic murmur. It is common in persons who also show a systolic pulmonary murmur conducted to the apex. No enlargement or radiological abnormality was found in these patients, who often had a heart of the narrow longitudinal type, obviously not organically diseased.

*Exocardial Murmur.*—Another common adventitious sound can be described as an exocardial murmur or rub. There were 26 cases (11%). Whether this label "exocardial" has any basis in fact is impossible to determine. One patient, however, produced some evidence suggesting this explanation; for there was a shuffling murmur which corresponded with all of the heart's movements—systole and diastole of the ventricles and systole of the auricles producing a triple shuffling sound. This is exactly analogous to what may be heard in pericarditis, where the sound is definitely exocardial. But in the present case the shuffling sound was eliminated by inspiration and was only heard during the last half of expiration and the beginning of inspiration. Moreover, radiography showed the heart to be perfectly normal in size and shape, and there were no symptoms indicating any diminution in normal cardiac function. This exceptional case is only of importance as presenting evidence for the exocardial basis of these murmurs.

The commonest exocardial murmur is that which is heard most loudly in the fourth space to the left of the sternum, and close to it. The sound is conducted to some extent towards the apex and to some extent towards the pulmonary base. There is no associated thrill and no enlargement of the heart, and as a rule the sound is eliminated during full inspiration. In about a quarter of the cases showing a harsh exocardial sound this is present only at the pulmonary base. Though the murmur is usually a loud rather harsh shuffle, occasionally there is a definite musical squeak, which also disappears on full inspiration.

These are the murmurs of greatest importance which are found in normal young adults. They suggest various organic lesions and have to be differentiated from them.

#### DIFFERENTIAL DIAGNOSIS

The systolic murmurs must be differentiated from the murmur of mitral regurgitation. This murmur is heard both on standing and on lying down, though it is often louder on lying down. It is also not affected by respiration. Further, in mitral regurgitation there is usually some enlargement of the heart, and the character of the first sound may vary, being raised in pitch.

The systolic murmurs at the pulmonary base are so common, especially when conducted to the apex, that they are unlikely to cause difficulty. When the murmur is restricted to the pulmonary base, the question of an organic congenital defect may arise. Some of these murmurs may indeed be due to a very minor lesion of the pulmonary valve; but a diagnosis is impossible, because the interference with the normal circulation is so slight as to cause neither symptoms nor signs. There is no cyanosis, clubbing, or enlargement of the right ventricle.

The harsh exocardial murmurs to the left of the sternum suggest chronic pericardial disease, but here again the heart is otherwise so normal that this diagnosis is unlikely. Another possibility here is a very small patency in the interventricular septum; but in this condition the murmur should be associated with a thrill and some enlargement of the heart, and should be heard during all phases of respiration.

The above murmurs and sounds have been fully described because a clear clinical description may be the first step in elucidating clinical problems. Careful examination is likely to confirm the separate characters and qualities of these murmurs, and by separating them from one another some impetus may be given to attempts to define how they individually may be produced. In none of them has any characteristic abnormality been seen on the X-ray screen. Since an electrocardiogram was not taken in every case, it is just possible that this form of investigation might be helpful, though the examination of many thousands of normal people in hospital and in private practice has not provided evidence that this is likely. Since, however, these murmurs exist as clinical entities, it is necessary to define them so that their innocence may be clearly understood in individual patients.

#### BLOOD-PRESSURE

The final diagnostic difficulty which arises in apparently healthy young adults is that associated with the blood-pressure. This is often increased in nervous subjects, and a figure of 180/90 may be noticed. Three points are of importance in determining whether this increase in blood-pressure is nervous or not. The general behaviour of the patient is likely to give a clue to his nervous state. An associated tachycardia is nearly always present when the increase in blood-pressure is due to nervous causes. Radiographic measurement of the heart will show no increase whatever in size, as would be the case if hyperpiesis were constantly present. Indeed the heart may be small. The diastolic figure is of far greater importance

than the systolic. If it is normal or only slightly raised, the hyperpiesis is unlikely to have an organic cause.

#### ASSESSMENT OF CARDIOVASCULAR SYSTEM

The most important points in assessing the state of the heart and cardiovascular system in young people are as follows:

(1) Is there any enlargement of the heart? If the heart is normal in size and shape, organic disease is unlikely. If the heart is small, organic disease is almost certainly absent.

(2) Is the first sound of normal or of low pitch? If it is low-pitched, any associated murmurs are unlikely to be due to mitral disease.

(3) Does the murmur disappear either on standing or on lying down, or does it disappear during respiration? Any murmur which disappears in this way is very unlikely to be due to organic disease.

During examination of these 308 subjects the following abnormalities due to organic disease were noticed:

Mitral stenosis (40).

Mitral regurgitation (13).

Mitral stenosis with aortic regurgitation (4).

Aortic regurgitation, almost certainly rheumatic, present alone (7).

Patency of the ductus arteriosus (2).

Patency of the interventricular septum (4).

Transposition of the viscera (1).

Coarctation of the aorta (1).

Enlargement of the heart, radiography showing a cardiac diameter of more than half of the chest diameter. The cause of enlargement not ascertainable (9).

The organic defects were present in these cases without symptoms, and often this was so even though the young man or woman was playing normal games and undertaking normal physical activities.

The murmurs of mitral disease were sometimes heard only when the patient was lying down, and in a few cases only in the left lateral position; and the diastolic murmur of aortic regurgitation was often so distant that it was difficult to detect, and the leak was so small as to cause no change in blood-pressure. On the other hand the congenital murmurs were loud and easy to pick up.

The series contained 9 cases of effort syndrome with characteristic symptoms but an organically normal heart.

#### SUMMARY

Of 308 Service recruits referred by medical boards for cardiological investigation, 224 had normal hearts and 84 organic heart disease.

Difficulties in diagnosis were mainly due to abnormalities in the first and second sounds, a physiological third sound, and adventitious sounds. These sounds are described and interpreted.

Another difficulty in diagnosis was an increase in blood-pressure in an apparently healthy person.

Suggestions for the assessment of the cardiovascular system are given.

"As we are actually situated today I do not think we can possibly have too great an increase in the amount of intelligence available in our society. . . . I . . . find men of high intellect . . . overpressed and overworked. . . . Yet the fact remains that we could at least in theory breed too many intellectuals. Firstly, in a society made up exclusively of, say, Aldous Huxleys, Laskis, Einsteins, or Stracheys, who would . . . perform the innumerable dull routine services necessary if our life is not to relapse into confusion? Secondly, even if you could get the necessary manual and unpleasant work done by compelling intellectuals to tackle it, this could only be achieved in an atmosphere of discontent and internal stress that would make . . . for revolution and dictatorships and oppression. Thirdly, pure intellect is perhaps not all that it is cracked up to be from the point of view of making the most successful sort of society in this world."—Mr. GEOFFREY ELLER, addressing the Eugenics Society on May 28. (*Eugen. Rev.* October, 1946, p. 133.)

## ABSORPTION AND EXCRETION OF WATER THE ANTIDIURETIC HORMONE

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(Concluded from p. 744)

### INHIBITION OF WATER DIURESIS BY RISE IN OSMOTIC PRESSURE OF CAROTID PLASMA

The hypothesis that water diuresis is conditioned by an inhibition of secretion of antidiuretic substance by the neurohypophysis implies a prior governance of this secretion by the osmotic pressure of the arterial plasma. It was of interest, therefore, to determine the effects of a rise in the osmotic pressure of the carotid plasma on the secretion of the kidney during water diuresis.

Dogs have been used exclusively in this work. They were perineotomised to facilitate catheterisation, and each common carotid artery was exteriorised as a "carotid loop" (Van Leersum 1911). In the formation of the loop, two parallel incisions are made through the skin along the course of the carotid, the artery is enfolded within the strip of skin by suturing its edges behind the artery, and finally the outer edges of the skin incisions are approximated by a row of sutures deep to the tunnel of skin through which the carotid artery is now passing. During this surgical procedure the carotid sinus has sometimes been denervated, sometimes not. The animals were trained to lie quietly on their right side for long periods, and during an experiment the urine was collected continuously into a series of graduated glass tubes. The solutions for injection were carefully filtered and sterilised beforehand, and the injections were made under aseptic conditions as uniformly as possible with the aid of a beating metronome.

*Effect of Intracarotid Injections of Hypertonic Solutions of NaCl.*—It was first necessary to see whether intracarotid injection of isotonic solutions at different temperatures and intravenous injections of hypertonic solutions produced any effect on the course of urine flow. They were found not to do so. When, however, hypertonic solutions were injected into the carotid, definite inhibitory responses were observed (fig. 15). The magnitude of the response varied with the tonicity of the solution at constant rate and period of injection and with the period of the injection at constant volume and tonicity of solution.

*Disappearance of Effect after Removal of Posterior Lobe.*—The shape of these responses suggested that they were of pituitary origin, and this hypothesis was put to the test of experiment by measuring the responses to a given injection before and after removal of the posterior lobe. Fig. 16 shows that the response to 21 c.cm. of 2.50% NaCl injected into the right carotid in 20 sec. equates closely with the response to 1.0 mU of postpituitary extract injected intravenously, whereas the response to the same intracarotid injection after removal of the posterior lobe is very much reduced in size. It is, therefore, a valid procedure to assay the responses in terms of postpituitary extract; and, when this is done, it is found that the response to a given intracarotid injection is diminished by some 90% as the result of removal of the posterior lobe. It will be recollected that the response to emotional stress suffered a similar reduction in magnitude as the result of a similar procedure. No difference was detected between the response to an intravenous and that to an intracarotid injection of postpituitary extract.

*Effect of Short-period Injections is Osmotically Determined.*—It now became of interest to inquire whether it was indeed the increase in the osmotic pressure of the plasma which was operative in eliciting the response to intracarotid injections, and to this end comparison was made of the effects of isosmotic solutions of NaCl and

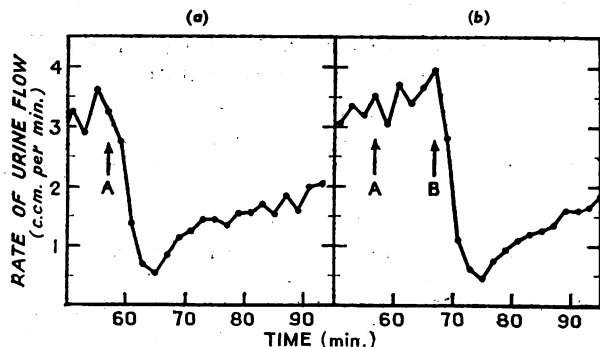


Fig. 15—Inhibitory response to intracarotid injection of hypertonic solution: (a) at A, injection of 10.5 c.c.m. of 1.50% NaCl into left carotid in 9 sec.; (b) at B, injection of 11.0 c.c.m. of 1.50% NaCl into right carotid in 13 sec.

dextrose. Fig. 17 shows three responses: to 10 c.c.m. of 2.50% NaCl injected in 12 sec.; to 10 c.c.m. of 15.4% dextrose injected in 11 sec.; and to 2.0 c.c.m. of 8% NaCl injected in 10 sec., the volume and strength of this last solution being such as were calculated, at an estimated carotid blood-flow of 2.5 c.c.m./sec., to produce about the same increase in osmotic pressure as the two isosmotic solutions. The three responses are indistinguishable and are all assayed at 2.5 mU. The response, therefore, is due not specifically to NaCl but to the rise in osmotic pressure.

The osmoreceptors,† wherever they may be, do not accommodate during short-period exposure to a rise in the osmotic pressure of the carotid plasma produced by NaCl, doubling the period of exposure to the same rise causing the release of at least double the quantity of antidiuretic substance. This lack of accommodation would be expected on the view that the osmoreceptors are continually engaged in controlling the antidiuretic function of the pituitary.

*Effect of Intracarotid Infusions of Hypertonic Solutions of NaCl, and its Quantitative Assessment in Terms of Postpituitary Extract.*—I will now refer to the results of longer periods of exposure to smaller increases in osmotic pressure. The infusions of the solutions of NaCl were

† The term "osmoreceptors" is used without prejudice to any specific permeability which they may later be shown to exhibit to their ionic and molecular environment.

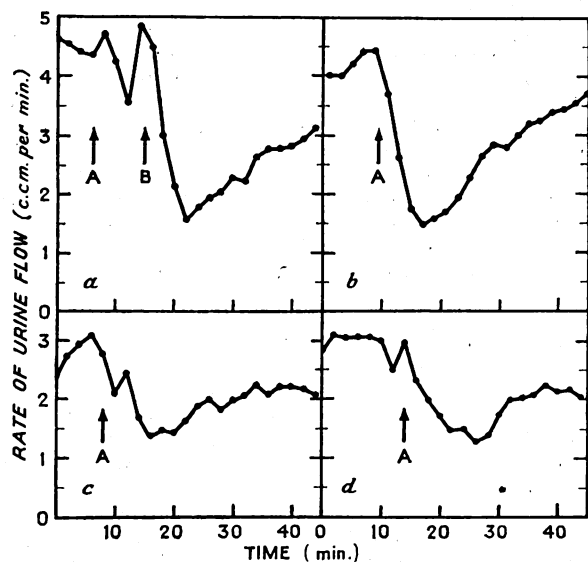


Fig. 16—Responses to injections: a and b 5 days before, c and d 11 days after, removal of posterior lobe of pituitary. a: at B, injection of 21 c.c.m. of 2.50% NaCl into right carotid in 20 sec.; b: at A, 1.0 mU of postpituitary extract injected intravenously in 15 sec.; c: at A, injection of 21 c.c.m. of 2.50% NaCl into right carotid in 20 sec.; d: at A, 0.1 mU postpituitary extract injected intravenously in 20 sec.

made by means of a synchronous motor connected by reduction gearing to the head of a micrometer screw which moved forward the plunger of the all-glass syringe with which the fine infusing needle was connected. It was first necessary to determine the course of the aortic blood-chloride during the infusion of a hypertonic solution into (1) the left carotid artery, and (2) the malleolar vein. Chloride determinations on samples of blood from the right carotid artery taken at intervals during the 10-min. period of such infusion showed that the aortic blood-chloride followed exactly the same course, irrespective of whether the infusion was made into the left carotid artery or into the malleolar vein. So far, therefore, as the effects of an increase in the aortic blood-chloride are concerned, intravenous infusions may be used as controls of intracarotid infusions.

Now, it was found that, when an infusion of NaCl was made into the carotid over a period of 10 min., the urine flow was inhibited earlier than when the same infusion was made into the malleolar vein; and that,

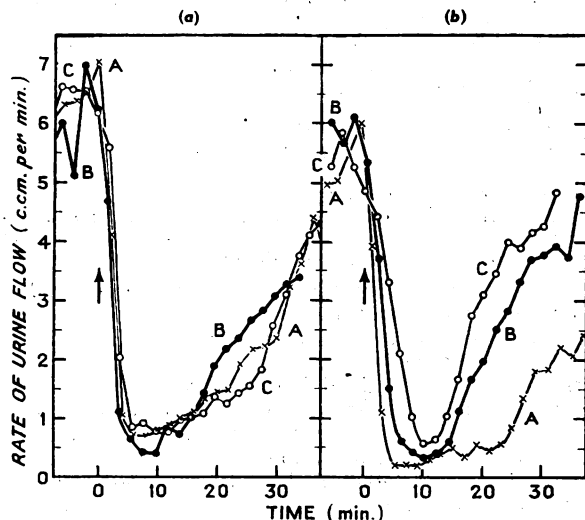


Fig. 17—Similarity between responses to equivalent increases in the osmotic pressure of the carotid plasma: (a) at the arrow 10.0 c.c.m. of 2.50% NaCl was injected into the right carotid in 12 sec. (graph A); 10.0 c.c.m. of 15.4% dextrose in 11 sec. (graph B); and 2.0 c.c.m. of 8.00% NaCl in 10 sec. (graph C); (b) at the arrow postpituitary extract 3.0 mU was injected into the malleolar vein (graph A), 2.0 mU (graph B), and 1.0 mU (graph C).

as the strength of the infused solution was reduced, this difference became greater. The cause of the earlier onset of the inhibition when the infusion was made into the carotid artery must be attributed to the increase in osmotic pressure of the blood in the vascular bed supplied by the carotid over and above that of the aortic blood. Experiments were then performed in which NaCl was infused over periods of 40 min. at the slow rate of 0.33 mg. of NaCl per sec. (fig. 18). The infusion into the carotid was accompanied by a gradual fall in urine flow from 6.0 to 0.5 c.c.m./min., at which level the flow was persisting when the infusion was stopped. The flow then slowly increased to reach a rate of nearly 4 c.c.m./min. thirty minutes later. The responses to intravenous infusion of the same solution of NaCl without added postpituitary extract, and with increasing additions of this substance, are also shown in fig. 18; and the response to the intracarotid infusion is assayed as equivalent to that of an intravenous infusion of 1 μU of postpituitary extract per sec. ( $0.5 \times 10^{-9}$  g./sec. in terms of the standard powder). This, then, may be regarded as the rate at which the antidiuretic substance is being continuously secreted in the non-hydrated dog, a figure which agrees well with the results of Shannon's (1942) experiments on replacement therapy in the dog with diabetes insipidus. The carotid blood-flow of the animal to which fig. 18 relates is probably about 2.5 c.c.m./sec. On this assump-



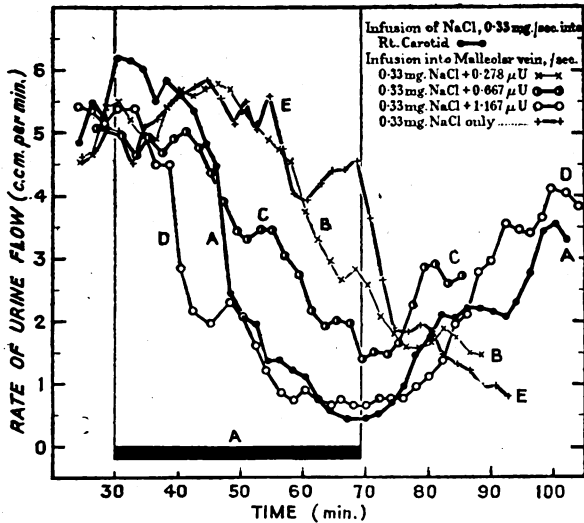


Fig. 18—Effect of prolonged infusion of NaCl into the carotid, and the method of its assay. The black rectangle covers the period of the infusions.

tion the increase in blood-chloride to which the osmoreceptors are responding and causing the pituitary to secrete  $1 \mu\text{U}$  per sec. is  $8 \text{ mg./100 c.cm.}$ , or, in terms of the resultant increase of osmotic pressure in the water phase of the blood,  $96 \text{ mm. Hg.}$ —i.e., an increase of less than 2%. This change in blood-chloride is well within the range of the falls reported in water diuresis in man—Priestley (1921) found a fall of  $35 \text{ mg./100 c.cm.}$  of venous blood—and the smallness of the figure gains additional interest when it is recollected that the carotid infusion was unilateral.

#### HORMONAL CHARACTERISATION OF POSTPITUITARY ANTI-DIURETIC SUBSTANCE

The recovery of urine flow when the intracarotid infusion is stopped shows that the secretion of pituitary anti-diuretic substance is being inhibited by the fall in blood-chloride and consequent depression of activity in the osmoreceptors. The progression of this recovery is to be attributed to the gradual destruction in the kidney, and perhaps in the blood, of the quantity of anti-diuretic substance which was maintaining the secretion of urine at a non-diuretic level. The latent period between the peak of the water-load curve and the maximal rate of urine secretion, to which I referred earlier and promised to return, is to be attributed to the same process, as indeed was foreseen at the time that work was done. Water diuresis, then, may be fitly and accurately described as a condition of physiological diabetes insipidus; and there can be little doubt that the anti-diuretic secretion of the neurohypophysis is a hormone in the physiological sense, its liberation being continuously governed by the contemporary concentration of chloride, and possibly of other osmotically active substances, in the arterial plasma.

The presence of osmoreceptors connected by nerve paths with the pituitary was postulated by Klisieccki et al. (1933), who gave also references to earlier work on water diuresis. Their apprehension has now become justified; their localisation is for future inquiry. We do not yet know whether the osmoreceptors lie in the vascular bed—e.g., the supra-optic nucleus—supplied by the internal carotid artery or in that supplied by the external; they are not in the carotid sinus. Should the site of the receptors become experimentally definable, one may predict the possibility of developing a suitable technique for their exposure in the non-diuretic animal to a local fall in osmotic pressure, and so of producing a condition of diabetes insipidus which, in its experimental reversibility, would exhibit the attribute which theory demands.

#### POSTSCRIPT

Since this lecture was delivered, short-period (10 sec.) intracarotid injections of hypertonic solutions of sucrose have been found to release approximately the same amount of the anti-diuretic hormone as do similar injections of isosmotic solutions of NaCl and of dextrose. A similar injection of an isosmotic solution of urea is, however, entirely without action. Moreover, long-period (40 min.) intracarotid infusion of dextrose, producing a local increase in blood-sugar of some  $80 \text{ mg./100 c.cm.}$  and the same increase in osmotic pressure as does the NaCl in the experiment illustrated in fig. 18, has no apparent influence on the course of water diuresis. It appears that, as judged within the compass of these periods, the osmoreceptors are freely permeable to urea, less freely permeable to dextrose, and relatively impermeable to sodium chloride. Further, in connexion with the localisation of the osmoreceptors, it has been found in the one animal to which the test has so far been applied that the anti-diuretic response to an intracarotid injection of a hypertonic solution of NaCl vanishes as the result of ligation of the internal carotid artery.

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#### ORAL PENICILLIN IN GONORRHEA

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It was early observed by Abraham et al. (1941) that the dose of penicillin clinically effective parenterally was ineffective orally, and that the proportion of oral penicillin recovered in the urine was low compared with that of parenteral. Penicillin being unstable at low pH, its destruction in the stomach was assumed to play an important part; and the later discovery of the production of penicillinase by coliform organisms seemed to justify the view that the antibiotic could not be effective by mouth (Chain and Florey 1944).

The largely theoretical concept of destruction of penicillin by gastric juice has been thoroughly investigated.

Cutting et al. (1945) made extensive tests with enteric coatings and concluded that a resin-cellulose plastic was superior to all others, but they also incorporated acid-neutralising buffers.

Burke et al. (1945) used a double gelatin capsule hardened in formaldehyde and alcohol and gave prior treatment with aluminium hydroxide.

György et al. (1945) used sodium citrate as a buffer, and Charney et al. (1945) showed that after the oral administration of penicillin with sodium citrate, especially after meals, the amount of penicillin excreted in the urine was increased.

McDermott et al. (1945) combined penicillin with peanut oil as a protection against acid.

TABLE I—SERUM-PENICILLIN LEVELS AFTER ADMINISTRATION OF SINGLE DOSES OF UNCOATED AND ENTERIC-COATED TABLETS

Volunteer	Dose of penicillin (I.U.)	Tablet	Serum-penicillin level (I.U./ml.) at hours after administration			
			0.5	1.5	3.0	5.0
A	40,000	Uncoated	0.06	0.125	0.03	0.02
		Coated	<0.02	<0.02	0.12	<0.02
B	40,000	Uncoated	0.04	0.2	0.03	<0.02
		Coated	<0.02	<0.02	0.03	<0.02
C	60,000	Uncoated	0.04	0.08	0.04	<0.02
		Coated	<0.02	<0.02	0.04	<0.02
D	60,000	Uncoated	0.04	0.16	0.08	<0.02
		Coated	<0.02	<0.02	<0.02	<0.02
E	60,000	Uncoated	0.06	0.2	0.04	<0.02
		Coated	<0.02	<0.02	0.08	<0.02
F	60,000	Uncoated	0.12	0.12	0.16	<0.02
		Coated	<0.02	<0.02	0.03	<0.02

Most authors claim some advantage for their adjuvant, but Bunn et al. (1945), after a trial of antacids and suspensions in oil and beeswax, could find no instance in which their effect was superior to that obtained with penicillin either in capsule or dissolved in saline.

The present position is summed up by Finland et al. (1945), who conclude that penicillin in water gives as good results as when taken with buffers or stabilisers, though aluminium hydroxide may have a slight adjuvant effect. It seems, however, of paramount importance for penicillin in water to be taken before meals.

In the absence of experimental evidence derived from penicillin absorption and excretion balance experiments in man, two further possibilities should be considered. Free et al. (1945) believe penicillin to be destroyed in the tissues. A contrast is drawn between the sudden flooding of the blood-stream after intravenous or intramuscular injection and the continuous entry into the circulation after oral administration. The other possibility is that penicillin is slowly and incompletely absorbed. If this is true, there may be unexpected advantages in the oral route in the case of highly susceptible organisms located in tissue other than blood.

In infections due to the gonococcus or to the pneumococcus, both of which are known to be extremely sensitive to penicillin (Ross et al. 1945), a good deal of evidence exists that penicillin may be administered effectively by mouth provided the dose is adequate.

György et al. (1945) treated successfully 18 cases of gonorrhoea in adult males, 5 cases of gonococcal vulvovaginitis in children, and 3 cases of gonococcal conjunctivitis in infants with penicillin by mouth in doses varying from 10,000 units three-hourly or four-hourly in children to 15,000–40,000 units three-hourly in adults for two or three days. In 3 further cases of gonococcal vulvovaginitis there was a relapse after three courses of the same dosage, but permanent cures followed the same dosage given intramuscularly.

Finland et al. (1945) report 7 failures in the treatment of 61 cases of acute gonorrhoea, using a total dosage varying between 120,000 and 800,000 units given hourly or two-hourly.

Ross et al. (1945) treated successfully 8 cases of gonococcal vulvovaginitis in children with four doses each of 100,000 units three-hourly. In a preliminary trial there were failures with two doses and three doses each of 100,000 units.

Cutting et al. (1945) reported 11 failures in the treatment of 53 cases of gonorrhoea. In 4 of the failures the patients had each received doses of 25,000 units, with a total dosage of 250,000 units, and in the remaining 7 failures the patients had each received doses of 50,000 units, with a total dosage of 500,000 units.

Free et al. (1945) treated 14 cases of gonorrhoea with 1,600,000 units in two days (100,000 units two-hourly during the waking period); there were no failures.

Bohls et al. (1946) treated 10 cases of gonorrhoea with one oral dose of 100,000 units, with 4 failures; 15 with a single dose of 200,000 units, with 1 failure; 13 with 100,000 units

twice daily for two days, with 3 failures; and 36 with 200,000 units twice daily, with 1 failure.

The present report concerns 62 cases of gonorrhoea treated orally with six doses of penicillin 40,000 I.U. and sodium citrate 1 g. three-hourly. After single doses of 40,000 or 60,000 units (2 or 3 tablets each containing calcium penicillin 20,000 I.U. with sodium citrate 0.5 g.) taken an hour after breakfast, estimates were made at intervals on volunteers. Food, consisting of bread and butter and tea, was taken about two hours after the penicillin, and a light lunch two hours later. The resulting concentrations are shown in table I. When given in uncoated tablets penicillin appeared in the blood within 30 min., reached a peak in about 1½ hours, and was undetectable at 5½ hours. When given in tablets coated with a multilayer enteric coating of proved efficiency penicillin did not appear in the blood until after 2½ hours, and was undetectable at 5½ hours. Only 11 patients received coated tablets.

#### DETERMINATION OF PENICILLIN IN BLOOD

The usual methods for determining penicillin in blood-serum will not detect quantities less than 0.02 unit per ml. American workers (cited by Suchet 1945) consider that lower levels than this are therapeutically effective in gonorrhoea; this may be true, for many organisms are definitely sensitive to lower levels when tested *in vitro* with suitable bacteriological media.

The limiting factor is the need to dilute the serum to make it a suitable medium for the growth of the test organism. Attempts to increase the sensitivity of the estimation by using the gonococcus for this purpose failed, since it grows feebly in 50% serum, and any increase in sensitivity which is gained is defeated by the need for higher dilutions. We have found Fleming's (1943) slide technique an easy and convenient method for small quantities. It avoids the need for absolutely sterile samples, as neat serum and red cells do not readily grow the ordinary contaminants, though readily allowing the growth of the test organism—a virulent haemolytic streptococcus.

The neat blood does, however, slightly decrease the antibiotic action of the penicillin; hence levels below 0.02 unit per ml. cannot be detected. Abraham and Duthie (1946) found that penicillin was most active at pH 6.5, and by increasing the hydrogen-ion concentration of the blood we have attempted, unsuccessfully, to increase the sensitivity of Fleming's method.

#### PRELIMINARY OBSERVATIONS

Preliminary observations were made on patients with acute gonorrhoea treated with penicillin 40,000 units and sodium citrate 1 g. at various intervals and for various periods. There was a good response in 6 patients receiving six doses four-hourly and 6 receiving five doses four-hourly. Among 10 patients receiving four doses three-hourly and 4 patients receiving three doses four-hourly there was 1 failure in each group; both responded well to a second course of six doses three-hourly. These clinical observations suggested to us that twelve hours was too short a period of treatment, and four hours too long an interval between doses; so we decided to treat further cases (62 in all) with six doses three-hourly.

The serum-penicillin levels were determined in 53 cases. Considerable variations were found before each dose, not only from patient to patient but also in the same patient. Examples are shown in table II.

#### TYPE OF CASE

In this series we treated a total of 85 adult males (84 with gonorrhoea and 1 with primary anorectal gonococcal infection) and 3 adult females (1 with urethritis and cervicitis and 2 with cervicitis only). Of these 88 cases 40 were sulphonamide-resistant, of which 2 were complicated by acute epididymitis, 1 by acute

prostatitis, and 3 (2 males and 1 female) had not responded to intramuscular injections of penicillin administered elsewhere. Of these latter, 1 male had had one injection of 150,000 units in peanut oil and the other had had five daily doses of 100,000 units each; the female had had one injection of 200,000 units in peanut oil and beeswax, and, owing to failure, had had a similar dose five days later. To facilitate the taking of blood two-hourly in certain patients, 42 were admitted to hospital for twelve hours and 46 continued with their usual occupations. Fluids were restricted to  $1\frac{1}{2}$  pints during treatment, and there was usually at least an hour's interval between the taking of tablets and solid food. Urination took place two-hourly, immediately after the taking of smears and cultures.

#### CLINICAL OBSERVATIONS

A feeling of well-being during treatment was observed (as it is after parenteral administration) in many of our cases; we attribute this to the elimination of a gonococcal bacteraemia.

The gonorrhoeal discharge, often more profuse 2-6 hours after the start of treatment, became progressively less during treatment; in a few cases it disappeared entirely. In a large proportion of cases the creamy discharge at the fourth hour became mucopurulent, and at each subsequent examination more mucoid, persisting as such until 2-5 days after the last dose of penicillin. Residual non-gonococcal urethritis (more frequent in sulphonamide-resistant cases) in most cases was due, as it is with parenteral penicillin, to resolution processes in gonococcal lesions, such as soft infiltrations and infections of glandular tissues. Pre-existing lesions of the urinary tract may also be a cause of persistence of non-gonococcal urethritis. This was so in one of our

TABLE II—SERUM-PENICILLIN LEVELS (I.U./ML.) IN PATIENTS RECEIVING BY MOUTH PENICILLIN 40,000 UNITS AND SODIUM CITRATE 1 G. THREE-HOURLY FOR SIX DOSES

Case	2*	4	6	8	10	12	14	16
	2†	1	3	2	1	3	2	1
1	<0.02 +	0.04 +	<0.02 -	<0.02 -	0.16 -	0.02 -	0.02 -	0.12 -
2	<0.02 +	<0.02 +	0.02 -	<0.02 -	<0.02 -	<0.02 -	<0.02 -	0.06 -
3	<0.02 +	0.04 +	<0.02 +	<0.02 -	0.04 -	<0.02 -	<0.02 -	<0.02 -
4	<0.02 +	0.04 -	<0.02 -	<0.02 -	0.04 -	<0.02 -	<0.02 -	0.02 -
5	<0.02 +	0.03 +	0.10 -	0.02 -	<0.02 -	<0.02 -	<0.02 -	0.04 -
6	0.02 -	<0.02 -	<0.02 -	0.04 -	<0.02 -	<0.02 -	<0.02 -	0.08 -
7	<0.02 +	<0.02 +	<0.02 +	<0.02 -	0.04 -	0.02 -	0.02 -	0.04 -
8	0.12 +	0.06 +	0.04 +	0.04 -	0.02 -	0.16 -	0.02 -	0.02 -
9	<0.02 +	0.04 +	0.02 +	0.02 -	0.12 -	0.02 -	<0.02 -	0.04 -
10	<0.02 +	0.02 +	0.02 +	<0.02 -	0.02 -	<0.02 -	0.02 -	0.04 -
11	0.02 +	0.16 +	.. +	0.12 -	<0.02 -	0.06 -	<0.02 -	<0.02 -
12	<0.02 +	0.04 +	<0.02 +	<0.02 -	0.02 -	<0.02 -	<0.02 -	0.02 -
13	<0.02 +	<0.02 -	<0.02 -	<0.02 -	<0.02 -	<0.02 -	0.02 -	0.02 -
14	<0.02 +	<0.02 +	<0.02 -	<0.02 -	<0.02 -	<0.02 -	0.02 -	0.02 -
15	<0.02 -	0.02 -	<0.02 -	0.04 -	0.04 -	<0.02 -	0.08 -	0.08 -

\* These figures indicate hours after start of treatment.

† These figures indicate hours after last dose of penicillin.

+ = Gonococci in films of discharge.

- = No gonococci in films.

cases in which a discharge was present until the fourteenth day, when urethroscopy revealed a stricture of the urethra due to a previous attack of gonorrhoea.

Primary mixed infections due to both the gonococcus and non-specific organisms are also occasionally responsible for residual non-gonococcal urethritis. Penicillin is effective in destroying the gonococcus but usually does not benefit non-specific infections. One such patient (who admitted masturbation) developed an acute non-specific epididymitis four days after the completion of treatment.

The urine, in recent infections, still contained a few mucous threads in the first glass after completion of treatment, but in some of the older infections, especially sulphonamide failures with gross involvement of the posterior urethra, it was still muddy, or clear, with heavy threads, usually in one glass, but on four occasions in two glasses. The persistence of a mucoid non-gonococcal discharge did not often indicate the condition of the urine, as in many such cases the first morning specimen was clear, with no threads. Threads in the urine were often present for a week and sometimes for longer periods, and would no doubt have disappeared more rapidly with a few urethrovessical irrigations, withheld entirely in this series for fear of masking gonococcal relapse.

Dysuria, noted in 39 cases before the start of treatment, invariably disappeared during treatment, but in 4 cases (2 associated with painful erections, no discharge, and clear urine with no threads) it persisted two days and may have been due to restriction of fluids during penicillin therapy. The early clinical cure in the cases with painful erections was considered to be explained by the fact that resolution was taking place in structures—e.g., corpora cavernosa—isolated from the urethra.

#### TOXIC MANIFESTATIONS

An urticarial eruption developed in one patient two hours after the fifth dose. The sixth dose was taken, and the patient was not seen by one of us until four hours later, when there was swelling of hands, feet, and neck, and a generalised papular urticaria. Ephedrine gr.  $\frac{1}{2}$  was given six-hourly, and the skin returned to normal in thirty-six hours. Before the administration of oral penicillin the patient had been treated elsewhere with several courses of sulphonamides and was said to have had, a week before seeing us, a daily injection of penicillin 100,000 units for five days. This we rather doubted, as the urethral discharge had not improved. A patch test carried out two months after completion of treatment was completely negative. This patient was reinfecting a fortnight after the patch test, and no toxic manifestations were observed with a repeated course of oral penicillin.

#### BACTERIOLOGICAL EXAMINATIONS

Smears of the urethral discharge were examined every two hours during treatment in most cases. Giant forms of gonococci (first observed by one of us in January, 1944) were present in all cases at two hours, usually at four hours, and occasionally at six hours (their delay in disappearance being invariably associated with the use of coated tablets), when they were detected only after a thorough search. Gonococci, normal in size and shape, were also seen in most cases at two hours and often at four hours. Cultures were carried out two-hourly in many cases, but the gonococcus was not grown after smears had become negative. The rate of elimination did not appear to be related to the blood-penicillin level (table II), and the invariable presence of giant forms in smears taken two hours after the start of treatment showed that penicillin was present in the discharge at that time. The presence of giant forms in smears did not indicate that viable gonococci were no longer present in the secretions, since cultures in such cases were occasionally positive. Cultures were positive

in several cases up to six hours, when coated tablets were given, after the start of treatment but never later, in spite of the presence in smears of an occasional giant form. It is an easy matter to overlook giant forms at and after the sixth hour, as they may stain very lightly and, when engulfed in degenerated polymorphs, may be mistaken for a portion of the nucleus.

#### TESTS FOR CURE

Our investigations began in February, 1946, and a large majority of our cases have been under observation five or six months, none less than two months. During the first fortnight examinations were carried out thrice weekly, and subsequently weekly. All patients were requested to refrain from micturating for at least three hours before each visit, when smears and cultures were taken and the condition of the urine assessed by the two-glass test.

No instrumentation or rectal investigations were carried out until fourteen days had elapsed, when in all cases there was no discharge and the urine was clear, with no threads, at which stage tests for cure were made. Anterior urethroscopy was performed. Smears and cultures after massage of prostate, vesiculæ seminales, and Cowper's glands were made on two occasions at an interval of a week. At least one of the examinations took place before the first morning micturition and usually followed the anterior urethroscopy. Other than the detection of 1 case of urethral stricture, these tests were negative in all cases. The Wassermann and Kahn reactions were negative in all cases, and the gonococcal complement-fixation reaction was positive in 8; 3 of these became negative during the period of observation, the others remaining persistent positives. The significance of these latter has been discussed elsewhere (Harkness 1944 and 1945) and is due, in our opinion, to delay in the start of treatment or to previous long-standing infection. All the failures and reinfections had negative reactions.

On completion of the above-mentioned tests the taking of alcohol was permitted, and during the subsequent observation periods of weekly examinations the Wassermann and Kahn tests were repeated on several occasions in view of the dangers of a concomitantly acquired syphilis.

#### FAILURES AND REINFECTIONS

In all there were 4 failures and 2 reinfections. There were 2 relapses (twenty-four hours after three doses of 40,000 units four-hourly, and forty-eight hours after four doses of 40,000 units three-hourly) during the preliminary observations, when the minimal effective amount of oral penicillin was being studied. The 2 other failures (our only failures in 62 cases receiving six doses of 40,000 units three-hourly) could be attributed to maladministration on the part of the patients. One was a labourer who had previously been resistant to one injection of 150,000 units in peanut oil and beeswax and a five-day course of sulphathiazole 1 g. six-hourly and who, owing to a misunderstanding of our orders, took large amounts of fluids during his oral penicillin course. The other was a young man who did not take the tablets at the proper intervals. Cure in both these cases was effected by a second course; the dose was, however, probably needlessly increased to 60,000 units. The case of epididymitis which developed four days after completion of treatment, when there was no discharge and the urine was clear, with no threads, was considered to be due to the effects of trauma by masturbation on a recently inflamed urogenital tract with a mild residual non-gonococcal infection. A laboratory report of the centrifuged deposit of urine showed only an occasional leucocyte, and cultures were sterile. The reinfections occurred in 2 males (who admitted exposure without protection two and three days before the onset of urethritis) a month and two and a half months after

cures had been effected with six doses of 40,000 units three-hourly; both were again successfully treated with the same dosage.

#### DISCUSSION

The practical demonstration of the efficiency of oral penicillin emphasises the importance of dosage. The first assumption following the demonstration that more was required was that much was destroyed; but recent evidence gives less and less support to the theory of gastric or penicillinase destruction. Our own evidence that the only effect of an enteric coating of proved efficiency was to delay the arrival of penicillin in the blood-stream gives no support to the theory of destruction in the stomach. There remains the theory of destruction in the tissues. We believe the evidence of renal clearance following intravenous and intramuscular exhibition to obscure the field; more diffuse penicillin penetration in tissues other than blood may well follow the slower absorption of oral penicillin. That penicillin absorption from the gut is slow and probably incomplete is the explanation we favour.

There were 2 failures in our 62 cases treated for fifteen hours with 240,000 units (40,000 units at three-hourly intervals), a relapse-rate comparing very favourably with our work and the work of others with parenteral penicillin. An analysis of our estimates of serum-penicillin levels shows the levels to have been generally at or under 0.02 unit throughout the course of treatment. This level is lower than that quoted as essential to success by some authorities. Thus Jones et al. (1945) consider that a high percentage of cure cannot be obtained unless the serum inhibition is present in a dilution of not less than 1 in 8 and is maintained for nine and a half hours; but their published figures do not support this view. This degree of serum inhibition would necessitate a concentration of 0.08 unit per ml.; and, even though most of our cases had levels higher than this during treatment, the average level was lower. On the other hand, some American workers maintain that blood-penicillin levels undetectable by laboratory methods are clinically efficient, and Allan (1946) is of the opinion that a demonstrable amount of penicillin in the blood need not be maintained so long as hitherto believed necessary, nor that the level need be high. Perhaps further study of different serum-penicillin levels maintained for different lengths of time will explain this discrepancy. Jones et al. (1945) believe 0.08 unit for nine and a half hours to be essential; we maintained a level of about 0.02 unit for about fifteen hours. Our figures support the view that lower serum-penicillin levels maintained for a longer time may be effective, since we had 2 failures in 14 cases receiving nine hours' treatment, and only 2 failures in 62 cases receiving fifteen hours' treatment. Again, the presence of giant forms of gonococci before penicillin has been detected is evidence of antibiotic activity at low serum-penicillin levels.

Non-gonococcal urethritis persists for various periods with equal frequency, after successful oral and parenteral penicillin therapy, but in our opinion it occurs more often than after successful sulphonamide therapy. Adjuvant treatment, consisting of urethrovessical irrigations, would have been helpful in aiding resolution in some of our cases and is recommended, but it was withheld for fear of masking gonococcal relapse.

The minimum of interference until fourteen days after the disappearance of gonococci from the secretions is a wise precaution, as trauma due to instrumentation and prostatovesicular massage may precipitate local or metastatic non-gonococcal complications; in one of our cases epididymitis followed masturbation.

Oral administration of penicillin incorporated in sodium citrate is recommended for the treatment of gonorrhoea. It is necessary, however, to give a word of

warning on the importance of regular dosage during the fifteen hours' course; otherwise failure may sometimes follow, as it does with sulphonamide therapy. Short concise instructions should be given verbally and in writing to each patient. The course of treatment has the advantage that the drug is taken only during fifteen normal waking hours.

## SUMMARY

Of 62 cases treated for fifteen hours with six doses each of penicillin 40,000 units and sodium citrate 1 g. given by mouth, a total of 240,000 units, 2 cases relapsed.

This rate compares favourably with our experience of parenteral therapy.

It is important to keep strictly to the regular dosage schedule and the restriction of fluids to 1½ pints during the course.

We are indebted to Dr. P. Lamb, of St. Peter's Hospital, and to Mr. A. E. Day and Mr. J. Croxford, male nurses at St. Charles's Hospital, for their collaboration; and Messrs. Burroughs Wellcome & Co. for supplying the tablets, each containing calcium penicillin 20,000 i.u. and sodium citrate 0.5 g.

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Darby and Jones (1945) and Darby et al. (1946) have reported from America that synthetic folic acid has successfully abolished or reduced megaloblastic hæmopoiesis in non-tropical sprue, with restoration of a normal blood picture. Spies (1946a) has obtained a good hæmopoietic response to folic acid, with reversal of megaloblastic hæmopoiesis, in macrocytic anæmias, including nutritional macrocytic anæmia, pellagra, uncomplicated Addisonian pernicious anæmia, macrocytic anæmia of pregnancy, and sprue.

A link is provided between the megaloblastic hyperplasia of the marrow in sprue and Addisonian pernicious anæmia, besides other megaloblastic anæmias, in that synthetic folic acid, which appears to be distinct from the hæmopoietic principle of the liver, may restore normoblastic hæmopoiesis in all these conditions. With reference to the multiple-factor hypothesis of Jacobson and SubbaRow (1937) regarding the nature of the hæmopoietic principle, folic acid also appears to be distinct from their "primary factor," which is a liver fraction active in very small amounts, especially in the presence of accessory substances. The use of folic acid in sprue by Darby and Jones (1945) and Darby et al. (1946) was the outcome of observations on the similarity between human sprue syndrome and vitamin-M deficiency in rhesus monkeys described by Day et al. (1935). This deficiency condition, accompanied by severe anæmia, leucopenia, and diarrhœa, could be prevented by giving dried brewer's yeast or liver extract, and Day et al. (1945) found *Lactobacillus casei* factor to be curative. This factor is also necessary for normal growth and hæmoglobin formation in chicks.

The *L. casei* factor had been described by Snell and Peterson (1940) as "norite eluate factor," extractable from yeast and liver, and an essential growth factor for *L. casei*. A growth factor for *Strep. lactis*, isolated by Mitchell et al. (1941) from spinach and called folic acid, was found to be widely distributed in vegetable and animal tissues. Many observers noted similarities between the properties and activities of *L. casei* factor and folic acid from various sources, and Piffner et al. (1943) isolated a crystalline folic-acid substance from liver with growth-promoting activity for *L. casei* and *Strep. lactis*. SubbaRow et al. (1945) finally synthesised a folic acid identical with the natural *L. casei* factor from liver.

It is this synthetic folic acid or *L. casei* factor which has been used therapeutically in man, and its structural formula, with two alternative modes of synthesis, has been published by Angier et al. (1946). The substance contains pteridyl, *p*-aminobenzoyl, and glutamic-acid groups. The extent of the natural group of substances to which synthetic folic acid belongs is not yet known. Piffner et al. (1945) isolated a crystalline vitamin-B<sub>12</sub> conjugate from yeast with anti-anæmic potency for the chick but very little microbiological growth-promoting activity. They suggest that further work may reveal the relationship of several compounds—e.g., the human nutritional factor of Wills (1931) in yeast—to this crystalline factor. Darby et al. (1946) suggest the term "vitamin-M group" to designate substances related to folic acid and *L. casei* factor with hæmopoietic activity for primates.

Recent American work suggests that the pyrimidine base, thymine, which is identical with synthetic 5-methyl uracil (Jones 1920), may have a hæmopoietic activity similar to that of folic acid. Snell and Mitchell (1941) and Stokstad (1941) showed that thymine could be substituted for folic-acid substance as the growth factor for *L. casei*, provided substances such as adenine were present. Stokes (1944) found the bacterial cells grown with thymine to contain no folic acid; great excess of thymine is required as a substitute for folic acid, and he suggests that folic acid is a coenzyme for the synthesis of thymine or similar substances required for

## HÆMPOIETIC RESPONSE TO FOLIC ACID IN PERNICIOUS ANÆMIA

### THE STERNAL-MARROW CHANGES

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THIS paper describes the results of folic-acid therapy in a case of pernicious anæmia, with particular reference to the sternal-marrow changes. Consideration of one case obviously does not justify full assessment of the value of folic acid in the treatment of pernicious anæmia, but the observations on hæmopoiesis are of interest.

The range of hæmopoietic substances affecting the human bone-marrow has recently been extended. The hæmopoietic principle of liver, effective in very highly concentrated form in restoring the megaloblastic hæmopoiesis of uncomplicated Addisonian pernicious anæmia to normoblastic form, does not always abolish the similar megaloblastic picture which may accompany tropical or non-tropical sprue. Less highly refined and concentrated liver extracts given parenterally, or proteolysed liver or yeast extract by mouth, are often effective however, substances other than the hæmopoietic principle of liver or Castle's intrinsic factor (Castle et al. 1930) presumably being involved. The successful treatment of nutritional macrocytic anæmia with autolysed yeast extract has been attributed by Wills (1945) and Wills and Evans (1938) to a substance distinct from the extrinsic factor.

TABLE I—PERIPHERAL BLOOD PICTURE BEFORE THERAPY

Time	Red cells (millions per c.mm.)	Hb (% Haden)	Hb (g./100 c.cm.)	Colour-index	Reticulo-cytes (%)	White cells (per c.mm.)	Poly-morphs (per c.mm.)
On admission*	0.9	24	3.74	1.33	—	2600	2002
2nd day†	0.84	20	3.12	1.19	0.2	—	—
3rd day‡	0.68	21	3.28	1.54	0.3	1900	1235

\* 1 normoblast and 1 intermediate erythroblast per 100 white cells. † P.C.V. 9.2 c.cm.%; M.C.H. 48.2  $\gamma\gamma$ ; M.C.V. 135.3  $\mu$ c.m.; M.C.H.C. 35.6%; E.S.R. (Wintrobe) 55 mm. after 1 hour; corrected E.S.R. <1 mm.

‡ Blood-platelets 105,000 per c.mm.

the synthesis of nucleic acids. Spies (1946b) has substituted synthetic thymine for folic acid in the treatment of tropical sprue and Spies et al. (1946) of pernicious anæmia; hæmopoietic response has been obtained, but the dosage required is large (15 g. a day). Berry and Spies (1946) have recently reviewed the present status of folic acid and substances with related action.

The case to be described here has been treated by the oral administration of synthetic folic acid.

## CASE-RECORD

A man, aged 63, was admitted to hospital on June 4, 1946, with six months' history of weakness, anorexia, and loss of weight. He had lost 16 lb. The skin of his face and hands had become darker; for two months there had been progressive dyspnoea on exertion.

He had been given six 1 c.cm. injections of a liver extract without improvement; the liver preparation used was six years old.

His diet before his illness had been high in carbohydrate, with deficiencies in vitamins A, B complex, and C. On admission he was placed on a hospital ward diet omitting liver, kidneys, and sweetbreads.

There was nothing relevant in past or family history.

*On Examination.*—Cheerful, coöperative, and emaciated. Weight 103 lb. Height 5 ft. 2 in. No orthopnoea, but dyspnoea on slight exertion. Skin of face and hands pigmented; mucosæ pale, no pigmentation. Hair grey. Temperature normal. Tongue moist, pale, with smooth surface and atrophic papillæ. Spleen just palpable. Jugular venous pressure 2 cm. above sternal angle. Resting pulse-rate 100 per min. Blood-pressure 120/45. Heart not enlarged; no added sounds. No abnormal neurological signs.

*Fractional Test-meal.*—Histamine-fast achlorhydria.

*Neutral-red Test-meal.*—No neutral red in any of the specimens of gastric juice.

*Gastroscopy* June 29 (Mr. Avery Jones).—Anterior wall and fundus showed gross mucosal atrophy, these changes less marked on posterior wall and not present on antrum.

*Radiography.*—Barium meal showed smooth mucosa, with few rugæ.

*Urine.*—Schlesinger's test for urobilin was strongly positive on admission, and from the fourth day of treatment onwards weakly positive.

*Plasma icteric on admission.* Plasma bilirubin less than 0.5 mg. per 100 c.cm. two days after start of folic-acid therapy; 1 mg. per 100 c.cm. six weeks later; less than 0.5 mg. per 100 c.cm. nine weeks from start. Direct van den Bergh consistently negative.

*Hæmatological Investigations.*—The peripheral blood picture before therapy is given in table I.

*Blood films* showed anisocytosis of the erythrocytes, with a preponderance of ovoid rather large cells and occasional very large macrocytes. There was very little anisochromasia or polychromasia. Poikilocytosis was quite frequent. The nucleated red cells present were normoblasts or intermediate erythroblasts. The neutrophil polymorphs sometimes showed excessive segmentation of the nucleus.

*Sternal puncture* was performed shortly after admission, and films and sections of the marrow indicated very advanced megaloblastic hyperplasia, with abnormalities in the granulocytic series leading to the formation of giant metamyelocytes and proleucocytes (table II). Hæmocytoblasts were numerous (2.2%), and the early members of red-cell and granulocytic series were increased. The nucleated red cells were predominantly members of the abnormal megaloblastic series, and all

stages of hæmoglobinisation were observed. Occasional mitoses were seen, and were practically confined to the megaloblasts. There was considerable pleomorphism of the megaloblasts, and giant forms were seen with multiple nuclei and moderately advanced hæmoglobinisation of the cytoplasm (fig. 2). The sections showed a sheet-like cellular hyperplasia, with obliteration of fat-spaces, and the very numerous elements with basophilic cytoplasm were seen to be islets of megaloblasts developing near hæmocytoblasts (fig. 1).

*Therapy.*—Oral treatment with folic acid was given; 20 mg. was administered on each of the first two days, followed by 10 mg. daily for six days.

On the day following the start of therapy the patient's general condition deteriorated, he became mentally confused and disoriented, and showed signs of increasing congestive cardiac failure. Jugular venous pressure 10 cm. above sternal angle, blood-pressure 90/50 mm. Hg. A slow drip transfusion of 250 c.cm. of packed red cells was given carefully for six hours, followed by distinct improvement. A further 250 c.cm. of packed red cells was given next day. The general condition was now much improved, and the jugular venous pressure was not raised above the sternal angle, blood-pressure being 110/60 mm. Hg.

The hæmatological response to therapy was good, and the peripheral blood changes are shown in fig. 7. A reticulocyte response of 3.4% began on the fourth day and reached a maximum of 27.6% on the sixth day. A rapid rise in the red-cell count and Hb levels was accompanied by a gradual return of the leucocytes to within normal limits.

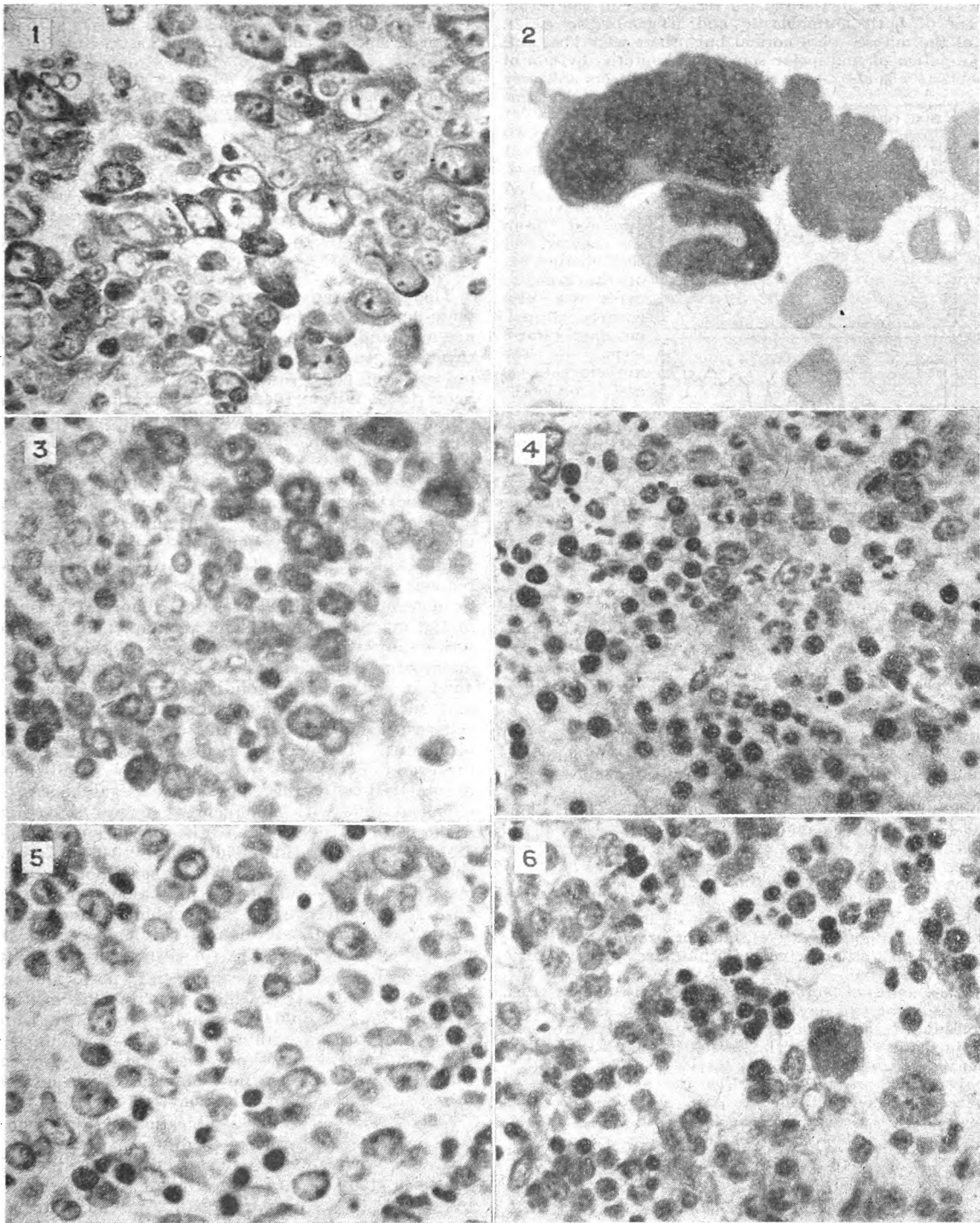
The qualitative and quantitative changes in the sternal-marrow picture are shown in table II. Early changes were apparent twenty-four hours after the start of folic-acid

TABLE II—MYELOGRAMS BEFORE, DURING, AND AFTER THERAPY

Cell types	Percentage of cell types (from counts of 500 cells)					
	Shortly after admission	Days from start of 1st course of folic acid			19 days from start of 2nd course of folic acid	6 days from start of 3rd course of folic acid
		1 day	10 days	16 days		
Reticulum cells	0.6	1.0	0.4	0.4	0.6	—
Hæmocytoblasts	2.2	1.8	0.4	0.4	1.0	0.2
Myeloblasts	2.4	1.2	0.4	0.6	1.4	0.2*
Promyelocytes	3.1	0.6	0.8	0.8	1.4	2.4*
Myelocytes	6.6	6.0	5.8	4.0	8.2	4.6*
N. metamyelocytes	2.2	5.4	9.4	4.4	5.4	9.6*
Giant n. metamyelocytes	1.8	0.8	—	0.2	1.2	—*
E. metamyelocytes	1.8	1.8	0.2	0.4	1.0	0.6*
N. proleucocytes	7.8	10.8	11.6	5.2	9.2	15.4*
Giant n. proleucocytes	10.2	2.6	—	—	1.2	—*
E. proleucocytes	0.8	2.4	1.0	0.8	0.6	0.6*
N. leucocytes	14.0	14.6	20.8	45.0	20.6	11.4*
E. leucocytes	2.2	1.8	1.8	0.8	0.8	1.8*
B. leucocytes	—	—	—	0.6	1.0	0.8*
Total immature granulocytes (to metamyelocytic stage)	18.2	15.8	17.0	10.4	18.6	18.4
Promonocytes and monocytes	—	—	2.2	0.2	0.8	0.4
Plasma cells	0.4	0.2	—	—	0.4	0.2
Lymphocytes	28.6	13.8	20.4	25.6	29.4	25.2
Total white cells	82.6	64.0	75.2	88.6	82.6	73.2
Proerythroblasts	1.6	3.6	—	1.0	0.4	0.6†
Early erythroblasts	—	3.8	1.6	1.8	3.4	1.2†
Intermediate erythroblasts	—	0.4	6.4	3.2	3.8	6.6†
Late erythroblasts	—	0.2	8.6	2.6	2.6	9.6†
Normoblasts	0.2	2.2	5.8	1.6	2.2	6.6†
Macronormoblasts	0.8	2.0	1.2	—	0.2	0.4†
Early megaloblasts	2.2	6.2	—	—	—	—†
Intermediate megaloblasts	3.6	6.0	—	—	0.6	—†
Late megaloblasts	3.4	4.4	—	0.4	1.2	—†
Erythroblasts in mitosis	—	1.0	0.6	—	0.2	0.2†
Megaloblasts in mitosis	0.2	1.0	—	—	—	—†
Amitosis of megaloblasts	—	0.4	—	—	—	—†
Total nucleated red cells	12.8	33.2	24.2	10.6	14.6	25.4
Unclassified cells	1.8	1.8	0.2	—	1.2	1.2
Leucoerythrogenetic ratio	1.42	0.53	0.70	0.98	1.27	0.68

\* Granulocytic series.

† Red-cell series.



**Figs. 1, 2, 3, and 4**—Sections and films of marrow from sternal punctures of the case described: fig. 1, section before folic-acid therapy, showing megaloblastic hyperplasia and increase in haemocyto blasts; fig. 2, giant megaloblast from marrow film before therapy, showing multiple nucleus, with characteristic reticular chromatin pattern, and polychromatic cytoplasm (Jenner-Giemsa stain,  $\times 1150$ ); fig. 3, section twenty-four hours after start of folic-acid therapy, showing appearance similar to that in fig. 1, with aberrant granulopoiesis, and a megaloblast in mitotic division in upper right-hand corner; fig. 4, section nine days after start of folic-acid therapy, showing entirely normoblastic erythropoiesis, with darkly staining nuclei of erythroblasts and normoblasts, and occasional proerythroblasts, and normal granulopoiesis.

**Figs. 5 and 6**—Sections of sternal marrow from a typical case of pernicious anemia in relapse, and following successful therapy with purified liver principle ('Anahamin'), for comparison with figs. 1, 2, and 3: fig. 5, section before therapy (red cells 1,000,000 per c.mm., Hb 25% (Haden)), showing megaloblastic hyperplasia; fig. 6, section six days after parenteral liver therapy (reticulocytes 44%), showing actively normoblastic erythropoiesis.

All sections except fig. 2  $\times 580$ . Figs. 1, 3, and 4 fixed in Susa and stained with pyronin-methyl green. Figs. 5 and 6 fixed in methyl alcohol-formol and stained with Delafield's haematoxylin and azur-Giemsa (White et al. 1946).

therapy (fig. 3). The significant change was a considerable increase in mitoses in the red-cell series, seen in the earlier members of both normoblastic and megaloblastic series. Some of the mitoses were normal but others were aberrant, with formation of multipolar spindles. Amitotic division of megaloblasts was also observed. Megaloblasts were still very numerous at this time.

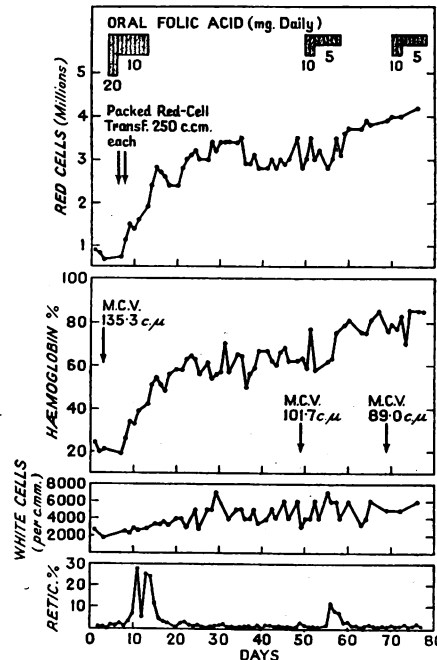


Fig. 7—Peripheral blood changes in response to folic-acid therapy.

sternal-marrow examination after 16 days (table II) showed a more normal cellularity, and maintenance of predominantly normoblastic erythropoiesis, but a few late megaloblasts and giant neutrophil metamyelocytes had reappeared.

The peripheral blood picture became stabilised at about 3,000,000 red cells per c.mm. and Hb 60% (Haden) (9.36 g.). The absolute values 44 days after the start of therapy were:

P.C.V. ..	28.5 c.m.%	M.C.H. ..	34.7γ
M.C.V. ..	101.7 c.µ	M.C.H.C. ..	34%
		Reticulocytes	1%

At this time the serum-bilirubin was 1.0 mg. per 100 c.m. (direct van den Bergh negative), but the urinary Schlesinger test for urobilin was consistently within normal limits, being only weakly positive.

A further course of 50 mg. of oral folic acid was now given (10 mg. daily for two days, followed by 5 mg. daily for six days), leading to a reticulocyte response of 10.6% after five days. On the day following the reticulocyte peak the patient was put on a high-protein dietary intake of 125 g. daily.

The blood picture showed further improvement thirteen days after the second reticulocyte peak:

Red cells ..	3,900,000 per c.mm.	M.C.H. ..	30.4γ
Hb ..	76% (Haden) (11.6 g.)	M.C.H.C. ..	34.2%
Colour-index ..	0.97	White cells ..	5000 per c.mm.
P.C.V. ..	34.7 c.m.%	Reticulocytes	0.1%
M.C.V. ..	89.0 c.µ.		

Films of the sternal marrow nineteen days from the start of the second course of folic acid (table II) contained some abnormally developing granulocytes and a few megaloblasts. Section of the marrow, however, showed a return to a degree of cellularity only slightly above normal. A third course of folic acid (50 mg.) was now given, in divided dosage as before, for eight days.

The red-cell count and Hb level continued to rise slowly, but no further reticulocyte peak developed. Six days from the start of the third course (table II) the sternal marrow showed entirely normal erythropoiesis and granulopoiesis:

Red cells ..	4,200,000 per c.mm.	White cells ..	6000 per c.mm.
Hb ..	85% (Haden) (13.26 g.)	Reticulocytes	1.2%
Colour-index ..	1.01		

Patient's condition was now very good; he felt well, had an excellent appetite, and could walk without dyspnoea. The pigmentation of face and hands persisted, the tongue remained smooth, and repetition of gastroscopy (Mr. Avery Jones) revealed no change in the atrophic mucosa. It is interesting that after the folic-acid therapy he evinced a liking for fresh green vegetables for the first time.

Maintenance therapy with folic acid 20 mg. orally, twice weekly, was now instituted.

Latest blood-count, 3 months from start of therapy:

Red cells ..	5,000,000 per c.mm.	White cells ..	6000 per c.mm.
Hb ..	94% (Haden) (14.6 g.)	Reticulocytes	1.4%
Colour-index ..	0.94		

DISCUSSION

The characteristic structure of the megaloblastic bone-marrow is familiar, particularly in pernicious anæmia, and several descriptions have been given of the reversion to normoblastic erythropoiesis under the influence of the liver principle (Davidson et al. 1942, Scott 1939, Wilson 1942). Interpretation of the presence of megaloblasts as an abnormal series never found in the absence of deficiency of the hæmopoietic principle has been emphasised (Israëls 1939, Jones 1943). Many observers have suggested that abnormal changes in the granulocytic series are equally as characteristic of deficiency of the hæmopoietic principle as is the coexistent megaloblastic proliferation.

La Cour (1944) considers that abnormal mitoses in red-cell and granulocytic series are responsible for the formation of megaloblasts and abnormal granulocytes in the marrow of pernicious anæmia, and that the two series show well-marked differences in the amounts and distribution of nucleic acids. In the marrow of pernicious anæmia and in other conditions, such as tropical sprue and macrocytic megaloblastic anæmia of pregnancy, cells with deeply basophilic cytoplasm become more numerous. These cells are hæmocytoblasts (stem cells for granulocytes and red cells), early members of the normal red-cell series, and early megaloblasts. Cytochemical tests with ribonuclease suggest that the basophilia of these cells is due to the presence of considerable amounts of ribonucleic acid (White 1946). Response of the megaloblastic marrow to hæmopoietic principle leads to rapid reversion to the normal type of maturation, with disappearance of megaloblasts and abnormal granulocytes and reduction of the hæmocytoblasts and basophilic early cell types to within normal limits.

These changes are typically seen in pernicious anæmia treated with highly purified preparations of the liver principle. Megaloblasts rapidly disappear from the marrow, mitoses are numerous in the early stages of the response, and at the time of the reticulocyte peak the marrow shows intense normoblastic erythropoiesis and orderly maturation of granulocytes.

The response of the megaloblastic marrow to successful folic-acid therapy appears to differ in no way from the characteristic response to purified liver principle. Reports by Spies (1946a) and by Kaufmann and Schwager (1946) indicate that the essential change in the marrow under therapy is a rapid reversion from megaloblastic to normoblastic erythropoiesis, with a reticulocyte response and return of the red cells and leucocytes in the peripheral blood towards normal levels. In the present case of advanced pernicious anæmia the marrow showed a complete return to normoblastic erythropoiesis, with total absence of megaloblasts and abnormal granulocytes, in a sternal-marrow specimen taken nine days after the start of folic-acid therapy. Before treatment the predominantly megaloblastic erythropoiesis and accumulation of hæmocytoblasts were very striking. Hb metabolism also became more normal, as shown by the fall in urinary urobilin and ultimately in the reduced serum-bilirubin level.



The diagnosis of pernicious anaemia was substantiated by the changes in peripheral blood and bone-marrow, the histamine-fast achlorhydria, and atrophic gastritis.

The question arises whether the two transfusions could have provoked the haemopoietic response. They were given twenty-four and forty-eight hours after the start of folic-acid therapy, when the patient's general condition was still precarious: it was evident that their immediate effect was good, and the cardiac failure did not increase. The well-marked reticulocyte response—3.4% initially, 27.6% at the peak—began on the fourth day of therapy, with the peak on the sixth day. It appears very unlikely that the transfusions could have been responsible so rapidly. Spies (1946a) observed incipient reticulocyte response 4-7 days after the start of therapy in five cases of pernicious anaemia, with peaks at 7-10 days, and the results in the present case strongly suggest that the folic acid was responsible. It is also unlikely that a natural remission coincided with administration of folic acid, because before the start of therapy the red-cell count and the amount of Hb actually decreased, and reticulocyte levels were low. The lack of response to liver therapy some time before folic-acid therapy was very probably due to the extract having lost potency, since it was six years old.

The initial dosage of folic acid was sufficient to effect temporarily a complete return to normal erythropoiesis and granulopoiesis in the marrow. The subsequent rise in the red-cell count and the Hb level was considerable, but continued therapy produced a second reticulocyte response, with further improvement in the peripheral blood picture. It should be noted, however, that early megaloblastic changes had reappeared before the second course of folic acid. Similar marrow findings nineteen days after the start of the second course also indicate that megaloblastic erythropoiesis and disordered granulopoiesis rapidly recur in the absence of continued administration of folic acid. These changes can be eliminated completely within a few days by readministration of folic acid, and it is evidently necessary to repeat the maintenance dosage at short intervals to sustain normal haemopoiesis. The maintenance level has not been determined, but in the present case 20 mg. of folic acid twice weekly is to be given a trial. Further clinical trials are to be made with other cases to determine the optimal dosage.

Repeated small doses were manifestly sufficient to secure a gradual return to a normal blood picture in the present case. Davidson and Girdwood (1946) have advocated a single large initial dosage, followed by similar weekly or fortnightly maintenance doses, in pernicious anaemia.

Further knowledge is required of the possible function of folic acid as an enzyme or coenzyme before it will be possible to assess its significance in reversing megaloblastic erythropoiesis and its rôle in the normal maturation of red cells.

The position of folic acid in preventing subacute combined degeneration has not been determined yet. Signs of neurological involvement were absent at all times in the present case.

#### SUMMARY

The response of an advanced case of pernicious anaemia to folic acid given by mouth is described.

Therapy led to a return to normal haemopoiesis, as shown by the changes in sternal marrow and peripheral blood.

Repeated doses of folic acid were necessary to maintain normal haemopoiesis.

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*Continued at foot of next column*

## EXAMINATION OF HOME-CONTACTS OF TUBERCULOUS PERSONS

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The examination of home-contacts of tuberculous persons is one of the most important parts of the preventive work of chest clinics. It enables incipient disease to be checked and brings to light sources of infection that may be present in the home. Such examinations could well be undertaken by a mass radiography unit, and it is hoped to deal with this possibility in a further communication.

Thompson (1944) described a suggested programme for the routine examination of home-contacts and presented statistics for the years 1942-43. It is now possible to analyse the results of a close follow-up of all available home-contacts seen at the Ealing Chest Clinic during the years 1942-45. During this time 3168 persons (2025 adults and 1143 children) were examined, and 186 persons (111 adults and 75 children) were found to have significant lesions. An average of 2.5 contacts were seen for every index-case. The age-distribution of examinees and cases is shown in table I.

It will be noted that the greatest number of examinees per year of age falls into the 0-4 age-group, and that there is a steady diminution in the numbers examined as the older age-groups are approached; and that the highest percentage of cases of tuberculosis was found in the age-groups 0-4 and 15-24. These are dealt with in more detail below.

Contacts of non-pulmonary tuberculosis in whom no significant abnormality could be detected on first examination were not recalled for a further interview, the object of the investigation being essentially to find the source case. On the other hand, contacts of cases of pulmonary tuberculosis were seen at three-monthly intervals: the children for a tuberculin test and clinical

*Continued from previous column*

in the British Postgraduate Medical School for their coöperation and assistance. The photomicrographs were made by Mr. V. Willmott.

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examination to be followed by radiography if the skin test were positive; the adults for radiography and a clinical examination. Some persons, having attended for their first and possibly a subsequent examination, did not report again and were lost sight of. Occasionally

TABLE I—AGE-DISTRIBUTION

Age-group (yrs.)	0-4	5-14	15-24	25-34	35-44	45-54	55+
Total examined	405*	738	559	450	430	356	230
No. with significant lesions	34 (8.4%)	41 (5.5%)	57 (10%)	24 (5.3%)	18 (4.2%)	6 (1.7%)	6 (2.6%)

\* 255 (63%) of this group gave a positive tuberculin reaction.

one of these recalcitrant contacts was referred to the clinic by his doctor or a hospital and was found to have developed a significant lesion since his last attendance. In table II those persons found to have pulmonary tuberculosis are grouped according to the time of diagnosis of their disease. As would be expected, the greatest number of cases was found at first examination.

An analysis of the 34 cases in the age-group 0-4 (table I) shows that with one exception they were all in contact with a sputum-positive case. Of the 34 patients 5 died (2% of the positive reactors), and all 5 had been living in infectious households. Of these children 3 were less than a year old, 1 was aged 14 months, and 1 was aged 3 years. They all died within eight weeks of diagnosis, except 1 child who died after fifteen weeks.

The great importance of examining all available contacts in the age-group 15-24 is emphasised by the fact that 1 out of every 10 persons examined in this group had a significant lesion. This is about twice the proportion found in the age-groups 25-34 and 35-44, and over four times as high as in persons aged 45 or more.

The cases of pulmonary tuberculosis among adults have been subdivided in table III according to the stage of their disease.

The diagnostic standards of the National Tuberculosis Association of America (1940) were used, minimal lesions being defined as being without demonstrable excavation

TABLE II—TIME OF DIAGNOSIS

Group	No. examined	No. with significant lesions			
		At 1st exam.	At subsequent exam.	Referred by doctor	Total
Adults ..	2025	77 (3.8%)	17	17	111 (5.5%)
Children	1143	58 (5.1%)	17	..	75 (6.6%)
Total..	3168	135 (4.3%)	34	17	186 (5.9%)

and confined to a small part of one or both lungs, the total extent of the lesions, regardless of distribution, not to exceed the equivalent volume of lung tissue which lies above the second chondrosternal junction and the spine of the fourth, or body of the fifth, thoracic vertebra on one side.

It was found that, whereas three-quarters of the cases discovered on first examination and four-fifths as the result of routine re-examination had minimal lesions, among those persons who had defaulted and were subsequently referred to the clinic the proportion of minimal lesions fell to a half. It does not follow that the defaulters fared worse than the other two groups, for there may well have been a high proportion of minimal lesions among the defaulters who did not return to the clinic.

The disposal of the 111 adults with tuberculous lesions is shown in table IV. There is a steep rise in the percentage of cases requiring treatment among those who did not remain under observation. It is also highly significant that among contacts the percentage of cases of previously undiagnosed tuberculosis requiring treatment is five times that found among the general population by mass radiography.

The Medical Research Council (1942), discussing contact examination, recommends that young adults (aged 15-30) should be radiographed at three-monthly intervals and continue to be kept under observation for at least two years after contact is broken; and that the re-examination of contacts over thirty years of age may be dispensed with, if necessary through pressure of work, as being less likely to be productive of cases. The findings at the Ealing Clinic support this view. Of the 17 persons found at routine re-examination to have significant lesions only 2 were over thirty years of age. When it is realised that about 60% of the adult contacts were in this older age-group, it will be seen that a very considerable saving in work could have been effected by omitting to re-examine those over thirty years of age, and that during the four years under review only 2 cases would have been missed.

All children with significant disease were in contact with a positive index-case, except 1 in whom contact had been broken for thirteen months. All adults were in contact except 5 cases discovered at first or subsequent exami-

TABLE III—STAGE OF DISEASE IN 111 ADULTS

Stage of disease	At 1st examination	At subsequent examination	Referred by doctor
Minimal .. ..	59 (77%)	14 (82%)	8 (47%)
Moderately advanced	15	3	7
Far advanced ..	3	0	2
Total .. ..	77	17	17

nation in which contact had been broken for from four to fifteen months; 5 cases discovered at first examination in which the index-case was negative; and 10 cases discovered on reference by doctor in which contact had been broken for fifteen months in 2 cases and for from three to five years in 8 cases. These last patients having previously defaulted, it was impossible to decide the exact time at which their disease had first appeared.

## COMMENTS

Ideally all contacts of all cases of tuberculosis should be examined at least once. All contacts of sputum-positive cases should be examined at three-monthly intervals while contact continues and for two years after contact is broken. As a practical programme, when pressure of work is a limiting factor, all contacts should be seen once, but the routine re-examination of those over thirty years of age can be omitted. Two age-groups, 0-4 and 15-24 years, require special mention as producing the highest proportion of cases. In the age-group 0-4 years, 2% of those presenting a positive tuberculin reaction developed fatal tuberculosis, and all but one of those who died were under eighteen months old. It was felt that the only factor which could influence this result was the immediate breaking of contact with infection, and that, if the child survived the first three months after becoming tuberculin-positive, the results were uniformly good.

TABLE IV—DISPOSAL OF 111 ADULTS

Group	At 1st exam.	At subsequent exam.	Referred by doctor	Total
Observation .. ..	45 (2.2%)	8	3	56 (2.8%)
Treatment .. ..	32 (1.6%)*	9	14	55 (2.7%)
% requiring treatment	42%	53%	82%	50%

\* cf. 0.3% found by mass radiography (Dick 1945). Figures in parentheses are percentages of 2025 examinees.

The examination of all available persons in the age-group 15-24 years is of first importance in any programme of contact examination. In this group 1 in every 10 persons had a significant lesion. A constant

factor in all groups was a history of present or recent contact with a positive index-case.

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HYPERTENSION AND CALCIUM INTAKE

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THE statement has been made that a high-calcium diet is an important factor in the production of hypertension in subjects over middle age.<sup>1</sup> During an investigation of the aetiology and treatment of senile osteoporosis we have made observations which throw some light on the relationship between the intake of lime and hypertension.

**Low Calcium Intake.**—In all, 80 patients over the age of forty years were examined. Of these, 32 gave definite radiographic evidence of osteoporosis in at least three regions of the body. All were in the wards of a municipal hospital, and there is no doubt that they had been for years consuming diets with a calcium content of less than 0.5 g. a day, the amount usually accepted as the minimal intake. The percentage utilisation of lime varies considerably from subject to subject, but it seems reasonable to assume that the amount of calcium retained was not so high in the osteoporotic patients as in the others. Since all the patients came from the same social stratum, one would expect that hypertension and arteriosclerosis would be rather less prevalent in the osteoporotic group, if the retention of calcium is an important aetiological factor in hypertension.

The average blood-pressure in the osteoporotic group was 164/96, and in the other 167/96 mm. Hg. The relationship of arteriosclerosis and calcification to osteoporosis was as follows:

Arteriosclerosis found on clinical examination	No. of patients without osteoporosis	No. of patients with osteoporosis
Nil ..	13 (27%)	8 (25%)
Slight ..	15 (31%)	12 (37%)
Pronounced ..	20 (42%)	12 (38%)

Calcification of arteries on radiological examination	No. of patients without osteoporosis	No. of patients with osteoporosis
Nil ..	23 (48%)	11 (34%)
Slight ..	7 (15%)	12 (38%)
Pronounced ..	18 (37%)	9 (28%)

These results clearly indicate that there was no special association between osteoporosis and hypertension, physical phenomena of arteriosclerosis, or calcification of the vessels as demonstrated by radiography. In several patients with osteoporosis it was possible to demonstrate calcification of arm and leg vessels though the bones showed well-marked rarefaction.

**High Calcium Intake.**—In the course of the investigation it was found necessary to supplement the ordinary hospital diet of 19 patients with calcium salts (gluconate or phosphocarbonate) so that each patient was taking not less than 1.6 g. of calcium a day. This was maintained for periods ranging from six to fifteen months. In 9 patients the retention of calcium was determined for two weeks at the start of the investigation, and it was found that the average amount retained was 1.051 g. a day (limits 0.556 and 1.358 g.). In 2 of these patients a repeat estimation was made, in one case fourteen

weeks later and in the other case eighteen weeks later. In both instances the retention of calcium still remained high (670 and 1306 mg. a day), as in the first month of the high-calcium diet. It therefore appears that throughout the investigation large amounts of calcium were retained. If a high retention of lime is an important aetiological factor in the production of hypertension, one might have expected to find some sign of hypertension in these patients. In no instance, however, was there any significant change in the systolic or diastolic pressures. In only 1 patient was there any radiological evidence of increased deposition of calcium. In this patient, a woman aged 66 years, the slight increase in the vascular shadow was not more than might be expected in a subject of that age irrespective of diet.

CONCLUSION

These findings provide no evidence that a high retention of lime prolonged over many months has any effect on the development of hypertension or on the calcification of the vessel walls.

We wish to thank Prof. Noah Morris for his interest and help, and Dr. S. Briggs, medical superintendent of Stobhill Hospital, for permission to conduct the investigation.

Medical Societies

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY

At a meeting of the society in Liverpool on Oct. 4, Dr. BRYAN WILLIAMS, speaking on

Factors Causing Difficult Labour in Multigravidæ

said that his observations were based on women who had had at least eight normal deliveries previously; a low forceps delivery, an unaccountable stillbirth, antepartum hæmorrhage, or any other complication not directly associated with the actual birth of the child was not included as an abnormality.

In 23 cases satisfying these criteria, difficulty with subsequent labour was usually caused by either an unusually large child or some contraction of the pelvis, or both. There was convincing evidence of a tendency for babies to be larger at successive deliveries. Often the pelvis was definitely contracted; this contraction, which was acquired after the birth of the first child or first two children, was probably due to minor osteomalacic changes.

Similar changes have been noted by observers in countries, such as China, where they are very prevalent. Dr. Williams was satisfied that the lack of certain vitamins, and especially vitamin D, in the diet of many in this country causes these bony changes which eventually give rise to dystocia at some future birth.

Avoidance of Catheterisation following Vaginal Plastic Operations

Mr. A. A. GEMMELL said that he recommended the instillation of 1 oz. of 0.5% mercurochrome into the bladder directly after operations for prolapse, &c. A group of 63 patients was treated by this method and the results compared with those in 50 patients who had not received this instillation. Catheterisation was necessary in 9.5% of the first group, and 72% of the second. The efficacy of mercurochrome is, he considers, due to the irritant action of the solution.

Erythroblastosis Fœtalis

At a meeting in Sheffield on Nov. 1, Dr. C. C. BOWLEY said that erythroblastosis, which occurs only once in more than 300 labours, if untreated carries a mortality-rate of nearly 80%. Of those infants who do recover, 10% may be affected by hepatosplenomegaly or lesions of the central nervous system. Erythroblastosis fœtalis should be anticipated by routine Rh typing of the blood of every pregnant woman; and where the blood is Rh-negative, it should be examined for atypical agglutinins, at the 8th month in primigravidæ and at least once before the 8th month in multigravidæ. A previous transfusion should be considered as having the

1. Harris, I. Studies in Hypertony, Bristol, 1946.

same effect as a pregnancy, and all emergency transfusions should be carried out with Rh-negative blood. When atypical agglutinins are discovered, their titre should be determined at once, and again each month until delivery; and this routine should be observed, whether or not atypical agglutinins have been identified, in all multiparæ with a history of children affected by erythroblastosis foetalis. Because of the erythroblastic infant's disposition to hæmorrhage, vitamin K should be given to the Rh-negative mother before delivery; this is effective if given as little as four hours before delivery. If given orally, it should be administered with bile salts, so as to break up the fat vehicle and to obtain maximum absorption; when given to the child, the vitamin should be dissolved in water and administered by intramuscular injection. Dr. Bowley recommended early blood-transfusion, even before the typical blood picture is seen; a Rh-negative red-cell concentrate, he concluded, should always be used, and should be given as fresh as possible.

## Reviews of Books

### Repertorium Pharmazeutischer Spezialpräparate

Editor: Dr. med. HERBERT LUDWIG, privatdozent an der Universität, Chefarzt am Bürgerspital, Basle; with the help of Prof. Dr. phil. F. L. FURLAN and Dr. med. E. LOELIGER. Basle: Verlagsgesellschaft Beobachter. Pp. 1308.

BEFORE the war, those who needed to find the maker and composition of Continental proprietary drugs relied chiefly on Gehes Codex. The last edition of Gehes to reach this country was published in 1937, and the last supplement in 1939; many new products, and names for them, have appeared since then. This new Swiss work, published in German, is a list of about 10,000 special pharmaceutical preparations including sera and vaccines by over 2000 different manufacturers, mostly Continental but with some British and American preparations. The information on each product, which was obtained from the manufacturer, is given under the headings: manufacturer, composition, indications, form in which issued, and dosage. In addition, pharmacological and clinical data, printed in italics and provided and paid for by the manufacturer, are given for a number of products. German and Austrian proprietaries are included since it is uncertain which of these will reappear and which will prove to have disappeared permanently. There are, besides, a therapeutic index, and a list of manufacturers and the products they issue—a helpful addition to the main text. The work is not likely to prove exceptionally useful to doctors in this country, but will appeal to all who need to know the maker and composition of proprietary drugs, particularly Continental ones.

### Studies in Hypertony and the Prevention of Disease

I. HARRIS, M.D., director, Institute for Prevention of Disease, physician, Liverpool Heart Hospital; in coöperation with J. T. IRELAND, B.S.C., G. V. JAMES, M.S.C., EDWARD CRONIN LOWE, M.B., and C. E. VERNON, M.S.C. Bristol: John Wright. Pp. 114. 12s. 6d.

CONTRIBUTIONS to our knowledge of the life-history of hypertension must be carefully but critically received. This book describes researches carried out by Dr. Harris and his collaborators at Liverpool. It includes chapters on calcium, cholesterol, the influence of fats on protein metabolism, and potassium requirement. Experiments are recorded in which calcium appeared to have raised blood-pressure in rabbits. These animals, however, were given doses which would represent an enormous amount for the human subject. Before a high-calcium diet is invoked as an important factor in the production of hypertension it seems reasonable to ask for some evidence that it raises the blood-pressure in man. None is given: instead we are treated to an outburst against the Ministry of Food, the Medical Research Council, and some scientific workers. Those who have worked in poor-law institutions will be aware that advanced arteriosclerosis can sometimes be demonstrated in patients whose intake of calcium has been very low and who show signs of calcium impoverishment. It is fairly clear that the deposition of lime in arteriosclerotic

patches is a process quite different from ossification, and it will require much more evidence than Dr. Harris has so far adduced to convince us that fortification of bread with calcium is likely to lead to arteriosclerosis and hypertension.

### Annual Review of Physiology

(Vol. VIII.) Editor: JAMES MURRAY LUCK, Stanford University, California. London: H. K. Lewis. Pp. 658. 30s.

THE editors and authors of this year's volume are to be congratulated on one of the best productions of the series. Their aim is to provide reviews of the important contributions of the preceding year or biennium, "appraise them critically, and evaluate with discrimination the present status of the subject." Many subjects of clinical interest are covered, including resistance to heat stress and cold stress, the therapeutic use of heat and cold, and the mechanism of temperature regulation; energy metabolism in relation to nutrition; physiology of the skin in relation to sweating and vascular reactions; peptic ulcer; blood-coagulation; thrombosis and hæmorrhagic disorders; clinical hæmatology; blood-groups; visceral functions of the nervous system; aviation physiology; physiological psychology; applied physiology; and sulphonamides and penicillin. Though many researches made during the war are still unpublished, some are beginning to emerge: thus, aspects of resistance to high temperature and dehydration are treated in a number of reviews, and some misconceptions and traditions relating to shock are corrected in Gregersen's article.

### The World's Hunger

FRANK A. PEARSON; FLOYD A. HARPER. London: Oxford University Press. Pp. 90. 9s. 6d.

THIS brief book is—and is clearly intended to be—a corrective pill for world planners. The reader, as he takes it, should have its purpose in mind. It may purge him of a few illusions; but let him remember that there is more, much more, to be said than the writers admit or have even assimilated into their scientific philosophy. They are two professors of Cornell University, the one of prices and statistics, the other of marketing; and they have concentrated their attention upon consumption levels, production, and the sources of increased production. Three-quarters of the world's population live in Asia and Europe, and it cannot be assumed that the rest of the world can be so developed for food-production as to adjust this inequality. A very large proportion of the earth's surface is only partially cultivable, and only 4.3% is at present under crops—the proportion ranging from 19.9% in Europe to 1.1% in Oceania. Careful examination of soils, rainfall, climate, and so forth, leads the writers to conclude that the cultivable area cannot be very far extended—perhaps to no more than 7% of the land area of the globe. But there we may pause. The figures appear to be correct, but not enough allowance is made for man's ability to apply new methods and particularly his capacity to make better use of the soil at present under cultivation.

It is useful to be dosed with physic at times, especially since the world's population is not only unevenly distributed but still increasing; but the close of the book is patently addressed to a transatlantic audience, and makes one wonder how far the writers came to their conclusions before they studied their brief. There is an almost shameless scientific pessimism:

"Europe is the danger spot. It is rich in agriculture and other natural resources and has a great industrial plant. It has had a high standard of living, which has been rising. It has the second largest continental population, which has been increasing. For over a century the excess spilled over into North and South America. This honeymoon for Europe is over, however."

"It seems reasonably clear that there are no large areas of new land to be brought into cultivation, that each continent will tend to manufacture an increasing proportion of the products it consumes, that immigration will continue to be restricted, and that there will be insufficient controls to prevent population from expanding."

They may be right; yet surely this is a challenge to man's innate ability to organise and overcome?

# THE LANCET

LONDON: SATURDAY, NOV. 30, 1946

## The Electronic and the Human Brain

ANOTHER war secret now disclosed is an electrical calculating machine which has been built in the United States and has been called an "electronic brain," or more accurately an Electronic Numerical Integrator and Computer—ENIAC. The principles on which this machine is constructed have been described by HARTREE.<sup>1</sup> Calculating machines are not new, and ENIAC does not seem to do anything qualitatively different from what simpler machines have done in the past. The use of electronic valves, however, has enormously increased its speed and hence its range of applicability. Built at the Moore school of engineering of the University of Pennsylvania, it operates by the counting of electrical pulses by electronic counting circuits. If such a machine is to carry out a series of arithmetical operations it is necessary first that the required sequence should be furnished to it in such a form that it can be followed automatically and at a speed comparable with that of the individual operations, and secondly that the machine should be able to record and retain intermediate results of the calculation. Thus it requires equipment for carrying out arithmetical operations, a means of organising their sequence, and a "memory" for the numbers on which the operations are to be performed and for their results. The basic units of ENIAC are "accumulators," whose numerical portion consists of ten decade counters, one for each decimal place, a decade counter consisting of ten double-triode valves in a ring. At any one time only one valve in the ring is in the excited state, and the reception of a single pulse steps the excitation from one valve to the next. Results of the operations are put out in the form of punched cards. ENIAC can perform a multiplication in rather less than 3 milliseconds; so a computation involving altogether 10 million multiplications would take about 8½ hours.

The National Physical Laboratory is now planning a machine called ACE (Automatic Computing Engine), which will work at the speed of ENIAC, or possibly a somewhat higher speed, and will take advantage of new technical developments, permitting both a greater "memory" capacity and a higher degree of complexity in the instructions. It is intended that this machine shall be able to multiply two ten-figure numbers in 0.002 sec., and its speed and range will enable it to solve mathematical problems hitherto almost insoluble with pencil and paper. It will be able to tackle simultaneous equations with fifty or even a hundred unknowns.

ENIAC has been credited with both "memory" and "judgment." If it is to work it must retain the effects of previous excitations in such a way as to influence its response to future stimuli; but this is a property of many material systems, and the mountain might with equal truth be said to remember the glacier which grooved it. Some such electrical change occurring in the brain is doubtless the basis of true

memory; but memory involves the presentation of the past to consciousness, and to apply this term to a calculating machine except by analogy is to confuse the material basis of memory with memory itself. So also with judgment. HARTREE<sup>2</sup> explains that in extended calculations it often happens that there are two or perhaps more alternative courses open, and it is necessary to choose between them, the choice depending on the work done up to that stage. "An electronic calculating machine can be designed and set up so that on the occurrence of a situation requiring such a selection of procedure, it first selects the appropriate criterion, if such selection is necessary, then applies it, assesses the result of applying it, and takes the action necessary to initiate the course of procedure thus indicated." This is held to imply the exercise by the machine of "a certain amount of judgment," the limiting factor being the operating instructions supplied to it. But the machine's "choice" is clearly automatic, and a calculating machine which whimsically began to exercise free will would considerably disturb the mathematicians who received the results of its operations. There is thus no basis for alarmist visions of intelligent robots making slaves of humanity. Machines, however complex, are no more than tools; and tools, as SAMUEL BUTLER pointed out, are only detachable extensions of the human body. No machine can carry out processes which have not been fathered by the human mind, though the machine's speed and efficiency may raise man's intentions to the *n*th power of beneficence or devastation.

But to compare ENIAC with the human brain is to see at once how limited, and indeed amateurish, an apparatus it is. ENIAC with its 18,000 valves consists of 40 panels 8 feet high and 2 feet wide—a total surface area of 640 square feet: the human head contains 10,000 million electrical units in the cerebral cortex alone. To apply the term brain to ENIAC is to adopt, implicitly, a conception of the working of the brain which, as Dr. F. M. R. WALSH, F.R.S., showed in his Victor Horsley lecture delivered this week,<sup>3</sup> is now outmoded. Many years' study of the electrical excitation of the cerebral cortex established what may be called the popular physiological view "that the motor cortex is a close-set mosaic of points, in each of which is represented or localised a physiological unit of movement"; that is to say, the correlation between excitable cortical spot and corresponding movement is one to one, and this connection is permanent. The nervous system on this hypothesis is an immensely complicated but equally rigid ENIAC. WALSH shows that alongside this "Newtonian" conception of neurology, especially English neurology, has maintained an alternative theory, originated by HUGHLINGS JACKSON, which the most recent experimental work shows to be correct. Both discharging lesions, such as the Jacksonian fit, and destroying lesions causing hemiplegia demonstrate the existence of "leading parts" in the motor cortex, the areas for the hand, face, and foot, which are the foci of convulsions and whose movements suffer most in hemiplegia. Clinical observation also shows

2. Hartree, D. R. *Times*, Nov. 22, p. 5.

3. Walsh, F. M. R. On the Contribution of Clinical Study to the Physiology of the Cerebral Motor Cortex. Edinburgh: E. & S. Livingstone. 1946.

1. Hartree, D. R. *Nature*, Lond. 1946, 157, 527; 1946, 158, 500.

that it is movements and not structures which are represented in the cortex, and that the representation of movements is multiple in the sense that a given cortical focus must contain the anatomical and physiological substrata of more than a single movement. Conversely, a single movement must be represented in varying degrees of subordination throughout the motor cortex. "The 'hand area,' in brief, is merely, as it were, the macula of the field of hand movement representations." This view clearly involves a profound change in the popular idea of cortical localisation. What is localised is not a part of the body but a performance, and performances are represented not in discrete areas but in mutually overlapping fields, within each of which one locus influences another and the threshold of excitation may shift from place to place.

As WALSHE points out, our present knowledge of cortical function is the product of the Jacksonian method—the application of conceptual thinking to the facts of observation—of which WALSHE's lecture is itself a notable example. His stress on this is timely. JOHN HUNTER's words to JENNER: "Why think? Why not try the experiment?" are often misapplied at present. None knew better than HUNTER that observation, though it comes first, is incomplete until it has been thought about. Today we have in medicine, if not too many observers, certainly too few thinkers. WALSHE's plea for conceptual thinking is apposite also in another sense. In the world of thought outside medicine the barriers between science and philosophy are being broken down. Scientists, like EDDINGTON, have become philosophers because their observations compelled conceptual thinking. From the opposite direction BERTRAND RUSSELL<sup>4</sup> can say that the philosophical school of "modern analytical empiricism . . . by its incorporation of mathematics and its development of a powerful logical technique, is able, in regard to certain problems, to achieve definite answers, which have the quality of science rather than of philosophy." Science is thus becoming, once more, natural philosophy, and medicine cannot escape the challenge to thought.

### Penicillin by Mouth for Gonorrhoea

THE potential importance of the oral route in penicillin therapy has been obscured by the rapidity and comparative certainty of the results with parenteral administration. When the drug is taken by mouth the proportion which can be recovered from the urine is relatively small, and it has been assumed that much of the penicillin is destroyed or inactivated by the acid of the gastric secretion. Attempts to counter this effect by applying enteric coatings to the penicillin, or by the simultaneous administration of buffer substances, have given variable results, but it has been established that the use of neutralising agents does increase the proportion of penicillin absorbed. Thus SEAGER<sup>1</sup> found that when he gave penicillin by mouth with aluminium hydroxide, magnesium trisilicate, magnesium hydroxide, trisodium citrate, or aluminium dihydroxyamino-acetate the blood-levels were considerably higher than when an equivalent dose was given in tap water. Yet these

levels were still far below those attained by parenteral administration. As CUTTING and others<sup>2</sup> have suggested, it seems that the gastric acid is not the only factor restricting the absorption of penicillin from the gut. This has been confirmed by McDERMOTT and colleagues,<sup>3</sup> who estimated the urinary excretion of penicillin in six patients with complete achlorhydria when identical doses of the drug in watery solution were given by the mouth and intramuscularly on alternate days. After intramuscular injection the amount recovered from the urine varied from 36% to 100% of the total dose and was in most cases more than 60%. After oral administration the amount was only 8-32%, and thus was much the same proportion as in normal controls. In some of the patients who had received penicillin by mouth a small amount of antibacterial substance, presumed to be penicillin, was recovered from the stools, but this represented only a small fraction of the amount taken. It seemed probable that the remainder was destroyed by penicillinase produced by bacteria in the intestinal tract. The conclusion reached was that when penicillin is given by mouth to adults, even with an effective antacid, the maximum amount likely to be absorbed is a third of the dose taken; and, since maximum absorption is the exception rather than the rule, an effective oral dose should be about five times as large as the normally effective intramuscular dose.

This view was not supported by the findings of LITTLE and LUMB,<sup>4</sup> who gave penicillin "stabilised" with egg-white and preceded by sodium bicarbonate and found that oral administration then gave blood-levels which were as high as those obtained by the parenteral route. Similarly, BUSHBY and HARKNESS describe in this issue their results in the treatment of gonorrhoea with penicillin by mouth which are not inferior to the general experience with intramuscular injections. The dosage which they used in most cases—240,000 units—is not much more than that successfully used by LLOYD-JONES and colleagues<sup>5</sup> for intramuscular injection—namely, 150,000 units. The latter found that the blood-level of penicillin must be maintained at 0.08 unit per ml. for nine and a half hours to produce a high proportion of cures. BUSHBY and HARKNESS obtained their best results by prolonging the dosage period to fifteen hours; but the blood-levels of penicillin in their patients were not consistently above 0.02 unit per ml., a fact which supports their view that lower levels than those usually thought to be essential may be effective if maintained for a longer time. They gave individual doses of 40,000 units, plus 1 g. of sodium citrate, every three hours. BOHLS and colleagues<sup>6</sup> have combined penicillin with aluminium potassium sulphate and sodium benzoate in tablets for oral medication, retarding excretion from the kidney by means of the benzoate and thus maintaining a therapeutically effective concentration of penicillin in the blood-stream for twenty-four hours. Of 36 female patients given 400,000 units of penicillin in this way, only 1 failed to respond to the treatment.

4. Russell, B. *History of Western Philosophy*, London, 1946.

1. Seager, L. D. *Science*, 1946, 103, 353.

2. Cutting, W. C., Halpern, R. M., Sultan, E. H., Armstrong, C. D., Collins, C. L. *J. Amer. med. Ass.* 1945, 129, 425.

3. McDermott, W., Bunn, P. A., Benoit, M., DuBois, R., Reynolds, M. E. *Science*, 1946, 103, 359.

4. Little, C. J. H., Lumb, G. *Lancet*, 1945, i, 203.

5. Jones, T. R. L., Maitland, F. G., Allen, S. J. *Ibid.* p. 368.

6. Bohls, S. W., Cook, E. B. M., Potter, R. T. *J. ven. Dis. Inform.* 1946, 27, 69.

There will certainly be further developments along these lines in the treatment of gonorrhœa, for the advantages of oral medication to the patient are clear enough, and considerations of economy are fast becoming obsolete. There will be special scope for this method in the treatment of children, and HENDERSON and McADAM<sup>7</sup> have shown that in infants, who have a low gastric acidity and probably a relatively sterile jejunum, penicillin is little destroyed in the gut; moreover, the inefficiency of their kidney function delays excretion.<sup>8</sup> The oral route will also be useful in nervous patients, and in seamen and others who have only occasional access to medical supervision. But there are dangers which these developments may render more acute, the chief being over-confidence on the part of patient and doctor. That of the patient is already manifest in the increasing proportion of those who, attending the public clinics for the treatment of gonorrhœa, cease to attend when penicillin treatment is finished. That of the doctor is shown in increasing disregard of those standards of observation and tests which should establish cure. BUSHBY and HARKNESS set fairly exacting standards in their present series, but such care in assessment is by no means universal. The achievements of this "wonder drug" may obscure the incontrovertible truth that gonorrhœa remains a disease with a predilection for infectious latency. Unless this is kept in mind mistakes will be made, and mistakes may be disastrous for the individual and the public health.

### Experimental Tumorigenesis

IN three lectures lately delivered at the Royal College of Surgeons Prof. ALEXANDER LIPSCHUTZ, of the University of Chile, has reviewed the observations made in his department over many years on the action of steroids in relation to "tumorigenesis." These observations have mostly sprung from the discovery that œstrogens injected into guineapigs cause nodules of fibrous tissue to appear in many parts of the abdomen. LIPSCHUTZ and his associates<sup>1</sup> have studied in detail the endocrine environment which favours or prevents the appearance of these nodules, and from data thus obtained he has elaborated hypotheses about the natural "antitumoral" defences of the body, which he believes may throw light on the problem of neoplastic growth in general, including cancer. The fibrous proliferations do not arise when œstrogens are given discontinuously—a fact which leads him to speculate on the advantages of cyclical secretion of œstrogens in the female—and they regress when the stimulus is removed. He conceives of two phases in the production of neoplastic growth: in the first, as seen in his guineapigs, there is proliferation of cells which are physiologically normal; while in the second (which may or may not follow) these cells assume the habit of autonomous, continuous, and irreversible growth. With œstrogens, he admits, the succession of these two phases is rare; "it is probable that the second phase is established by œstrogens only under certain quantitative and timing condi-

tions," and he suggests long and continuous stimulation by very small quantities as the circumstance most likely to turn the phase of proliferation into the phase of neoplastic growth. The critical change might, he thinks, be attributed to a cellular mutation induced by continuous œstrogenic stimulation, or to a virus coming into action under the abnormal conditions such stimulation has produced.

Any close consideration of the views Professor LIPSCHUTZ has thus put before us reveals at once an important difference between his terminology and that now current here. It is clear that, though he speaks of experimental tumorigenesis and antitumoral defence, the guineapig nodules which serve him as test object are not tumours in the sense in which that word has been used of late years by British pathologists.<sup>2</sup> In this country the term tumour has come to be applied only to progressive new formations or neoplasms (benign or malignant) with a capacity for autonomous growth—i.e., in the second of LIPSCHUTZ's two phases mentioned above. The nature of the stimulus responsible for this particular kind of cell multiplication is known only in the case of a few neoplasms in which a virus has been demonstrated—chicken tumours, Shope fibromas, Shope papillomas, kidney adenomas of frogs, and the mammary tumours of inbred strains of mice—but it is generally supposed that, whatever the causative stimulus may be, it is situated within the tumour cell. When the stimulus is not peculiar to the tumour and does not lie within the tumour cell, and when the result of withholding it is regression of the former increase in size, then the swelling is not a tumour but a simple hyperplasia. The only exception to this rule appears to be the tar wart of rabbits, which, though a true benign neoplasm, can regress and become latent. That it does not revert to its former state but merely goes into a latent state has been amply proved.<sup>3</sup>

Most of this orthodox pathology was recognised by LIPSCHUTZ and VARGAS<sup>4</sup> in their original papers describing how they produced local proliferations of fibrous-tissue cells, how they made them disappear by withholding the stimulus, and how by the combined applications of antagonistic sex hormones (alternately applied) they prevented the swellings from appearing. Though their description of these two processes as tumorigenesis and antitumorigenesis did not accord with English usage, there was reason for latitude in choice of terms, because these local hyperplasias were thought to be composed of muscle and fibrous tissue and it seemed probable that human fibromyomas would turn out to have the same origin. Human fibromyomas had been (and still are) classed as benign autonomous new growths, no extrinsic cause for them having been ascertained; and it was an advantage to place the spontaneous and experimental conditions in juxtaposition, even at the expense of exact taxonomy, until such time as both could be properly reclassified. It appears now, however, that the localised fibrous hyperplasias of guineapigs do not contain any plain muscle-fibres; they are composed of fibroblasts and collagen; it has been impossible to produce them in any other species; and

7. Henderson, J. L., McAdam, I. W. J. *Lancet*, 1916, i, 922.

8. Buchanan, J. L. *Ibid.*, Oct. 19, p. 560.

1. His principal collaborators have included Drs. Iglesias, Vargas, Bruzzone, Fuenzalida, and Riesco, and the work has been supported by the Coffin Foundation, the Rockefeller Foundation, the Ella Sachs Plotz Foundation, and the National Academy of Sciences of the United States.

2. Kettle, E. H. *Pathology of Tumours*, London, 1925.

3. Mackenzie, I., Rous, P. *J. exp. Med.* 1941, 73, 391.

4. Lipschutz, A., Vargas, L. *Lancet*, 1939, i, 1313; Lipschutz, A., Murillo, R., Vargas, L. *Ibid.*, 1939, ii, 420; see also Iglesias, R., Lipschutz, A. *Ibid.*, Oct. 5, p. 488.

they are not encapsulated—the cells infiltrating slightly at the sites from which they arise. They are therefore not true neoplasms, and not analogous to uterine fibromyomas; and it seems questionable, at least, whether they have any right to retain their provisional title of tumours, even if that title is ascribed to them only by implication. This does not of course exclude the possibility that human fibromyomas may yet be found to be due to a hormonal derangement; but in that case the uterine fibroids would also lose their status in pathology as tumours and would become hormone-conditioned hyperplasias like the experimental hyperplasias of the pituitary which were once thought to be adenomas.

The discovery of these curious focal fibrous proliferations in guineapigs has been valuable in several ways. It suggested a possible cause of uterine fibroids that had not been thought of; it can be used in demonstrating what is and what is not a true tumour; and it provides in the guineapig a kind of indicator of hormone action and antagonisms. As regards these various uses, it must be admitted that we do not yet know what is the cause of uterine fibroids; and, while it is known that hyperplasias may become converted into true neoplastic tissue, there is no evidence of this happening in the guineapig lesion. As an indicator of action and reaction of the sex hormones of the guineapig these fibrous proliferations enable ingenious experiments to be done, and Professor LIPSCHUTZ in his lectures related a remarkable series. It is of course too early to predict what further knowledge this technique may reveal.

## Annotations

### A MORAL PROBLEM

NUREMBERG is to be followed by further trials, and among the first to answer charges of atrocious conduct will be some doctors who are said to have misused human beings in scientific experiments. The sort of crimes of which they are accused are described in a collection of narratives by medical survivors from internment camps in Czechoslovakia,<sup>1</sup> and the stories there told suggest a degree of degeneration which few would have thought possible in Europe. Having accepted the Nazi view that extermination of Jews and other enemies was necessary and legitimate, a number of doctors in concentration camps assisted in destroying these lives. From this it was but a step to persuade themselves that the men and women doomed to death should previously be employed as experimental material: if they were killed under controlled conditions—for example, by measured exposure to cold—data could be obtained which might later save the life of a good German soldier. Why should not science, and German arms, make use of this unusual opportunity?

From time to time during the past year or two we have been invited to publish or summarise, for the use of investigators, detailed reports of lethal experiments performed by Germans. None of these has seemed to us, on its merits, worth publicity; for the tests were generally ill conceived and ill conducted and the results no more informative than those already secured by other means. But supposing facts of real value to medicine were still to emerge from the records of the experiments—should they be published or not?

1. *Medical Science Abused: German Medical Science as Practised in Concentration Camps and in the so-called Protectorate*. Reported by Czechoslovak Doctors. Prague: Orbis. 1946. Pp. 92.

Opinion on this difficult ethical question is divided. Those who favour publication say that the crime has been committed, and that our duty both to the victims and to their surviving friends is to see that all possible advantage is gained from their sufferings, so that they shall not have suffered wholly in vain. If some good can come out of this horror, let it come. Those who would refuse publication argue, on the other hand, that the crime has been committed and that we should make ourselves accessories if we were to profit by it in any way. To do so, they believe, would make it slightly easier for someone in the future to justify another crime of the same kind; and the value of medical progress is as nothing weighed against the harm done to human values by promoting tolerance to systematic murder.

The problem was presented in simple form by a member of our profession in a novel published before the war.<sup>2</sup> Here a hospital doctor kills a patient so as to get information required in his researches—information which proves in fact to be of no small interest and value. After his suicide the hospital's medical committee faces the question whether this information is to be used. "May I remind you," says the chairman, "that our duty to our neighbour, our fellow man, comes before even our interest in science?"; and the papers are solemnly burnt. Now that the same problem may arise in real life, ought we to burn the papers? Or is this a case in which we should take the moral risk eternally involved in trying to extract good from evil?

### POTASSIUM AND PARALYSIS

THE association of low serum-potassium with attacks of familial periodic paralysis has been recognised for some years, but there has been a conspicuous absence of authentic reports of paralysis associated with low serum-potassium in other conditions. An example has now been reported by Holler<sup>1</sup> in a diabetic girl of 18 years, admitted to hospital in coma. After the administration of 800 units of insulin in twenty-one hours ketosis was overcome, but respiratory paralysis supervened, so severe that the patient had to be put into a Drinker apparatus. Blood for serum-potassium was taken, but without waiting for the result 1.5 g. of potassium chloride was given intravenously, with great clinical improvement, the diaphragm now moving freely. The serum-potassium report was 2.5 m.Eq. per litre (9.75 mg. per 100 ml.) instead of the normal value of 5 m.Eq. After her removal from the Drinker apparatus the girl's respiratory difficulty recurred and was again relieved by potassium. On her complete recovery from all symptoms five days later her serum-potassium was found to be 5.07 m.Eq. per litre.

Two years ago Brown and colleagues<sup>2</sup> recorded 3 cases of chronic nephritis in which attacks of paralysis occurred spontaneously and were relieved by potassium administration, but the analytical data were somewhat scanty. Though at the time the condition did not seem so well substantiated as in the report of Holler it seems probable that a similar syndrome was involved. On the other hand, as Allott and McArdle<sup>3</sup> pointed out, alkalosis from pyloric stenosis is often accompanied by extremely low serum-potassium levels, without any evidence of paralysis. The syndrome of low serum-potassium with alkalosis has been reported in Cushing's syndrome by Willson and colleagues,<sup>4</sup> and very low serum-potassium levels are observed after testosterone treatment; in both these conditions there is no paralysis.

2. *Murder in Hospital*. By "Josephine Bell." Penguin Books, 1941.

1. Holler, J. W. *J. Amer. med. Ass.* 1946, 131, 1186.

2. Brown, M. R., Currens, J. H., Marchand, J. F. *Ibid.* 1944, 124, 545.

3. Allott, E. N., McArdle, B. *Clin. Sci.* 1938, 3, 229.

4. Willson, D. M., Power, M. H., Kepler, E. J. *J. clin. Invest.* 1940, 19, 701.



Lately Darrow<sup>5</sup> has demonstrated that in experimental alkalosis with chloride deficiency there is a change in the muscle electrolytes, the potassium falling and being in part replaced by sodium. It seems likely that the solution of the problem why paralysis occurs in some conditions in which the serum-potassium is low and not in others must await further work on muscle electrolyte changes in these conditions. Allott and McArdle showed that the paralytic manifestations in familial periodic paralysis were not associated with a potassium diuresis but rather with a retention. So mere loss of potassium from the body is not the cause: the distribution of potassium within the body must be profoundly disturbed.

#### WISDOM FROM THE EGG

MICRO-ORGANISMS in general must still be studied collectively rather than as individuals, and by methods based on analogy, chance, or personal flair rather than directly on the natural host-parasite relationship. Thus the fact that most members of the genus salmonella ferment arabinose (a pentose derived from gum acacia), though interesting and useful, has little direct connexion with the problems of food-poisoning. It was by analogy that Rous and Murphy in 1911 came to use the techniques of the embryologists and showed that the fowl sarcoma could be transmitted to the developing embryo in the egg by means of a cell-free filtrate. Twenty years later Goodpasture and Woodruff succeeded in infecting the chorioallantois with the virus of fowl-pox. In the hands of Burnet and his school the technique was extended, and during the last twelve years inoculation of the developing egg with virus or rickettsia has been adapted for many purposes. The egg has advantages over the animal as an experimental subject. It is cheaper, smaller, and less liable to cross-infection; and it does not appear to harbour any natural virus infection. Inoculation may be into the embryo itself, or into the yolk-sac, the amnion, or chorioallantois, and some viruses will infect far more satisfactorily by one route than by any other. Infection of the chorioallantois often produces visible lesions which may be measured or counted, and the effects of antibodies or chemotherapy may thus be estimated quantitatively under conditions far easier to control than in an experiment involving animals.

The developing egg has already proved its value in the application of the newer knowledge of viruses and rickettsiae to preventive medicine. Since viruses will not multiply on artificial media, one of the major difficulties in using them as prophylactic vaccines has been to concentrate sufficient volume of material in a form suitable for injection. The classical method, by the use of infected animal tissue, was used by Pasteur in anti-rabic prophylaxis, and by Nicolle and others in the preparation of anti-typhus vaccine. The fertile egg has been found to give higher yields of some viruses than can be obtained by any other method and has the added advantage that adventitious infection of all kinds can be excluded with reasonable certainty. The yellow-fever vaccine prepared in the chick embryo might well claim to have the widest social implications of any medical discovery of recent years. Whether the influenza vaccine prepared in the allantois is an effective prophylactic remains to be proved. Vaccination against smallpox with a pure strain of virus derived from culture on the chorioallantois is feasible, effective, and free from the risks of secondary infection. Virus from the developing egg has been shown to be a more satisfactory reagent for the Frei test in the diagnosis of lymphogranuloma inguinale than sterilised pus or mouse-brain suspension. Inoculation of the yolk-sac has been used by Cox in the preparation of rickettsial vaccines against epidemic and murine typhus and Rocky Mountain spotted fever.

5. Darrow, D. C. *Ibid.*, 1946, 25, 324.

The growth of viruses and rickettsiae on the developing egg presents no great technical difficulties, and the monograph by Beveridge and Burnet,<sup>1</sup> just published, describes those practical devices without which the investigator in any new field must flounder until luck and perseverance teach him foolproof methods. The monograph reviews the history and present status of the technique in all its aspects, but says little or nothing of the future possibilities, though these must be far from exhausted—for example, in the experimental chemotherapy of virus infections, which is still in its infancy; and, since bacteria can be grown on the egg at least as well as on artificial media, in the rapid diagnosis of bacterial infections. This monograph originates from Australia, where much of the pioneer work on this subject has been done; it will make the bacteriologist in Britain view his empty egg-cup with increased regret.

#### ENDS AND BEGINNINGS IN INTERNATIONAL HEALTH

CONTRASTS between the old and new in international public health were apparent at what may be the last meeting of the Office International d'Hygiène Publique in Paris on Oct. 23, followed by the second session of the Interim Commission of the World Health Organisation at Geneva on Nov. 4.

The Permanent Committee of the Paris Office occupied itself chiefly with good-tempered arrangements for its own funeral. The director-general, Dr. Robert Pierret, offered his resignation to facilitate the transfer, and it was agreed that the work of epidemiological reporting, as well as some of the staff, should be transferred to the Interim Commission by the end of the year. When the protocol enters into force<sup>1</sup>—possibly about next March—formal transfer of the funds and other assets will take place. It seems likely that the assets of the Office will not exceed the ultimate liabilities for pensions, compensation, and the like, unless member countries pay up their arrears of contributions. True to a forty-year-old tradition the president of the Permanent Committee, Dr. M. T. Morgan, managed to obtain agreement even on the most controversial subjects, and no voting was necessary. Naturally the technical discussions were thrust somewhat into the background, but interesting papers were submitted, notably by Dr. P. G. Stock, Dr. Vollenweider, and Dr. G. Stuart on the "immune reaction" following anti-smallpox vaccination, by Dr. van den Berg on postvaccinal encephalitis, and by others on B.C.G., plague, and typhus.

Of the 18 members of the World Health Organisation's Interim Commission, 17 met in Geneva—only Dr. Medved of the Ukraine being unavoidably absent. Although a smaller body than the Permanent Committee of the Paris Office, it is still too large for the expeditious conduct of its business, and the meeting, scheduled to last for seven days, went on for ten. This was partly due to inevitable lack of experience of many of the delegates in this type of work, to translation delays, and to the birth-pangs of a new organisation, but an important cause was the natural desire of members to press for work to be undertaken or committees to be set up on the specialty or disease in which they happened to be personally interested. Fortunately, as Dr. Melville Mackenzie pointed out, the Interim Commission is precluded from dealing in its short life with anything except "urgent" health problems; but, even so, the secretariat has been given "an almost impossible burden" in addition to its statutory obligations such as those concerning the international sanitary conventions, the nomenclature of diseases and causes of death, the

1. Beveridge, W. I. B., Burnet, F. M. *The Cultivation of Viruses and Rickettsiae in the Chick Embryo, Spec. Rep. Ser. med. Res. Coun., Lond.* no. 256. H.M. Stationery Office. Pp. 92. 2s.

1. See *Lancet*, Sept. 7, p. 358.

control of narcotics, and biological standardisation. Yet tuberculosis, the outstanding problem in world health at the present time, was hardly mentioned. Underlying this problem is an important point of principle, since it involves the question how far the members of the Interim Commission, who are nominated by governments in their personal capacity, are responsible to, and should receive instructions from, their own governments. It was evident that some members consider themselves primarily as representatives of their countries, while others clearly spoke for themselves alone; and although the point was raised by Dr. Mani (India) it was not specifically discussed. The narrower functions of the Paris Office make possible a dichotomy, delegates speaking under instructions in administrative matters concerning the conventions and personally on scientific matters; but in bodies such as the old Health Committee of the League of Nations, and the Interim Commission, which have wider powers of spending money on the initiation of work, such a distinction is probably impracticable. It may be that a mixture of responsible and irresponsible members—of civil servants and "rash, inconsiderate, fiery voluntaries"—is not only inevitable but desirable; but more will certainly be heard of the question.

Among the important decisions taken was one to accept UNRRA's generous offer of 1½ million dollars—half as much again as the commission's budget for 1947. It will be used in the first place to continue certain aspects of UNRRA's health work, including medical fellowships, the programmes in China and Ethiopia, and the control of tuberculosis and malaria: meanwhile governments of countries receiving aid from UNRRA will be asked to review their needs, so that the programme for spending the balance of the money can be revised. This should bring to the Interim Commission and the World Health Organisation additional strength by adding practical field work to their more academic responsibilities, as well as partially salving many consciences dismayed by the premature ending of UNRRA's activities. But how far governments will wish to accept expert advice unaccompanied by more tangible aid remains to be seen.

A stubborn debate took place on whether the headquarters of the Interim Commission should remain in New York or be transferred to Geneva, with a liaison office in the United States. An eloquent plea for Geneva by the executive secretary, Dr. B. Chisholm, on grounds of practicability and cost, was supported by the chairman, Dr. A. Stampar, and (as regards epidemic notification and the transfer of UNRRA work) by Dr. N. M. Goodman, the observer for UNRRA. But the commission felt that the more intangible considerations in favour of a New York headquarters were of paramount importance, and a vote on a compromise motion to retain headquarters there but establish a regional office in Geneva to deal with epidemiological reporting and the UNRRA field work in Europe revealed only two dissentients, Dr. Cavaillon and Dr. Krotkov, the members from France and the U.S.S.R. The next meeting of the Interim Commission is scheduled for March 31 in Geneva, and meanwhile the secretariat will have to increase its staff to deal with its new responsibilities.

#### DROWSINESS FROM BENADRYL.

THE drug 'Benadryl' ( $\beta$ -dimethylaminoethyl benzhydryl ether hydrochloride) has anti-allergic properties and also an anti-histamine action which enables it to relieve spasm of smooth muscle.<sup>1</sup> It is given by mouth in capsules of 50 mg., the average adult dose being one to four capsules daily. It has been used with great success in urticaria, angioneurotic oedema, erythema multiforme, and hay-fever; and Willcox<sup>2</sup> has shown that the urticaria which occasionally follows penicillin

therapy also responds well. It is not, however, without toxic effects, the most prominent being drowsiness; and Slater and Francis<sup>3</sup> describe a case in which an accident resulted from this symptom. A hay-fever patient took a 50 mg. capsule of benadryl at 7 A.M. and complained of feeling drowsy on starting work at 8 A.M. An hour later, while driving an electric platform cargo truck, he lost control and jumped off the truck. He was not hurt, but the truck ran off the platform and was wrecked.

More than half the patients taking benadryl notice slight drowsiness, and a few sleep for anything up to 18 hours at night, though this effect usually wears off in a day or two. When drowsiness is severe the dose may be reduced to 10–20 mg. A possible alternative would be to give amphetamine ('Benzedrine') in doses of 5 or 10 mg. at the same time. In the treatment of epilepsy it has been found that large doses of phenobarbitone (e.g., gr. 3 daily), which alone produce intolerable drowsiness, will still have the same effect on the fits if given in conjunction with amphetamine, though their hypnotic action is much reduced.

#### WELFARE OF THE DEAF

DEAFNESS in early childhood is not always easy to detect, and it is often difficult to decide whether a child's failure to develop normal speech is due to deafness or to mental retardation. Ascertainment at an early age is extremely important because the deaf child can acquire speech and language only by expert teaching, and until he has done so no other education is practicable. Under the Education Act, 1944, the parent of a deaf child can ask the local education authority to provide special education for his child from the age of two years, and an increasing number of parents are applying for these facilities. Unfortunately, however, the schools for the deaf are still suffering from war-time interruptions. Several of the largest of them, which were evacuated from dangerous areas, are only just beginning to settle down in their original premises. Most of the schools are residential and have had great difficulties in securing adequate domestic staff. The total number of trained teachers of the deaf is comparatively small so that the claims of the Armed Forces inevitably hit some schools hard. The training of teachers for so highly skilled a profession takes time, and there is still a shortage of suitable premises. The development of group hearing-aids for teaching purposes, which had made a good start before the war, was held up by difficulties of supply and maintenance. The solution of these problems is not a matter of weeks or even of months, but, in reply to an eloquent appeal by Mr. Edward Evans in the House of Commons on Nov. 20, reported on another page, Mr. Key, parliamentary secretary to the Ministry of Health, assured the House that the Minister of Education was urging local education authorities to make more provision for deaf children, and that conferences were being held to consider the erection of new schools and the extension of existing ones.

Three committees of the Medical Research Council are at work on different aspects of deafness. Most has been heard of the Electro-Acoustics Committee, which is concerned with the design of a hearing-aid which will be provided and maintained free of cost under the National Health Service. The two other committees are studying medical and surgical questions and the educational aspects. The findings of these committees will no doubt be valuable, but the various problems of deafness need for their solution the co-operation of doctors, physicists, educationists, and social workers. Doctors can help by ensuring that every child who develops otitis media receives early and efficient treatment, and by encouraging the parents of deaf children to seek the aid of the local education authority as soon as possible.

1. See *Lancet*, 1946, i, 425.

2. Willcox, R. R. *Brit. med. J.* Nov. 16, p. 732.

3. Slater, B. J., Francis, N. *J. Amer. med. Ass.* 1946, 132, 212.

## Special Articles

## CARE OF THE ELDERLY\*

Lord AMULREE  
M.D. Camb., F.R.C.P.

DURING the past few years the care of the elderly has assumed a particular importance in England, and it has been realised that their welfare propounds a problem that it will be difficult to solve. One hesitates to use these rather cold and impersonal words to describe what is essentially a human responsibility, and I should like to emphasise from the start that this is a matter from which the hand of the bureaucrat should be kept as far as is possible.

How to provide adequate living conditions for the elderly, and how to give them their proper place as essential members of the community, is likely to be the great special question of the future.

## THE AGEING POPULATION

In the United Kingdom during the last forty years the average expectation of life has increased by 17 years for men, to an age of 61, and by 20 years for women, to an age of 67. In 1901 there were about 2,400,000 persons (1,100,000 men and 1,300,000 women) aged 60 or over, but by 1944 the number had risen to 6,300,000 (2,700,000 men and 3,600,000 women).

This change in the constitution of the population is partly attributable to differences in the birth-rate, but partly also to prevention of many of the great killing diseases, with healthier living conditions generally and a higher standard of living among poorer people. The successful prevention of disease, especially in the young and middle-aged, makes it likely that in the next fifty years patients admitted to acute hospitals will be drawn more and more from the higher age-groups.

In a short time—if indeed it has not already happened—the real workers, between 18 and 60 years of age, will form only 40% of the population. Economically, it would not be satisfactory for 40% to carry the other 60% as drones, and from this purely practical point of view, if from no other, old people must be preserved as working members of the community for as long as is possible. This does not, of course, mean that they should be encouraged or expected to undertake heavy manual work; but that they should do light work and be employed in other ways where their wisdom and experience can be used to the full seems to be as natural as it is desirable. That it can be done was shown during the late war, when many men, and women, continued to work for some years after they would normally have retired—and with little damage, but rather improvement, to their health.

## WHERE TO LIVE ?

Compared with former, and perhaps happier, times, many more old people are faced with the problem of how to carry on their daily routine. Increased taxation, smaller houses, and lack of domestic help—a factor of great importance—are compelling many of the elderly to seek assistance even though they are by no means destitute. And this loneliness is one of the terrible aspects of old age. In 1944 there were over half a million pensioners on the supplementary pensions list who were living alone (including of course those in hostels or boarding-houses), and 85,000 of these were over 80 years of age.

What are the alternatives now open to those who, through no fault of their own, find that they are unable to deal with their own housekeeping, or indeed to look after themselves adequately ?

In the first place there are the public-assistance institutions. No-one can say that most of these are in any way satisfactory; their buildings are old and hideously decorated, with no human comforts, run under a lay administration with any number of encumbering and intimidating rules. There is, however, one valuable aspect of this system which must not be lost sight of in any impulse to sweep away the monstrous relics of the past. Those who are destitute, old, and ill can find a lodging in these institutions—a bed, food, and devoted nursing when it is needed. Granted that a lot, including the medical care, was bad; the system nevertheless has certain merits which must not be overlooked.

Then there are hostels and the like, mostly run by voluntary bodies, but a few by enlightened local authorities. Some of these are good, and some indifferent; but whatever their virtues or their faults their number is small, and they do no more than touch the fringe of the problem.

## SOME REQUIREMENTS

One great difficulty has been that no-one has ever laid down the criteria necessary to make a satisfactory home for the elderly. For these are minimum requirements which apply no matter what type of building is selected.

It is probably a mistake to collect old people together into self-contained communities, unless these are situated in the middle of towns and unless there is complete freedom for the old to leave the home whenever they like and to receive visitors at any reasonable hour. In general the old enjoy the society of the young, and the young can learn much from contact with their elders. Plans for new blocks of flats or for housing estates do, from time to time, contain provision for a certain number of flats or houses specially made for the elderly. Rooms should if possible be on the ground floor; but, if this cannot be arranged, nothing higher than the first floor should be used and an easy staircase provided. The staircase should be well lighted, should have a handrail on each side, and should not be a spiral; if a turn has to be made this should be done by means of a half landing. In any building inhabited by the elderly, care must be taken that the stair-carpet is in good condition and not loose. Some 10% of fatal domestic accidents to people over the age of 60 can be traced to an accident on the stairs.

If possible floors should be made of some non-slip material. A hand-chain over the bath, which may be of the sitz type, is of advantage. Fires, whether open, electric, or gas, should be adequately protected—over 5% of fatal domestic accidents to people over 60 are due to burns from improperly protected fires. The house, or flat, should not be too large; a living-room with a curtained bed recess, a bathroom and kitchen, are usually all that an elderly person wishes to look after. A good example of such flats is to be seen at the Glasgow corporation's Crookston institution. The bed recess is important during the winter, because it enables the occupant to sleep in the same atmosphere as that in which he has spent the day, thus avoiding sudden chills. An internal w.c. should always be provided, and the coal store should open into the house.

When hostels are proposed, care must be taken that each person has the possibility of as much privacy as he desires. While it is true that the old feel lonely, they do not always want to pass all their time in full public view. Single rooms are of course the ideal; but where this is impossible, small wards, or rooms, of not more than six beds (preferably less), should be provided. By the skilful use of screens and curtains the beds can usually be arranged so that inmates can retire into their own world from time to time. It is a great advantage for the occupants of hostels to bring their own furniture and belongings. Personal possessions acquire an increased value with old age, and their continued presence goes

\* A paper read at the opening session of the Anglo-Swiss Medical Conference at Basle, 1946.

a long way towards relieving the sorrow natural upon giving up a home. There are some old people who prefer to share a bedroom; they feel lonely and frightened at night and enjoy the feeling of someone in the room.

#### LESSONS FROM CHELSEA AND FRANCE

One of the best provisions made for the elderly in Great Britain is the Royal Hospital, Chelsea, founded by King Charles II for Army pensioners.

Here about 600 men, ex-Regulars of good conduct, are housed in large wards. But each pensioner has a cubicle of his own, containing his bed, chest-of-drawers and chair, into which he can retire and shut the door. The ward is large, with plenty of space, light, and air. There is a large open coal fire, with arm-chairs, while at one end is a small stove where any of the pensioners can cook a sausage, or the like, if he so wishes. This is of course in addition to his regular meals. Each pensioner is given a monetary allowance for beer and tobacco, and he can leave the building more or less as he likes. He also has at least three suits—a scarlet one for Sundays and feast-days, a blue one for ordinary days, and a fatigue dress for wearing in the hospital.

The beer-and-tobacco allowance, together with a wardrobe of reasonable size, go a long way towards making the lives of these men appear as normal as possible. Too often an atmosphere of quite unnecessary restriction surrounds such institutions; any attempt to indulge in mild human weaknesses or pleasures is regarded as improper, and the unfortunate inmate is treated as if his poverty and helplessness were a crime. It is a gloomy commentary on the progress of mankind that the best institution of this kind in England dates back 350 years.

Attached to this hospital is an infirmary where pensioners can go when they are sick of mild or minor diseases (for anything serious they are sent to a military hospital) or where they can be permanent inmates when they become feeble. During the war the infirmary was removed to a large house in the country, where the pensioners enjoyed the benefits of a beautiful garden and park, as well as immunity from bombs. The old gentlemen were, however, completely miserable, and only longed to return to London. The house was about two miles from a small country town—too far for them to walk, or for their friends to pay them visits. They missed the noises of the town, the sight of the traffic, and the feeling of being a member of a vast community. This experience has been instructive, for it is often suggested that large country houses might be converted into homes for the elderly. We must recognise that in general old people need to be kept in touch with the community, where their friends and relatives can see them with ease and where they still have the surroundings they have always known: otherwise there will be no contentment in their old age. Their life is contracting, and what is still left is doubly precious on that account.

In France great attention has been paid to the care of the aged for many years. The Assistance Publique, the central authority which controls all but a small number of the hospitals, is responsible for providing accommodation and care for old people. Under this authority homes, which may be roughly divided into three categories, are available—those who can afford to pay a sum equivalent to approximately £1 a week at the present rate of exchange can obtain a large bed-sitting-room furnished by themselves in one of the many *maisons de retraite*. Here medical attention, under the hospital authority, is available, food is served in a common dining-room, and there are practically no rules governing the institution. For those who cannot afford this sum, smaller rooms, *petits ménages*, are available in large institutions, which are equally free from tiresome restrictions. And even the paupers, housed in large dormitories in somewhat old-fashioned institutions, or hospices, are allowed

a degree of freedom which compares favourably with that enjoyed by inmates of our public-assistance institutions. But, from the medical point of view, the most important fact is that the healthy aged are cared for by the same authority as the sick, and there is, therefore, no administrative barrier fixed between these two inseparable types of old people.

Any arrangements made for the care of the elderly in hostels, homes or institutions must include a close link with a hospital. Old people develop mild diseases, notably respiratory or cardiovascular, which prompt care will often cure in a short time, whereas neglect may lead to catastrophe. The aged do not react to infection as vigorously as the young, and apparently trivial symptoms may mask a serious condition. It is true that the old frequently object strongly to removal to hospital, because they have a secret fear that they will never leave. An efficient hospital service can in time overcome that fear; when they see their friends returning from hospital, improved in health, if not cured entirely, they no longer regard their own transfer to the hospital as the first step to the tomb.

At present elderly persons who become ill are often taken away from home to some institution, where they are put in a ward for the chronic sick. Here they lie until they die—receiving no proper medical investigation or treatment—and are made unnecessarily bed-fast. Then life becomes miserable and cramped, and they occupy valuable beds which are required for other purposes.

#### AN UNPAID DEBT

What I have been saying is obvious once it comes to the mind.

We have already made great strides with the improvement of conditions for infants and young children, and this has paid handsomely. Let us now turn our attention to the old, who, having worked all their lives, can pay no dividend: in fact it is we who owe them much. Their plight is desperate.

### GENERAL MEDICAL COUNCIL

#### PRESIDENT'S ADDRESS

OPENING the 189th session on Tuesday last Sir HERBERT EASON, the president, spoke with deep regret of the death of Sir Kaye Le Fleming—a direct representative for England and “an outstanding example of family physician and friend”—and of two former members of the council, Sir Walter Langdon-Brown and Dr. Wardrop Griffith. Dr. Thomas Fraser, the direct representative for Scotland, has retired after five years' valued service, and Dr. R. W. Craig, former Scottish secretary of the British Medical Association, has taken his place. Mr. Duncan Macgregor has been appointed by the Privy Council to be an additional member of the council under the Dentists Act, 1921.

At their meeting in May, continued the president, the council decided that in the consideration of their draft recommendations as to the curriculum a stage had been reached when it might be desirable to consult some of those concerned with the medical curriculum in Canada and the United States.

“Thanks to the generosity of the Nuffield Foundation, who defrayed the cost of transport across the Atlantic, and of the Rockefeller Foundation, who defrayed the cost of living in the New World, this aspiration was fulfilled, and in the middle of September a delegation from the council, consisting of Dr. Bigger, Dr. Brocklehurst, Dr. Campbell, Dr. Cohen, and myself, with the registrar, crossed the Atlantic and visited the following medical schools: in New York the Long Island college of medicine, Cornell University medical college, New York University college of medicine, and Columbia University college of physicians and surgeons; the University of Chicago; the University of Michigan medical school, Ann Arbor; in Canada, the faculties of medicine in the University of Toronto and in McGill University; the Harvard University medical school in Boston; and the Johns Hopkins University school of

medicine in Baltimore. In addition, the delegation met representatives of the council on medical education and hospitals of the American Medical Association in Chicago, and of the National Board of Medical Examiners in Philadelphia.

"From all these bodies the delegates obtained valuable information as to the requirements for medical practice, the content and layout of the medical curriculum, and the views of those who would amend the existing regulations."

A preliminary report on the visit would be presented during the session, when the council would have to consider the draft recommendations in the light of observations made on them by licensing bodies and medical schools; but since replies had not been received from a number of bodies and schools it would probably be necessary to have an additional session in February for adoption of the recommendations in their final form.

At their May meeting the council approved the draft of a short Medical Bill restricted in its scope to matters which in their opinion urgently required legislation. Copies of the draft and of an explanatory memorandum were transmitted to the Minister of Health and to the Lord President of the Council on Sept. 21, with a submission that the Bill should be settled by the Government draftsman with a view to its introduction, as settled, into Parliament at the first opportunity.

## YES OR NO ?

### FURTHER COMMENTS

LAST week we published extracts from published comments on the British Medical Association's plebiscite. The following is a further selection :

Sir ALFRED WEBB-JOHNSON (*president of the Royal College of Surgeons of England*) :

I hope that all practitioners will give this question most serious consideration. I trust that they will not lightly make it difficult for the responsible leaders of the profession to enter into negotiations in which the Minister is now at liberty to take part.

It must be borne in mind that a vote in favour of discussions with the Minister does not register approval of the Act in every detail. A vote in favour of discussions does not commit any practitioner to accepting service under the Act.

There are parts of the Act which, in the judgment of the majority of the profession, will not give the public the best service. But the Act probably pleases no-one entirely. There are obvious dangers to be guarded against.

Discussions will, however, provide opportunities for negotiation on many points which still need clarification in spite of the debates in Parliament. They will also provide opportunities for helping to plan most of the machinery of the service, and to mould much of the policy which remains to be settled by regulations.

Dr. GUY DAIN (*chairman of council, B.M.A.*) :

Mr. Souttar accuses the B.M.A.'s leaders of "blind opposition" to the Health Act, when in fact they are adopting the most democratic step open to them—that of taking the opinion of the whole profession, an opinion that through the plebiscite will determine all future action. He says that the medical profession will never refuse to serve the nation. Of course it will not. But it has the right to determine by its own faith and conscience whether the Act can in fact be made to work in the best interests of the people. (*Times*, Nov. 20.)

Dr. CHARLES HILL (*secretary, B.M.A.*) :

Let me make it clear, with all the emphasis I can, that whatever the result of this plebiscite the medical profession's services to the sick and the suffering will not be diminished in the smallest degree. No patient in this country is going to have one bottle less medicine, one minute less of care and attention, on account of the doctors' little disagreements with the present Minister of Health. . . .

Nor, again, is it either true or fair to pretend that this plebiscite is (in some unexplained fashion) disloyal or "seditious," to argue that the B.M.A. is "challenging the authority of Parliament" by organising it. We are not yet faced in this country, thank God, with the alternative of signing on the dotted line or going to prison, the choice (let us say) between "Bevan or Belsen."

All doctors are expressly left free by the Act itself to choose whether to come into the new Health Service or not. . . .

No, the "supremacy of Parliament" is being insidiously and corrosively tampered with by people other than the B.M.A. One of the many reasons why doctors dislike this Act is that it is the worst sample yet seen in England of delegated legislation, of the fatal temptation to leave the making of law to the bureaucrat. . . .

This ill-judged scheme hurriedly rushed through Parliament is not a proper Statute at all. It is not even an "Enabling Act." It is just a Sahara of blank spaces in which a temporary political office-holder may scrawl anything. That is the ugly fact behind the much-advertised vision of a "free health service for everybody."

That is the issue this plebiscite will test. Naturally, and rightly, doctors are being told what their professional leaders think of the Act as it now stands. But the illusion, sedulously fostered by opponents, that the average doctor would be quite willing to work with Mr. Bevan if it were not for the intrigues of some mysterious clique or "faction" at the B.M.A. has no foundation in fact. (*Evening Standard*, Nov. 20.)

Sir WILLIAM GOODENOUGH and Sir JOHN STOPFORD, F.R.C.P., F.R.S. :

It is not for us to interfere in any way in the internal affairs of the medical profession, we are concerned not with medical practice but with university and hospital administration. Nevertheless, because of these concerns, the future of the health service is a matter of vital importance to us and to the patients and students whom we serve, and this future depends upon the attitude towards the service of the doctors and others by whom it will be operated. . . .

It seems to us that if the profession decide now not to take part in any discussion with the Government, they will be forfeiting their right to share in the shaping of the new service and will be deciding in advance to reject the scheme which has been approved by Parliament before they have any knowledge of what that scheme in fact will be. We earnestly hope that our medical colleagues will not take hastily so rash a decision but will join with the Government and with all others concerned to discuss how best the Act can be translated into an effective health service. (*Times*, Nov. 25.)

## BRITISH AND AUSTRALIAN MEDICAL SERVICES COMPARED

### FROM OUR AUSTRALIAN CORRESPONDENT

"THE panel system in Britain has broken down so completely that the Government has been forced to bring out a new scheme," said Dr. A. W. Chambers, an Australian doctor who has just returned after nine years in England and Scotland. "The standard of the medical profession in Britain today is high, except for general practitioners, who have deteriorated considerably because they have not the time to bring themselves up to date," he is reported as saying.

"Patients in public hospitals in Britain paid according to their means. There was nothing comparable to the six shillings a day subsidy for hospital patients paid by the Australian Government.

"Britain was far behind Australia in maternal care. Many children were still delivered in the mother's home with the aid of a certified midwife. Every British mother did not receive a maternal benefit as in Australia.

"Only the working girl, a contributor to the National Insurance Scheme, received a grant of less than £5 for her confinement if a child was born to her within a certain time of her leaving work."

In Australia, since 1943, a mother has received £15, £16, or £17 10s. according to whether there are none, one or two, or three or more other children under 14 in the family.

### AUSTRALIA'S NATIONAL HEALTH SCHEME

It may be of interest to British readers to recall that Australia has a National Health Scheme which passed both houses of parliament in 1938 but has never been put into operation.<sup>1</sup> The scheme was compulsory, but did not cover everyone. It was limited to employees, other than public servants, having an income of less than £7 per week. In 1939 the scheme would have applied to only a quarter of the population of Australia.

1. *Lancet*, 1938, 1, 1463; 1939, 1, 778.

The scheme was based on the insurance principle, with contributions from employees, employers, and the government. The contributions were fixed at 3s. per week for men and 2s. for women, with employers contributing similar amounts on account of each employee. There was no means test.

The benefits were: medical treatment, medicines, and drugs; sickness benefits (males 20s., females 15s., and dependent children 3s. 6d. weekly, for maximum of 26 weeks); disablement pension (males 15s., females 12s. 6d.); old-age pensions (males 20s., females 15s.); widows' pensions (12s. 6d., rising to 15s. by 1944); orphans' pensions (7s. 6d. if last parent insured). A comparison with the Beveridge plan showed that Australian contributions would have been two-thirds of the British, but the benefits would have been proportionately less.

Why was the scheme abandoned? First, it was out of step with the individualistic Australian temperament. Medical practice in Australia in 1938 was very different from that of Britain in 1938. Much more so from that in Britain in 1911. Sir Walter Kinnear, who framed the Australian scheme on British lines, was not sufficiently influenced by the leaders of the friendly societies in Australia. Secondly, although the federal executive of the British Medical Association had agreed to a capitation fee of 11s. a year, and had agreed to a pledge of secrecy until the Bill had been presented to Parliament, there was widespread criticism from the rank and file of B.M.A. members.

The Bill was finally passed on the promise that a Royal Commission would recommend a capitation fee, the scope of treatment, and travelling expenses. But even this action did not still the criticisms that (a) remuneration on the basis of an annual capitation fee was much too low, and an insurance doctor would be forced to increase the number of his panel patients at the expense of his professional efficiency; (b) no provision was made for mothers and children or for the unemployed, the small-scale employers, and self-employed persons; (c) no provision was made for hospital services, specialist services, preventive medicine, for regulation of medical working hours, or for better distribution of doctors to places where their services are needed, but which were economically unattractive; (d) there was no coördination between clinical treatment and hospital and health services.

Thirdly, employers, employees, friendly societies, feminists, and farmers all had various objections to the Bill. The shadow of war was beginning to fall; a record defence expenditure was in the budget, and there was a widespread drought in the country. If a last straw had been needed it was the tragic crash of an air-liner which was conveying most of the members of the Royal Commission. There were no survivors of this crash, which also destroyed most of the important documents of the commission.

As late as 1943 a parliamentary joint committee on social security announced sentence. "On the evidence submitted there is," they said, "unanimous objection to national health insurance as contained in the Commonwealth National Health and Pensions Insurance Act, 1938. Special attention has been directed to the restriction of benefits to a particular income group, to the very limited health and social benefits, and to the absence of any provisions covering the dependants of an insured person. . . . Generally it is our opinion that the National Health and Pensions Insurance Act falls far short of any plan of social security adequate for the people of Australia, and this Committee does not favour the principle of national insurance for such a purpose. In view of the overwhelming weight of evidence we strongly advise that no action be taken to implement any of the provisions of this legislation in its present form."

Dr. G. Matthew Fyfe, M.O.H. for Fife, is to represent the Scottish branch of the Society of Medical Officers of Health on the advisory committee set up under the Scottish Water Act, 1946.

Dr. Catherine B. Crane has been appointed medical officer of health for the city of York, in succession to the late Dr. P. R. MacNaught, whom she served as deputy. According to the *Medical Officer* of Nov. 23, Dr. Crane is the first woman to receive the full appointment of M.O.H. for a county borough.

## Reconstruction

### THE REGIONAL AREAS

#### MINISTRY'S PROVISIONAL PROPOSALS

UNDER the National Health Service Act the Minister of Health is required to determine the areas to be covered by the regional hospital boards administering the hospital and specialist services. So far as possible these areas are to be such that the services can conveniently be associated with a university having a medical school, and in determining their extent the Minister must consult the bodies and organisations which appear to him to be concerned.

Accordingly Mr. Bevan has now prepared a statement of his provisional views and has asked a wide range of professional and other bodies for their observations—to reach him by Dec. 15.

In so doing he points out that the size and extent of the areas must be determined primarily by their purpose, "which is to provide an area adapted rather for the planning, coördination, and provision of hospital and specialist services than for the control and management of hospitals. The latter task will . . . be the function of hospital management committees. It follows that the areas can and should be comparatively large in population, and such that each has a natural university medical centre as a focal point."

In certain regions geographical or other circumstances "appear to render it necessary that for part of the area there should be set up a regional committee of the board with delegated powers and its own offices. The Minister has in mind such areas as Devon and Cornwall; Hampshire, Dorset, and Isle of Wight; North Lancashire and South Westmorland; and Cumberland and North Westmorland."

The boundaries of regional areas need not and will not prevent the free passage of patients from one area to another. "Indeed in some instances at the outset regional boards will become responsible for hospitals, &c., in their area which have belonged to and served communities in other areas, and which must continue to do so." However, the Minister thinks that wherever possible the boundaries of the regional areas should coincide with those of local health authorities, so as to secure the maximum of administrative efficiency. Except where other considerations must in his view clearly prevail, the proposed boundaries accordingly follow those of counties and county boroughs. "In some instances it appears that other important factors (e.g., association of the services with the appropriate medical schools, grouping of related hospitals under the same regional board) make it essential to cross local health authority boundaries in defining the boundaries of regional board areas. Here again the Minister has sought wherever possible to ensure that the proposed boundaries shall coincide with those of boroughs or county districts."

The following notes show the 14 proposed areas, grouped round 11 universities. It will be noted that London University is related to four regions.

#### NEWCASTLE

Counties of Cumberland, Northumberland, and Durham. County boroughs of Carlisle; Newcastle-upon-Tyne and Tynemouth; Darlington, Gateshead, South Shields, Sunderland, and West Hartlepool.

County of Westmorland (Appleby B. and North Westmorland R.D.).

County of York, N. Riding (Middlesbrough C.B.; boroughs of Redcar, Richmond, and Thörnaby-on-Tees; U.D.s of Eston, Guisborough, Loftus, Northallerton, Saltburn and Marske, and Skelton and Brotton; and R.D.s of Croft, Northallerton, Reeth, Richmond, Startforth, and Stokesley).

## LEEDS

- County of York, E. Riding.  
County of York, N. Riding (except area in Newcastle region).  
County of York, W. Riding (except area in Sheffield region).  
County boroughs of Kingston-upon-Hull; York; Bradford, Dewsbury, Halifax, Huddersfield, Leeds, and Wakefield.

## SHEFFIELD

Counties of Derby (except area in Manchester region), Leicester (except Hinckley U.D.), Lincoln (Parts of Holland, Parts of Kesteven except area in Cambridge region), and Parts of Lindsey, Nottingham, and Rutland (except Ketton R.D.).

County boroughs of Derby; Leicester; Grimsby and Lincoln; Nottingham.

County of York, W. Riding (C.B.s of Barnsley, Doncaster, Rotherham, and Sheffield; borough of Goole; U.D.s of Adwick le-Street, Bentley with Arksey, Conisborough, Cudworth, Darfield, Darton, Dearne, Dodworth, Hoyland Nether, Maltby, Mexborough, Penistone, Rawmarsh, Royston, Stocksbridge, Swinton, Tickhill, Wath-upon-Deerne, Wombwell, and Worsborough; R.D.s of Doncaster, Goole, Kiveton Park, Penistone, Rotherham, Thorne, and Wortley).

County of Stafford (Burton-on-Trent C.B. and Tutbury R.D.).

## CAMBRIDGE

Counties of Bedford (except area in N.W. London region), Cambridge, Huntingdon, Isle of Ely, Norfolk, Soke of Peterborough, Suffolk East, and Suffolk West.

County boroughs of Great Yarmouth and Norwich; Ipswich.

County of Essex (Saffron Walden B. and R.D.).

County of Herts (Royston U.D.).

County of Lincoln (Parts of Kesteven) (Stamford B., Bourne U.D., South Kesteven R.D.).

County of Rutland (Ketton R.D.).

## LONDON

*North-west*

Counties of Bedford (Luton B. and R.D., Dunstable B., Leighton Buzzard U.D.), Bucks (boroughs of Chepping Wycombe and Slough; U.D.s of Beaconsfield, Chesham, Eton, and Marlow; R.D. of Amersham, Eton, and Wycombe).

Berks (boroughs of Maidenhead and New Windsor; R.D.s of Cookham, Easthampstead, and Windsor).

Herts (except areas in Cambridge and N.E. London regions).

Middlesex (except area in N.E. London region).  
London (Hammersmith (north of Goldhawk Road and Stamford Brook Road), Hampstead, Holborn, Islington, Kensington (north of Holland Park Avenue, Notting Hill Gate, and Bayswater Road), Paddington (north of Bayswater Road), St. Marylebone, St. Pancras, Westminster (north-east of Park Lane, north of Constitution Hill, Birdcage Walk, Great George Street, and Bridge Street).

*North-east*

Counties of Essex (except area in Cambridge region); Herts (Hertford B., U.D.s of Bishop's Stortford, Cheshunt, Hoddesdon, Sawbridgeworth, Ware; R.D.s of Braughing, Hertford, and Ware); Middlesex (Edmonton B., Tottenham B., Enfield U.D.); London (Bethnal Green, City, Finsbury, Hackney, Poplar, Shoreditch, Stepney, Stoke Newington).

County boroughs of East Ham, Southend-on-Sea, and West Ham.

*South-east*

Counties of Kent and East Sussex; London (Bermondsey, Camberwell, Deptford, Greenwich, Lambeth (east of Kennington Park Road, Brixton Road, and Brixton Hill), Lewisham, Southwark, Woolwich).

County boroughs of Brighton, Canterbury, Eastbourne, and Hastings.

*South-west*

Counties of Surrey and West Sussex.  
Hampshire, Isle of Wight, Dorset (except area in Bristol region), Wilts (boroughs of Salisbury and Wilton; R.D.s of Amesbury, Mere and Tisbury, and Salisbury and Wilton).

London (Battersea, Chelsea, Fulham, Hammersmith (south of Goldhawk Road and Stamford Brook Road), Kensington (south of Holland Park Avenue, Notting Hill Gate, and Bayswater Road), Lambeth (west of Kennington Park Road, Brixton Road, and Brixton Hill), Paddington (south of Bayswater Road), Wandsworth, Westminster (south-west

of Park Lane, south of Constitution Hill, Birdcage Walk, Great George Street, and Bridge Street)).

County boroughs of Bournemouth, Croydon, Portsmouth, and Southampton.

## OXFORD

Counties of Berkshire (except area in N.W. London region), Buckingham (except area in N.W. London region), Northampton, and Oxford.

County boroughs of Northampton, Oxford, and Reading.

## BRISTOL

Counties of Cornwall, Devon, Gloucester, Somerset, and Wilts (except area in S.W. London region).

County of Dorset (boroughs of Bridport and Lyme Regis; Sherborne U.D.; R.D.s of Beaminster, Bridport, and Sherborne); Isles of Scilly.

County boroughs of Bath, Bristol, Exeter, Gloucester, and Plymouth.

## CARDIFF

The whole of Wales and Monmouth.

## BIRMINGHAM

Counties of Hereford, Leicester (Hinckley U.D.), Salop, Stafford (except Burton-on-Trent C.B. and Tutbury R.D.), Warwick, and Worcester.

County boroughs of Birmingham, Coventry, Dudley, Smethwick, Stoke-on-Trent, Walsall, West Bromwich, Wolverhampton, and Worcester.

## MANCHESTER

Counties of Cheshire (except area in Liverpool region), Lancashire (except area in Liverpool region), and Westmorland (except area in Newcastle region).

County of Derby (boroughs of Buxton and Glossop, U.D.s of New Mills and Whaley Bridge, and R.D. of Chapel-en-le-Frith).

County boroughs of Barrow-in-Furness, Blackburn, Blackpool, Bolton, Burnley, Bury, Manchester, Oldham, Preston, Rochdale, Salford, and Stockport.

## LIVERPOOL

County of Cheshire (C.B.s of Birkenhead, Chester, and Wallasey; boroughs of Bebington, Congleton, and Crewe; U.D.s of Alsager, Ellesmere Port, Hoyle, Hoole, Knutsford, Lymm, Middlewich, Nantwich, Neston, Northwich, Runcorn, Sandbach, Winsford, and Wirral; R.D.s of Bucklow, Chester, Congleton, Nantwich, Northwich, Runcorn, and Tarvin).

County of Lancashire (C.B.s of Bootle, Liverpool, St. Helens, Southport, Warrington, and Wigan; boroughs of Crosby and Widnes; U.D.s of Abram, Ashton-in-Makerfield, Aspall, Billinge and Winstanley, Formby, Golborne, Haydock, Hindley, Huyton with Roby, Ince-in-Makerfield, Litherland, Newton-le-Willows, Ormskirk, Orrell, Prescott, Rainford, Skelmersdale, Standish with Langtree, and Upholland; R.D.s of Warrington, West Lancashire, Whiston, and Wigan).

## INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED NOV. 16

*Notifications.*—Smallpox, 0; scarlet fever, 1293; whooping-cough, 1696; diphtheria, 330; paratyphoid, 26; typhoid, 7; measles (excluding rubella), 4382; pneumonia (primary or influenzal), 625; cerebrospinal fever, 30; poliomyelitis, 15; polioencephalitis, 2; encephalitis lethargica, 3; dysentery, 70; puerperal pyrexia, 141; ophthalmia neonatorum, 60. No case of cholera, plague, or typhus was notified during the week.

The number of Service and civilian sick in the Infectious Hospitals of the London County Council on Nov. 13 was 957. During the previous week the following cases were admitted: scarlet fever, 57; diphtheria, 31; measles, 22; whooping-cough, 35.

*Deaths.*—In 126 great towns there were no deaths from enteric fever, 1 (0) from measles, 1 (0) from scarlet fever, 9 (1) from whooping-cough, 7 (0) from diphtheria, 63 (6) from diarrhoea and enteritis under two years, and 16 (3) from influenza. The figures in parentheses are those for London itself.

Liverpool reported 11 deaths from diarrhoea and enteritis, Manchester 9.

The number of stillbirths notified during the week was 297 (corresponding to a rate of 33 per thousand total births), including 48 in London.

## In England Now

### A Running Commentary by Peripatetic Correspondents

Now is my time for stocktaking. Until a year ago my life was in the R.A.F., now it's in G.P. The differences are very great and the changing mind can play queer tricks. For instance, there is one hilly road leading into our valley town that I will drive down in preference to all the others. This gives a panoramic view of the town below, turns sharp right and immediately increases its angle of descent for 100 yards (A.S.I. 90-95 m.p.h.). Then it flattens suddenly for 10 yards (1st check), descends again almost to the valley bottom, eases left, then right, bumps over a railway bridge (throttle back and ease the stick forward), then over a canal bridge (throttle right back, ease the tail down), and glides straight in towards the main street (flap lever up, look behind you). Then, instead of setting the trimmer tail heavy, I change into second gear and turn into the main street. My first solo is over, but it will never be forgotten.

There were awkward moments when a modern youth would slouch into the surgery and say, "I worn't a milk ticket furr me Dad." He would look at me as if I were the Minister of Labour. And I would look at him for long enough to curdle the milk before it was delivered.

Other difficulties were over forgetting the patients' names. It's easy to connect the face with the complaint, but even the pioneer studies of Ebbinghaus didn't help, because if one was going to use the method of learning by groups and related series whole families would have to attend the surgery together. But within a week of our finding a permanent house near the centre of the town I could remember most of the names and even recall the names of those I had seen in the first month. Retroactive inhibition? Emotional blockage? I dunno.

\* \* \*

To sit in the common-room of any strange university and discuss the current technical problems is always a pleasure. To do so in Germany brings to life the shadowy curtain of unreality that seems inseparable from everything to do with the country just now.

We had sat through a demonstration of the effects of starvation on children, put on for our special benefit. There was only one case of any importance. All comment about prognosis, and the difficulty of getting rid of famine oedema, was immediately scotched by a reference to our experiences at concentration camps.

We then learnt, with joy (and it must be admitted a good deal of disbelief), that a way had been found of converting soya bean into an almost tasteless milk. It has been converted into almost everything in its time, but never has the scientist succeeded in disguising its taste for long. It has even been detected in the non-soya sausage now issued in lieu of its more famous relative, the war-time link. We were not then surprised to find that, though palatable at first, second thoughts were unanimous in deciding that nature's milk was better. Still, it is a useful adjunct to protein-starved Europe.

It might be thought that these little interludes would prevent a friendly discussion of Germany's educational and spiritual problems. We were delighted to find that the eminent professors (now often youngsters since their elders, and usually betters, had failed to survive either Hitler's or our purge) were only too glad to talk. They were afraid of Communism because once again it removed the responsibility of thinking from the individual. That, they thought, was its main appeal to the youth of the country, and not its economic policy. They told us the story of the school-teacher who, after a lecture on Independent Thought delivered by an eminent British Parliamentarian, went up to the speaker and asked for some guidance on independent thinking. They then fell into the same mistake themselves by saying that we should show them how to govern. When we suggested that they should try to find out and that we would try to guide them, they were a little surprised.

It is pathetic how lost the whole nation appears to be. It is also a little frightening to realise how difficult it is to bring into being an entirely new method of thought. The danger is that someone will give them a new doctrine to follow before they have assimilated

the new method of reasoning that we are attempting to instil into their politics. Most of the Germans at heart still believe that their cause was right, but that they were unlucky in not applying a better method.

Rather unexpectedly there is a great demand among German students for instruction in philosophy. And yet perhaps not so strange. The Dean had some misgivings about this, fearing that it was not a real thirst for knowledge but a method of escape, and perhaps of self-justification. He did not find a willingness to learn from the older men, a desire to draw from their experience. But perhaps the German student is no different in that from his colleagues all over the world. "Everyone wants to be a student," he said. "There are far too many of them. What Germany wants for the next twenty years is men that can use their hands." Looking at the almost untouched piles of rubble we were inclined to agree.

\* \* \*

I am going to start a one-man war against our chief occupational disease, though I cannot look forward to any Nobel award if I succeed. My only recompense will be in the fact that the medical profession are the chief sufferers. Slowly but surely this detestable complaint, jargon aphasia, eporrhoea, or Herbert's disease, has been invading our ranks from the chief endemic reservoir of infection—the official circular. Typical cases, like the "disinfestation officer" who circulated a report which suggested that mice should be trapped as they emerge from their apertures, are fortunately rare, but there is no lack of this kind of thing:

"This failure to exercise objective acumen derives from professional indoctrination with the time-worn diagnostic axiom, that to seek a plurality of causes for a clinical picture is deplorable. It is understandable that in a busy clinic, scientific curiosity may be curbed when the therapeutic exigencies are abbreviated by the self-determined course of the disorder. . . . The phenomenology observed following ingestion of *Datura stramonium* seeds may be incorrectly interpreted as evidence of an affective disorder."

"Pronation deficiency following immobilisation in plaster can be minimised by taking care to avoid inversion of the foot, and to see that the foot is pronated in plaster as much as possible."

"The drug is devoid of risk, but irresponsible patients should preferably be institutionalised."

In the general presence of disease we may forget the look of health. "Sir, your son was struck in the leg by a cannonball, that we were forced to cut it off, whereof he died. . . ." ". . . that you be hanged by the neck until you are dead, and the Lord have mercy on your soul." Deformed as we are, of necessity, by the weight of sulphonamides, heteroauxins, heteronymous hemianopias, and osteodystrophiae epiphysio-arthritis, we can at least raise our heads to look back at better days.

In the matter of words and units, the electricians, who made themselves a vocabulary to measure, have the better of us. Their terminology, crisp, homely, and readily transferable into an alphabet of signs that recall gardening implements, is enviable to us—better than the rings and semi-detached indoxyl penthouses of the biochemists with their barbarous names. Could we not measure olfactory thresholds in snouts and megasnouts, the lateness of honorary physicians at rounds in dawdles or coffees? A terminology rugged but not barbarous, that is what we want. Let us take personal names if we wish, and to ohms and curies let us oppose chaplins of valgus deformity, potts of curvature, even megafreddies of azoospermia and charringtons of polyuria. We could well enrich the language which we are now occupied to outrage.

\* \* \*

"Even my driver sometimes doesn't know what the diagnosis is." This startling remark by an UNRRA medical officer in Germany led to the explanation that his colleagues from among the Displaced Persons of Eastern Europe very naturally and rightly report their diagnoses in Latin, of which tongue he, being Western-trained, was comparatively ignorant. His Polish D.P. driver, an ex-medical student, had recently explained to him, for example, that "Intussusceptio ostii abdominalis" did not mean that D.P.'s had a bone in their bellies unknown in America!



## Letters to the Editor

### REGIONAL BOARDS

SIR,—Sir Leonard Parsons and Sir Ernest Rock Carling have written most valuable letters on regional affairs.

A comment, however, seems called for on Sir Leonard Parsons's use of the words "administration" and "policy," which I think has also puzzled Sir Ernest Rock Carling. Referring to your leading article of Nov. 9, Sir Leonard Parsons asks whether you are right in assuming that the function of the regional boards is primarily one of administration. He says that in his view the boards should be concerned with "policy" whilst "administration" should be delegated to the hospital management committees. It is a misfortune that our terminology for dealing with such matters is so lacking in precision. One could be forgiven for supposing that "administration" and "policy" in this context were synonyms and not opposites—i.e., that policy means major questions of administration. And one would have thought that if the board were concerned with "policy" the implication would be that it should be predominantly lay and served by a lay chief executive officer as in the case of the board of a hospital.

Sir Leonard Parsons, however, argues that the prime concern of the regional board—its policy—should be to organise the best possible facilities for treatment, and he draws the conclusion that "it would follow" that the primary qualification of the chief executive officer of the board should be his "intimate knowledge of the medical aspects of hospital care." I hope this is a fair summary of his argument. In regard to the object of the board, one can whole-heartedly agree: in regard to method, and the question whether the objective is best achieved by a medical chief executive officer, there is room for difference of opinion.

The trouble is surely this: that if professional ability could really be brought to bear in the simple way Sir Leonard Parsons suggests, all would be plain sailing. There would in fact be no need for a regional board or of a medical advisory committee at all. A medical man acting as a commissioner would suffice. But in actual fact this is not the case: medical men differ as to what ought to be done, and a lay decision has to be taken somewhere and by somebody as to the allocation of monetary resources: hence the need for the machinery of the medical advisory committee and lay governing body on the lines on which it has evolved in our hospitals.

Sir Ernest Rock Carling suggests that in the matter of the chief executive officer there should be experiment—some regions trying a medical man and others a layman, if the right individuals can be found. The danger of the medical chief executive officer is not that he will be a worse servant to the board than the layman of corresponding experience and ability, but that he may arrogate to himself the functions of the medical advisory committee and ultimately render it an ineffective appendix to his own conception of "the medical aspects of hospital care." This is a real and serious danger which might well lead to a blurring of the distinction between lay "policy" on the one hand, and professional advice on the other. Policy and politics are not far apart, and it is of overriding importance that the profession should keep a firm grasp of its advisory relationship to the machinery of policy.

YOUR CORRESPONDENT OF NOV. 9.

### CORONARY DISEASE

SIR,—In your issue of Nov. 9 Prof. J. A. Ryle trails his coat on the vexed question of the aetiology of coronary disease which Sir Maurice Cassidy raised in his recent Harveian oration. I am prompted to ask the Irishman's question: Is this a private (physicians') fight, or can anyone (even a surgeon) join in?

From my hilltop position of seniority the fence between medicine and surgery appears merely as an artificial aid to the cultivation of a continuous field. This letter is primarily an assertion of the right of any one branch of medicine to offer criticism and suggestion to any other branch. In the present era of multiple specialism the maintenance of this right is of vital importance to the

future of medicine. It offers a guarantee against the danger that the corpus of medicine will be split up into a number of specialties having no more organic connexion or communication between themselves than the joints on a butcher's counter: there will result an extravagant devotion to technique, and a loss of interest in pathology, which necessarily deals with the body as a working whole.

I must pursue this long digression a little further to make my meaning clear, and to illustrate the fruitful interchange of ideas. Many years ago the late Dr. Essex Wynter asked me to see with him a case of ascites, and suggested that I should expose the femoral canal, open it, and drain the fluid into the subcutaneous tissue of the thigh. In carefully selected cases Essex Wynter's operation of "femoral drainage" has proved to be a permanent cure for ascites. Per contra, I have ventured into the field of dermatology to prove that lupus is essentially a tuberculous lymphangitis, and into that of urology to suggest that for unilateral prostatic enlargement a unilateral adenectomy will give permanent relief at a minimum of risk. These are just instances of what I mean.

To return to coronary disease and its increasing frequency. I have recently come across two cases in medical men where a long history of chronic cholecystitis preceded cardiac trouble, and I would ask whether a chronic bacterial infection of the liver, probably staphylococcal, since that organism is *par excellence* the organism of thrombosis, is not a more likely cause than the "strain of modern life." Professor Ryle and Sir M. Cassidy in their country journeys are certainly subject to less strain than was Sir Astley Cooper in his stage-coach, shouting to the postilion "I pay sixpence a mile for bad driving, ninepence a mile for good driving, and a shilling a mile if you drive like hell."

It must be significant that the classes who subject their cardiovascular mechanism to maximum strain by heavy work are not the selected victims of coronary trouble. Mental work may fray the nerves, but does it impose much strain on the heart and arteries? What it certainly may do by interference with regular meals, digestion, sleep, and exercise, is to upset the alimentary mechanism, and favour chronic infections, helped as age advances by a growing defect of thyroid activity.

An attack on the subject from this point of view, and by really intensive pathological and bacteriological examination of even a few cases post mortem, might, I venture to think, prove even more rewarding than the extensive statistical inquiries suggested by Professor Ryle.

London, W.1.

W. SAMPSON HANDLEY.

### ICTERUS GRAVIS NEONATORUM

SIR,—In his interesting paper of Nov. 2 Dr. Third makes certain statements which are open to criticism. For instance, he says, "There seem to be, however, three very distinct pathological types"—hydrops foetalis, toxic jaundice, and erythroblastæmia—and adds, "It is undesirable to include all groups under either icterus gravis or hæmolytic disease, because not all cases are hæmolytic, nor are all cases severely jaundiced." From the description he gives, "erythroblastæmia" is clearly the condition usually known as hæmolytic anæmia of the newborn, and, apart from the fact that babies suffering from icterus gravis are always severely jaundiced (otherwise why is the disease called icterus gravis?), children in all these three groups, although not necessarily obviously anæmic, do show evidence of hæmolysis and at autopsy an erythroblastotic reaction thereto.<sup>1</sup> Erythroblastæmia is the result of this reaction and is in no sense evidence of a special variety of hæmolytic disease of the newborn; indeed, it is sometimes absent in that disease at birth, whereas it is sometimes present in the normal full-term infant, and both it and jaundice may be present in sepsis neonatorum and congenital syphilis. The best general name for the disease under discussion is either "hæmolytic disease of the newborn" or "congenital hæmolytic disease," since the more usual title "erythroblastosis foetalis" refers only to the erythroblastotic reaction which at one time American workers thought was the cause of the disease. The names given to the

1. Parsons, L. G., Hawksley, J. C., Gittins, R. J. *Arch. Dis. Childh.* 1933, 8, 159.

three subgroups are derived from the outstanding symptoms present in each group—oedema in hydrops; jaundice in icterus gravis; hæmolytic anæmia in hæmolytic anæmia of the newborn.

Again, Dr. Third states that the results of blood-transfusions "are satisfactory in true erythroblastæmia only. In the 'toxic jaundice' type there is grave risk that if the child recovers it will be faulty to the point of imbecility." If, in fact, this were the case it would be wise to withhold blood-transfusion and allow these babies to die. In a series of over 250 babies suffering from hæmolytic disease of the newborn treated at the Children's Hospital, Birmingham, the majority of whom had icterus gravis, kernicterus—as evidenced by autopsy findings or by clinical symptoms such as extrapyramidal rigidity, mental deficiency, &c.—occurred in about 7% of cases; moreover, the incidence of kernicterus was not decreased by the use of Rh-negative blood. Dr. Third mentions that he has been able to find evidence of "cerebral or extrapyramidal irritation" in the majority of babies with "toxic jaundice" which came under his care. I have, however, never been able to find convincing signs of this condition in newborn babies, although on rare occasions a high-pitched cry and convulsions have suggested that possibility to me. If I ever did find unequivocal signs of kernicterus in a newborn baby I should certainly abstain from any form of treatment and wish for its death.

Finally, it is true, as Dr. Third points out, that Rh antibodies have been found in breast milk, but the evidence that these have any ill effect on the child is, so far, insufficient to warrant artificial feeding in preference to breast-feeding, although it may be wise to express the breast milk and boil it before giving it to the child.

Birmingham.

LEONARD G. PARSONS.

#### CALCIFEROL FOR TUBERCULOUS ADENITIS

SIR,—Recently there have been in THE LANCET a few reports on the treatment of tuberculous cervical adenitis with high doses of calciferol, with apparently satisfactory results. In the last 6 months my partner and I have treated five children with this condition. The first three were treated by rest and good food. In two of these the glands became fluctuant and were repeatedly aspirated, eventually breaking down; and in the third they slowly resolved and healed in about 3½ months.

The last two children, a girl of 11 years and a boy of 3 years, had in addition to general treatment 100,000 units of calciferol daily for a month. There was no obvious change in the first week, and then they rapidly began to resolve—the temperature came down, the periadenitis subsided, and the glands lost their tenderness and rapidly became more discrete, firmer, and smaller. The girl's gland had healed in 4 weeks and the boy's in 6 weeks. The boy's mass had been very large and under other conditions one would have expected it to become fluctuant. These results seemed very satisfactory, and there were no side-effects of the treatment. Both children had a well-marked positive Mantoux test to 1/1000 old tuberculin.

In view of the satisfactory reports on a few scattered cases it would be interesting to know if anyone has treated a wider group, and more scientifically.

Rothbury, Northumberland.

ANTHONY BELL.

#### LEFT TURN

SIR,—In his speech on the Act (*Brit. med. J.* Nov. 16, p. 747) Dr. Dain describes as dictatorship the position where the representatives of the people have the chief say in deciding the principles on which the new service shall operate. In its place he appears to advocate "government of the doctors, by the doctors, for the doctors" as the essence of democracy.

This curiously inverted attitude, reminiscent of Father William, is shared by quite a number of the older members of the profession and arises from refusal to accept the fact that there has been something of a change in the political complexion of the country. Doctors were formerly entitled to a specially privileged status as protégés of the ruling class, and many of them are unwilling to accept the loss of privilege which this change implies. Is it too much to ask the profession to stand on their feet instead of their heads? The profession

should be content to be assessed by the public at its true worth by the contribution which it can make to society. It should seek an alliance with a rising working-class rather than with a decaying bourgeoisie.

Insistence on professional "dignity" is merely an effort to retain the benefits of patronage which obtained under squirearchy. This is the obstacle which has prevented the medical profession from following the example of the teachers and other workers and organising itself in a trade union. Such a step is the proper remedy for the situation, visualised by the British Medical Association spokesmen, of doctors under the new Act with no right of appeal to an independent body. By this means the medical profession could at once secure a proper recognition of its own services and make a useful contribution to democracy in practice.

St. Mary Cray, Kent.

BRIAN H. KIRMAN.

#### LOCAL PENICILLIN IN CORTICAL MASTOIDECTOMY

SIR,—Mr. Philip Reading (*Lancet*, 1946, i, 811) has described a method in which a cortical mastoidectomy cavity is filled with penicillin dissolved in fluid plasma, which is then clotted by adding thrombin; the skin incision is afterwards sutured completely.

This method is a great advance in the technique of completion and aftercare of this operation. We have found, however, that obtainable fluid plasma does not always coagulate on adding thrombin. If citrated blood taken from the patient by venepuncture be used instead of plasma, its clotting may lead to a boggy swelling, due to serum, under the wound, and cause suspicion of pus. Insufflating the operation cavity with penicillin powder and letting it fill with blood also has the disadvantage of not ensuring homogeneous distribution of the penicillin throughout the clot.

We have obtained results as satisfactory as those of Reading by filling the operation cavity with a paste made by mixing penicillin solution with plasma or serum powder, using approximately 100,000 units of penicillin in each instance. A thorough operation and very good hæmostasis are essential to success. Complete primary suture of the skin wound is carried out. In cases suitable for cortical mastoidectomy middle-ear suppuration has usually ceased and the tympanic membrane and the wound heal within a week. Audiometer tests before and some weeks after operation show that the hearing of patients thus treated is usually improved or unaffected by the procedure; this applies also to other methods of aftercare of cortical mastoidectomy.

Warwick.

J. A. HAREMAN.

#### PSYCHONEUROSIS TREATED WITH ELECTRICAL CONVULSIONS

SIR,—Dr. Glaister (Oct. 26, p. 615) claims that intensive electro-convulsive treatment is ethically wrong when applied to psychoneurotics but ethically right when applied to sufferers from melancholia. Yet in both types the fundamental personalities are intact, so what is the ethical difference in treating both by electro-convulsions?

The rigid distinction between the symptoms and the disease made by Dr. Glaister is hard to draw in psychological medicine. Is melancholia a symptom or a disease? Are the whining, the egocentricity, and the misery of the psychoneurotic merely symptoms? If such a patient is made cheerful, coöperative, and happy, and remains so, is not this a cure of his disease, no matter how the cure is effected?

Even if there be a slight intellectual deterioration after treatment, the patient is still the gainer if he be made happy. Presumably happiness is what the patient wants.

Bridlington.

P. D. H. CHAPMAN.

SIR,—When your correspondents begin to mention Belsen and livid pages in history, it is surely time for doctor-patients who are not psychiatrists to give their experiences. In 1941 I suffered from a psychosis characterised by depression and anxiety. After wandering about the grounds of a mental home for many weeks, having given up hope of following my profession again, and with no confidence in medical colleagues, I received 10 convulsions, and returned to full duty within six weeks

of the last treatment. Then there followed a course of psychotherapy lasting over two years which terminated when I was called up for service with H.M. Forces. I have since been demobbed with my group and returned to my civilian job and there has been no relapse.

I do not pretend that E.C.T. is a pleasant experience; I was anxious about it, but "dread" would be the wrong word to use, and I would have it again if necessary. Apart from the pain in the back following the convulsions the experience was not too bad. One is knocked out immediately. But it must be pointed out that even psychotherapy is not altogether an enjoyable experience. After many stormy sessions one learns that, unlike E.C.T., *there is no anaesthesia!*

It seems a pity to exaggerate about E.C.T. Surely by now a sufficient number of cases have been examined, treated, and followed up by competent psychiatrists for its true worth to be assessed? DOCTOR-PATIENT.

SIR,—Dr. Learoyd (Nov. 23) disapproves of convulsion therapy, and speaks of our mental hospitals as of Belsens within our gates. He is, of course, entitled to his views; yet, To offend, and judge, are distinct offices, And of opposed natures.

Truro.

H. PULLAR-STRECKER.

EXERCISE AND CARDIAC HYPERTROPHY

SIR,—Sir Adolphe Abrahams's case of cardiac hypertrophy (Oct. 19, p. 565) in an otherwise normal man of 78, who was in his youth a successful long-distance cyclist, is of extraordinary interest. The old-established opinion of some clinicians that a normal heart never hypertrophies, now queried in this paper, is overdue for revision.

There is considerable evidence that such hearts are acquired and not congenital. Whole series of oarsmen and long-distance runners show, as I have been able to demonstrate,<sup>1</sup> hypertrophy which can be recognised in the X-ray picture at a glance. It would appear very unlikely that these men have become record-holders through having large hearts.

The main evidence is that the hearts of professional sportsmen show, in the rare cases that come to necropsy, typical hypertrophy, affecting only those parts of the heart which are heavily strained.<sup>2</sup> Apart from this, there is plenty of evidence from training experiments with rats and dogs that certain kinds of exercise cause hypertrophy. It should not be necessary, therefore, to preserve the myth that the normal heart does not hypertrophy. It definitely does, and the importance of the case published is that the hypertrophy persisted into old age—a possibility which, till now, has been doubted by many, including myself.

London, N.22.

II. HERXHEIMER.

ARSENICAL ENCEPHALOPATHY

SIR,—Dr. J. R. Edge reports (Nov. 9) an interesting case of myocardial fibrosis ending in fatal heart-failure, in a man who had been treated with nearsphenamine for early syphilis. After the second injection of his second course of treatment the patient passed into coma, and on recovering was left with permanent bilateral pyramidal signs.

The cardiac complication is unusual, and I would suggest that the encephalopathy is worthy of further comment. Arsenical encephalopathy in Europeans is a very rare condition of which I have only seen one example. During the late war it was however very common amongst Indian troops. In two large v.d. centres in India the incidence of encephalopathy over a long period was as high as 1 in 73 cases treated, and in another over several months the incidence rose to 1 in 55. This became a very serious matter as the mortality was invariably about 50%.

The factors underlying arsenical encephalopathy are by no means clear. Dosage is only one factor, and I have seen a fatal outcome following a single injection of 0.3 g. N.A.B. Probably a more important factor is the relationship of dose to body-weight, and most cases of encephalopathy in Indians occurred in the undernourished; incidentally, they were almost invariably Tamils or Bengalis.

The clinical picture is essentially one of coma and convulsions, often of very rapid onset, but sometimes preceded for a few hours by confusion or other altered mental states. Focal signs are usually absent, and, apart from dilated and sluggish pupils with bilateral extensor responses when coma was deep, I was never able to elicit focal signs. Various forms of empirical therapy were tried (British anti-lewisite was not available), but none seemed to influence the course of the disease in any way. Among the 50% who recovered, I did not observe any sequela. Dr. Edge's case is therefore unusual in that there were apparently no convulsions and neurological sequela were severe.

Dr. Edge refers to the commonest findings in the brains of fatal cases. Major L. Krainer, R.A.M.C., found however that in a large number of cases careful microscopy did not show any adequate cause of death, and certainly in those cases which were rapidly fatal histological examination was negative.

Leeds.

HUGH GARLAND.

MALT EXTRACT IN INFANT FEEDING

SIR,—An investigation at the Lister Institute<sup>1</sup> has shown that a combination of malt extract, wheat flour, and soya flour, in which about 70% of the total solids and about 30% of the total protein is obtained from malt extract, possesses a mixture of proteins whose growth-promoting value for young rats is about equal to that of the protein of milk. It is also concluded that such a mixture, if used for baby food, would not need supplementation with food yeast or synthetic B vitamins.

Since these important findings may find direct application in the present food crises, it seems desirable to emphasise that malt extract can vary widely in composition, as shown by the following data obtained in these laboratories on a series of some 70 commercial malt extracts from over 30 different manufacturers, excluding samples fortified with synthetic B vitamins<sup>2</sup>:

		per 100 g. dry matter	
		range	mean
"Protein"	.. .. .	g. 1.36-8.37	5.31
Vitamin B <sub>1</sub>	.. .. .	mg. 0.23-0.58	0.37
Riboflavin	.. .. .	mg. 0.27-0.56	0.42
Nicotinic acid	.. .. .	mg. 9.3-16.5	12.6

The so-called "protein" of malt extract (vide B.P. 1932), being obtained by the action of malt enzymes on the crude protein of germinated barley, contains digestion products of protein which are more readily available to the actively growing baby or young rat. This should be borne in mind when seeking an explanation for the marked improvement in the biological value of the protein mixture in 'Maltavena' produced by the relatively small proportion (perhaps about a third) which can come from malt extract. Moreover, the growth-promoting properties of maltavena will also depend on its content of B vitamins, by far the greater part of which should be derived from the malt extract. The malt extracts we used in manufacturing the maltavena supplied to Dr. Chick for her experiments had vitamin-B contents close to the maxima in the above table, and protein contents well above the average. We can imagine that if maltavena were made with less nutritious malt extracts it might not give such good results. It is therefore desirable that the manufacture of maltavena for infant feeding should, wherever possible, be controlled by estimation of the above factors.

We emphasised this point strongly when discussing the matter last year with Major McNeile, who was then in charge of brewing and distilling in the British zone in Germany; and we offered to undertake estimations on maltavena preparations which he was arranging to make in Germany. We have not had the opportunity of examining any of the maltavena preparations which have been used in Germany, mainly in the Dortmund area, and we sincerely hope that their contents of the above factors have been controlled by other workers, and that such control will be exerted in any future experiments.

Ovaltine Research Laboratories,  
King's Langley, Herts.

FRANK WOKES  
Director of Research.

1. Chick, H., Slack, E. B. *Lancet*, Oct. 26, p. 601.  
2. See Klutskzin, C., Norris, F. W., Wokes, F. *Quart. J. Pharm.* 1946, 19, 376.

1. Grundriss der Sportmedizin, Leipzig, 1933.  
2. Kirsh, E. *Verh. dtsch. Ges. inn. Med.* 1935, 47, 73.

## DETECTION OF TUBERCLE BACILLI IN C.S.F.

SIR,—A technique of concentrating tubercle bacilli in cerebrospinal fluids which I have applied to 24 specimens has been found to give a greater number of positive results than the usual methods. The technique can also be used for exudates and transudates which are not too viscid: the morphology of organisms is not affected. The method is as follows:

1. Place 3 c.cm. of C.S.F. in a 15 ml. centrifuge tube.
2. Add about 7 c.cm. of absolute alcohol, and cork with a rubber stopper; shake by inverting for two minutes, and allow to stand for thirty minutes.
3. Centrifuge at high speed for at least five minutes, and pour off the supernatant fluid, leaving the residue.
4. Add 10 c.cm. of distilled water, shake for two minutes, centrifuge at high speed for five minutes, pour off the supernatant fluid, mix well the residue with a fine capillary pipette, spread fairly thick on a slide, and let it dry.
5. Stain with Ziehl-Neelsen's stain and examine.

Public Health Department, Amman, B. S. N. SHAMYEH  
Trans-Jordan. Assistant Bacteriologist.

## PENICILLIN FOR GONORRHOEA IN THE FEMALE

SIR,—Dr. Mascall (Nov. 16, p. 712) has sounded a long-needed warning against the indiscriminate use of penicillin for "gonorrhoea" in women, and his emphasis on the part played by the gonococcus and (I would add) allied organisms in the production of a "great amount of the chronic ill health from which so many women suffer" is sound. Many of us, however, have found penicillin of more value in treatment than any previous drug that has been tried—provided that it is used only in the right way. So far, in civilian practice, the penicillin-resistant gonococcus is fortunately a rarity, though this may not continue. At present the main cause of failure in treating gonorrhoea in the adult female is the lack of clinical diagnosis of minor degrees of extension of the disease to the body of the uterus and the adnexa. This may occur directly after the first menstrual period following the infection. The majority of female patients do not seek advice until that time, possibly because a woman often believes that her vaginal symptoms will clear up after her period. This delay gives time for the infection to ascend to regions where it becomes less accessible to drugs such as systemic penicillin. It is found that cure is difficult unless drainage is established by dilatation of the cervix and a glycerin drain, followed within twenty-four hours by the administration of the usual dosage of penicillin (i.e., 25,000 to 50,000 units three-hourly for four doses). In our hands the single "massive" dose has not yielded such good results. To ensure success, some such procedure as drainage followed by penicillin is essential in most of the cases. Patients seen and diagnosed within the first week of infection form the only exception.

For the intelligent use of penicillin in gonorrhoea (and in certain allied infections) clinical experience in gynaecological diagnosis is essential, and this is nearly always lacking in medical officers who have received special training only for "130 hours at an approved centre." Failures in treatment will persist until it is customary, for example, in each department, for every patient to be examined pelvically by the chief at least once a month and preferably more often.

Dr. Mascall also mentions the difficulties in the treatment of vulvovaginitis in children and with this we all agree. These difficulties can however be greatly reduced by treating these children only as inpatients in a unit where the nursing staff have been specially trained. While at home the child is often reinfected by the original source (even if every care is taken in the "follow-up" of contacts), and the average mother cannot carry out the necessary procedures to diminish infection from the child's garments, &c. The child's general health plays a large part in the cure of this disease, and the provision of good food, regular hours, and fresh air is a most important factor.

Our grateful thanks are due to Dr. Mascall for emphasising the high rate of failure in the treatment of gonorrhoea in the female by "routine" methods. The public have recently been lulled into the mistaken belief that there is an "easy" method of a potentially serious condition.

London, W.1.

G. M. SANDES.

## Parliament

## FROM THE PRESS GALLERY

## Education of the Deaf

ON Nov. 20, on the motion for adjournment, Mr. EDWARD EVANS drew the attention of the House to the needs of those born deaf, of the deafened, and the hard of hearing. Mr. Evans, who for many years was the headmaster of a school for the deaf, pointed out that deafness imposed a greater educational and social handicap on healthy people than any other disability. A child born deaf had to learn by a laborious and lengthy process not only how to speak but also how to acquire language. Even then he seldom attained the fluency of a normally hearing person. It was of the greatest importance that a deaf child should receive as early as possible the benefits of special education, but there was a tragic dearth of nursery accommodation and places for infants.

Nearly all deaf schools were understaffed, and Mr. Evans urged the Ministry of Education to encourage ex-Service men and women to take up this work. Only one secondary grammar school was available for deaf children, and it was incapable of dealing with the demand for places, was inadequately financed, and lacked representative control. There was also, Mr. Evans declared, a need for a first-class technical school where other trades than the traditional ones of bootmaking, tailoring, and baking could be taught. He was convinced that in normal schools many backward children suffered from some form of deafness, and with proper training would develop educationally. To pick out these children as early as possible, a gramophone audiometer, he suggested, should be in use in every school for group-testing. The certification of deaf people as mentally defective, he continued, was an anxiety to all who were associated with their welfare. Most psychological tests depended upon linguistic response beyond the capacity of the totally deaf, and he felt strongly that no deaf person should be certified unless a trained teacher of the deaf or a welfare worker was present.

In his reply Mr. C. KEY, parliamentary secretary to the Ministry of Health, said that there were a goodly number of schools for the deaf—some 44—already in existence, but there was a growing appreciation of the problem, and conferences were being held in many areas to consider the provision of additional schools and the extension of existing ones.

Because so much publicity had been given to the scheme to provide hearing-aids free of cost under the National Health Service it did not mean that the Government believed hearing-aids to be the beginning and the end of the problem. The electro-acoustics committee was only one of three M.R.C. committees. Another was at work on the medical and surgical considerations for the diagnosis and treatment of deafness, and another was considering the education of deaf children and adults. In framing comprehensive measures for the deaf the Minister would be armed with authoritative recommendations from all three, and Mr. Key thought there would be no difficulty in persuading the Medical Research Council to undertake further research.

## QUESTION TIME

## Streptomycin Trials

Colonel D. E. CROSTHWAITE-EYRE asked the Lord President of the Council what provision had been made by his department for research into the use of streptomycin, and whether any moneys had been allocated for research and production of this drug.—Mr. HERBERT MORRISON replied: The Medical Research Council have arranged for making controlled clinical trials of streptomycin, as soon as supplies are available, to determine its value in tuberculosis and other conditions and the best methods of its use. Funds are being allocated for the cost of this work, including the purchase of the necessary quantities of the product.

## Family Allowances Complaints

Mr. P. DAINES asked the Minister of National Insurance whether he would now state what action it was proposed to take as a result of the examination of the complaints arising out of the working of the Family Allowances Act, to which his attention had been drawn.—Mr. JAMES GRIFFITHS replied:

All the new and expanded social service schemes must be considered as a co-ordinated whole and most of the difficulties which have arisen out of the piecemeal introduction of parts of the schemes will be removed when the full schemes are in operation. In the meantime, the Assistance Board have been considering the position of children in families drawing supplementary pensions or unemployment assistance. They have now submitted draft regulations embodying increases in their scale rates for children which have been accepted by the Government, and I propose to lay these draft regulations before Parliament this week.

#### Tuberculosis Allowances

Lieutenant-Commander CLARK HUTCHISON asked the Secretary of State for Scotland whether it was his intention to introduce amending legislation so as to enable a person who was in receipt of a tuberculosis allowance to draw, if otherwise eligible, the allowance payable under the Family Allowances Act, 1945.—Mr. G. BUCHANAN replied: Recent social legislation has aimed at the principle of avoiding duplication of benefits payable out of public funds, but Mr. Westwood is in consultation with the Minister of Health about the possibility of increasing the rate for children under the tuberculosis allowances scheme.

#### Miners' Dermatitis

Replying to a question Mr. JAMES GRIFFITHS stated that the number of cases of dermatitis among miners generally, the majority of whom will have been coalminers, from 1938 to 1945 were as follows:

1938 .. .. .	254	1942 .. .. .	884
1939 .. .. .	305	1943 .. .. .	1207
1940 .. .. .	402	1944 .. .. .	1506
1941 .. .. .	573	1945 .. .. .	1867

#### National Health Service

Mr. SOMERVILLE HASTINGS asked the Minister of Health whether, in view of the public misrepresentations regarding the National Health Service Act, he would consider the issue to the public of a short factual statement setting out the main provisions of the Act.—Mr. A. BEVAN replied: At the appropriate time before the service comes into operation I intend to make known as widely as possible the effect of the Act and the nature of the services to be provided under it.

#### Health Insurance Prescriptions

Dr. R. CLITHEROW asked the Minister if he was aware that prescriptions for dangerous drugs and scheduled drugs were being issued to National Health Insurance patients in quantities sufficient, in many cases, to ensure a constant supply for many weeks—namely, 200 barbitone tablets in one case; and if, in view of the possibility of the patient taking increasing doses and perhaps becoming an addict, he would take steps to prevent the issue of National Health Insurance prescriptions containing dangerous drugs and scheduled drugs for more than one week's supply at any one time.—Mr. BEVAN replied: I do not think it would be proper to interfere with a doctor's discretion by any such general prohibition.

#### National Dietary Survey

Mr. P. PRATIN asked the Minister of Food whether he would institute a national dietary survey to determine what changes in food consumption were needed to provide the whole population with a diet fully adequate for proper health.—Mr. J. STRACHEY replied: Since the beginning of the Second World War the Ministry of Food have conducted a national food survey of the diets of working-class households. They also make use of the surveys, clinical and otherwise, made by the Ministry of Health, the Department of Health for Scotland, and by research centres throughout the country. In the light of this information the Ministry of Food has followed a policy of providing, to the limit to which supplies are available, a diet adequate for proper health for the different sections of the community. In this they have been guided by the advice of the Ministry of Health and their own scientific adviser. In the circumstances no additional dietary survey is necessary.

#### Hospital Accommodation for Mental Defectives

Mr. R. W. SOBENSEN asked the Minister of Health what increase had been secured in accommodation for mental defectives during the past twelve months; to what extent mental hospitals were becoming overcrowded; and to what extent the number of nurses, trained and training, respectively

had increased during the past twelve months.—Mr. BEVAN replied: During the past twelve months the accommodation for mental defectives has increased by 177 beds; on Jan. 1, 1946, mental hospitals were overcrowded to the extent of 13,176 patients, or 11.5% of the total accommodation; the number of nursing staff employed in mental hospitals and mental-deficiency institutions has increased by 620 during the twelve months ended June 30, 1946, bringing the total to 25,840, just over half of whom are fully trained.

## Obituary

### CHARLES WILLIAM DEAN

F.R.C.S.E.

Mr. C. W. Dean, consulting surgeon and ophthalmic surgeon to the Royal Lancaster Infirmary, died on Nov. 15, only a few days after his 86th birthday.

Born in Lancaster, he spent his whole life there, apart from his student years in Edinburgh and at St. Bartholomew's Hospital in London. After qualifying L.R.C.P.E. in 1884 he was for the most part engaged in general practice, but he found time and opportunity to train himself in general and ophthalmic surgery. In 1899 he took the Edinburgh fellowship, and his work won the esteem and confidence of his neighbouring colleagues. He was the first surgeon in Lancaster to remove an appendix, and that was over fifty years ago.

"Dean never took part in public life," writes J. A. G., "but he was keenly interested in music, and in younger days he was no mean performer on the French horn. His taste in literature was wide. Belles-lettres, biography, and travel were probably most to his taste, and he had a more than superficial knowledge of heraldry. With a retentive memory, which time had not impaired, he had as he himself used to say 'a mind stored with useless and irrelevant facts,' which was perhaps one of the chief charms of his conversation. Quiet and reserved in manner, somewhat impulsive, very sympathetic, the feature of his character which most impressed me was his intense and essential humanness."

### JAMES LAW BROWNLIE

M.D. GLASG.

Dr. J. L. Brownlie, who died in Edinburgh on Nov. 12, was a former chief medical officer of the Department of Health for Scotland, but probably his happiest days as a doctor were spent in the laboratory.

In 1913 he graduated M.B. at the University of Glasgow, and three years later took the D.P.H. at Cambridge. In 1918 he was awarded his M.D. with commendation for a thesis on the problem of the diphtheria carrier. After serving for some years in Glasgow corporation fever hospitals he became assistant bacteriologist in the city laboratory, and there developed his flair for epidemiology. From the Glasgow laboratory Brownlie went to take charge of the Lanarkshire public-health laboratory, and in 1930 he joined the staff of the Department of Health for Scotland. At first he was concerned with hospital and laboratory services, but in 1932 he became chief medical officer in succession to the late Dr. Parlane Kinloch. He was reluctant to assume the post, for he did not greatly enjoy the political flavour and the rough and tumble of work in a Government office, and the four years during which he held senior office were years of indifferent health, which finally compelled him to resign. A fellow of the Royal Society of Edinburgh, his interests were catholic and variously filled the years of his retirement. His many friends will remember his human qualities, generous hospitality, and shrewd commentaries on official vicissitudes.

### IZSET MEAD HAYTHORNTHWAITHE

L.R.C.P.E.

Dr. I. M. Haythornthwaite, who died on Nov. 24 at King's Langley, was the second woman to receive the Scottish Conjoint qualification. Born in 1859 and trained by the Zenana Bible and Medical Mission, she took the L.R.C.P.E. in 1886. After postgraduate study in Vienna she became in 1887 house-surgeon under Elizabeth Garrett Anderson at the New Hospital for Women, which then stood where Marylebone Station now is.

For the next five years she worked in the Lady Kinnaid Hospital for Women and Children with Miss Haskew (now Mrs. Birket), to whose efforts the building of that hospital was largely due.

Her marriage in 1892 to the Rev. J. P. Haythornthwaite put a term to her regular medical work, but while in Agra, from 1893 to 1911, as wife of the principal of St. John's College she found ample opportunities in ministering to the families of missionaries as well as in bringing up her own five children. In 1915 her eldest son was killed in action in France, and though by now she was getting old and somewhat infirm, she did her best to fill a place in the depleted ranks of doctors serving the civilian population. For short periods she worked as clinical assistant at the Garrett Anderson Hospital, and as resident medical officer at the Nayland Sanatorium. For three years she was also visiting physician of the Four Boroughs antenatal clinic, and first doctor to the King's Langley antenatal clinic.

Her husband died many years before her; but she leaves three children, two of them doctors in India, who mourn the loss of a woman of more than ordinary character, ability, and sweetness.

E. P. H.

## Diary of the Week

DEC. 1 TO 7

### Tuesday, 3rd

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.1  
5 P.M. Dr. H. L. Marriott: Quantitative Considerations Regarding Depletion of Tissue Fluid and Blood Constituents. (First Croonian lecture.)  
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1  
5.30 P.M. *Orthopaedics*. Cases will be shown at 4.30 P.M.  
LONDON SCHOOL OF DERMATOLOGY, 5, Lisle Street, W.C.2  
5 P.M. Dr. G. B. Dowling: Erythrodermia.

### Wednesday, 4th

ROYAL SOCIETY OF MEDICINE  
2.30 P.M. *History of Medicine*. Dr. H. P. Bayon: Transition between Scholastic and Clinical Medicine in Europe during the 16th and 17th Centuries.  
5 P.M. *Comparative Medicine*. Mr. H. H. Holman, Ph.D.: Studies on the Hematology of the Horse, Ox, and Sheep. Mr. J. B. Brooksby: Serum Proteins of the Domestic Animals. Dr. C. L. Oakley: Normal Constituents of Human Blood. Dr. H. Gruneberg: Inherited Disorders of the Blood in Rodents.  
8 P.M. *Surgery*. Pathological Meeting.  
ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1  
3.30 P.M. Prof. Arnold Sorsby: Blindness in Childhood—Past Achievements and Present Problems.

### Thursday, 5th

ROYAL COLLEGE OF PHYSICIANS  
5 P.M. Dr. H. L. Marriott: Quantitative Considerations Regarding Depletion of Tissue Fluid and Blood Constituents. (Second Croonian lecture.)  
ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2  
5 P.M. Dr. B. D. Pullinger: Cystic Disease of the Breast—Human and Experimental. (Imperial Cancer Research Fund lecture.)  
MEDICAL SOCIETY OF THE L.C.C. SERVICE  
3 P.M. (North Eastern Hospital, St. Ann's Road, South Tottenham.) Cases will be shown. Dr. E. H. R. Harries: Modern Fever Hospital.  
LONDON SCHOOL OF DERMATOLOGY  
5 P.M. Dr. L. Forman: Cutaneous Manifestations of Malignant Disease.  
CHADWICK PUBLIC LECTURES  
4.30 P.M. (St. Mary's Hospital medical school, Paddington, W.2.) Prof. C. H. Stuart-Harris: Problem of Prevention of Acute Diseases of the Respiratory Tract, with Particular Reference to Influenza.

### Friday, 6th

ROYAL SOCIETY OF MEDICINE  
10.30 A.M. *Otology*. Cases will be shown at 10 A.M. Mr. Terence Cawthorne: Review of Surgery of Otosclerosis. Mr. Garnett Passe: Fenestration Operation. (Coloured film.)  
2.30 P.M. *Laryngology*. Cases will be shown at 2 P.M. Miss D. J. Collier: Epistaxis. Mr. R. G. Macbeth: Ligation of Anterior Ethmoid Artery for Epistaxis.  
5.30 P.M. *Anaesthetics*. Prof. H. N. Green, Dr. R. P. Harbord: Shock, with Special Reference to Anaesthesia.  
BIOCHEMICAL SOCIETY  
1.30 P.M. (National Institute for Medical Research, Hampstead, N.W.3.) Papers.  
LONDON ASSOCIATION OF THE MEDICAL WOMEN'S FEDERATION  
8.30 P.M. (B.M.A. House, Tavistock Square, W.C.1.) Dr. W. Ritchie Russell: Rehabilitation after Head Injuries.  
LONDON CHEST HOSPITAL, Victoria Park, E.2  
5 P.M. Dr. Browning Alexander: Diagnosis and Treatment of Lung Abscess.  
ROYAL MEDICAL SOCIETY, 7, Melbourne Place, Edinburgh  
8 P.M. Colonel L. W. Harrison: Half a Lifetime in V.D.—from Chaos to Order.

## Notes and News

### MEDICAL WAR RELIEF FUND

DURING the past year 81 awards have been made from this fund at a cost of £18,016. The total amount distributed since the inauguration of the fund is now £52,236. Most of the applicants have been ex-Service doctors whose single-handed practices have declined seriously in their absence; other applications include ten from widows of doctors who lost their lives in the war. It is expected that further calls on the fund will be made by demobilised doctors needing help in resettlement, and by widows seeking the means to educate young children. The contributions received since the second appeal in December, 1945, amount to about £22,000. The committee hopes that those who have not yet responded will subscribe; cheques, payable to the fund, should be sent to the hon. treasurer at B.M.A. House, Tavistock Square, London, W.C.1.

### ATOMIC WAR

Prof. Albert Einstein and a group of scientists have appealed for £250,000 to be used in educating the community in the social implications of atomic energy and the steps necessary to avoid the destruction of civilisation. The *Manchester Guardian* (Nov. 18) reports that the appeal is accompanied by the following declaration:

1. Atomic bombs can now be made cheaply and in large number. They will become more destructive.
2. There is no military defence against the atomic bomb and none can be expected.
3. Other nations can rediscover American secret processes by themselves.
4. Preparedness against atomic warfare is futile and if attempted will ruin the structure of our social order.
5. If war breaks out atomic bombs will be used and they will surely destroy our civilisation.
6. There is no solution to this problem except the international control of atomic energy and ultimately the elimination of war.

### L.C.C. AND BOARDING-SCHOOLS

At a meeting on Nov. 20 the L.C.C. education committee decided that a boarding-school education should be provided for children in certain categories. From September, 1947, the county council expects to have just over 200 places in direct-grant and independent schools. Selection will be made from: (1) orphans or neglected children, (2) children whose parents are unable to look after them, (3) children of parents living abroad, (4) children whose homes are moved frequently from one part of the country to another, and (5) children who live in congested areas. The education subcommittees take the view that, with the present restricted accommodation, any attempt to place other children in boarding-schools, as envisaged recently by the Minister of Education,<sup>1</sup> should be deferred until these special categories have been dealt with.

### TIERRA DEL FUEGANS

Prof. Alejandro Lipschutz, at a meeting of the Royal Anthropological Institute on Nov. 12, described the results obtained by a recent expedition to Tierra del Fuego. One of its objects was to determine whether the natives belonged to the general stock of American Indians or were descended from Australian immigrants. A great obstacle to the solution of this question was the fact that not only had the population dwindled from about two or three thousand a century ago to about two hundred today, but also miscegenation with Europeans had taken place to such an extent that only about a tenth of the Indians claimed to be of pure blood, and even their claims were very suspect. The blood-groups were determined in 77 persons, belonging to three very different tribes, and group O was found in about three-quarters of them, pointing to the derivation of these three stocks from the general body of American Indians generally recognised as Mongoloid immigrants from Asia.

### CANCER CONTROL IN LIVERPOOL

THE "unincorporated association known as Liverpool Cancer Control Organization" came into being on Feb. 3, 1939; it was not until March 23, 1945, that it received a certificate of incorporation. Thus its first report covers the work of six years. The two constant aims have been the concentration of resources and the establishment of a regional organisation based on Liverpool. In 1939 the city had four different stocks of radium, apart from that held privately, and two hospitals independently were conducting radiotherapy; surgical treatment was being undertaken in a large number of hospitals, and various separate bodies were inter-

1. Circular no. 120. See *Lancet*, August 31, p. 323.

ested in cancer control. Despite war-time diversions substantial progress has been made. The organisation has suggested that the Radium Institute should be amalgamated with the United Hospital, and that all X-ray therapy should then be concentrated in the institute as a branch of the United Hospital; this would mean that, when eventually the new United Hospital is built, its Radium Institute branch would take a place on the common site. This policy is approved by the National Radium Commission, and the plan has been under discussion by the parties directly concerned. Though the Cancer Act of 1939 will be superseded when the National Health Service Act comes into operation, the organisation, whose purposes are wider than those of the Cancer Act, expects to continue "to assist in combating the onset, progress, and effect of cancer, and to alleviate the sufferings caused by cancer."

#### SCIENTIFIC WHAT'S WHAT

In 1920 the Conjoint Board of Scientific Societies, acting on the suggestion of Sir Sidney Harmer, F.R.S., worked out a scheme for a complete list of scientific periodicals. When, in 1923, the board was dissolved, the work was taken over by a new non-profit company, under the chairmanship of the late Sir Peter Chalmers Mitchell, F.R.S. With the help of donations from the Carnegie Trust and from private sources the first edition of the *World List of Scientific Periodicals* appeared in 1925, and was followed by a second edition in 1934. This book, which names the place of publication and the recommended abbreviation of over 33,000 periodicals and also gives the libraries where they are stocked, has proved invaluable to scientists and librarians in and beyond Great Britain. For some time, however, it has been out of print, and the council of management, under the chairmanship of Mr. S. A. Neave, D.Sc., has decided to undertake a new edition, including all periodicals published between 1900 and 1947. Librarians can help in the compilation of the list by sending particulars of journals either not included in the second edition or shown as having no location in this country. Communications should be directed to the secretary, *World List of Scientific Periodicals*, c/o the Zoological Society of London, Regent's Park, London, N.W.8.

#### BRITISH COUNCIL

THE council has had another active year. As might be expected, European countries, such as Yugoslavia, are eager for news from Britain after their years of isolation; and there has been a heavy demand for medical books and periodicals.<sup>1</sup> The council has continued to publish its own medical journal, the *British Medical Bulletin*; it also runs a medical information service, helps to stock medical libraries, arranges for visits to Britain by foreign doctors and for overseas tours by British doctors, organises programmes for holders of the council's scholarships in medicine, and sponsors medical films. During the past years exhibitions of medical books have been held in various countries, and Anglo-Chilean and Argentine-British medical centres have been opened. The council aims not only to interpret British ways to other countries but to promote our own understanding of foreign cultures; outside medicine this purpose was reflected in the exhibition here of paintings by Picasso and Matisse, and the interchange visits between the Old Vic company and the Comédie Française.

#### SENTENCE OF DEATH

FOR many years now the case for and against capital punishment has been debated in this country. In 1930 a select committee, in a majority report, recommended its suspension for an experimental period of five years; and the issue will doubtless be raised again when the Government are able to introduce their Criminal Justice Bill. In the meantime, Mrs. Calvert has written a pamphlet in which the arguments for abolition are clearly set out.<sup>1</sup> Certainty of conviction and punishment, she says, is more effective in preventing crime than severity. When in 1810 Sir Samuel Romilly brought a proposal before Parliament to end capital punishment for shoplifting to the value of five shillings and upwards, Lord Ellenborough, the Chief Justice, said in the House of Lords' debate: "Such will be the consequence of the repeal of this statute that I am certain depredations to an unlimited extent would be immediately committed." The

event proved him wrong. In eleven European countries, in parts of North and South America and Australia, and in New Zealand, the death penalty has been abolished or abrogated by disuse without influencing the trend of homicide figures. "It has," Mrs. Calvert concludes, "no place in a modern system of penal administration, and it is high time that it was swept away, and that the gallows took a place with the rack and the triangle in some limbo of obsolete instruments of punishment and torture."

#### University of Cambridge

At a congregation on Nov. 16 the following degrees were conferred:

M.B., B.Chir.—N. H. Harwood-Yarred, W. A. A. Hedges (by proxy); H. G. Mather.

#### University of London

Dr. John McMichael has been appointed to the university chair of medicine tenable at the British Postgraduate Medical School, as from Oct. 1, 1946.

Dr. McMichael is 42 years of age. He was educated at Kirkcubright Academy and the University of Edinburgh, where in 1927 he was awarded the Eccles scholarship as the most distinguished graduate of the year. After holding house-appointments at the Royal Infirmary, Edinburgh, and at Paddington Green Children's Hospital, London, he returned to Edinburgh University in 1929 as Goodsir fellow to work in the departments of pathology and surgery. In 1930 he became M.R.C.P.E., and for the next four years he held a Beit fellowship, working first as assistant to the professor of medicine in the University of Aberdeen, and later as clinical assistant to Dr. J. W. McNee at University College Hospital, London, with whom he made a special study of the splenic anemias. He was awarded a gold medal for his M.D. thesis in 1933. In 1934 he was appointed lecturer in human physiology in the University of Edinburgh, and in 1936 became Johnston and Lawrence research fellow of the Royal Society and extra hon. assistant physician at the Royal Infirmary, Edinburgh. He was elected F.R.S.E. in 1936 and F.R.C.P.E. in 1940. Since 1939 Dr. McMichael has been reader in medicine, and from the outbreak of the late war acting director of the department of medicine, at the British Postgraduate Medical School, London. Besides his work on the splenic anemias, Dr. McMichael has published papers on hæmorrhage, shock, cardiac failure, and hepatitis.

Dr. S. D. Elliott has been appointed to the university readership in bacteriology tenable at the London Hospital medical college, as from Oct. 1, 1946.

From 1933 to 1935 Dr. Elliott was demonstrator in bacteriology, and from 1935 to 1937 assistant lecturer, at University College Hospital medical school. From 1937 to 1938 he was university demonstrator in pathology at Cambridge. Since 1938 he has been a Freedom research fellow in the department of bacteriology at the London Hospital medical college, from which he was seconded to the Emergency Medical Service during the war years. In February, 1941, he returned to the staff of the college, and was seconded to the Rockefeller Institute, New York, for six months.

#### University of Leeds

Mr. F. C. Happold, D.Sc., reader in biochemistry, has been appointed to the chair of biochemistry, from August 1, 1946.

Mr. Digby Chamberlain has been appointed professor of surgery, from Oct. 1, 1946.

Mr. Chamberlain studied medicine at Leeds, where he qualified M.B., with first-class honours, in 1921. In 1924 he graduated Ch.M., and became F.R.C.S. He was resident surgical officer and assistant surgeon at the General Infirmary before appointment to his present post as surgeon. He is also honorary visiting surgeon to a number of hospitals in and around Leeds. In 1921 he was awarded the William Hey gold medal by the University of Leeds, and in 1940 was Hunterian professor of the Royal College of Surgeons. He has taken special interest in abdominal surgery, on which he has published a number of papers.

The title of emeritus professor has been conferred on Prof. William MacAdam, Prof. P. L. Sutherland, and Prof. C. W. Vining.

#### University of Glasgow

Sir John Boyd Orr, M.D., F.R.S., has been elected chancellor of the university.

#### Royal College of Surgeons of England

The following lectures will be given at 5 P.M. during December: Thursday, 5th, Dr. B. D. Pullinger, Cystic Disease of the Breast, Human and Experimental (Imperial Cancer Research Fund lecture); Thursday, 12th, Mr. W. Rowley Bristow, Injuries of the Peripheral Nerves in Two World Wars (Robert Jones lecture); Tuesday, 17th, Mr. R. W. Raven, Melanoma and Related Tumours (Erasmus Wilson demonstration); and Thursday, 19th, Dr. E. Ashworth Underwood, Naval Medicine in the Ages of Elizabeth and John (Thomas Vicary lecture).

A course of 72 lectures on anatomy, applied physiology, and pathology will be given at the college between Feb. 3 and March 28, 1947, at 3.45 and 5 P.M. daily.

1. British Council, 3, Hanover Street, London, W.1. Annual report for 1945-46. Pp. 178.

1. Capital Punishment: Society Takes Revenge. By Theodora Calvert. Published by National News-Letter, 162, Buckingham Palace Road, London, S.W.1. 1s.

### Association of Anæsthetists of Great Britain and Ireland

As part of the centenary celebrations of the first administration of ether in Great Britain, a dinner-dance is to be held at the Dorchester Hotel on Saturday, Dec. 21.

### Course in Industrial Medicine

A postgraduate course in industrial medicine is to be held at the London Hospital from April 21 to June 19, 1947. It will cover the syllabus for part II of the Royal Colleges' diploma in industrial health, and will include visits to factories. Applications should be sent to Dr. A. E. Clark-Kennedy, dean of the medical college, Turner Street, E.1.

### Research into Effects of Nuclear Radiation

A Biological Research Division has been formed in the United States to investigate the effect of nuclear radiations upon living cells and to determine the maximum safe exposure. The division will include the following units: biochemistry, cytogenetics, general physiology, experimental radiology, and a section of cooperative studies. Observations will be based on radiations from nuclear disintegration within a pile.

### Pharmaceutical Liaison Committee

This committee has been established to promote contact between the Ministries of Health and Supply on the one hand and the pharmaceutical profession on the other. The first meeting, under the chairmanship of Sir Weldon Dalrymple-Champneys, deputy chief medical officer of the Ministry of Health, was held on Oct. 16. The secretary is Miss C. Mozley-Stark, Ministry of Health, Whitehall, S.W.1.

### New Laboratory for U.S. Institute

A laboratory for the study of infectious diseases has been added to the National Institute of Health, at Bethesda, Maryland, as a memorial to the 23 members of the U.S. Public Health Service who have died in the course of their work. The laboratory, which contains six research units, is to be directed by Dr. Charles Armstrong, chief of the division of infectious diseases at the institute.

### Scientific Film Association

Two films from Australia (*Neurological Sequelæ of Deficiency Disease seen in ex-Prisoners-of-war*, and *Hydatid Disease of the Liver*) and one from Canada (*This Town is Ours*), which have been presented to the association, will be shown for the first time in Britain at 6 P.M. on Thursday, Dec. 5, in the film theatre of the Wellcome Foundation, 183, Euston Road, London, N.W.1.

### Voluntary Work under the National Health Service Act

Speaking last week at Stratford, Mr. Charles Key, parliamentary secretary to the Ministry of Health, claimed that the scope for voluntary work will be just as wide in the future as it has been in the past. "Benefactors should not be put off," he said, "for this valuable outlet for benevolence will be made more attractive by the knowledge that money given to hospitals need no longer be used for their general expenditure. . . . The regional boards, the management committees, the house committees, and many other bodies will provide opportunities for those who wish to serve the public interest. Indeed, we hope that when the preoccupation with finance is removed . . . the scope for voluntary service will be greater than ever before."

### Sound Waves to Kill Bacteria

High-frequency sound waves, vibrating at 100,000,000 cycles per second, are being used in the United States to destroy bacteria in food; they are stated to act by producing and rupturing a small air-bubble in the organism. Supersonic vibrations, says a B.U.P. message, have also been used to cut and drill teeth soundlessly and painlessly, though the process is at present too expensive for general application. Mr. Henry von Jeneff, a Chicago acoustical engineer associated with the development of the process, claims that it has opened a new field in physical, chemical, and biological research since the sound waves are able to agitate and vibrate chemicals without heating them.

### Return to Practice

The Central Medical War Committee announces that Dr. R. J. Buxton has resumed civilian practice at 34, Clarence Road South, Weston-super-Mare, Som.

In announcing on Nov. 2 the formation of a medical committee to advise the Government on the revision of the international list of the causes of death we inadvertently omitted the name of Prof. Arthur Ellis, F.R.C.P.

## Appointments

AGASSIZ, C. D. S., M.C., M.D. Aberd., F.R.C.P., D.P.H.: medical superintendent, Queen Mary's Hospital, Carshalton.  
 COYLE, C. D., M.B. N.U.I.: medical superintendent, Archway group of hospitals, Highgate.  
 CRAWFORD, J. M., M.D. Edin., D.P.M.: deputy medical superintendent, Darent Park.  
 DOUGLAS, A. A., M.D. St. And., F.R.C.S.E., D.P.H.: assistant ophthalmic surgeon, Children's Hospital, Birmingham.  
 FELDMAN, W. M. D. Lond., M.R.C.P.: medical superintendent, St. Giles' Hospital, London County Council.  
 FERRABY, G. S., M.S. Lond., F.R.C.S.: deputy medical superintendent, St. Charles' Hospital, London County Council.  
 HARDING, H. E., D.M. Oxid.: orthopaedic surgeon, National Hospital, Queen Square, W.C.1.  
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 WILSON, M. M., M.B. Leeds, D.P.H.: medical officer, Ministry of Education.

## Births, Marriages, and Deaths

### BIRTHS

FRANKLAND.—On Nov. 21, in London, the wife of Dr. A. W. Frankland—a daughter.  
 GRIFFITHS.—On Nov. 14, at Chester, the wife of Dr. F. E. Davidson Griffiths—a son.  
 HATFIELD.—On Nov. 15, at Ongar, the wife of Dr. F. E. S. Hatfield—a daughter.  
 HEWER.—On Nov. 20, in London, the wife of Dr. A. J. H. Hewer—a son.  
 HOLT.—On Nov. 17, at Stamford, the wife of Dr. Leslie R. Holt—a daughter.  
 JOY.—On Nov. 16, at Frome, the wife of Dr. David Joy—a daughter.  
 McLAUGHLIN.—On Nov. 21, the wife of Mr. Redmond McLaughlin, F.R.C.S.E.—a daughter.  
 MITCHELL.—On Nov. 11, at Trieste, the wife of Lieutenant-Colonel P. C. Mitchell, M.C., R.A.M.C.—a son.  
 PRICHARD.—On Oct. 9, in London, the wife of Dr. J. S. Prichard—a daughter.  
 SQUIRE.—On Nov. 17, at Solihull, the wife of Dr. J. R. Squire—a daughter.

### MARRIAGES

JAMES—WITHERS.—On Nov. 16, at Egerton, Flying-Officer Derrick William James, M.R.C.S., to Elisabeth Courtenay Wright Withers.  
 O'BRIEN—LEWIS.—On Nov. 5, in London, Daniel James O'Brien, M.B., to Margaret Mary Lewis.  
 RIDDELL—WILTSHIRE.—On Nov. 16, at Folkestone, Athol G. Riddell, M.B.E., M.B., to Valerie C. Wiltshire.

### DEATHS

BOSWELL.—On Nov. 17, at St. Boswells, Henry St. George Boswell, M.B. Edin., aged 89.  
 CAMPBELL.—On Nov. 15, at Castleford, John James Williamson Campbell, L.R.C.P.E., aged 84.  
 DEAN.—On Nov. 16, at Berkhamsted, Charles William Dean, F.R.C.S.E., aged 86.  
 GRIFFITHS.—On Nov. 16, at Cardiff, Thomas Ellis Griffiths, M.B. Lond.  
 LOCKE.—On Nov. 19, at Sedlescombe, George Locke, M.R.C.S., aged 93.  
 MacGILLIVRAY.—On Nov. 20, at Bad Salzuflen, Germany, Isabel Margaret MacGillivray, M.B. Edin., M.R.C.P.E.  
 MACPHAIL.—On Nov. 6, in Edinburgh, Alexandrina Matilda Macphail, O.B.E., L.R.C.P.E.  
 PUTTOCK.—On Nov. 19, at Billingshurst, Reginald Puttock, M.B. Camb.  
 SEARLE.—On Oct. 29, George Percy Searle, L.R.C.P.E.  
 WINTER.—On Nov. 20, at Rotherham, Herbert Edmund Winter, M.R.C.S., lieutenant-colonel R.A.M.C., aged 85.



## SYNOVIAL MEMBRANE AND SYNOVIAL FLUID OF JOINTS\*

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LITTLE attention has been paid to the synovial membrane and synovial fluid of joints, although their mechanics have been discussed a great deal.

Paracelsus coined the term *synovia* or *synophia* for the fluid in joints (Hyrthl 1880). Among observations on the anatomy and physiology of joints are those of William Hunter (1743) on the blood-supply, the circulus vasculosus articulari; Bichat (1806) on the nature of the synovial membrane and the origin of the fluid; and John Hilton (1863) who enunciated what is now known as Hilton's law.

Recent contributions by Bauer and his colleagues (1930, 1940) have given accurate chemical analyses of both bovine and human synovial fluids. From the synovial mucin Meyer et al. (1939) have isolated its polysaccharide, which they term hyaluronic acid. Hoffman and Duran-Reynals (1930, 1931) and Chain and Duthie (1940) have isolated an enzyme, hyaluronidase, from animal and bacterial tissue capable of hydrolysing this mucin.

### DEVELOPMENT

All the components of the diarthrodial joint are developed from mesoderm. The chondrifying skeletal elements, already sketched on the adult pattern, are at first separated by mesenchymal tissue, in which cavitation soon appears and delineates the joint cavity. The perichondrium is continued over the joint cavity as the capsule, while the lining of the cavity presents, on the one hand, articular cartilage and, on the other, synovial membrane. The capsule is composed of tough, inelastic, relatively avascular, white connective tissue with marked powers of resistance to disease and relatively low powers of repair. It differs but little from perichondrium or periosteum. The synovial membrane, on the other hand, is a soft, freely moving and elastic, sensitive membrane with a good blood-supply, good powers of repair and regeneration, and well-marked phagocytic powers. Accident, attrition, repeated trauma of the joint, and liability to certain infections (all forms of arthritis) focus attention on the vascularity and special function of the synovial membrane.

### Special Features of the Diarthrodial Joint

#### STRUCTURE OF THE SYNOVIAL MEMBRANE

The synovial membrane forms a relatively smooth glistening yellowish or grey lining, covering all intra-articular surfaces except the cartilage-covered weight-bearing areas. It extends a few millimetres over the margin of the articular cartilage, adheres firmly to it, and terminates without any sharp line of demarcation. The contention of William Hunter (1743), upheld later by Bichat (1806), that it clothed the articular surfaces was rightly contradicted by Cruveilhier, Magendie, and Velpeau (Todd 1836).

The surface of the synovial membrane presents a variable number of folds and villi and, occasionally, delicate cord-like bridges, more often met with in bursæ. Information is still lacking about the extent of the synovial surface in various joints and its relation to the area of articular surface. Estimates of the synovial surface in the human knee- and ankle-joints show that, whereas the synovial membrane of the knee-joint is 43 sq. in., that of the ankle-joint is only 7 sq. in., but the cartilaginous surface of the ankle-joint is 5 sq. in. and that of the knee-joint only 23 sq. in.

The mobility and thickness of the synovial membrane depends on the quality and amount of the underlying subsynovial tissue and is adjusted to suit mechanical requirements. The underlying tissue may be abundant and loose in texture, the areolar type of Key (1928); dense collagenous tissue as at the articular margins or covering ligaments (fibrous type); or a pad of fat covered with a layer of synovial membrane in which the cells are more flattened (adipose type). Pads of fat are found in most joints and have in the past attracted much attention. Havers (1691) regarded them as mucilaginous glands. This view was rejected by Bichat (1806). MacConaill (1932) suggested that the freely movable pads of fat effected distribution of the synovial fluid. The extent and distribution of the areolar, fibrous, and adipose types of synovial membrane vary greatly from joint to joint; the temporomandibular joint, for example, is lined with a predominantly fibrous membrane, whereas the ankle-joint displays all three types, but predominantly the adipose and areolar.

The synovial membrane is relatively cellular, and its cells are pleomorphic, varying in their dimensions. There is little morphological similarity between the synovial membrane and the lining of serous cavities, such as the pleura and the peritoneum. The cells are often separated from the joint cavity by a homogeneous eosinophilic ground substance or even by collagenous fibres. The cells show a finely granular eosinophilic cytoplasm with occasional vacuoles or fat globules. Mitochondria are present as small granules or rods but display no constant orientation. The existence of a Golgi apparatus is denied by Key (1928) and Davies (1943) but described and figured by King (1935), who thinks that the orientation of the cell components is of functional significance.

Unlike pleura and peritoneum there is no basement membrane in the synovial membrane. Except at the transition zone of the articular margins, no cells resembling those of cartilage occur. Chondromatosis of the synovial membrane results from metaplasia and not from proliferation of pre-existing cartilage cells.

The statement that elastic tissue is sparse in synovial membrane is incorrect. A network of fine elastic fibres pervades most regions; this increases in amount in the more mobile areas and may form one or two distinct elastic laminae (fig. 1). No elastic fibres occur in the villi except in association with the blood-vessels, and they are generally scanty over the fat pads. The elastic laminae prevent the more mobile areas from being nipped between the articulating surfaces during motion.

#### NATURE OF SYNOVIAL CELLS

Much confusion exists as to the nature of the synovial lining. The cells are variously described as endothelial, epithelial, mesothelial, glandular, and, more latterly, as modified connective-tissue cells. The term mesothelial is the most informative. Pertinent questions are:

- (1) Does the synovial lining differ from the underlying connective tissue and, if so, in what respects?
- (2) Is the lining comparable with that of serous cavities, such as pleura or peritoneum?
- (3) What rôle does the lining cell play in the economy of the joint, in production of synovial fluid or in its removal?

According to Vaubel (1933a and b) synovial cells differ from fibroblasts in tissue culture by their fibrolytic activity and their ability to produce a mucin-like substance in detectable quantities. He suggests that they be designated synovioblasts. Further investigation with hyaluronidase might help to identify this mucin-like product obtained on culture. There is little similarity between normal synovial membrane and the lining of a false joint, where the lining layer consists purely of flattened connective tissue.

\* An Arris and Gale lecture delivered at the Royal College of Surgeons on June 6, 1945.

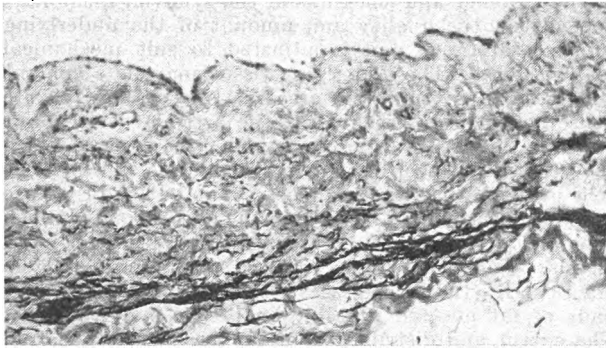


Fig. 1—Section of synovial membrane, from atlanto-occipital joint of an ox, stained with orcein to show elastic lamina. ( $\times 85$ )

Synovial cells bear little resemblance to the flattened polygonal cells of peritoneum, although both show analogous changes in their response to irritation. They increase in number, enlarge, and retract their processes to become more rounded. According to Cunningham (1922) fibroblasts respond to irritation by becoming more elaborately branched. Synovial cells in small numbers are continually set free in the joint cavity. Their subsequent fate and functions remain obscure.

Key (1925) describes a re-formation of the synovial membrane, after synovectomy, by metaplasia of the underlying connective tissue. Whether the newly formed lining shows reactions analogous to normal synovial cells, and whether the contents of the joint cavity are in any way modified after this procedure, are important problems which remain unsolved.

#### NERVE-SUPPLY

John Hilton's (1863) statement still remains the most important pronouncement on the nerve-supply of joints:

"The same trunks of nerves, whose branches supply the groups of muscles moving a joint also furnish a distribution of nerves to the skin over the insertions of the same muscles and—what at this moment more especially merits our attention—the interior of the joint receives its nerves from the same source."

Chief among the features of the synovial membrane is its sensitivity to pain. Localisation is often not highly accurate. To what degree the synovial membrane responds to other sensations, such as tension or pressure, is uncertain. Medullated and non-medullated nerves entering the joint with the blood-vessels form a plexus

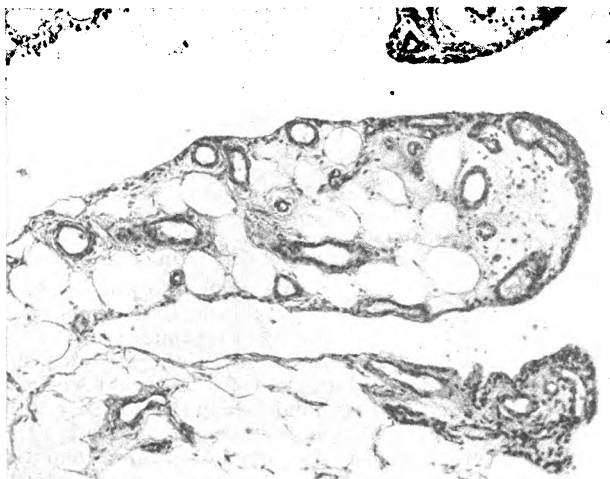


Fig. 2—Section of synovial villus from human ankle-joint to show superficial position of blood-vessels. ( $\times 85$ )

in the synovial membrane. The non-medullated fibres in large part innervate the blood-vessels and are probably of sympathetic origin. The effects of sympathectomy on the vascular supply of joints remain obscure and, in view of the paradoxical effects recorded by Engel (1941), need investigation. The synovial membrane and its villi show an abundance of free nerve-endings, presumably subserving pain; end-organs, possibly concerned with proprioceptive impulses, are variously described as of the Ruffini, Golgi, Mazzoni, looped, or knotted types. Pacinian corpuscles are not a characteristic feature of the synovial membrane. Gardner (1942) failed to find them in the capsule, and I confirm this. Of the articular cartilage William Hunter (1743) said:

"Insensibility of the articular cartilage is wisely contrived, as by this means the necessary motion of the body is performed without pain."

#### BLOOD-SUPPLY

Little has been added to the first description of the *circulus vasculosus articuli* by William Hunter in 1743:

"All round the neck of the bone there is a great number of Arteries and Veins, which ramify into smaller Branches and communicate with one another by frequent Anastomoses like those of the mesentery. This might be called the *Circulus articuli vasculosus*, the vascular border of the Joint."

The capillaries of the synovial membrane are characterised by their richness and superficial position (fig. 2). Small

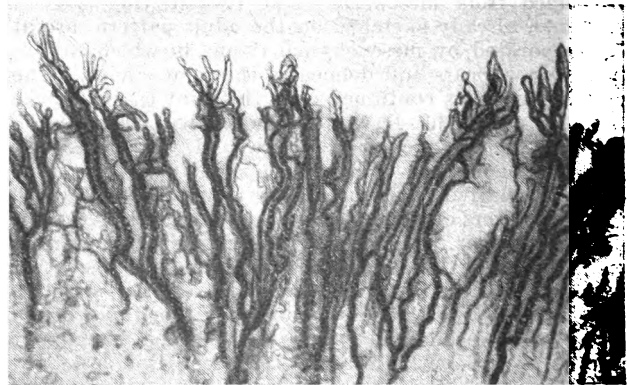


Fig. 3—Capillary loops at the articular margin of synovial membrane in talocalcaneal joint of a man in whom the corresponding femoral artery had been ligated. ( $\times 16\frac{1}{2}$ )

extravasations of blood into the joint cavity are very often found in animals, and some extravasation follows such a simple procedure as puncture (Davies 1944).

At the articular margins the capillaries form delicate anastomosing loops comparable in pattern to those seen in the mesentery (fig. 3). In the villi and fringes the capillaries form delicate tufts supplied by one or more central arterioles. The blood-supply of synovial membrane and capsule communicates freely with the periosteal and epiphyseal supply; hence the shaft of the bone forms one nutritional unit, and the joint cavity and the adjoining epiphyses form another. For this reason Harris (1933) uses the term *circulus vasculosus articuli et epiphyseos* to emphasise the nutritional interdependence of the joint and the epiphyses.

The venous drainage has received little attention. Sappey (Testut 1880) stated that the veins were characterised by their frequent anastomoses, tortuosities, and varicosities. Testut (1880) remarked on their voluminous nature. Occasional valves are seen in the larger veins, even in the more superficial parts of the synovial membrane (fig. 5).

#### LYMPHATICS

There is only one plexus of lymph vessels in the synovial membrane, though both superficial and deep

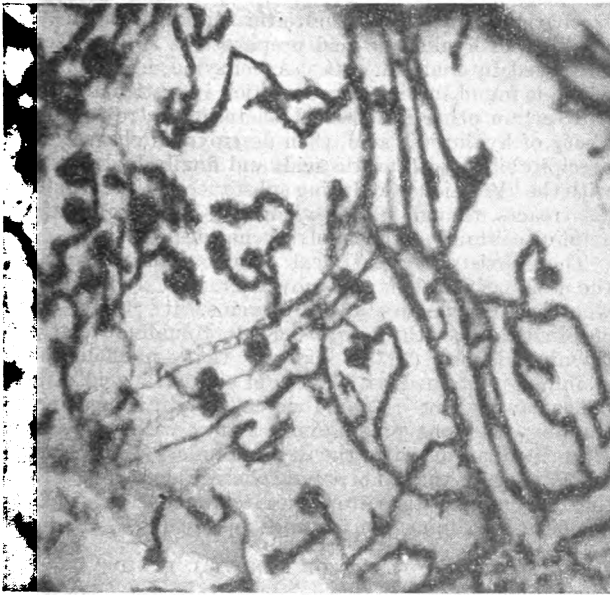


Fig. 4—Fresh synovial membrane from metatarsophalangeal joint of an ox, showing lymphatic vessels injected with Indian ink.

plexuses have been described. This plexus forms wide-meshed irregular polygonal patterns within which are seen numerous blindly ending vessels with terminal lacuniform enlargements (fig. 4). The lymph vessels are neither so numerous nor so superficial as the blood capillaries, and no lymph vessels can be traced into the villi of the synovial membrane. The larger lymph vessels draining this plexus pass in groups of twos and threes along the blood-vessels towards the flexor aspect of the joint and communicate freely with the periosteal lymphatics (fig. 5). Few valves are seen in the synovial lymph vessels, but they are numerous in the collecting trunks on the periosteum. The plexus is finer and wider-meshed in the more fibrous types of synovial membrane. The effect of movement on the emptying of the synovial lymphatic vessels is made evident in trying to preserve specimens after injection.

#### EXCHANGE OF SUBSTANCES ACROSS THE SYNOVIAL MEMBRANE

The exchange of substances across the barrier of the synovial membrane is determined to a considerable extent by the arrangement of the arteries, veins, and

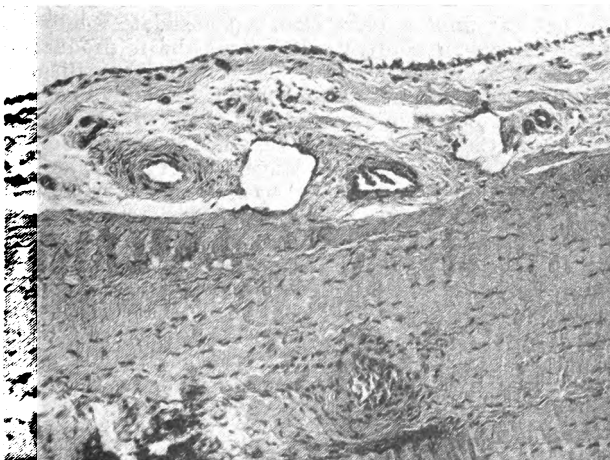


Fig. 5—Section of the synovial membrane from metatarsophalangeal joint of an ox, showing two large lymphatic vessels. Note valves in intervening vein. ( $\times 101$ ).

lymphatic vessels. Solutions and substances of small molecular dimensions pass through the barrier with rapidity in either direction, mainly if not exclusively through the blood capillary bed. Colloidal particles of larger dimensions, including the proteins, reach the cavity more slowly, and their removal is slower still. This removal takes place by way of the blood capillary and lymph capillary streams. Particulate matter of 100 m $\mu$ . and more moves slowly into the subsynovial tissue and becomes deposited there, moving no further (Key 1926, Adkins and Davies 1940). After hæmorrhage, hæmosiderin tends to accumulate here in considerable quantities (fig. 6). Exchange across the synovial barrier is increased in acute inflammation (Bauer et al. 1940), but the effects of chronic inflammation seem variable.

In the removal from the joint cavity of particulate matter the synovial cells and phagocytes of the synovial membrane play an important rôle. The rôle of the synovial cells in the exchange of solutions and small colloidal particles is dubious. Though most investigations show that a passive rôle is probable, there are some outstanding anomalies, such as the difference in rates of diffusion of thiocyanate and sugar, recorded by Bauer et al. (1940), and the failure of passage of methyl orange from the blood into the fluid in Engel's experiments (1940). It is probable that differing substances have different rates of transfer across the membrane, and these may differ from joint to joint. There are as yet no

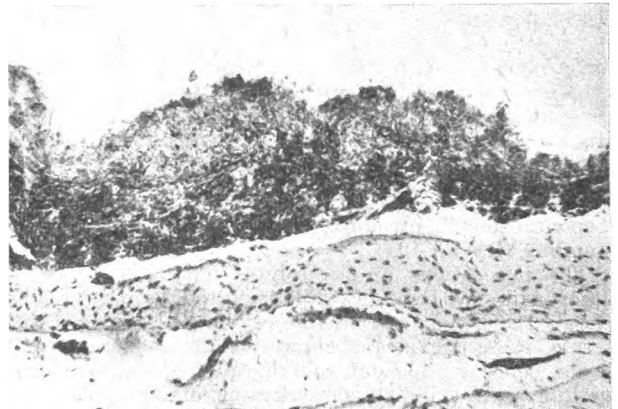


Fig. 6—Section through synovial membrane from a case of torn medial meniscus, showing a collection of hæmosiderin immediately beneath the surface. Stained for iron by the Prussian-blue reaction. ( $\times 85$ ).

comparative data available as to the nature of these differences.

#### Synovial Fluid

The physical characters of synovial fluid vary not only from animal to animal but also from joint to joint in the same animal. Its volume shows well-marked species differences which bear little relation to the size or capacity of the joint in question. The human knee-joint generally contains a small volume (0.2–0.3 c.cm.) of pale straw-coloured fluid of moderate viscosity, whereas the smaller knee-joint of sheep or dog contains a similar volume of highly viscous colourless fluid. In the ox the knee-joint contains about 10 c.cm. of fluid, whereas the ankle-joint has on the average 25 c.cm. and sometimes considerably more. Its viscosity bears no relation to the volume. In the ankle-joint of the ox the fluid is pale yellow and has a relative viscosity of about 5 at 20° C, whereas in the atlanto-occipital joint of the same animal the fluid is generally deep yellow and often sets into a gel at 20° C. Serial changes in character of the synovial fluid are shown in the costovertebral joints of cattle. The fluid is of greatest volume and smallest viscosity in the most anterior joint and progressively decreases in volume and increases in viscosity on passing backwards.

In many animals the volume seems to be greatly in excess of that required for lubrication (Davies 1944).

The chemical composition of the synovial fluid is still imperfectly known. Bauer and his colleagues regard synovial fluid as a dialysate of serum with added mucin. Apart from the proteins of the blood, urea, uric acid, and amino-acids seem to diffuse freely into the joints. Glucose is found in a lower concentration than in blood, a fact to be explained partly by the consumption of glucose within the joint.

Besides mucin, the synovial fluid contains albumin and globulin, with a predominance of albumin (in a proportion of about 4 : 1), but both in smaller concentration than in serum. This fits in with the greater permeability of the synovial barrier to the smaller albumin molecule. No fibrinogen is found in the synovial fluid. Hence the fluid does not clot, though the mucin may display a

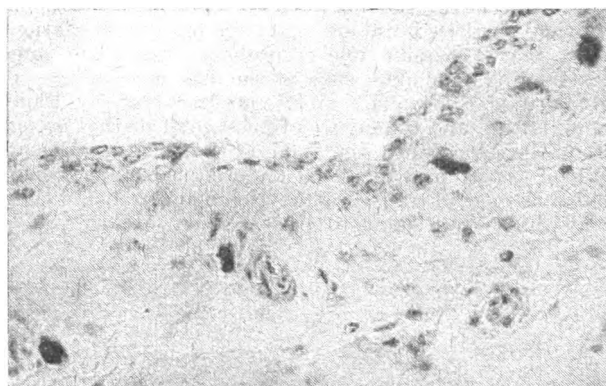


Fig. 7.—Section of synovial membrane from ankle-joint of an ox, stained with polychrome methylene-blue to show the metachromatically stained mast cells. ( $\times 85$ .)

“spontaneous” precipitation in sac-like manner on standing (Davies 1944).

The proportions of electrolytes in the fluid are in accord with the Donnan equilibrium theory and resemble closely those in an ultrafiltrate of blood. Compared with serum, there is excess of chloride and bicarbonate, with lower concentrations of sodium, potassium, and magnesium and a similar concentration of inorganic phosphate. The calcium values are high, varying from 6.5–7.0 mg. per 100 c.cm. in the ankle-joint of the ox to 8.0–10 mg. in the atlanto-occipital joint. The calcium concentration is proportional to the mucin content and viscosity of the fluid, part of the calcium being bound to the mucin. The calcium may assist in maintaining the stability of the colloidal systems in the joint and with the mucin may form the main buffer system to keep the fluid alkaline (pH 7.5–7.7).

Apart from these observations there is no information on the variations in chemical composition from joint to joint, but it is certain that the cellular content differs widely.

The synovial mucin is distinct from the sulphate-containing mucins which are found in cartilage, gastric secretions, and ovarian cysts. It is a sulphate-free mucin, the viscous polysaccharide component of which has recently been isolated by Meyer et al. (1939) as hyaluronic acid, and found to be identical with the mucopolysaccharide of the vitreous of the eye and of Wharton's jelly in the umbilical cord. The same polysaccharide has also been identified in connective tissue, certain groups of streptococci, and certain tumours. Hyaluronic acid is a substance of high molecular weight, does not dialyse through collodion membranes, is highly viscous, forms salts with the amino groups of various proteins, is non-antigenic, is precipitated by acetic acid, and is apparently identical in all animals. In connective tissues

it exists along with a sulphur-containing mucopolysaccharide, probably chondroitin sulphuric acid. The viscosity of hyaluronic-acid preparations is decreased or destroyed by many agents. An enzyme, hyaluronidase, which is found in high concentration in testicular extract and certain other tissues and bacteria, destroys the viscosity of hyaluronic acid, then destroys its characteristic precipitability with acetic acid, and finally hydrolyses it, with the liberation of reducing substances. Hyaluronidase also reacts, though not so vigorously, with some of the sulphur-containing mucopolysaccharides.

There exists a great deal of uncertainty regarding the staining reactions of synovial mucin. It is doubtful whether, like many other mucins, it stains metachromatically with dyes, such as toluidine blue and thionin. Lison (1935) reports that metachromatic staining is obtained with esters of sulphuric acid of high molecular weight. I could detect no difference in the staining reactions of synovial tissues with these dyes after incubation with the hyaluronidase preparations, and I suggest that the polysaccharide does not exhibit the metachromatic properties characteristic of the sulphate-containing mucins and heparin (fig. 7).

#### CELL CONTENT OF SYNOVIAL FLUID

There are few observations on the cell content of human synovial fluid. Coggeshall et al. (1940), from autopsies on 29 human knee-joints aged 32–80 years, give a cell count ranging from 13 to 180, with an average of 63 cells per c.mm.

Studies of the cell content in cattle, sheep, and horses show several points of interest. The content of nucleated white cells varies considerably from joint to joint in the same animal—e.g., in cattle from about 200 per c.mm. in the appendicular to about 1200 in some of the axial joints. The count varies from species to species and with age within the same species. These variations are not wholly explicable in terms of functional differences. In general, in cattle the higher cell counts were obtained in joints with highly viscous fluids and a marked freedom from disease and degenerative changes, such as those of the atlas (Davies 1945). Red blood cells do not normally occur in synovial fluid, though small traumatic extravasations from the delicate capillaries are frequent.

Of the cell types, monocytes form about 50% of the total, accompanied by rather fewer clasmatocytes, the remainder being lymphocytes, polymorphonuclear leucocytes, synovial cells, and unclassified phagocytes. There is a significant variation in the proportions of these different types from joint to joint and species to species. This field remains unexplored.

#### THEORIES OF THE ORIGIN OF SYNOVIAL FLUID

That the fluid is more than a transudate is obvious from its mucin content. It cannot be a product of degeneration in cartilage, for the mucin of cartilage is distinct from that of synovial fluid. Theories that it is a secretion of certain areas or cells of the synovial membrane in the main depend on the demonstration of patches of secretory cells. Havers (1691) thought that the synovial fluid was secreted by the synovial membrane over the pads of fat, a view no longer tenable. The mucin-secreting cells of the synovial membrane described by Fisher (1923), Kling (1938), and others are based on metachromatic staining methods. I have investigated these claims and concluded that the metachromatically staining cells in the synovial membrane are mast cells; and, if any function is attributable to them, it is that of maintenance of fluidity of the tissue juice. They certainly do not secrete mucin.

Chemical considerations indicate that the synovia is a dialysate of blood plasma with the addition of mucin. The mucin may arise as a secretion of the synovial cells or a product of the intercellular matrix of the synovial

tissues. Some regard the synovial fluid as the liquid matrix of the joint "tissue," if the cells here merit such a name. If the mucin is derived from the matrix of the connective tissue, it should contain both sulphated and non-sulphated mucopolysaccharides in the proportion in which they exist in this tissue. The great variations which are found in mucin content and viscosity from joint to joint are opposed to such a view. Vaubel (1933a and b) has shown that synovial cells in tissue culture elaborate a mucin-like substance, but its exact identity is unknown. It is, however, a product of cell activity, ceasing to be produced when the synovioblasts are transformed to fibroblasts or degenerate. Removal of synovial fluid from normal joints in cattle is followed within less than twenty-four hours by the outpouring into the cavity of an equal or even larger volume of a fluid of high nitrogen content, rich in cells, and of low viscosity. This fluid is less viscous than the normal fluid but differs from serum in the presence of mucin. It is probable that raising the viscosity to the normal level is a slow process and related to further elaboration of mucin by synovial cells. We do not know of any stimulus which will increase the mucin content of the fluid.

#### FUNCTIONS OF THE SYNOVIAL GLAND

These may be summarised as follows:

(1) *Lubrication*.—This is clearly important but not necessarily the main function. The amount of fluid in most joints, including even the human, is in excess of that required for lubrication.

(2) *Nutrition*, particularly of the avascular articular cartilage.

(3) Maintenance of a *constant fluid medium* within the joint. The water binding power and high osmotic properties of mucin are essential to this. The hyaluronic acid of the mucin and the mucin itself are markedly hygroscopic.

(4) Maintenance of a *constant chemical reaction* within the joint. Both the mucin and the calcium are well fitted to maintain the reaction of the synovial fluid at a constant level.

(5) *Protective*.—Mucin in other organs has been shown to protect the tissues against enzyme action and toxins. Though no work has been done on this aspect of synovial mucin, there is reason to believe that it possesses similar protective functions.

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## RELATIONSHIP OF BENIGN LYMPHOCYTIC MENINGITIS AND GLANDULAR FEVER\*

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GLANDULAR fever was originally described by Pfeiffer in 1889 as an acute infectious disease of children, characterised by rapid painless swelling of the cervical glands, in which suppuration never developed, with slight constitutional symptoms. Hæmaturia alone was noted as an occasional complication. The course was short and uniformly favourable.

Benign lymphocytic meningitis was first clearly described by Wallgren (1925) under the title "acute aseptic meningitis." The principal criteria given for the diagnosis were: (1) an acute onset of meningeal symptoms; (2) the absence of any condition known to cause meningeal irritation and of any acute or chronic infection; (3) changes in the cerebrospinal fluid (c.s.f.) characteristic of meningeal irritation, with an increase in the number of cells, especially lymphocytes, but no organisms; (4) a short mild course of the disease, with no complications; (5) the absence in the community of any disease which characteristically involves the central nervous system.

It is at first sight a far cry between these two supposed entities. Both conditions, however, have extended their boundaries beyond their original conception. Thus, benign lymphocytic meningitis has become linked with certain cases of meningo-encephalitis, of encephalitis, of lesions of the cord, and lesions of peripheral nerves. Glandular fever has extended even more widely. It became temporarily almost a blood disease with the recognition of the mononucleosis in 1920. The discovery of the presence in the blood of heterophil antibodies to sheep's red corpuscles, in which the disease is unique, established the existence of one entity without excluding the possibility of more than one virus. Other clinical and pathological manifestations have been added. Eruptions were found to be not infrequent and may be indistinguishable from rubella or may closely simulate many of the exanthemata. The blood-count at the onset may exhibit a well-marked polynucleosis or a leucopenia or be within normal limits. The long obscure febrile types were gradually recognised (though still often overlooked) in which several weeks may pass with constitutional symptoms only before a slight enlargement of lymphatic glands appears, with a late development of mononucleosis and heterophil agglutinins. This severe febrile type was found to be of almost any duration, short or long. This group, in which the characteristic glandular enlargement is slight and easily overlooked and the constitutional symptoms are more prominent, is of special interest for the question with which we are here concerned.

#### REVIEW OF PUBLISHED CASES

Epstein and Dameshek (1931) and Johansen (1931) gave the first clear descriptions of neurological complications in glandular fever. It is not intended to give here a review of all published cases but only to refer to those which illustrate the general picture.

Epstein and Dameshek's patient was a young man aged 19 years. The onset was sudden, with headache, malaise, and nausea. Five days later he had become stuporose and restless. On admission to hospital the temperature was 103° F. The c.s.f. was under pressure and contained 34 cells per c.mm., of which 30 were lymphocytes. In subsequent examinations the cells were all lymphocytes. In four weeks all symptoms had passed and the c.s.f. was normal. So far this is the

\* Glandular fever and infectious mononucleosis are regarded as synonyms.

record of a case of benign lymphocytic meningitis. But it was noted on admission that there was general glandular enlargement and the spleen was palpable. The leucocyte-count was 22,000 per c.mm., with 71% mononuclears.

In this case the ordinary manifestations of glandular fever and those of involvement of the meninges were present together and subsided simultaneously.

Johansen's case was materially similar, but in his patient there was no glandular enlargement.

Sucher and Schwarz's (1936) patient was a girl aged 17 years. The onset was with headache and vomiting. Slight glandular enlargement and a palpable spleen were noted a few days later, and there were ataxia, diplopia, and stiffness of the neck. The symptoms were not severe, no lumbar puncture was performed, and in a fortnight she was convalescent and the glands and spleen had subsided. The highest leucocyte-count was 14,000 per c.mm. (lymphocytes 80%). Ten days later the temperature rose again and some glands were palpable; the leucocyte-count was 9300 per c.mm. (polynuclears 65%). In the next fortnight she passed through stages of convulsions, coma, status epilepticus, left hemiparesis, and right oculomotor paralysis to practically complete recovery. The c.s.f. on more than one examination was under increased pressure and contained more than 100 cells per c.mm., all lymphocytes. Throughout this second period of well-marked neurological symptoms the leucocyte-count remained normal—e.g., 7000 per c.mm. (76% polynuclears).

In this case the characteristic features of glandular fever had appeared and subsided before the severe affection of the nervous system became manifest, during which period the blood-count was normal.

The Paul-Bunnell reaction for heterophil agglutinins was now coming into use and is recorded in all subsequent published cases of neurological manifestations in glandular fever except Gsell's (1937). The reaction has been positive in the blood in all instances except the two cases in sisters, published by Thelander and Shaw (1941). It has never been positive in the c.s.f.

Landes et al. (1941) record the case of a man aged 21 years, whose illness began with severe pains in the calf, lasting twenty-four hours only, followed by headache, vomiting, giddiness, and unsteady gait. He became irritable and lethargic. On admission to hospital on the tenth day he was almost stuporose and speech was difficult to understand. There was no neck-rigidity. The c.s.f. contained a high excess of protein but only 5 cells per c.mm., all lymphocytes. Encephalitis was diagnosed. The leucocyte-count was 11,000 per c.mm. (polynuclears 50%, mononuclears 50%). The pathologist recognised that many types of mononuclear cells were present, and the Paul-Bunnell reaction was positive in a titre of 1:1024. By the twenty-second day the patient had lost all symptoms. On this day glands were felt in the neck and groin for the first time, though previously examined for regularly. On the twenty-fifth day the leucocyte-count was 10,100 per c.mm. (mononuclears 78%).

Landes considers that the diagnosis in this case would have been overlooked had not the pathologist tested for heterophil agglutinins. The neurological manifestations suggesting encephalitis had completely subsided before the glands enlarged.

Thelander and Shaw (1941) admitted a man, aged 22 years, with the diagnosis of meningitis. The symptoms were pyrexia, headache, and neck-rigidity. The c.s.f. on admission contained 630 cells per c.mm. (lymphocytes 70%); on subsequent examinations the cells were nearly all mononuclears. The blood on admission contained 15,000 leucocytes per c.mm. (polynuclears 75%). Glands became palpable for the first time on the thirteenth day. On the sixteenth day the leucocyte-count was 9000 per c.mm. (mononuclears 65%). The Paul-Bunnell reaction was positive on the nineteenth day in 1:160, and on the twenty-ninth day in 1:640. The c.s.f. still contained an excess of cells four months later.

In this case the initial blood-count showed a polynucleosis in spite of the very high lymphocytosis in the c.s.f., and the glands did not enlarge until later.

#### NEUROLOGICAL SYMPTOMS

Various types of cranial- and peripheral-nerve palsies may develop in glandular fever, such as ocular paralysis

(Fledelius 1935), facial paralysis and optic neuritis (Gsell 1937), and serratus-magnus palsy (Richardson 1942, Saksena 1943).

I have personal knowledge of several cases with neurological manifestations of various types in glandular fever which support those cited above without materially adding to them. On these illustrative cases the following observations can be made:

(1) There is great variation in the neurological manifestations. The symptoms are most commonly meningeal but may be meningo-encephalitic or encephalitic, or the cranial and peripheral nerves may be involved, and various localisations may develop in sequence.

(2) The neurological symptoms may develop together with or before or after the usual characteristic features of glandular fever.

(3) The common characteristics of glandular fever tend to be slight, as is usual in its severer forms. The glandular enlargement is usually mild or may be absent.

(4) During the period of neurological symptoms, or at least in the early stages, the blood-count may be normal or a definite polynuclear leucocytosis may be present. (It has long been known that at the onset of the severer types of glandular fever the blood-count may show a high degree of polynuclear leucocytosis or may be normal or leucopenic.)

(5) The morphological character of the mononuclear cells present is of importance.

The next question is how these neurological symptoms in undoubted cases of glandular fever compare with those recorded in benign lymphocytic meningitis. It can, I think, be accepted that changes in the c.s.f. are identical in the two conditions, and that there is no difference in the duration and prognosis.

The following account of the symptoms of benign lymphocytic meningitis is summarised from an editorial in *THE LANCET* (1936). The onset is acute, sometimes preceded by a sore throat. Severe headache is usually the first symptom and is soon followed by other evidence of meningeal irritation or of increased intracranial pressure; stiffness or pain in the neck, back, abdomen, or limbs; vomiting, restlessness, and insomnia. Drowsiness, delirium, and stupor are rare, and convulsions uncommon except in infants. Gross papilloedema, pupillary changes, and cranial-nerve palsies do not often develop. Early pyramidal signs in the arms, trunk, or legs may perhaps be found but are not conspicuous. The prognosis is excellent. Recovery is rapid, and patients can leave their beds in the third or fourth week of the illness.

Viets and Warren (1937) have published the only fatal case of which I am aware. The patient was a man aged 20 years. The onset began with slight headache, followed by attacks of vomiting. On admission to hospital he was mentally clear. There was no paralysis of cranial nerves. The neck was definitely stiff. There was no paralysis of arms or legs. The c.s.f. was under pressure and contained over 300 cells per c.mm. (lymphocytes 98%). The symptoms temporarily improved, but on the thirteenth day he became restless, and he died during a convulsion next day.

The various points of a neurological examination—e.g., the condition of the optic fundi and of the reflexes—have not been referred to, but it is justifiable to say that the published work reveals no differences between the two conditions.

From a study of the available publications and from personal experience I can find no points of difference between the neurological symptoms of benign lymphocytic meningitis and those of glandular fever, or between the changes in the c.s.f. in the two conditions.

#### DIFFERENTIAL DIAGNOSIS

How, then, can benign lymphocytic meningitis and glandular fever be differentiated? One indication would obviously be that, in a case with the symptoms of benign lymphocytic meningitis, the special characteristics of

glandular fever must be looked for carefully, purposely, and repeatedly, in view of the observations recorded above. Only thus can glandular fever as an aetiological factor be excluded. Therefore it is pertinent to inquire how far the published records of cases of benign lymphocytic meningitis give evidence of such examinations. In a search which is not claimed to be exhaustive I have failed to find a single published case in which glandular fever or infectious mononucleosis is even mentioned, much less excluded. Here and there are provoking statements. In the fatal case of Viets and Warren (1937) it is recorded that the white-cell count fell from 17,300 to 8650 per c.mm., but no other information is given. In the first case of Dominic (1937) the leucocyte-count is given as 11,300 per c.mm. (polymorphs 52%, lymphocytes 38%, Türk cells 10%); this might have been the early stage of a mononucleosis.

So far as this literature is concerned, every published case of benign lymphocytic meningitis may have been glandular fever; there is no evidence to exclude it. Naturally one does not put the claim for the association of the two conditions nearly so high as this. Many viruses may become neurotropic. One may note that the virus of glandular fever is probably not far removed from that of rubella; a point worthy of recollection in view of the recent discoveries of the effects of rubella. Writers on the neurological manifestations of glandular fever have almost invariably called attention to the close resemblance to benign lymphocytic meningitis. Epstein (1935) put the position quite clearly. But it must be recorded that Thelander and Shaw (1941) stated that they had seen many cases of benign lymphocytic meningitis and of encephalitis in children which they were certain were not connected with infectious mononucleosis; the evidence is not given.

It is hoped that in future those who diagnose benign lymphocytic meningitis will take all reasonable steps, in accordance with the principles set out above, to ascertain if glandular fever is the causal factor. Cases in which such examinations and observations have not been made cannot be put forward to support the claim that benign lymphocytic meningitis is an entity. At present there are apparently no others to support this view.

## SUMMARY

The clinical symptoms, course, and prognosis of benign lymphocytic meningitis and of the neurological manifestations of glandular fever are indistinguishable.

The changes in the c.s.f. are identical in the two conditions.

In glandular fever with neurological manifestations the glandular enlargement is usually slight. This feature, together with mononucleosis and heterophil agglutinins, may only develop after the neurological symptoms have subsided, or may precede the nervous stage.

With the presence of such neurological symptoms, glandular fever can only be excluded by specific and repeated examinations.

Such examinations do not appear to have been performed in general in cases recorded as benign lymphocytic meningitis, and the possibility of glandular fever as a causal factor has consequently not been excluded.

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## FLUORINE HAZARDS

## WITH SPECIAL REFERENCE TO SOME SOCIAL CONSEQUENCES OF INDUSTRIAL PROCESSES

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IN this country the relation of certain industrial developments to human ecology is not as yet sufficiently appreciated. While it is a part of their function to ensure that the laws relating to the health of workers and public amenities are not infringed, it is not a special duty of Government departments to anticipate new industrial hazards or their secondary social effects.

An outbreak of fluorosis in cattle has once more drawn attention to the large amount of fluorine and fluorine compounds being set free by some recently extended industrial processes and has shown the necessity for consideration of the dangers to public health and to agricultural economy existing in the neighbourhood of these undertakings. At least 28 occupations provide the possibility of such dangers (Sappington 1943). In one industry alone, the manufacture of superphosphate fertilisers, more than 4400 tons of fluorine are "wastefully emptied" into the atmosphere of the British Isles annually (Gill 1946), though methods are known for the control, and in some cases for the further utilisation, of the fluorine liberated. Hazards associated with such fluorine evolution concern not only workers inside the factories but also their families living in the neighbourhood and others resident or employed in the area. They may also have economic consequences through damage to crops and animal stock.

Fluorine is derived from certain volcanic rocks and many different geological formations containing phosphates. Commercially, the main English source of fluorine is fluor-spar (calcium fluoride), but for the special purposes of aluminium manufacture cryolite (sodium aluminium fluoride) is imported from Greenland. In human nutrition fluorine is recognised as having a dual rôle, probably beneficial at one level of intake and definitely harmful at another. As a trace-element, the concentration at which fluorine is effective suggests a catalytic effect and/or an inhibitor action on certain enzyme systems. Epidemiological investigation in the United States, combined with standardised grading of dental fluorosis (mottled enamel), showed less dental caries and more teeth of good structure, with a "mild" degree of white mottling (Dean 1944) among people who had used drinking-water containing fluorine 0.5-1.0 part per million (p.p.m.) for at least the first eight years of life. With higher fluorine levels, staining of the enamel and skeletal changes may develop. In human balance experiments the close correlation between fluorine in the drinking-water and in the urine indicate that elimination of absorbed fluorine is practically complete when the quantity absorbed does not exceed 5 mg. daily (McClure et al. 1945). The provision of the right amount of fluorine in British water-supplies is a matter worthy of further study (Murray and Wilson 1945). Naturally occurring or endemic fluorosis, attributable to water-supplies, and "man-made" fluorosis, due to industrial processes, should be separately considered, though some of their effects may be the same.

In fluorine intoxication the effective poisons are the gaseous fluorine compounds or the fluorine ion; and, whenever fluorine tolerance levels are exceeded, systemic illness and bone abnormalities may develop. Fluorine can affect bone at all ages, leading in man to osteosclerosis, whereas tooth structure can only be influenced during

development. Gastric derangement is an early diagnostic symptom, and respiratory embarrassment is not uncommon. More precise information on the degree and effects of exposure is obtained by chemical determination of the range of excretion in the urine and, at a later date, by radiological examination of bone. The severity of fluorotic lesions is influenced by the customary diet and bears a definite relation to the economic status of a community (Pandit et al. 1940). Spinal deformity in later life may result from progressive degeneration of malformations laid down in youth; even where fluorine absorption has been excessive, bone symptoms may not be appreciated for some considerable time (Kemp 1946).

#### EXAMPLES OF FLUOROSIS RECOGNISED IN THIS COUNTRY

*Acute Accidental Effects.*—(1) Consumption of an insect powder containing sodium fluoride by a farmer's wife (Bell 1936).

(2) Gastric upset, among Nottingham workgirls, from fluorine introduced into cake with a baking-powder prepared from rock phosphate (*Lancet* 1943).

The interdepartmental committee on food standards of the Ministry of Food have now under consideration maximal limits for the fluorine content of calcium acid phosphate sold for use in food (*Analyst* 1946).

*Chronic Absorption.*—(1) Fluorosis due to drinking-water:

Radiological investigations were carried out on Essex children from Maldon, where mottled enamel in Britain was first recognised (Ainsworth 1933). The domestic water has been shown to contain over 3.5 p.p.m. of fluorine, and severe dental fluorosis has been demonstrated and was associated with developmental disturbances of ossification (Kemp et al. 1942).

(2) Fluorosis as an industrial disease, from the known use of fluorine:

(a) From *fluor-spar*: Wilkie (1940) recognised osteosclerosis radiologically in two Yorkshire workmen occupied in the manufacture of hydrofluoric acid and of aluminium fluoride. Subsequent analyses showed that their daily urinary output was at least four times that of normal controls.

(b) From *cryolite* used as a flux in the manufacture of aluminium: the fluorine output of one aluminium factory was studied by the industrial medical research unit under Dr. Donald Hunter (1946). It found that these works handled some 800 tons of cryolite a year, much of which was lost to the atmosphere and settled in particulate form on the surrounding fields, in which grazing sheep and cows developed fluorosis. Inside the factory skeletal fluorosis was demonstrated in 28 out of 264 furnace-men examined, none of whom complained of disability.

(3) "Neighbourhood" fluorosis:

(a) From a known source of atmospheric contamination (cryolite): Boddie (1945) recognised fluorosis in sheep on pastures contaminated by the fumes of an aluminium factory  $1\frac{1}{4}$  miles distant. Alveolar periostitis not only made it impossible for the sheep to chew their food properly but also led to infection of the sinuses of the skull and to obvious purulent nasal discharge.

In the same part of Inverness-shire we found that the local water-supply had a very low fluorine content (0.2 p.p.m.), but we observed "moderate" dental fluorosis in the milk-teeth of young children whose homes lay within the district contaminated by vapours from the factory chimneys.

Such a condition in the temporary dentition is usually associated with a high maternal intake of fluorine. Children using the same water, whose homes lay outside the affected area, did not show mottled enamel.

(b) From the unsuspected evolution of fluorine from a marine clay used for brickmaking: agriculturists exposed to the fumes of Bedfordshire brick-works (Wilson 1939) complained of respiratory distress.

Bosworth et al. (1941) and Blakemore (1942) studied the onset and prevention of fluorosis among animals in the same neighbourhood. The origin of the fluorine was traced to the local clay used in the brick-factory, which parted with about a third of its fluorine content (550 p.p.m.) at the higher temperatures, above 900° C, of the kiln. Condensed in the fumes to an oily mist by association with volatile products from the organic

matter in the clay, fluorine drifted down from the chimneys, contaminating surrounding pastures to a distance of about a mile on the leeward side. Fluorine values up to 90 p.p.m. were shown by hay and grass.

Farm animals differed in susceptibility, lactating cattle being the most vulnerable. Cows had such acute osteodystrophy that they sometimes knelt to eat. Values for fluorine in urine often exceeded 20 times the normal figure.

Control observations on cattle in the neighbourhood of south-east Lancashire brick-works using clay deposits of non-marine origin gave negative results.

On a recent visit to the Bedfordshire area we learnt that fluorine hazards to grazing animals had been temporarily met by the "ploughing-up" campaign of the war agricultural emergency committee.

(c) From coals as a possible hazard: Crossley (1944) investigated the amounts of fluorine in British coals of all types, anthracite and bituminous. He determined by micro-analysis that their fluorine content ranged from 0–175 p.p.m., and concluded that coals containing over 85 p.p.m. of fluorine were potentially harmful in industry.

In beer manufacture with the direct type of kiln all the fluorine in malting coals passes on to the malt; in their present dilute state British beers contain only 0.4–1.0 p.p.m. of fluorine, but considerably more fluorine is present in the "culm" (lees) used as a cattle food.

In coal-mines there is intimate association of the fluorine-containing phosphates with the shales of roof and floor, which take part in the formation of dust at the coal-face. It was suggested (International Labour Office 1940) that pulmonary changes took place from the inhalation of dust containing both silica and fluorine.

Fluorine is present in the water from some mines and in the domestic supplies of many mining communities (Kemp and Wilson 1946). Fluorine in coals increased the hazards of fluorosis during the local calcination of ironstone (see below).

(d) From ironstone calcination: Green (1946) identified the cause of lameness and cachexia in some Lincolnshire cattle as an effect of the local burning of ironstone.

The urine of four affected animals contained from 5–13 times the normal amount of fluorine, urinary values of 26–69 p.p.m. being encountered.

Fluorine in the bones was much increased, values from 10,000 p.p.m. in the ash of ribs to 15,000 p.p.m. in the ash of femur and vertebrae being shown as compared with 500 p.p.m. in normal bone ash from cattle in other areas.

Water in the cattle drinking-trough did not contain more than 0.5 p.p.m. of fluorine.

The ironstone contained about 1200 p.p.m. of fluorine, which came down to about 300 p.p.m. on calcining with coal-slack in heaps on the fields.

The coal contained over 100 p.p.m. of fluorine and was therefore another source of contamination. The smoke drifted on to the surrounding vegetation. Near the calcining mounds grass showed very high values, up to 2200 p.p.m.; and more distant stacks, adjacent to the farmhouse, 68–487 p.p.m. of fluorine. Members of the farmer's household showed a raised excretion of fluorine in their urine.

We have studied the ultimate and contributory causes and present manifestations of this particular outbreak of fluorosis, as it affects the public generally.

#### FARMER X'S HOMESTEAD

Details of Farmer X's family and associated workers are summarised in the accompanying table.

*Environmental Factors.*—Ironstone workings in south Lincolnshire lie in an agricultural district of low hills and wide valleys. Mounds formed by the rocky overburden of the mining pits stand out from the cultivated land, which is both arable and pasture. Some farms are isolated, but many agricultural workers live near small villages. The ironstone industry is of considerable antiquity, but since 1939, owing to war-time requirements, workings have been extended very considerably. About 25–30% of iron is obtained from this rock, which compares favourably with many imported samples. Mining pits are in the form of long trenches 8–40 ft. in depth; land has only been levelled for return to agriculture when ore is extracted from near the surface.

Whether the ore is conveyed direct to central blast furnaces or first calcined, so that hygroscopic moisture



and other volatile components are driven off, depends on the type of ore and the cost of transport. In this area the ore is mixed, in the field where it is mined, with coal cobbles and slack and "burnt"—i.e., dehydrated—and the resulting cloud of smoke, containing fluorine compounds, drifts over the countryside. The direction of the prevailing wind in this area is shown by deterioration in the growth of field crops in the immediate vicinity of the smoke. Wheat and barley embryos do not mature, and it is customary for farmers to obtain compensation from the mine-owners, based on the difference between the expected and actual grain yield. At the height of calcining the density of fumes may even make driving on neighbouring roads difficult. In one instance a local practitioner, summoned to an accident in daylight, was unable to see where his patient lay.

Farmer X's home, a small brick house with numerous outbuildings, is situated in the midst of his fields, so that "one fence surrounds them all." In this he differs from the owners of the neighbouring fields near the ironstone burning dumps ("cally heaps"), who live elsewhere. A well on his land supplies Farmer X's house; the water, examined twice, has contained 0.4 and 0.6 p.p.m. of fluorine; the higher figure, obtained in wet weather, suggests the possibility of surface percolation of fluorine or its compounds.

*Domestic and Habitual Factors Increasing the Hazard.*—The house is poorly constructed, and the windows do not fit. All the family suffer when fumes drift over the farm. Food in the larder is exposed to these fumes and is

covered with red dust when the calcined ore is loaded for dispatch. Farmer X's daughter (case 3) complained that she could not clean the glass on the windows facing the fumes. Subsequent examination by an expert of a piece of window glass from the bedroom of Farmer X's mother (case 8, with a high excretion of fluorine) has confirmed that the changes on the surface of the glass can be explained as due to the action of hydrogen fluoride.

*Occupational and Economic Factors.*—During the past six years, since ironstone burning has been carried on more continuously and nearer to the farm, 7 horses and 11 cows have died; young cattle and sheep have been under weight; the sheep also have been lame and had nasal discharge; and much poultry has been lost. But for the war-time increase in agricultural prices the farm would have been abandoned. Farmer X (case 1) has also been very worried about his own health and that of his family. A young labourer (case 9), who chose agriculture instead of military duty and was "directed" to this farm, says he would really enjoy his work but for stomach pain.

*Nutritional Factors.*—Family X has experienced no shortage of milk or pork; pieces of home-cured bacon can be seen hanging up in the kitchen. Their vegetables, grown round the farm, are of poor quality. Surface contamination of food with fluorine compounds may explain the raised fluorine levels in these people's urines.

*Educational Factors.*—Until the recent investigation of cattle fluorosis, the significance of fluorine in this area had not been appreciated. Farmer X was convinced

FARMER X'S HOUSEHOLD

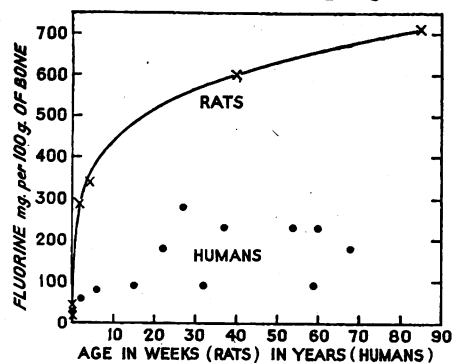
Case no.	Description	Age (yr.)	Occupation	Length of residence at farm (yr.)	Previous residence	Degree of dental fluorosis	Symptoms	Urine analysis* (Dr. H. H. Green), fluorine p.p.m. corrected to sp. gr. 1.015	Remarks	Radiological examination
1	Farmer X	38	Farmer	14	Leics	Moderate	Frequent cough, pain in right shoulder, blurred vision unrelieved by glasses, pain over head	2.9	Youngest child of cases 1 and 2 died at 2 months of bronchitis in April, 1941	Slight arthritis of right acromioclavicular joint; no lesion seen in chest
2	Wife of X	41	Housewife	14	Leics, born Notts	(Edentulous)	Loss of appetite and of weight; recent pneumonia; stiffness of left elbow	2.3	..	Old calcified tuberculous lesion in right upper lung; no lesion seen in left elbow
3	Daughter of cases 1 and 2	15	Housework	14	Leics	Moderate	Stiffness in both knees and calves, worse in winter	1.6	Has winged scapula and a "Rossetti" neck	No lesions seen in chest or knees
4	Son of cases 1 and 2	13	At school, farmwork in holidays	13	..	Moderate	Left leg aches when he runs	4.2	Sleeps facing fumes; window glass etched	No lesions seen in chest or left leg
5	Son of cases 1 and 2	9	Schoolboy	9	..	Mild	Frequent catarrh and cough	Not examined	Sleeps with case 4	Slightly increased markings in chest
6	Son of cases 1 and 2	3	At home	3	..	Moderate in milk-teeth	Pain in knees, legs, and ankles; two attacks pneumonia; continuous bronchial catarrh	2.0	..	No lesions seen in knees, ankles, or chest
7	Father of case 1	78	Shepherd	14	Leics	(Edentulous)	Bronchial catarrh; pain in stomach	Not examined	Sleeps with case 8	No definite lesions seen in chest
8	Mother of case 1	80	Housewife	14	Leics, born Rutland	(Edentulous)	Pain in back and right knee	4.1	Sleeps in room facing fumes; window glass etched	No change in bones of thoracic cage; bones show some increased markings, particularly basal, compatible with congestive change
9	Directed "worker"	18	Agri-cultural labourer	1	London, S.E.†	Moderate	Gastric upsets	..	..	No lesion seen in chest

\* The "corrected values" here take an average normal sp. gr. as 1.015 for the human subject and facilitate comparison of individuals irrespective of water output. An average fluorine figure for human urine on city dietaries may be taken as anything up to 0.5 p.p.m., so long as the water-supply does not itself exceed this figure. When it does, the urine figures tend to approximate to the higher water-values (McClure and Kinser 1944). The domestic water used by this household contained 0.6 p.p.m.

† For fluorine figures in various sources of London's water-supply, see Metropolitan Water Board (1936); Murray and Wilson (1945).

that both his family and his stock suffered from the ironstone fumes and had sought all possible local diagnostic aid since 1940, but it was only the identification in 1946 of the fluorosis in cattle which provided the clue to the lesser symptoms in the human subjects.

**Control Observations.**—At a farm adjacent to ironstone pits from which the ore was sent direct to blast furnaces without local calcining there was no sign or history of illness in either the members of the household or in their farm stock. Their domestic water contained 0.35 p.p.m. of fluorine in wet weather. Fluorine in small quantity is to be expected in the local springs deriving their water



Increase in fluorine content of bones of rats fed 5-7.5 mg. of sodium fluoride a day, and fluorine content of fat-free dried rib bones of persons of different ages resident in London for most of their lives.

to fluorine was obtained from workmen employed for over fifteen years.

#### DISCUSSION

The absorption of the products of fluorine combustion by the affected cattle consuming heavily contaminated hay and grass was obviously more intense than by Farmer X's family who presumably consumed only small quantities of contaminated foods. The human clinical symptoms are, however, in line with those recorded in chronic endemic fluorosis among people using waters with a raised fluorine content: Argentine (Roholm 1937); China (Lyth 1946); South India (Shortt et al. 1937); North India (Wilson 1939, Khan and Wig 1945); South Africa (Ockerse 1941); United States (Linsman and McMurray 1943).

Judging from the experience of these countries, it was unlikely that skeletal changes resulting from the absorption of fluorine would be appreciable radiologically within the period, about six years, in which Farmer X's household has been exposed to the effects of the intensive ironstone calcination; there is, however, abundant human evidence from other parts of the world that fluorine intake above tolerance levels over a sufficient period (as shown by raised excretion of fluorine) can lead to cumulative absorption and prove harmful to the human organism.

That fluorine must be regarded as a cumulative poison is well established by chemical and experimental observations. The bones of Danish cryolite factory workers contained about ten times that of average persons, the highest fluorine content being found in the worker with longest exposure; osteosclerosis resulted from the daily retention of about 25 mg. of fluorine (Roholm 1937, Brun et al. 1941). Animals given small amounts of sodium fluoride in the diet showed an increasing fluorine content of their bones (Glock et al. 1941). The accompanying figure shows the increase in fluorine content of the bones of rats fed 7-10 mg. of fluorine a day. A series of estimations of the fluorine content of the fat-free dried rib bones of persons of different ages resident in London for most of their lives is given in the same figure; these also show, on the whole, an increase in fluorine content with age.

Etching of window glass in houses facing industrial fumes should lead to inquiry for possible clinical evidence of fluorine absorption. Recently fluorosis was recognised in cattle grazing in the neighbourhood of a Shropshire colour and enamel factory. Fluorine values in the urine of the affected cattle ranged from 19-37 p.p.m. Water in the animals' drinking-trough did not contain more than 0.6 p.p.m. of fluorine, but there was severe contamination of pasture, samples of air-dried material showing 776-115 p.p.m. of fluorine at distances of 30-600 yards from the factory. During the winter these cattle had been fed on hay cut from another farm, and their exposure to fluorine was mainly at grass in summer; their skeletal lesions were not so pronounced as those of cattle near the brick-works and ironstone dumps (see above); but after three or four years' exposure their molar teeth were worn down to the gums, and the permanent incisors were distorted and misshapen. In the windows of an adjacent farmhouse etching of the glass by the fumes was reported; it was sufficiently severe to necessitate window-glass replacement by the family every two or three years. Human fluorine hazards in this neighbourhood had not yet received attention.

#### SUMMARY

Fluorine hazards, actual or potential, in this country have been described.

An example has been studied of some important secondary consequences for dwellers in the neighbourhood of certain industrial undertakings.

It is a practical proposition to extract fluorine from fumes before allowing them to pass into the atmosphere. This is already the practice of some firms. In the example studied the substitution of closed kilns in the burning of ironstone would make the amount of fluorine present in the ore and coal immaterial from the public health point of view, but methods for such fluorine control are at present too rarely applied in this country, because fluorine hazards are not sufficiently appreciated.

An investigation to ascertain the nature and location of all industrial processes creating a possible fluorine hazard seems to be desirable.

The need for a better intelligence service and coördinating mechanism to ensure collaboration between Government departments, industries, local authorities, and research workers is also apparent.

We wish to thank Dr. H. H. Green, of the Ministry of Agriculture's veterinary laboratory, Weybridge, for supplying much information and for his help in many different ways; our colleague, Dr. F. H. Kemp, for reporting on the radiological examinations of Farmer X's household, to whom access was very kindly given by their family doctor and the county health authorities concerned; Mr. C. N. Bromehead, of the geological survey, for providing data throughout this inquiry; and Mr. A. C. Pilkington for his examination of glass. We also wish to thank the Medical Research Council for an expenses grant.

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## RELAPSING BENIGN TERTIAN MALARIA TREATED WITH PALUDRINE

R. D. C. JOHNSTONE  
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TRIALS with 'Paludrine' in benign tertian (B.T.) malaria were carried out under the direction of the War Office and the malaria committee of the Medical Research Council at Colchester Military Hospital, beginning in July, 1945.

The following three different courses of treatment were used, each being given in strict rotation:

- (1) Paludrine 0.05 g. daily for ten days.
- (2) Paludrine 0.5 g. daily for ten days.
- (3) Quinine gr. 30, pamaquin 0.03 g. daily for ten days.

Patients were carefully selected; for example, those who had been given any treatment before admission to hospital were excluded. In every case there was a previous history of malaria, the vast majority having been proved by blood slide. Between July, 1945, and March, 1946, 324 cases, 108 of each series, were treated.

Blood slides, thick and thin, were taken when the patients arrived in the ward, and in the event of these showing *Plasmodium vivax*, and provided the cases were in other ways suitable, treatment was begun next morning. Above each bed was hung a specially prepared coloured chart on which the nurse responsible entered and signed for each dose of drug given. Every precaution was therefore taken to guard against possible errors in treatment. Each patient was allotted a serial number, and full particulars were entered on a special form devised by the malaria committee. In view of the difficulty of tracing patients after leaving hospital, these particulars included the patient's unit regiment, home address, and "age and service group." This was well rewarded in the final follow-up.

The drugs were given in divided doses, the paludrine twice a day, the quinine-pamaquin three times daily after food; none of the paludrine cases showed any digestive symptoms.

Patients were confined to bed until they had been afebrile for forty-eight hours, a temperature of over 99° F being considered pyrexial. After the patients had been allowed out of bed, their activities were in no way restricted; and, apart from ensuring an adequate fluid intake, no special precautions were taken throughout the stay in hospital.

Blood films were examined on the eighth, ninth, and tenth days of treatment in the first 240 cases; but, owing to shortage of laboratory staff, this was later discontinued. The results of these investigations showed all except one patient to be negative for asexual parasites. This one patient was being treated on the quinine-pamaquin course, and on the ninth day of treatment scanty B.T. rings were seen. Subsequent follow-up showed that this patient was free from relapse after six months.

Patients were normally discharged from hospital on the day following completion of treatment, when they

were given two prepaid postcards for return to me. On these was printed a form asking for details in the event of a relapse. Each patient was also asked, in the event of no relapse, to return the first card after three months and the second after six months. Less than 20% of the patients used the cards for the purpose for which they were intended.

### RESULTS OF TREATMENT

*Immediate.*—There was a rapid response to all forms of treatment, and little difference in results was seen in the three series. The number of days of pyrexia were as follows:

Course	Average no. of days of pyrexia after start of treatment
Paludrine (0.05 g.) .. .. .	1.49
Paludrine (0.5 g.) .. .. .	1.47
Quinine-pamaquin .. .. .	0.98

*Remote.*—Six months after discharge from hospital each patient was sent a standard form asking for information regarding further relapses. If this report indicated a clinical relapse, a second questionnaire, about rigors, periodicity of symptoms, duration, and treatment, was sent. From this information the cases were divided into proved relapses, clinical relapses, and no relapses. As the investigations progressed, an increasing number of patients fell into the doubtful category, owing to many of them being demobilised and therefore no longer entitled to treatment in a military hospital.

The response to follow-up was remarkably good, and many patients replied at the first request. Just over 450 letters were required to trace the 324 cases. Every patient in the series has been followed up, and only one has been excluded from the final analysis (table 1). This patient had a further attack of B.T. malaria in Cairo, where it was considered he might have been reinfected.

TABLE 1—REMOTE RESULTS OF TREATMENT

Course	No. of cases	Free from re-relapses	One proved relapse	Two or more proved re-relapses	Clinical relapse	% relapsed	
						All cases	Proved cases
Paludrine (0.05 g.)	108	62	26	7	13	42.6	30.5
Paludrine (0.5 g.)	107	60	23	2	22	43.9	23.3
Quinine-pamaquin	108	91	9	1	7	15.6	9.2

The standard quinine-pamaquin treatment has been used as a control in this investigation. The results obtained here may therefore be compared with previous findings, which show relapse-rates of 10.3% proved cases,<sup>1</sup> 11.3% proved cases, and 16.5% total relapses.<sup>2</sup> There is therefore no significant difference in the quinine-pamaquin results, and those obtained with paludrine may be reasonably concluded to be equally accurate.

### FACTORS POSSIBLY INFLUENCING RELAPSE-RATE

*Captivity.*—Of the total series, 89 cases (27.4%) were patients who had been prisoners-of-war in the Far East. Since the relapse-rate of these might be expected to differ from the normal cases, owing to most of them having had very inadequate treatment and very frequent attacks while prisoners, they have been analysed separately (table II). The relapse-rate is higher than in the other cases; but, since the distribution of prisoner-of-war cases shows almost equal division between the total paludrine and quinine-pamaquin series, it is justifiable

1. Malaria Committee of Medical Research Council, report M.L.E. 30, 1945.
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TABLE II—RELAPSE-RATE AMONG PRISONERS-OF-WAR AND OTHERS

Course	Total	Free from relapse	Proved relapses	Clinical relapses	% relapsed	
					All cases	Proved cases
<i>Far East prisoners-of-war</i>						
Paludrine (0.05 g.)	25	12	8	5	52.0	32.0
Paludrine (0.5 g.)	35	13	8	14	62.8	22.8
Quinine-pamaquin	29	20	5	4	31.0	17.2
<i>Other cases</i>						
Paludrine (0.05 g.)	83	50	25	8	39.7	30.1
Paludrine (0.5 g.)	72	47	17	8	34.7	23.6
Quinine-pamaquin	79	71	5	3	10.1	6.3

to include them in the totals provided it is realised that the total relapse-rate is thereby increased.

*Return to England.*—As relapses are more definite and more likely during the first few months after return to England, the time interval between arrival in U.K. and admission to hospital has been compared in the different series :

Course	Average months in U.K.	Maximum
Paludrine (0.05 g.) ..	3.26	11 months
Paludrine (0.5 g.) ..	3.31	1 year
Quinine-pamaquin ..	3.13	9 months

There is no bias in favour of any of the three treatments.

*Probable Area of Infection.*—Since different strains of *P. vivax* may possibly cause relapses at different intervals, the probable area of infection has been compared :

Course	India-Burma	Mediterranean area	Far East	Others
Paludrine (average for both courses) ..	65.5	10.5	30	1.5
Quinine-pamaquin ..	64	14	29	1

The probable area of infection does not seem to have influenced the relapse-rate in the different series.

#### INTERVALS BETWEEN RELAPSES

The interval between treatment and proved relapse has been assessed as follows :

Course	Average no. of days between treatment and proved relapse
Paludrine (0.05 g.) ..	65.1
Paludrine (0.5 g.) ..	53.0
Quinine-pamaquin ..	43.7

These findings are open to much criticism, as there is no doubt that some patients took occasional and inadequate doses of mepacrine after leaving hospital, though they were advised not to do so. As a result, it is probable that the relapse period in these cases was prolonged.

#### SUMMARY

Paludrine has been used in the treatment of 216 cases of relapsing B.T. malaria, while 108 control cases have received the standard quinine-pamaquin treatment.

A six-month follow-up has been obtained in all these cases, and the results show a relapse-rate associated with both dosages of paludrine over double that associated with quinine-pamaquin.

No appreciable difference has been noted between the results of small or large doses of paludrine.

This investigation does not include all the relapses, because the period does not cover sufficient time after treatment, it being generally agreed that a second but small peak of relapses is to be expected in the 250-300 day period. Thus one case treated on paludrine (0.5 g.) is

here given as "no relapse," having had his first relapse 240 days after leaving hospital.

Quinine-pamaquin treatment probably causes the temperature to fall to normal slightly quicker than does paludrine.

There is a suggestion that paludrine given in a ten-day course causes a longer period of freedom from relapse than does quinine-pamaquin, in spite of the high relapse-rate.

Paludrine given in a ten-day course is effective in treating acute attacks of B.T. malaria but in no way compares with the standard quinine-pamaquin treatment in controlling further relapses.

I wish to thank Major-General Sir Alexander Biggam, consulting physician to the Army, for permission to publish this paper; and many members of the staff of the Colchester Military Hospital, especially the nursing sisters and V.A.D. nurses, for their help. I am also indebted to Imperial Chemical (Pharmaceuticals) Ltd. for supplies of paludrine.

## MYELITIS AFTER ANTIRABIC VACCINE

REPORT OF A FATAL CASE

L. J. BUSSELL

B.M. Oxfrd

LATE MAJOR R.A.M.C.

THE pathogenesis of paralyzes following treatment with antirabic vaccine is not yet understood. In the case reported here a necropsy was done.

#### CASE-RECORD

*Clinical.*—A Sudanese soldier, aged 25, was bitten on the left hand and right ankle by a stray dog on Sept. 3, 1944. It is not known whether the dog was rabid or not.

Treatment with antirabic vaccine was started immediately. A killed carbolised vaccine was used, made from sheep's brain according to the method of Semple, a 2% emulsion being used. Injections were given subcutaneously into the abdominal wall in daily doses of 5 c.cm. each. Between Sept. 3 and Sept. 10 seven daily injections were given.

The patient then defaulted and next came under medical care on Oct. 31, when he said that the dog was mad, and it was decided to give him a further complete course of antirabic vaccine. Between Oct. 31 and Nov. 14 he was given thirteen daily injections as before. Treatment was then stopped. On Nov. 18, four days after his last injection, he complained of pain and twitching in his left upper arm and shoulder. He was immediately sent into hospital.

On examination there was fibrillary twitching in the muscles of his left upper arm and shoulder girdle. Temperature was 102° F, and a blood-count showed white cells 9600 (polymorphs 45%, lymphocytes 44%, mononuclears 9%, eosinophils 2%). His condition remained unchanged until Nov. 20, when it was found that he could not dorsiflex his left wrist.

On Nov. 21 neck rigidity and head-retraction developed, and there was complete flaccid paralysis of his left arm. Kernig's sign was positive. Temperature 99.2° F, pulse-rate 140 per minute, respirations 40 per minute. Nothing abnormal found in chest and abdomen. The white-cell count was 6400 per c.mm. (polymorphs 52%, lymphocytes 42%, mononuclears 4%, eosinophils 2%). Lumbar puncture was attempted but failed owing to the difficulty in flexing his back.

On Nov. 22, the day of his death, he presented a picture of acute distress. Temperature 100° F, pulse-rate 130 per minute, respirations 45 per minute. Head-retraction present. The fibrillary twitching had ceased in his left paralysed arm but was seen in his right arm and in the chest and abdominal muscles of both sides. He had violent uncontrollable spasms of the occipitofrontalis muscle and the muscles of the right upper lip, and had repeated attacks of retching. A profuse mucoid discharge came from his mouth and nose. His mental processes were unimpaired. He spoke intelligently and complained of pain in the left clavicular region but could not articulate properly and had difficulty in swallowing.

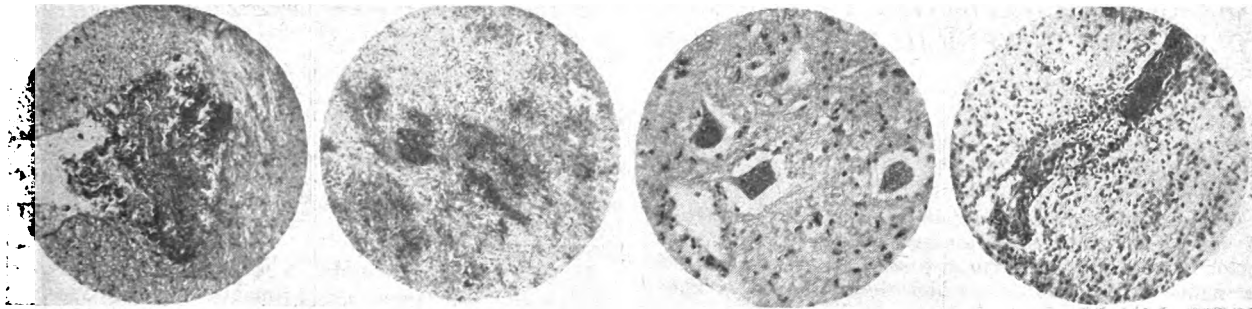


Fig. 1—Anterior sulcus of cervical cord showing an inflammatory focus of lymphocytes and erythrocytes. (Low power, Mann's stain.)

Fig. 2—Left anterior horn of cervical cord showing patches of hæmorrhage. (Low power, Mann's stain.)

Fig. 3—Degenerating nerve-cells showing destruction of their nuclei—left anterior horn of cervical cord. (Mann's stain.)

Fig. 4—Left anterior horn of cervical cord showing perivascular cuffing with lymphocytes. (High power, Mann's stain.)

Lumbar puncture was achieved under light 'Pentothal' anaesthesia. Pressure was normal, and there was no spinal block. The fluid showed a slight haze, made more evident on shaking the test-tube, but it cleared on standing. The cell count was 120 per c.m.m., with a preponderance of lymphocytes. The fluid was centrifuged, and a smear stained by Gram's method showed no organisms. The patient recovered consciousness but died in his sleep six hours after the lumbar puncture.

**Necropsy.**—No naked-eye changes were observed in the brain, spinal cord, or meninges, and nothing of note was found in the other organs.

The brain was removed and put into formalin without opening. Sections were taken from the cerebral cortex, the cornu Ammonis, and the cervical cord. They were stained with hæmatoxylin and eosin and by the method of Mann for negri bodies. They were examined by Prof. Vittorio Cilli at the Vaccine Institute, Asmara, a summary of whose report follows:—

"No negri bodies were found in the cornu Ammonis. Apart from a little vascular congestion the brain appears normal. The pia mater in the anterior sulcus of the cervical cord is acutely congested and infiltrated with lymphocytes and erythrocytes (fig. 1). This process extends into the periphery of the cord along the pial vessels.

"The grey matter of the left anterior horn of the cervical cord shows a large hæmorrhagic area speckled with foci of lymphocytes (fig. 2). This area extends into the corresponding posterior horn and into the adjoining right anterior horn. Some of the ganglion cells in this area are degenerate or destroyed (fig. 3). The changes vary from simple wrinkling of the nuclear membrane to karyorrhexis and karyolysis. The cells most affected are those of the left anterior horns. The cytoplasm of the affected cells shows corresponding regressive changes, the tigroid substance in many cells being reduced or absent. No intranuclear inclusion bodies were seen.

"There is infiltration with lymphocytes and erythrocytes in the lateral columns of the left side of the cervical cord. In other parts of the white matter perivascular cuffing with lymphocytes (fig. 4) and erythrocytes was seen.

"The picture is one of acute hæmorrhagic lymphocytic myelitis with spinal leptomeningitis."

Some brain substance was removed from the centre of the brain twelve hours after necropsy and emulsified with normal saline. Two rabbits were each injected subdurally with 0.15 c.cm. of the brain emulsion obtained. Both were reported to be alive and well two months later.

#### DISCUSSION

At different stages of the illness described, diagnoses of meningitis, acute anterior poliomyelitis, and rabies were considered. These possibilities were discarded in turn, and a diagnosis was made of myelitis due to antirabic vaccine, terminating in a bulbar palsy.

Paralyses from this cause are not uncommonly reported, but in most cases the paralysis is transient and recovery the rule.<sup>1</sup> The explanations put forward

fall into two main groups, either a virus or a toxin being held responsible. In cases where living attenuated rabies vaccine has been used—the group in which paralyses most often ensue—the rabies virus in the vaccine is naturally incriminated. In other cases the rabies virus inoculated by the rabid animal in its bite may cause the paralysis, the full picture of rabies being masked by the protective action of the vaccine.<sup>1</sup> Other and more speculative viruses have also been postulated—for instance, a neurotropic virus in the animal brain substance used in making the vaccine, and a dormant potentially neurotropic virus already present in the tissues of the host.

The toxin theory supposes that the heterologous brain substance in the vaccine is toxic to the central nervous system of the host. This may be a direct cytotoxic action or anaphylactic, the patient becoming sensitised by repeated injections.

In the present case it is impossible to say which of these factors was operating. The lack of inclusion bodies in the patient's brain or spinal cord and the negative result of the rabbit inoculations might be held against a virus but do not exclude it. The time of onset of the symptoms, four days after the last injection, does not suggest anaphylaxis.

No other accidents have been reported following the use of this batch of vaccine, and subsequent laboratory investigation of the vaccine for toxicity proved negative. It appears therefore that the patient exhibited an abnormal sensitivity to some chemical ingredient of the vaccine.

I am much indebted to Prof. Vittorio Cilli, director of the Vaccine Institute, Asmara, for doing all the pathological work in this case and for taking the photomicrographs. At his request the sections were also examined by Dr. R. Kirk at the Stack Laboratories, Khartoum, who concurred in the findings. Thanks are also expressed to Colonel W. H. Greany, s.m.s., commanding no. 2 S.D.F. base hospital, for permission to publish this case.

"The real division of hospitals at the present time is not between 'voluntary' and 'municipal.' It is between hospitals for the urgent and short-duration patients and hospitals for long-lasting and recurrent illness. . . . From their first sitting the new regional boards should face their responsibilities as a whole. The total hospital demands of the community must be considered together. . . . This is the moment for a change of policy. The needs of invalid children and of the tuberculous are already being met by long-stay hospitals and sanatoria. There remains the immediate task of improvising for the adult and elderly something comparable. . . . A vast programme of construction will be necessary. . . . What is needed more than anything material, however, is an awakening of the whole community to the existence in their midst of a state of affairs often tragic in its melancholy and suffering."

—Sir ERNEST ROCK CARLING in the *Times* (Nov. 25).

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## COLCHICINE INEFFECTIVE IN INDUCING POLYPLOIDY IN *PENICILLIUM NOTATUM*

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Gordon and McKechnie (1945) reported the production of strains of penicillium giving successively increased yields of penicillin after successive treatment with 0.2% colchicine under conditions which they described. They attributed the increased yield of penicillin to polyploidy, assuming that the untreated form was diploid; but they did not count its chromosomes, and it is most probably haploid. The first selection, which they found to give about twice as high a yield as the parent strain, they assumed to be tetraploid. The "tetraploid" was again subjected to colchicine treatment, and a new selection assumed to be "octoploid" was made. Similarly, a further treatment of the supposed "octoploid" gave a new selection assumed to be "sixteenploid."

By the courtesy of Dr. W. W. Gordon, who sent cultures of the strains to our colleague Dr. P. H. Gregory, we have been able to repeat the penicillin-production tests under our conditions. The strains were tested by the surface-culture method, and a culture of the commercial strain N.R.R.L. 1249 B21 was tested at the same time. The medium, a modification of that of Moyer and Coghill (1946), was made up as follows:

Lactose	..	2%
Dextrose	..	2%
Sodium nitrate	..	0.3%
Corn steep liquor	..	10%
Phenyl acetic acid	..	0.05%
Water; pH adjusted to 5.6 with sodium hydroxide.		

The results of the tests are given in table 1. It is clear that none of the strains approaches the yield of 1249 B21; nor did we find the correlation between yield and strain reported by Gordon and McKechnie. In the first test the "4n" strain possibly gave a higher yield than the "2n," and in the second test the "8n" strain possibly gave a higher yield than the untreated strain. The "16n" strain was low in all our tests. However, none of these differences is very striking. The discrepancy between our results and Gordon and McKechnie's may be due to chance. Penicillin yield is a very variable quantity, and the correlation obtained by Gordon and McKechnie between yield and treatment of strain may have been due to chance and may not be reproducible. Alternatively, since penicillium is an unstable fungus, the cultures finally tested by us may have been different in composition from the original cultures tested. Also, there remains the possibility that the treatment has a stimulatory effect which is more or less temporary.

The original results of Gordon and McKechnie seemed to indicate that higher-yielding strains had been obtained, probably by selection from an original mixture of strains; they did not indicate that these strains were polyploid. On the contrary, in view of the work of Richards (1938), Satina (reported by Blakeslee 1939), and others, in which efforts to induce chromosome doubling in fungi with colchicine were unsuccessful, we thought it unlikely that the strains obtained by Gordon and McKechnie were polyploids. A doubling in the yield of a product does not usually accompany the doubling of the chromosome number. Very often polyploidy has no effect on the yield of a particular substance. Sometimes it leads to an increase, but not to the extent of 100%.

It seems improbable, therefore, that Gordon and McKechnie's results are due to polyploidy. There remain three possibilities.

(1) The improved strains may have been selected by chance.

(2) The influence of colchicine or cold or both may have led to a selection of the high-yielding strains. It is a common practice to store cultures in a refrigerator, and so far no strains with increased yields have been reported to result from this treatment. However, in Gordon and McKechnie's experiment, spores were allowed to germinate and grow in the refrigerator, a procedure which might lead to results not obtained by storing mature cultures in a refrigerator.

(3) Colchicine or cold or both might have some stimulating effect, possibly of the nature of a "dauermodifikation," leading to an increased yield of penicillin for some time after the treatment.

In view of these possibilities it was decided to repeat Gordon and McKechnie's experiments on a high-yielding strain, using controls for the colchicine and temperature effects. At the same time efforts were made to determine whether or not polyploids were produced as a result of the colchicine treatment.

### EXPERIMENTAL

The medium used was the modified Czapek-Dox medium used by Gordon and McKechnie. It was made up in double strength as follows:

Sodium nitrate	..	3.0 g.
Magnesium sulphate, 7H <sub>2</sub> O	..	0.25 g.
Zinc sulphate, 7H <sub>2</sub> O	..	0.02 g.
Potassium phosphate	..	0.5 g.
Lactose	..	30.0 g.
Corn steep liquor	..	80.0 ml. made up to 0.5 litre with tap water.

The pH was adjusted to 5 with 10N NaOH.

For the controls the medium was brought to normal strength by the addition of 1 part medium to 1 part distilled water. For the colchicine samples 1 part of the medium was added to 1 part of 0.4% colchicine in distilled water, bringing the strength to 0.2% colchicine. Tubes containing absorbent cotton-wool were prepared and sterilised. To each tube was added 1 ml. of spore suspension containing  $2.9 \times 10^8$  spores of the strain N.R.R.L. 1978B. The spore suspension was prepared from a seven-day culture on glycerol-molasses-peptone-agar. To four tubes 7.5 ml. of the medium was added, and to four other tubes 7.5 ml. of medium and colchicine. Two control tubes and two tubes with colchicine were placed in the incubator at about 24° C, and a similar set in a refrigerator at about 4° C.

After four days the incubator cultures showed considerable growth and spore formation. Subcultures were made on Saboraud's agar. An examination of the spores showed no difference in variability of spore size between the control and colchicine-treated samples. The samples in the refrigerator showed no obvious growth after four days. There was a little thin growth after fourteen

TABLE 1—PENICILLIN PRODUCTION BY GORDON AND MCKECHNIE'S STRAINS COMPARED WITH THE STANDARD PRODUCTION STRAIN 1249 B21

Strain	Day						Av. of 3 highest consecutive days
	7th	8th	9th	10th	11th	12th	
<i>Test 1</i>							
1249 B21 .. ..	61	66	63	54	..	..	63
G. and McK.'s "2n"	19	24	22	13	..	..	21
" "4n"	24	24	38	16	..	..	29
" "8n"	23	26	28	20	..	..	27
" "16n"	9	12	13	13	..	..	13
<i>Test 2</i>							
1249 B21 .. ..	38	42	53	65	62	66	64
G. and McK.'s "2n"	11	17	16	13	9	7	15
" "4n"	5	6	14	12	13	14	13
" "8n"	24	19	23	23	28	21	25
" "16n"	13	11	19	9	12	8	15

days, and subcultures, together with those made from the incubator series, were tested for penicillin production. The results are shown in table II. Differences in yield among the four sets are not significant by the method of assay used. Therefore the treatment did not succeed in producing a strain of 1978B giving a much higher yield of penicillin than the original strain.

#### COLCHICINE TREATMENT AND SPORE SIZE

Since polyploidy has often been found to be associated with an increase in size of the cells and especially of the haploid pollen grains, it was thought that spore size might be a useful criterion in testing for polyploidy, since the spores of penicillium are uninucleate. Moreover, large-spored strains have been produced by camphor treatment (Sansome 1946). Spore size was examined by mounting spores in physiological saline and a detergent and by making camera-lucida drawings at a magnification of about 1100. The spores of all strains sent by Gordon and McKechnie were found to be of the same average size. The average spore length for 10 spores was found to be as follows: "2n" = 3.0  $\mu$ , "4n" = 2.9  $\mu$ , "8n" = 3.1  $\mu$ , "16n" = 3.0  $\mu$ .

It was thought that, if polyploid nuclei were formed in the treated samples, these might well become overgrown by haploid nuclei on mass subculture. Dilution plates were therefore made of spores formed on the original treated cultures. The refrigerator series did not

TABLE II—PENICILLIN PRODUCTION IN STRAINS OF 1978B SUBJECTED TO COLCHICINE TREATMENT AT 4° C AND 24° C AND IN CONTROLS

Strain	Day						Av. of 3 highest consecutive days
	7th	8th	9th	10th	11th	12th	
1249 B21 ... ..	38	42	53	65	62	66	64
1978B Control at 4° C ..	53	45	59	47	37	44	48
Colch. at 4° C ..	31	45	50	53	55	61	56
Control at 24° C ..	53	49	63	52	45	65	54
Colch. at 24° C ..	48	59	70	62	54	66	64

form spores in the refrigerator; so after being at 4° C for three weeks they were put into the laboratory at 55° to 60° F until spores were formed.

After plating, single colonies were examined for spore size. Fifty colonies from the colchicine series in the incubator were examined, and all were found to have spores of the same average size as the control—i.e., a length of about 3.3  $\mu$ .

There is no evidence therefore that colchicine can induce polyploidy in *P. notatum* at temperatures of 24° C or 4° C. This is in accordance with the results of other workers.

#### SUMMARY

Treatment of a high-yielding strain of *P. notatum* (N.R.R.L. 1978B) with colchicine at a normal incubator temperature of 24° C and at a low temperature of 4° C did not significantly affect the yield of penicillin given by the strains.

An examination of spore size in fifty colonies from colchicine-treated cultures did not show any with spores of an increased size, such as might be expected to result from polyploids.

Colchicine is therefore believed to be ineffective in inducing polyploidy in *P. notatum*.

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## Preliminary Communication

### INDUCTION OF GLANDULAR CARCINOMAS OF THE PROSTATE IN THE MOUSE

THE empirical treatment of human prostatic carcinoma by the administration of oestrogens, or by castration, has been found to offer such promise of amelioration in recent years that there is clearly a need for an experimental investigation of the reactions of transplantable prostatic tumours in animals to hormonal and other factors. If it were possible to obtain a prostatic tumour which grows at a more or less constant rate, which is readily transplantable, and at the same time retains the structural characteristics of a glandular carcinoma, much might be done in testing various synthetic oestrogens and related compounds as possible growth inhibitors, as well as in investigating the more fundamental problem of the factors influencing carcinogenesis in the prostate gland.

By repeated examination of serial biopsy specimens of prostatic carcinoma in man, Fergusson<sup>1</sup> has shown that the administration of oestrogens causes regression of the neoplasm in nearly all cases, but in some the response to treatment is variable. He has emphasised the need for confirmatory observations on prostatic cancer in animals.

Attempts have been made, therefore, to induce transplantable prostatic tumours in rodents by using the carcinogen methylcholanthrene. The present paper is confined to a description of the technique, which is similar in essentials to that used by Rous and Smith,<sup>2</sup> and later confirmed by Greene<sup>3</sup>; but with one important difference—namely, that in our hands the technique has been successfully adapted to produce transplantable tumours from adult, not embryonic, tissues. We believe this to be the first instance of the induction of a series of transplantable tumours arising from adult tissue growing as homologous subcutaneous grafts. A brief description of the prostatic tumours which have been induced in mice, and which are being maintained by repeated transplantation, is included.

#### TECHNIQUE

The method of tumour induction consists essentially in isolating a sheet or mass of adult tissue, in this case prostatic epithelium, with a minimum of underlying stroma, which is wrapped round a few crystals of the pure carcinogen, and the whole is then transplanted under the skin of a host animal of the same inbred strain.

The epithelium from either the anterior or dorsal lobes of the prostate of six-month-old mice (Strong A inbred strain) was cut into small strips of approximately equal sizes, using a dissecting microscope. Some crystals of 20-methylcholanthrene were placed in contact with the epithelium, which was rolled up and inserted into a Bashford transplanting needle. The grafts were transplanted into male mice of the same inbred strain, care being taken to maintain the carcinogen in contact with the prostatic epithelium and shielded from contact with the subcutaneous tissues of the host.

In 10<sup>1/2</sup> weeks small primary tumours could be identified growing at a fairly uniform rate. It was found possible in a later series of experiments to make as many as three subcutaneous primary grafts on each side of the belly of a single host, and thus to induce a series of individual tumours growing under the same hormonal conditions.

#### RESULTS

In the first series of experiments fourteen Strong A mice received subcutaneous grafts of prostatic epithelium impregnated with the carcinogen. Twelve of these primary prostatic grafts formed tumours which proved

1. Fergusson, J. D. *Lancet*, Oct. 19, p. 551.  
 2. Rous, P., Smith, W. E. *J. exp. Med.* 1945, 81, 597.  
 3. Greene, H. S. N. *Science*, 1945, 101, 644.

to be malignant, and many transplants from these are, at the time of writing, in their eighth generation. Of the remaining implants which did not develop into tumours one was found at necropsy not to have become vascularised. Eleven of these tumours on histological examination proved to be glandular-celled carcinomata and one was a squamous-celled carcinoma.

A study was also made of the early phases of carcinogenesis within primary grafts of prostatic tissue. In this connexion it should be stressed that the technique used, whereby crystals of the carcinogen were placed in direct contact with the living tissue, without using a solvent such as lard or oil, resulted in no foreign-body reaction, and left no residue or necrosis within the graft which might mask or conceal the actual areas where neoplastic changes first arise. In serial sections of primary grafts it was found possible to relate individual invading masses of malignant cells by continuity with the particular alveolus lined with hyperplastic epithelium from which they had arisen. Well-marked hyperplasia was always found to precede the appearance of malignant change.

All types of tumours which developed in the grafts belonging to the first series of experiments were glandular-celled carcinomata (figs. 1 and 2), with the exception of one which was a scirrhous carcinoma.

Secretory activity was a prominent feature of the primary grafts and was surprisingly abundant even in some of the transplanted tumours of the eighth passage. It was common to find prostatic fluid encysted within distended alveoli; the secretory activity seems to depend, as might be expected, on successful vascularisation of the grafts.

#### DISCUSSION

Previous attempts to induce by experimental means a transplantable prostatic carcinoma in laboratory animals have been only partially successful; thus Moore and Melchionna<sup>4</sup> injected benzpyrene into the prostates of rats and obtained squamous-celled carcinomata and sarcomata, but they gave no information as to whether transplantation of these tumours was successful. Dunning and colleagues,<sup>5</sup> using pellets of methylcholanthrene inserted into the prostate glands of rats, induced squamous-celled carcinomata, and more recently

4. Moore, R. A., Melchionna, R. H. *Amer. J. Cancer*, 1937, 30, 731.

5. Dunning, W. F., Curtis, M. R., Segaloff, A. *Cancer Res.* 1946, 6, 256.

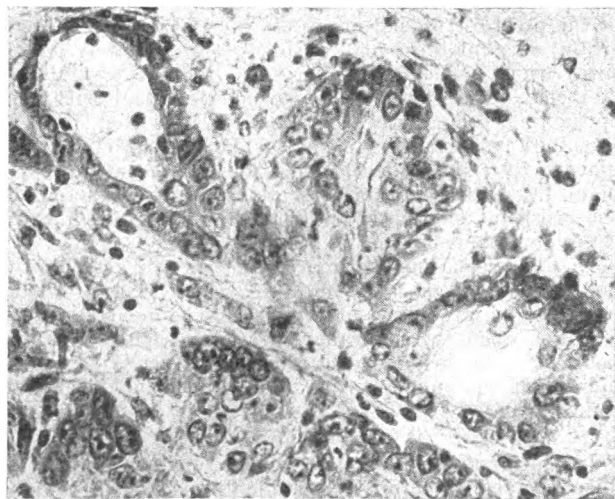


Fig. 1.—Section of a primary adenocarcinoma of the prostate gland in a Strong A mouse, induced from normal prostatic epithelium impregnated with crystals of methylcholanthrene and grafted subcutaneously into the belly of a male Strong A mouse. Secretion and cell debris are seen in two alveoli. Several glandular cells are in the process of cell division. This primary tumour has been transplanted and is now in the second passage. (All material was fixed in 'Bouin,' and subsequently stained with Ehrlich's acid hæmatoxylin and eosin.)



Fig. 2.—Section through a glandular carcinoma of the prostate gland in a Strong A mouse in the eighth generation of transplants. The tumour was induced by impregnating a piece of the prostatic epithelium with methylcholanthrene crystals and grafting under the skin.

Horning and Dmochowski<sup>6</sup> obtained transplantable carcinomata by injecting the prostates of pure-line strain mice in situ with methylcholanthrene in lard; all these tumours proved however to be squamous-celled carcinomata, unlike the common form of prostatic carcinoma in man.

The method adopted in the present experiments has succeeded though on theoretical grounds failure might have been expected; the fate of homologous grafts made from adult tissue is usually uncertain. The success seems partly to be due to the use of a closely inbred strain of mice in which homologous grafting is much better tolerated than it is in mixed strains. There is also reason to believe that results are more uniform if the graft is made from a strip of tissue rather than from a mass of minced fragments, though this point needs further investigation. Segregation of the crystals of methylcholanthrene by folding the strips of tissue round them would appear to provide the best possible contact between epithelium and carcinogen. The point of contact between them can be identified more or less precisely, and, further, the carcinogen is shielded by the graft from contact with the host tissues.

In appraising the possible value of transplantable tumours of the mouse prostate for the experimental investigation of prostatic cancer and its hormonal treatment in man, it must be admitted that many morphologists do not agree that a strict comparison can be drawn between the various parts of the accessory reproductive glands of primates and rodents.

Whatever homologies one may attempt to draw between the human prostate and the lobulated gland of the same name in rodents, it is clear that there exists in the rodent prostate both a fibromuscular stroma and a secretory epithelium identical in the general form of its cells with those of the human prostate. Arising like the human gland as a series of outgrowths from the embryonic urethra, the glandular epithelium of the rodent likewise depends for the maintenance of its cells on an adequate level of androgen.

It is therefore of great interest to find that, even although homologies may be uncertain and species differences often appear to upset the general plan of endocrine relationships, the prostatic tumours in mice are surprisingly similar to those found in man, at least as far as their structural and secretory characters are concerned. It remains for further experiments to decide whether these similarities can be shown to include such aspects as relative growth-rates, acid phosphatase secretion, and response to the administration of oestrogens.

Laboratories of the Imperial Cancer Research Fund, London. E. S. HORNING  
M.A., D.Sc. Melbourne.

6. Horning, E. S., Dmochowski, L. Unpublished.



## Medical Societies

### LIVERPOOL MEDICAL INSTITUTION

In his inaugural address at the opening of the 110th session, Dr. G. F. RAWDON SMITH, the president, traced the history of anaesthesia from the day that Adam's rib was removed. At first psychological methods, such as hypnotism, magnetism, and mesmerism, held the field. There were also primitive oral anodynes; and physical devices, variously attributed to the Egyptians, Assyrians, Greeks, and Romans, were introduced and persisted into medieval times. The first mention of inhalation anaesthesia is to be found in Pliny, though some claim that it originated in China. Continuing the record down to the present day, Dr. Rawdon Smith emphasised the improvements during his lifetime, and suggested that the present tendency was to attach overmuch importance to anaesthesia compared with surgery.

At a meeting of the institution on Nov. 7, with Mr. J. B. OLDHAM, vice-president, in the chair, a discussion on the late results of

#### Partial Gastrectomy for Peptic Ulcer

was opened by Mr. A. KIRK WILSON, who described a personal and consecutive series of 148 patients who had undergone partial gastrectomy for simple peptic ulceration between 1934 and 1939. Of these, 104 had gastric, 40 duodenal, and 4 jejunal ulceration. Of the patients with a jejunal ulcer, 3 had a gastrocolic fistula, and in 4 of the patients with a gastric ulcer a gastrojejunostomy had first to be undone. Analysis of the patients by age-groups showed that over 50% of the patients with duodenal ulcers were under forty years of age, while 65% of those with gastric ulcers were over forty. In the same period, 117 cases of carcinoma of the stomach were explored, and among these a partial or total gastrectomy was done 48 times.

Before deciding on operation for a high gastric ulcer, the size of the crater, the degree of penetration and fixation, and the response to medical treatment must first be considered. Ulcers of the pyloric antrum and canal were operated on fairly early because of their tendency to malignant metaplasia. With duodenal ulcers the main indications for operation were repeated perforation and recurrence of symptoms after several courses of intensive medical treatment in hospital.

The Polya-Moynihan operation was done for 44 patients, the Hofmeister operation for 45, and the "physiological" for 59. The over-all mortality was 8%; in exactly half of these deaths, necropsy showed that the cause of death was pneumonia and that healing had occurred without infection in the peritoneal cavity. One pulmonary embolus was recorded, and in 3 cases, where permission for necropsy was unobtainable, a leak from the duodenal stump was suspected.

In more recent series the mortality and morbidity had been much reduced by: (1) more intensive preoperative preparation, to correct minor degrees of anaemia and hypoproteinaemia, and (2) improved anaesthesia. With *d*-tubocurarine the relaxation compared very favourably with that produced by a perfect spinal anaesthetic, and chest complications had not caused any anxiety.

Dr. ROBERT KEMP said it must be remembered that the surgeon operated only on medical failures, and that the physician saw only the bad results of surgery. This paradoxical situation took no account of the good results of both methods. The physician had three duties to his patient in regard to surgery: he must have clear-cut indications in his own mind; he must know the risks and drawbacks of operation; and he must follow up the late results of his advice. With most complicated ulcers and with many gastric ulcers the indications for partial gastrectomy were clear. But with duodenal ulcers each case must be considered individually; and the decision as to when the lesion was beyond permanent help from medical treatment should not be delayed. Apart from the immediate postoperative risks, there were those of later stomal ulcer and, it seemed, an increased liability to pulmonary tuberculosis. After operation the patient might also be handicapped by anaemia, small stomach, dumping, lassitude, malnutrition,

gastritis in the stump, and the need for further dieting. Of the 148 patients on whom Mr. Kirk Wilson had performed partial gastrectomy 108 had been followed up; of these, 71 were still alive. No less than 55% of these 71 were in excellent health, doing full work and taking a full diet, with no significant symptoms. In another 28% the patients were in good health and capable of full work, but needed a modified diet. In the remaining 17% the result was only fair; despite dieting these patients still had some symptoms and lost some time from work. In every patient seen the condition was better than before operation. There had been a dramatic change from the miserable life of the man with an intractable ulcer to that of the fit active man without pain and full of gratitude to the surgeon even so long after the operation. The results in duodenal ulcer cases were particularly good. Nevertheless, it was still the physician's duty to keep his patient on a régime strict enough to obviate the need for surgery. If he failed in this the operation should be done under optimum conditions, with full preparation and convalescence in the medical wards. The best permanent results would be obtained by giving patients a simple postoperative régime to follow indefinitely, and by seeing them from time to time to ensure that they did so.

Mr. G. C. E. SIMPSON still felt that there were many cases where gastroenterostomy with ligature of the pylorus was the operation of choice. Before 1939 he would have said first choice, but since deprivation of fats now often prevented satisfactory dieting, he made it the exception. Towards the end of 1942 peptic ulcer had increased in frequency, and he had begun to meet numerous patients with gastrojejunal ulceration, often with colic involvement; in several the gastroenterostomy had been done as long as twenty years before, and they had been able to dispense with dieting. But in 1944 their number had again diminished; the change in the flour might possibly have had an influence. For many years all cases of peptic disorder had been seen on a joint ward round with a physician, and referred afterwards to a dietetic clinic.

Mr. COSBIE ROSS said that in 160 consecutive gastrectomies 8 patients had died as a result of the operation, making a mortality-rate of 5%. Of these 8 deaths, 3 had been from myocardial failure, 3 from lobar pneumonia, and 1 from a pulmonary embolus; and 1 patient had died during the operation. A further 3 patients had died later, 1 from carcinoma of the oesophagus, 1 from carcinoma of the stomach sac, and the third from a perforated stomal ulcer. This last case was interesting since the ulcer had occurred a year after gastrectomy, previous to which there had been two perforations. With these persistent perforations it might be advisable to prevent further trouble by carrying out an almost complete gastrectomy. Of the patients followed up, 55 had been interviewed and examined, 22 having had the operation for a duodenal ulcer and the remaining 33 for a gastric ulcer. It was a sobering thought that over 75% had had symptoms for over five years and that many of these cases had been in and out of hospital for medical treatment.

Of these 55, not one expressed dissatisfaction with the result of the operation; in fact, 47 were extremely grateful. Of the remaining 8, 2 were ill from other conditions, 1 having advanced phthisis and the second syringomyelia. The other 6, though stating that they were much improved, admitted to mild dyspeptic symptoms, such as heartburn, inability to eat greasy foods, occasional vomiting bouts, or discomfort after heavy meals. None complained of even moderate pain. Except the 2 patients ill from other causes, all were working regularly, though some had changed from their normal occupation to some less arduous work. In this connexion it was interesting that 11 out of the 55 complained of a diminution of strength and energy. The short afferent loop was important in making the anastomosis. Recent experiments had shown that the daily intramuscular injection of 30 mg. of histamine-base in beeswax in laboratory animals caused a torrent of acid secretion, which broke down the capacity of tissue in contact with the acid to defend itself. In a series of gastrectomised dogs the histamine-beeswax technique always produced a stomal ulcer when a long afferent loop was used, and never when a short loop was devised.

In view of this, the anastomosis should be a retrocolic one close to the duodenojejunal junction.

Mr. A. CLIFFORD BREWER had recently collected data on some 362 partial gastrectomies for duodenal ulceration. This analysis was being conducted in the department of surgery of the University of Liverpool. The predominant fact was that where a subtotal gastrectomy was done, with removal of the whole pylorus combined with a Hofmeister stoma, the results were excellent. Where any procedure less than this was performed, and particularly where the pylorus was left behind, results were by no means so good. Where difficulty was encountered from activity of duodenal ulceration, a two-stage operation appeared very satisfactory so long as the second stage was performed within some twelve weeks of the first. It seemed that subtotal gastrectomy was the operation of choice for duodenal ulceration, and in the cases analysed the results had proved eminently satisfactory.

Dr. T. CECIL GRAY said that spinal anaesthesia probably gave rise to more postoperative chest complications than did general anaesthesia. The improvement today was due not only to a special agent and technique but

also, and very largely, to correct preoperative and postoperative care. The importance of good nursing, dental treatment, breathing exercises before and after operation, and active and passive movements to aid the circulation in the recovery period was emphasised. Undoubtedly the use of the barbiturates as the main anaesthetic agent, aided by curare, had enormously improved the prognosis. By exacting criteria the incidence of chest complications in upper abdominal operations was now below 10%.

Dr. H. FULD thought Dr. Kemp had no reason to be gloomy about his figure of 30% for postoperative anaemias. American figures for anaemia following subtotal gastrectomy were 10%; the difference was probably due to the low-grade nutritional anaemia prevalent among hospital patients in this country. Haemoglobin estimations in 500 unselected patients seen in the surgery during the last twelve months revealed levels of less than 11.5 g. per 100 ml. in more than 20% of patients. In view of the progressive lowering of the operative mortality, it might prove worth while in future to refer patients who developed an ulcer syndrome after the age of forty-five to the surgical expert without much delay.

## Reviews of Books

### Year Book of Eye, Ear, Nose, and Throat, 1945

Editors: LOUIS BOTHMAN, M.D.; S. J. CROWE, M.D.; with the collaboration of E. W. Hagens, M.D. Chicago: Year Book Publishers. London: H. K. Lewis. Pp. 540. 18s.

THAT the fenestration operation has a place in the treatment of the deaf is now incontestable, but a keenly critical approach is still essential. These abstracts show that good results are obtainable in younger patients and in those where bone-conduction is still unimpaired. Cases of so-called catarrhal deafness may be more suitable than otosclerotics, but the differential diagnosis may vary from difficult to impossible. Technique is evidently becoming standardised, and the endaural approach is favoured by American surgeons. Deafness and cataract associated with maternal rubella in early pregnancy have been established as developmental deformities. A large number of abstracts deal with the use of chemotherapeutic substances in different areas of the eye and upper respiratory tract, and some good results obtained with penicillin in cases of intrinsic bacterial allergy are specially interesting. Both surgery and irradiation for laryngeal carcinoma receive support, though both are still crude. Fresh work on the surgical treatment of laryngeal or tracheal stenosis is reported. Treatment of disorders of the ocular muscles is still being revised. Again the bulk of the abstracts are from American literature, and again the high editorial standard is maintained.

### Juvenile Delinquency in New Zealand

*A Preliminary Study.* EILEEN PHILIPP. New Zealand: Council for Educational Research. London: Oxford University Press. Pp. 140. 7s. 6d.

THE need for up-to-date and reliable facts about the underlying causes of juvenile delinquency is widely recognised. A valuable contribution to the subject is promised by this book which provides a preliminary study of the nature and extent of juvenile delinquency in New Zealand during the years 1938-45. The writer was trained in the social-science department of an English university and has had wide experience in various branches of social case-work. The figures analysed reveal a striking difference in the proportion of cases of theft to other offences in New Zealand compared with other countries, the proportion being roughly 30% lower than, for example, in England, U.S.A., or Australia. This is thought to be attributable to the very much more uniform social and economic conditions prevalent in New Zealand. The information available also suggests a relatively heavy incidence of delinquency among Maori boys, in all probability associated with the lamentable housing conditions, although it is thought that unintentional discrimination, and readiness to bring a Maori child before the court, may have some bearing on these figures. The main body of the book is concerned with

an attempt to draft a form on which a summary of the social history can be recorded for the information of the children's court. A novel feature is the fact that the personal social histories are obtained from the delinquents themselves. The summaries, of which five examples are given, illustrate the complexity of the influences to which delinquency has been a response, and, as the writer says, should help "to correct the over-simplified ideas on causation still widely current." Although emphasis is laid on environmental influences as shown by a tendency to recommend removal from the home as an essential part of treatment, the fact that similar circumstances may have very different effects upon the behaviour of individual children is not overlooked. Useful suggestions are made regarding the lines along which further study of delinquents might be pursued.

### Manual of Diagnosis and Management of Peripheral Nerve Injuries

ROBERT A. GROFF, M.D., lieutenant-colonel, M.C.A.U.S., formerly assistant professor of surgery, Jefferson Medical College; SARA JANE HOUTZ, B.S., first lieutenant (P.T.) A.U.S. London: J. B. Lippincott. Pp. 188. 36s.

THIS little book, written primarily for physiotherapists, deals shortly with the anatomy, injuries, symptomatology, and treatment of peripheral nerve injuries. A full account of the tests of muscle function, including line drawings illustrating every test described, is followed by a series of beautiful anatomical drawings of the regions of the body most susceptible to nerve injury. The physiotherapist will find the first section easily read, and its subject matter should be sufficiently comprehensive for examination purposes. The section on muscle testing is detailed and useful for reference. The anatomical diagrams are no doubt of use to a student who is only concerned with the anatomy of the nerve and muscle, but have less to recommend them to doctors, to whom the book is also dedicated.

### Heredopathia Atactica Polyneuritiformis

*A Familial Syndrome Not Hitherto Described.* SIGVALD REFSUM. Oslo: Johan Grundt Tanum. Pp. 303.

THIS book deals with an intensive study of two unrelated Norwegian families in which the author finds evidence of a disease not previously recognised, and which he has named heredopathia atactica polyneuritiformis. One or more of the five persons in these two families presented signs of hemeralopia, atypical retinitis pigmentosa, chronic polyneuritis, ataxia, and other cerebellar phenomena. Three patients showed electrocardiographic signs of sinus tachycardia. Lumbar puncture showed albumino-cytological dissociation with a normal cell count and a great increase of the albumin and globulin content. He thinks the syndrome hereditary, and promises further light on it when pathological-anatomical studies by his colleague, Dr. Cammermeyer, on the patients coming to post-mortem examination have been completed.

# THE LANCET

LONDON: SATURDAY, DEC. 7, 1946

## Death in the Fireplace

It has been demonstrated beyond question that in the homes of the people we neglect the most elementary precautions against accident, and wantonly permit hazards that would arouse a public scandal in the most primitive factory or workshop. This is particularly vicious because the persons at risk in the home—chiefly old folk and children—are less disciplined and less able to look after themselves than adult workers in a factory. Nearly two years ago WRIGHT<sup>1</sup> drew a sombre picture of avoidable suffering and death in the home, caused by burns and scalds. Since then further studies have been pursued in the Birmingham Accident Hospital; and in March of this year GISSANE<sup>2</sup> confirmed WRIGHT's findings and urged immediate action to enforce the provision of fire-guards and to abolish highly inflammable materials for clothing. Another solemn and urgent warning now comes from COLEBROOK.<sup>3</sup> Looking first at the loss of life, he points out that, although there has been a substantial reduction in fatal burning accidents during the last two generations, no less than 6516 people in England and Wales died from these causes in the quinquennium 1935-39—and that 2825 of the victims were children. He estimates from his own data that more than 90% of the deaths followed burning and scalding in the home rather than at the place of work.

This shocking waste of life reflects only feebly the sum of human suffering and the loss to the community as a whole. Few calamities leave deeper scars on mind and body. It is true that recent advances in the control of infection have done much to save life and to relieve suffering; and the great achievements in plastic surgery go far to mitigate the permanent disability; but the sum of misery to the victim and his relatives is still enormous. The loss to the community is hard to assess. In terms of working days COLEBROOK gives a conservative estimate, based on hospital experience in Glasgow and Birmingham, of an average disability of 50 days for severe cases, and of 20 days for those treated as outpatients. Taking no account of the patients treated at home, this gives an annual total of more than a million man-days, and there is a similar total for "child-days" lost to schooling. Burning accidents, moreover, represent a serious expenditure in hospital and other medical and nursing services. The inpatients alone account for about a million bed-days a year, and outpatient services are heavily taxed because of the well-known tendency of burns to slow healing in the later stages of recovery, and the frequent need for protracted physiotherapy.

In his survey of the historical background of burning accidents in the home COLEBROOK remarks on some puzzling features. As one might expect, there has been a considerable fall in the total number of fatal burning accidents, especially in the age-group 0-4 years, during the past fifty years, while in people over 65 the number of deaths has steadily increased. But the sudden drop, far more pronounced in burns than scalds, immediately after the first world war is more difficult to account for. There is clearly a need here for a more detailed statistical analysis. In recent years fatal scalding accidents in children under 5 have involved more boys than girls; but the number of deaths from burning, at all ages over 4, has been much higher among females than males, especially in little girls and old women. We do not know nearly enough about the figures in relation to the population at risk, but some of the factors involved in the reduction in fatal accidents can be put forward with confidence:

1. The replacement of naked candles, gas lights, and oil lamps by electric lights. Candles used by the bedside are still a cause of burning accidents, as WRIGHT showed in her Glasgow investigation.
2. The substitution of modern gas and electric cooking appliances for the open fire and the monstrous kitchen range. Unfortunately a vast number of dwellings occupied by the lower income groups must still rely on obsolete and dangerous appliances, and many burning and scalding accidents are directly or indirectly due to their use. The unprotected gas-ring, often laid on the floor for want of space, is also a villain of the piece.
3. The use of fire-guards (made compulsory when there are children under 7 years in the home) may have had some influence, but COLEBROOK points out that there is no evidence of this in the returns of the Registrar-General for the years following 1908, when the Children Act introduced this provision. The fact is that the law has always been weakly enforced and in recent years neglected altogether. It should be remarked also that the protection of modern gas and electric fires is often lamentably deficient.
4. The shortening of skirts and the wearing of trousers—especially pyjamas—by women and children has made for greater safety, though not to the same degree in the lower income groups. "On the other hand," COLEBROOK says, "the change from woollens and tweeds to highly inflammable cotton and silk frocks, nightdresses, dressing-gowns, and underwear has certainly increased the danger of burning accidents." It is doubtful whether this comment can be sustained: the children of the poor have worn inflammable flannel-ette nightgowns for generations, and countless burning accidents have been reported from this cause.

The home background of all these accidents is a web of the commonplace; the tragedy lies in the fact that we do so little about it. In the broadest sense, bad housing and overcrowding are the principal ministers of death. There is no room for the children to play, except around the grate. Kettles and saucepans are often upset, because the grates are ill designed or out of repair. Overcrowding of both persons and equipment makes it difficult to keep dangerous things in safe places, and to prevent children from interfering with them. Fire-guards for coal, gas, and electric fires are absent or utterly inadequate. The garments of women and children are commonly made of

1. Wright, M. T. *Lancet*, 1945, 1, 155.  
 2. Gissane, W. *Ibid.*, 1946, 1, 326.  
 3. Colebrook, L. *Mon. Bull. Min. Hth & E.P.H.L.S.* October, 1946, p. 214.

material that burns like a torch. Beneath all these objective factors lies human failure through carelessness, stupidity, and neglect of elementary precautions.

The situation calls for immediate action. Cheap and efficient fire-guards, preferably fixed or hinged to the appliances, should be designed, and their use enforced by law. The manufacture of dangerous fittings ought to be forbidden under a safety code of standards. As COLEBROOK says, the level of awareness of danger can be raised among older children and adults by propaganda, films, radio talks, exhibitions, and other educational measures: "Such propaganda would necessarily encourage the general use of effective well-designed fire-guards; of clothing for children and women which is relatively fireproof (this should be certified by appropriate markings on the material); of fittings on the top of gas and electric stoves which would make it difficult to upset saucepans and kettles." Manufacturers of appliances and of clothing might well lead the way; and local authorities planning houses should review the safety measures which ought to be taken. To frame a long-term policy of safety in the home we need far more information than we possess today. The causes of minor burning accidents may show a different distribution from those of serious cases. More effective measures of prevention may be found when we know more about causes. A comprehensive survey is not easy to organise, but there are many willing helpers. The department of the chief scientific adviser to the Ministry of Works, in coöperation with the Ministry of Health, has already started a series of investigations, and the assistance of medical officers of health, housing managers, medical practitioners, and others is being sought. It is important that a long-term policy should be founded on accurate and comprehensive knowledge, but we know enough to take immediate measures of protection.

### Splenectomy

THE oddest thing about the spleen is that it should exist at all as a separate organ. It is an unpaired structure of considerable size, complex design, and exceedingly rich blood-supply; yet its total removal is compatible with perfect health. Indeed, if we are to believe the ancients and the evidence of more recent animal experiment, its presence is a positive embarrassment to those who aspire to athletic distinction. Every student knows that the spleen is a part of the reticulo-endothelial system and that it is therefore concerned with such matters as the formation of lymphocytes, the destruction of erythrocytes, the elaboration of antibodies, and the metabolism of lipoids, blood-pigments, iron, and possibly purines. But the only positive function which the spleen as a separate structure appears to subservise is to hold in reserve several hundred cubic centimetres of blood which can be added to the circulation in the emergencies of violent exercise anoxæmia or hæmorrhage. Many other functions have been postulated, only to remain, for lack of evidence, fascinating speculations. Perhaps the most interesting of these hypotheses is that the spleen exerts a hormonal influence on the bone-marrow and that the benefits of splenectomy for thrombocytopenic purpura and Banti's disease are derived from abolition of this influence. The mystery

surrounding its functions and the doubts which still exist on the indications for its removal must be responsible for the large volume of surgical writings on the spleen. It would otherwise be curious that surgeons should pay so much attention to an organ for which there is, in practical effect, only one surgical procedure—to wit, excision.

There are three absolute indications for splenectomy: rupture, familial acholuric jaundice (usually called spherocytic icterus in the United States), and primary thrombocytopenic purpura. Rupture of the spleen, whether its symptoms are manifested at once or delayed, and whether it occurs in a normal or a diseased organ, is perhaps the only indication for operation on the spleen in which the surgeon knows the precise reason for his intervention and why the operation is curative—it stops an almost invariably fatal intraperitoneal hæmorrhage. The rationale for splenectomy in acholuric jaundice is not so definite. It prevents the spleen from destroying abnormal blood cells, but in some cases the erythrocyte fragility is restored to normal by the operation, suggesting that the spleen may play a more complicated rôle than that of destructor and may influence the erythroblastic activity of the bone-marrow. Whatever the underlying explanation of the results, they are so good in practice that splenectomy is abundantly justified. Much the same is true of primary thrombocytopenic purpura. Here the results are very satisfactory provided the case is really primary and not connected with menstruation, pregnancy, or drugs; some authorities maintain that the disease is due not to excessive platelet destruction by the spleen but to its more oblique activity in inhibiting megakaryocytes. One might add to these three absolute indications a fourth class to contain those often described but seldom seen entities, ectopia, cysts, and primary tumours of the spleen, but here the diagnosis is seldom made before the abdomen has been opened.

There are some diseases in which the effects of splenectomy are so uncertain that they constitute a relative indication for operation. Banti's syndrome heads this list, and the work of the spleen clinic of the Columbia Presbyterian Medical Centre, lately reported by WHIPPLE,<sup>1</sup> has gone far to explain the uncertain results of splenectomy in this disease. The cause of the enlarged spleen is portal hypertension, and WHIPPLE has relieved the signs and symptoms in advanced cases by anastomosing the portal vein to the vena cava. He believes that splenectomy is helpful only where the splenic vein alone is obstructed and that it will do harm in most cases by destroying useful collateral channels. WHIPPLE does not discuss the cause of the anæmia in Banti's syndrome and one is left to wonder whether erythrocytes dammed back in an enlarged spleen naturally suffer abnormal destruction or whether the spleen has exerted a sinister influence on erythropoiesis. STIVEN<sup>2</sup> has reported favourable results from splenectomy in Egyptian splenomegaly, a condition which clinically resembles Banti's syndrome; but since this is probably a manifestation of schistosomiasis, the benefits of splenectomy must fall short of cure. There are further conditions in which the removal of a vast spleen,

1. Whipple, A. O. *Ann. Surg.* 1945, 122, 449; see *Lancet*, 1946, I, 743.  
2. Stiven, H. *Société Internationale de Chirurgie*, 10th Congress, 1935.

though not curative, affords great mechanical relief, and chronic malaria and kala-azar, as well as Gaucher's disease, may on rare occasions benefit thus from operation. Lastly, there is the group of cases distinguished by Prof. C. A. DOAN of Ohio—primary splenic neutropenia and panhæmatopenia—in which a persistent neutropenia in the former and anæmia, neutropenia, and thrombopenia in the latter are accompanied by signs of overactivity in the corresponding bone-marrow cells; DOAN recommends splenectomy for both these conditions.

The contra-indications to splenectomy are important. It is obviously useless where a moderate splenic enlargement is a manifestation, but not an essential part, of a generalised disease. Thus in Hodgkin's disease and lymphosarcoma splenectomy is a mistake. In leukæmia it is a fatal mistake. Its problematical benefits in pernicious anæmia have been displaced by liver therapy, and in icterus gravis neonatorum transfusion with rhesus-negative blood is its happy successor. With the proper indications, the mortality of splenectomy can be minimal. PUGH,<sup>3</sup> in a recent review, points out that the mortality for the original operation was 100%, but that this figure has now improved almost to zero. At the Mayo Clinic, for 1003 cases operated on over forty years, the figure was 9.4%; at the Lahey Clinic in Boston there has not been a single operative death from splenectomy since 1941; PUGH himself reports 15 splenectomies in which there was only 1 death, and that was reasonably attributed to a severe intracranial injury. It is likely that most surgeons would put the mortality of splenectomy at about 10%; but in fact, if traumatic cases are excluded, this is too high; the key to success is really effective coöperation between physician and surgeon in the selection of cases and the time for operation, and in the management of convalescence.

An essential part of splenectomy, except in cases of rupture, is a careful search for spleniculi, which must be removed if permanent results are to be achieved.

### Fluorosis—Endemic and Man-made

It is not yet certain that fluorine is essential to full health, as other trace elements such as iodine are known to be. There is evidence, however, that when optimal amounts are available during growth it increases the resistance of the teeth to caries. Like iodine, fluorine is present in varying amounts in drinking-waters. Unlike iodine, which produces harmful consequences by its defect, fluorine does so by its excess. In various parts of this country, and notably at Maldon, in Essex,<sup>1</sup> it gives rise to dental fluorosis with unsightly mottling of the teeth. In parts of China where it is present in the water in great excess it causes gross skeletal changes with severe disabilities and sometimes death.<sup>2</sup> In at least one or two areas in England where dental fluorosis occurs, osteochondral changes in the vertebræ have been discovered in adolescents; it seems probable that an association of fluorosis with poor social and nutritional status is here responsible.<sup>3</sup>

In addition, however, to endemic fluorosis there is another hazard present in and near certain industries which give rise to fluorine fumes or smokes. Elsewhere in this issue Dr. MARGARET MURRAY and Dr. DAGMAR WILSON give a useful summary of information bearing on both endemic and man-made fluorosis, together with a report of a local "incident." HUNTER<sup>4</sup> and his colleagues have studied the industrial and some of the secondary neighbourhood risks of fluorine smokes evolved by aluminium works. Grass and crops may be contaminated, especially on the leeward side of certain industries, to a considerable distance, and disease and death in sheep and cattle due to cropping of contaminated grass have been reported.<sup>5 6</sup> MURRAY and WILSON discuss the fuller public-health and social consequences of such a hazard in the neighbourhood of an area devoted during the war to surface iron-ore calcination. They mention further that some 28 industries in this country give rise to fluorine emanations, and suggest that the nature and degree of the risk to farm stock and human beings is not at present sufficiently appreciated by those responsible for all the industries concerned or by local authorities.

No such catastrophe as the "fog disaster" in the Meuse valley in 1930 has been recorded in the British Isles. On this occasion a thick cold mist lay over parts of Belgium. The smoke from a number of factories became mingled with the fog. Several thousand people developed pulmonary symptoms and there were 60 deaths, chiefly among old people. Of the 27 factories in the neighbourhood, 15 employed fluorine-containing substances involving the possibility of passing gaseous fluorine compounds into the chimney smoke.<sup>7</sup> Window-panes and electric bulbs lost their gloss more quickly than usual. Cattle, after grazing a short time, contracted serious bone disease; but, as the bony effects of fluorosis are very slow to arrive, this evidence must be accepted with caution. The whole episode was held to incriminate fluorine as the probable chemical cause of the disaster.

Such a combination of adverse circumstances is unlikely to be repeated, but, even were it impossible, there is clearly a case for the more detailed study of specific chemical hazards of this kind. We do something approaching our best to protect water and food from contamination, but the air we breathe can still be a source of danger. According to a recent statement by Mr. HERBERT MORRISON, as reported in the daily press, atmospheric pollution costs us £50 million a year, irrespective of its effects on the health of the people and their amenities. A great deal of this pollution is preventable. Some of the waste-products of industrial processes—fluorine among them—are not only recoverable but valuable. It seems that a major cause of delay in handling problems of this kind may be the lack of machinery for coördination between industry, the public-health services, a number of Government departments, and those research-workers who by their individual or collective initiative disclose evils we must all desire to abolish.

3. Pugh, H. L. *Surg. Gynec. Obstet. Int. Abstr. Surg.* 1946, **83**, 209.

1. Ainsworth, N. *Brit. dent. J.* 1933, **55**, 233.

2. Lyth, O. *Lancet*, 1946, **1**, 233.

3. Kemp, F. H., Murray, M. M., Wilson, D. C. *Ibid.*, 1942, **11**, 93.

4. Hunter, D. *Schweiz. med. Wschr.* 1946, **76**, 917; see *Brit. med. J.* 1946, **11**, 503.

5. Bosworth, T. J., Green, H. H. *Proc. R. Soc. Med.* 1941, **34**, 391.

6. Boddle, G. F. *Proc. Nutr. Soc.* 1945, **3**, 110.

7. Roholm, K. *Fluorine Intoxication*, London, 1937.

## Annotations

### A POSTGRADUATE SCHOOL AT CAMBRIDGE

IN 1944 the Goodenough Committee pointed to an opportunity at Cambridge to develop a postgraduate centre for doctors from this country or overseas who want advanced and specialist training. A beginning, they suggested, might well be made by setting up research and training units based on Addenbrooke's Hospital and on "the strong departments already existing in the University in the fundamental sciences." Part of this plan has become fact. The university has established departments of experimental medicine and radiotherapeutics for which the hospital is providing beds. Beds have also been put at the disposal of the regius professor of physic, and the honorary staff of the hospital has been strengthened by additional appointments. Further arrangements have now been made for the university to assume responsibility for the pathological and biochemical services of the hospital. Hitherto the university departments of pathology and biochemistry have been concerned only with research and teaching. Now their work is to cover clinical and pathological material from the hospital, and bacteriological and epidemiological material from the East Anglian region; and Dr. A. M. Barrett, Dr. M. H. Gleeson White, and Dr. N. R. Lawrie have respectively been appointed university morbid anatomist, bacteriologist, and biochemist to Addenbrooke's.

So far has been so good that the university and hospital have decided that they are now ready to carry the scheme a big step further, and a school of clinical research and postgraduate teaching is to be initiated, consisting of the departments of experimental medicine and therapeutics (already in being) in association with the university departments of medicine, anatomy, pathology, biochemistry, experimental psychology, and physiology. The regius professor of physic will be chairman of the council of the school, which will include the heads of the departments, and representatives of the faculty boards concerned, the general faculty board, and the general committee and the honorary staff of Addenbrooke's.

It is intended that the school shall share a common site with Addenbrooke's, and its research wards are to be an integral part of the hospital. But according to contemporary custom the scheme must await the builders, and until new premises are erected the hospital will assign some of its own beds to the new departments. The heads of the departments of the school will be elected to the honorary staff of the hospital, and arrangements are being made for the university to be represented on the general committee in whose deliberations they already take a friendly if informal part.

Under the National Health Service Act the hospital and specialist services of the area will be associated with the university, and it is hoped that Addenbrooke's will be designated a teaching hospital. The university has further announced that it is prepared, once the postgraduate school is well established, to consider the possibility of starting a pregraduate school of clinical teaching. The future clearly holds further opportunities and Cambridge is preparing for them.

### THE UNMARRIED MOTHER

THE illegitimacy-rate, which had been falling steadily since the beginning of the century, was down to 42 per 1000 live births in 1939, but rose with the war, to reach 72 per 1000 in 1944. In a new broadsheet<sup>1</sup> P.E.P. note that two-thirds of the mothers of illegitimate children return either to their family home, to the child's father, or to their legal husbands. The remaining third, who have neither home nor friends behind them, experi-

ence social and financial penalties which have changed relatively little since the last century. "Unfortunately, there are still some voluntary hospitals which do not admit unmarried mothers and demand to see the marriage lines of all women applying for beds in public (but not in private) maternity wards." Maternal mortality continues to be higher among single than among married mothers, and the rates for infant mortality, stillbirth, and neonatal death are higher among illegitimate than among legitimate infants. Some of the reasons for the greater risks to the illegitimate child were set out by Dr. G. F. Buchan<sup>2</sup> several years ago. During her pregnancy the mother has to keep herself and prepare for the child; so she may work almost until her confinement. Then, after ten days or a fortnight in hospital, she is discharged, often with nowhere to go, needing to get work at once. Not knowing how to find a foster-parent, she persuades someone to take the child, on a promise of payment out of her first earnings; and if work is not found at once the foster-mother may refuse to keep the child.

There have been advances since Dr. Buchan wrote his article, but not yet on a wide enough scale. The mother can sometimes stay on in a postnatal hospital for a time, breast-feeding her baby and giving domestic help in exchange for her keep. But this is only a temporary measure, and one which some mothers are unwilling to accept; moreover places in such hostels are scarce. The mother's best—almost her only—chance of keeping the baby with her is to take a resident domestic post. If she is unfitted or unwilling to do this she must leave the child in a day nursery while she goes to work, or find lodgings where the landlady is willing to look after the child: but again such landladies are rare, especially in the present housing shortage. Most homeless mothers must consent to be separated temporarily or permanently from their children, placing them in residential nurseries (though these are now fewer than they were during the war) or with foster-parents (now as uncommon as friendly landladies), or allowing them to be adopted, the arrangement often being made casually in a pub or a queue. In the opinion of P.E.P.—

"A mother, whether married or unmarried, who is without a breadwinner, should be enabled to earn her living and to keep her child with her. This is a problem of lodgings, of sufficient accommodation in day nurseries, and of residential nurseries for emergencies. Working mothers' clubs or hostels with bed-sitting rooms, gas-rings, and nurseries attached might go a long way in solving it; they should be part of the local authority's services for homeless mothers."

Because of the moral issues linked with the question of illegitimacy, most voluntary bodies caring for the welfare of the unmarried mother are religious. Unfortunately there is very little central coördination, and the efficiency of different homes varies very greatly. The religious organisations include the Salvation Army, which never refuses a case, the Church of England Moral Welfare Council, Roman Catholic Diocesan homes, and a few Free Church homes (the last three rarely take second pregnancies, and cases with venereal disease are rigidly segregated in separate homes). There are also some non-denominational homes and hostels. Some of these variously sponsored homes are run on modern lines; others lock their doors, open all letters, and remove all money and notepaper from the residents. There are only about 8 homes for mothers with venereal disease, but it is possible that with modern methods of treatment it may no longer be necessary to segregate such cases.

In November, 1943, the Minister of Health encouraged welfare authorities to meet their responsibilities in this field. He had a good response, 339 schemes being submitted, in 210 of which a moral-welfare association was

1. The Unmarried Mother. *Planning*, no. 255. Sept. 13, 1946. From P.E.P., 16, Queen Anne's Gate, London, S.W.1.

2. *Med. Offr.*, 1941, 65, 29; see *Lancet*, 1941, 1, 302.

being asked to coöperate, while in 50 specially qualified social workers were to be appointed, and in others health visitors were to be specially instructed. The homeless mother badly needs the support of an experienced social worker. By the end of 1944 seven new hostels for unmarried mothers and their babies and three residential nurseries had been, or were about to be, opened, and many authorities, following one of Dr. Buchan's suggestions, were arranging to find suitable foster-mothers and to guarantee their payment. P.E.P. would like to see services for the unmarried mother and her child centred in the Ministry of Health and administered as part of the National Health Service. Antenatal and postnatal homes are needed for all maternity cases, and would help to prevent the undesirable segregation of unmarried mothers.

### PULMONARY ŒDEMA

THERE is now much evidence, both in animals and man, that injected protein solutions usually leave the circulation rapidly, and that protein is removed as well as water and salts. Nevertheless the conception of fixed circulating proteins is still prevalent, and the suggestion is made that an attempt to increase their concentration in the blood will result in large quantities of œdema fluid being drawn out of the lungs.

Writing on pulmonary œdema lately in these columns, Courtice and Foss<sup>1</sup> reached conclusions which seemed diametrically opposed to those of Cleland.<sup>2</sup> But it is essential here to differentiate between two distinct types of pulmonary œdema—that following exposure to irritant gases, and that resulting from an acute rise of pressure in the pulmonary veins. Courtice and Foss studied the former type in dogs and goats and found that injected protein solutions will not correct the hæmoconcentration which follows exposure to phosgene. Arterial oxygen saturation was not followed, but their animals died more rapidly after injection of plasma or serum, presumably from increasing pulmonary œdema. Courtice and Foss conclude that transfusions in the presence of gross pulmonary œdema are therefore definitely detrimental. As Daly<sup>3</sup> has pointed out, however, it is difficult to correlate the results of animal experiments with different types of pulmonary œdema in man.

The second type of pulmonary œdema is commonly seen in lesions of the left side of the heart, but it also occurs when the heart is more normal, as in transfusions after hæmorrhage. The sequence of events is generally thought to be as follows. Initially there is an acute rise of pressure in the pulmonary venous system, and dyspnoea which is probably reflex from this rise of pressure. Peripheral arteriolar constriction occurs and the blood-pressure rises. Cyanosis at this stage is not due to diminished arterial oxygen saturation but to peripheral constriction. The rise of blood-pressure adds to the work of the heart, and dyspnoea probably increases the already high pulmonary venous pressure. Only terminally does arterial oxygen saturation show a conspicuous decrease. All intravenous infusions raise the venous pressure to greater or lesser degree, so that it is difficult to believe that injected protein solutions can do anything but harm in this type of case. Although data obtained in the field are necessarily incomplete and difficult to assess, the clinical improvement observed in some of Cleland's cases after the intravenous injection of concentrated plasma may have been due to the raising of a low venous filling pressure which had resulted from an acute reduction of blood-volume from hæmorrhage or plasma loss.

In the streets of a big city it is not uncommon to see an elderly hypertensive person in the throes of an attack of acute left heart-failure. Well-meaning but misguided bystanders will often attempt to increase the venous

pressure still further by insisting that the sufferer should lie flat. There is no reason why the informed physician should follow such courses.

### ARBUTHNOT LANE

Lane was a lion among surgeons, and none the less so because everything that he did led not to critical discussion but to disagreement and contention. In his prime he had three enthusiasms: for operation in cleft-palate children (by an extension of Davies-Colley's flaps at the earliest possible age and if possible within 24 hours of birth; for fixing every fracture of a long bone with an internal splint, again as early as possible; and for the removal of the colon for a condition, sensed rather than described, which he called "chronic intestinal stasis." The time has not yet come to write a final appreciation of this work—emotion would still sway reason too much—but the time has come to record the dates in his life. This Mr. W. E. Tanner<sup>1</sup> has done, and he has prefixed a chapter on his own life to show how Lane inspired the young men around him.

What was this wizardry that had so great an influence on those with whom and for whom Lane worked? For his patients felt it as strongly as his house-surgeons and were impelled to get well, sometimes from things quite outside those for which their operation had been performed. It lay in his idealism and his sympathy. Like Lister, Lane had an intense sympathy for group humanity, and each of the operations at which he worked was inspired by this. By his cleft-palate operation he strove to give life and human speech to children born with the commonest of the distressing deformities with which human beings come into the world. By his bone-plating he aimed to help the working man, and especially the casual labourer who was thrown out of work when he could not carry a 2 cwt. sack and faced starvation, because in those days there was no sickness benefit, no unemployment insurance, and no workmen's compensation—only the Poor Law Act of 1836, under which he was grudgingly given outdoor relief which meant the loss of his civil rights. Lane threw aside æsthetic estimations of the results of fracture treatment, such as good alignment, and replaced them by standards based on wage-earning capacity. If a man could not return to the work he did before he broke his leg the treatment of that fracture was a failure; and it was this ideal that makes Lane one of the founders of orthopædics. And lastly that sad little group of shrivelled up, greasy-skinned sour-tempered middle-aged women in sympathy for whom he started to open the abdomen; but instead of removing the ovaries or appendices or sewing up the kidneys or the uterus, as other surgeons were doing, Lane concentrated on the gut and therefore devised a hypothesis and an operation. The type of women for whom he did a colectomy have disappeared today, but it was sympathy for their very genuine misery that made Lane try to do more than merely pass them on to a different outpatients' department.

With his sympathy Lane combined a standard of idealism which taught that you must always have an ideal but must never attain to it, for when you find yourself doing so you must push it further away; and with this he incorporated a conscientious scepticism which held that when there was anything in surgery on which all were in agreement it was almost certainly wrong. No man at Guy's more fully followed the motto of the hospital—that it is better to give than to receive. In some ways he received greatly, but whether he took a big fee or only lifelong gratitude he always gave the patient something more than he had taken from him. We must thank Mr. Tanner for bringing out a life of this great man at a time when there is some need of emphasis on these points.

1. Courtice, F. C., Foss, G. L. *Lancet*. Nov. 9. p. 670.  
2. Cleland, G. *Ibid.* p. 667.  
3. Daly, I. de B. *Thorax*, 1946, 1, 182.

1. Arbuthnot Lane: His Life and Work. W. E. Tanner, M.S., F.R.C.S. London: Baillière. Pp. 192. 15s.

### PHASE-CONTRAST MICROSCOPY

OBSERVATION of the living cell by transmitted light has been a difficult task, for the refractive indices of the unstained components vary only slightly, and the thickness of a single cell is insufficient to make minor variations observable. Dark-ground illumination is a useful supplementary technique, and intravital staining has yielded further information. Ultraviolet microscopy requires special apparatus and the irradiation kills most tissues fairly rapidly, while the interpretation of observations made on the classical stained section is suspect, for one cannot eliminate the possibility that artefacts are produced by the staining technique. Electron microscopy is still for the few. The phase-contrast technique, first suggested ten years ago, was demonstrated to a meeting of the optical group of the Physical Society on Nov. 22. This brings to a successful conclusion the work of Mr. C. R. Burch, PH.D., F.R.S., and his colleagues at Bristol, who have long championed the idea and at this meeting presented a mathematical analysis of the principles involved.

The phase-contrast technique employs a system for retarding part of the beam incident on the microscope condenser; this is modified in passing through the specimen, and the emergent beam collected by the objective passes through another retard plate placed accurately over the first. The effect is to accentuate by interference the minor differences in phase introduced by the tissue, and so to render visible changes in optical density imperceptible by normal observation. Mr. A. W. Hughes, PH.D., spoke of the tremendous progress now possible in cytological studies, and showed two films made at the Strangeways Laboratories with a home-made simplification of the equipment. This development has also been studied in Germany, and a few examples of the Zeiss equipment are in England. Two speakers remarked that the recently developed British equipment is superior to the German. Old prejudices die hard, but it is time that the old wives' tale that English microscopes are not as good as Continental was discarded.

### THE DISPUTE

It is difficult to write temperately of the decision of certain local authorities to discharge anybody in their service who refuses to join a trade union. Yet presumably this decision seems to them entirely reasonable. "It is generally accepted," says the *Encyclopædia Britannica*, "that the conduct of industrial negotiations in Great Britain must be on the basis of negotiations between organised workers and organised employers," and during the war of 1914-18 the Government themselves, and many employers, encouraged workers in the larger industries to join a union. In big organisations it is obviously more convenient that terms of service should be agreed with the whole body of workers rather than with individuals separately, and there must be a mechanism for appointing plenipotentiary representatives. To a considerable proportion of the people of this country it has become an article of faith that the decent man joins a union so as to stand by his comrades; and those who refuse to join one incur scorn because they stand aside yet profit by the union's efforts—less being said about their suffering through union action of which they may disapprove. When he is elected to the control of a municipal service, the trade unionist naturally thinks of it as a rather untidy industry which needs to be set in order, and related to other industries, by giving everyone trade-union status as a worker with appropriate representation. Unfortunately, to achieve so desirable an end he sometimes holds it permissible to use compulsion—employing the direct action which has won the unions so many victories, and so many members, in the past.

There is no need to repeat here the arguments against this variety of compulsion: the indignation aroused by its application in a new field by the local councils has been vigorously expressed by many newspapers. We feel bound to add, however, that, rightly or wrongly, salaried members of the medical and nursing professions do not regard themselves as "employees"; when a doctor works for a council his primary duty is still towards his patient, and his relation towards the council is not the relation of "master and man" which obtains in industry and which forms the basis of trade-union organisation. It is true of course that the professional status cherished by doctors and nurses may have elements of snobbery (as a correspondent argued in our last issue), but what is much more important is that it provides standards and incentives of high social value, which more than ever need preserving now that the financial prizes of success are diminishing. To outsiders at least, it has seemed that whatever else they may have done, trade unions have seldom inspired their members to work without regard for time or place or anything but the end in view. We doctors require such inspiration; and, until we are offered something better, we shall continue to wear our professional uniform, because it helps to keep us up to the mark and still attracts likely lads to our ranks.

We shall be told perhaps that this is quite irrelevant; that nobody thinks of challenging professional status; and that for doctors, dentists, and nurses membership of a trade union is demanded merely as a matter of administrative convenience. Of this it will be easier to judge when we know precisely how the councils define "trade union"—whether strictly as a union affiliated with the Trades Union Congress or loosely as any body representing workers. In recent legislation Parliament has not apparently favoured a "closed shop" in any narrow sense; for example, the Coal Board are instructed to consult with "organisations appearing to them to represent substantial proportions of the persons in the employment of the Board, or of any class of such persons." If the local councils want to find organisations representing substantial proportions of the doctors in their employment they need go no further than the British Medical Association and the Society of Medical Officers of Health, which, though not trade unions, are recognised by the Government and the public as competent to represent doctors on questions of service. If the councils confine themselves to asking that doctors and nurses taking their appointments shall belong to an organisation capable of representing them we shall have to admit that they have a case worth considering. But in a reasonable society, such as we are trying to build, such proposals ought to be put forward in the first place for discussion rather than for compliance. The terms of service of doctors working for local authorities are largely the result of agreement on the national level between all the interested parties, and in our view no big change ought to be imposed locally by individual councils following their own ideas. We believe in fact that local authorities, like workers, should act through the associations formed to represent them.

The independent action of the councils has increased the difficulties of moderate men. Apart from its possible effect on the recruitment of nurses, it has provided a bonus for those who oppose the Government's plans for a National Health Service, and Mr. Bevan may not find it easy to undo the damage. At the same time it must be remembered that under that service the number of doctors and nurses working for local authorities will be far smaller than at present, and the question of trade-union membership may scarcely arise. One of the merits of the scheme, compared with some of its predecessors, is that it goes a very long way to take the medical services out of municipal politics.



## Special Articles

### WORK FOR THE DISABLED

THE scheme for the reablement and settlement of the disabled has benefited greatly by the appointment of the standing committee, under the chairmanship of Mr. H. H. Wiles, to coördinate the work of the responsible departments. They have now reported<sup>1</sup> on the progress of their work up to date, and it makes heartening reading.

The numbers of hospitals in England and Wales offering active reablement have increased from 150 in 1943 to 333 in 1946—thus amounting to nearly 65% of the 520 hospitals selected in 1943 by officers of the Ministry of Health as fitted to develop reablement departments.

In Scotland during the war reablement was concentrated largely in emergency hospitals run by the Department of Health, and in the hatted annexes run by local authorities as part of the Emergency Hospital Scheme. These contain the special units—for neurosurgery, plastic and orthopaedic surgery, and so on—set up under the scheme; reablement departments have been developed according to the needs of each institution. At Gleneagles the fitness centre established for miners now accepts any male civilian. The Department of Health is assessing the present reablement facilities in Scotland, and finding out at which hospitals they might be developed in future.

#### HEART AND LUNG CASES

The London County Council have agreed to start an experimental scheme at the Northern Hospital, Winchmore Hill, for cardiac patients between the ages of 18 and 25, but, owing to staffing difficulties, have not yet been able to set up a centre. More progress has been made on behalf of tuberculous patients: in 1943 memoranda on examination, diagnosis, treatment, and welfare were sent to local tuberculosis authorities; and maintenance allowances are now made to patients during treatment, and paid back to the authority by the Exchequer. The local offices of the Ministry of Labour are collaborating with the tuberculosis authorities in finding work under suitable conditions for patients as soon as they are fit to undertake it. It has proved easier to find part-time work for them than to provide reablement centres, but work in sheltered surroundings is being specially considered.

#### THE HARD OF HEARING

For the partially deaf a new and efficient hearing-aid has been designed by the electro-acoustics committee of the Medical Research Council. Under the new health service, treatment for deafness, scientific assessment of the need for this hearing-aid, and the aid itself, with service and new batteries, will all be provided. Possibly the aids themselves may be made in factories for the disabled.

#### THE MENTALLY ILL

Patients with psychiatric disorders are perhaps the hardest of any to settle in work. Two experimental assessment centres—one in England, one in Scotland—are to be set up where patients will be studied and recommended for the most appropriate form of reablement. They will be run on the lines of the Dartford centre set up to help returned prisoners-of-war. In addition, new reablement centres will be established by the Ministry of Labour for people developing neuroses in industry; these will occupy the civil resettlement units taken over from the Forces. Those with mild troubles, including some who have passed through the centres described, will be helped to return to ordinary work, while the more seriously affected will be given work under sheltered conditions, either by the Disabled Persons Employment Corporation or by voluntary bodies, such as the Ex-Services Welfare Society. For those who cannot be resettled in any of these ways new plans will have to be devised; but in the meantime it will be possible to learn much about their numbers and their needs.

1. Report of the Standing Committee on the Rehabilitation and Resettlement of Disabled Persons. H.M. Stationery Office. Pp. 20. 4d.

### MINERS AND DOCKERS

Apart from the Gleneagles Fitness Centre, special factories for miners with silicosis and pneumoconiosis are planned. Merseyside and Manchester dock-workers suffering from minor physical ailments can nowadays get medical advice and be referred for treatment under an experimental scheme, and the committee feel that the development of similar schemes would be useful. They have also studied the Scottish Supplementary Medical Service, which helps general practitioners by providing complete consultant and diagnostic facilities for early cases of organic disease. This scheme, originally limited to the Clyde Basin and to people under 25, has now been extended to people of all ages in every industrial area of Scotland, and is fully supported by doctors.

#### STAFF TRAINING COURSES

It is thought that the time is not yet ripe for founding a postgraduate diploma in reablement, but some special courses have been held and over 250 doctors have attended them. A new course of training, lasting a year, has been arranged by the Institute of Hospital Almoners, and eligible ex-Service candidates are offered financial help towards taking this. Some 150 physical-training instructors from the Forces are being trained as remedial gymnasts with the help of the Ling Institute.

#### OPENINGS FOR THE DISABLED

Artificial limbs are still being supplied either free or on a cost-recovery basis to all who need them, and the employment of people with artificial limbs is being encouraged by the Ministries of Labour and Pensions. Under the new Act, artificial limbs are to be provided as a part of the health service. The appointment of disablement resettlement officers (D.R.O.s) was at first not wholly successful because there were no candidates with experience of the special duties required of them. Better training courses are now provided.

Vocational training may be provided under the Act for all disabled people over 16 who need it, and a wide range of occupations and trades are covered, including agriculture, civil engineering, and such divers callings as bootmaking, diamond-polishing, commercial art, pottery, hairdressing, piano-making, watch-mending, spray painting, and many others. Great efforts are made to meet individual requests for forms of training not on the list. The number to be trained is agreed with representatives of the industry, who also ensure that those reaching a given standard of training will be found skilled jobs. Some important industries, however, such as engineering, furniture-making, and printing, can only accept small numbers.

Training for technical and professional occupations is also offered. Up to August 31 of this year 3000 people discharged from the Forces for medical reasons had been given awards under the Further Education and Training Scheme, and applications from another 500 were being considered.

At the residential Industrial Rehabilitation Centre at Egham 200 men can be received at a time. They stay 1-3 months, receiving free board and lodging and a maintenance allowance while they are made fit for work or vocational training. Some Army civil resettlement units are to be taken over by the Ministry of Labour and used for the same purpose. The new centres will not exclude people who have been suffering from neurosis, and at least one will accept women.

In order to be eligible for resettlement under the scheme, the patient must put his name on the register of disabled persons maintained at the local offices of the Ministry of Labour. As a result of the growth of the register, and the existence of unemployed disabled, the Minister of Labour decided to raise the quota of disabled persons to be employed in industry from 2% to 3% on Sept. 1, and the possibility of a further increase is being kept in mind. The two employments of passenger electric-lift attendant and car-park attendant have been designated as specially suited for the disabled, which means that future openings in these occupations will be reserved for them.

The Act gives the Ministry of Labour statutory authority to provide sheltered conditions for those who need them, and in fact for some years the Ministry has

assisted some voluntary bodies in work of this kind—notably the Lord Roberts Memorial Workshops. Local authorities will continue to be responsible for the blind, but the Ministry will help the workshops financially. In Scotland the Ministry will take over the responsibility for training in workshops of all blind people over the age of 18.

The Disabled Persons Employment Corporation Ltd., under the chairmanship of Viscount Portal, will develop employment facilities for the severely disabled wherever there is need of them. A programme of 50 factories, to be called "Remploy Factories," for this purpose has been approved, and the first three of these factories are now in action. People pensionably disabled as a result of service in the recent war may be helped to set up in work on their own account if this is considered the best form of resettlement for them.

Two hostels for paraplegics, each catering for 50-70 people, are to be built, one in the London, and one in the Glasgow, area. Meanwhile the Ministry of Pensions has opened convalescent wards at Stoke Mandeville Hospital, where pre-convalescent training is offered. A settlement for these patients is being established at Lyme Green Hall by the joint committee for Cheshire of the British Red Cross and Order of St. John, and the British Legion is undertaking to adapt the patients' homes to their needs. "They are for the town's end, to beg during life," said Falstaff of the old soldiers. Here at least we can admit to a little progress.

## ROYAL COLLEGE OF SURGEONS OF ENGLAND

### DISCUSSION OF THE ACT

THE position which has arisen from the enactment of the National Health Service Bill was discussed at a meeting of fellows on Nov. 29. Sir ALFRED WEBB-JOHNSON, the president, said that the college's representatives had done their best to consider the National Health Service in a non-political way; the freedom of the profession was regarded not as a vested interest of individuals to be served as they pleased. The college had supported the Negotiating Committee because it represented the whole profession; in such a question as this the whole profession should stand together, and the college should support the general practitioner. Despite representations, several important principles to which objection was taken had not been removed from the statute. Ownership of practices might seem a guarantee of independence and devoted service, yet their sale and purchase was to be prohibited. But here opinion was divided, and the point was perhaps not worthy of the important category in which it had been placed; it might possibly be settled by negotiation. In the restriction on the place where the general practitioner might work, the only concession had been that the decision should rest with general practitioners already employed in the area. Other objectionable features were the proposed tribunals with no appeal beyond the Minister, and the threat of part-payment by salary. But "I do not find in any of these items sufficient grounds for refusing to discuss the implementation of the Act with the Minister." The most undesirable of them was the salary element, which might interfere with the doctor-patient relationship.

For specialists, the Act created a monopoly of hospital services; but by negotiation it might be possible to get regulations framed so as to leave the profession as free as it is now. The council agreed that in a large proportion of hospital pay-blocks charges should be controlled; but in some part there must be a free relationship between doctor and patient. The powers given to the Minister might impede private venture; he could, for example, take over a private clinic. What was important was to preserve independent practice. Considerable concessions had been won; and further concessions, the President believed, might be obtained in framing the regulations. The council as a body favoured the profession's support in this work; it was for individuals to make up their own minds.

Mr. WILFRID ADAMS said that the Act was ill-founded because the profession had not been invited to lay down the form of the new service.

Mr. LAWRENCE ABEL agreed that there must be a medical service for all. But he was opposed to negotiation over regulations, because the Socialist Party's declared aim was a whole-time salaried service. The patient's main safeguard, he suggested, lay in the doctor having bought his share in a practice. The Act allowed for consultation with the profession, but the profession's advice would not necessarily be accepted. The most important item was the State-ownership of hospitals, by which a monopoly would be created. By a slight amending Act the service could be founded on rock.

Mr. W. ETHERINGTON-WILSON said that the feeling was growing among general practitioners that the people most likely to let the profession down were the consultants and specialists. Shackles, dictatorship, or direction must sooner or later appear whatever the Minister said now.

Mr. REGINALD PAYNE was opposed to this fresh example of delegated legislation, and monopoly without the right to dissent. The student was to be rendered servile, mobile, and docile. In ten years half the council would be civil servants and the other half Government pensioners. He saw the National Health Service as a whip in the hand of the executive.

Mr. J. S. HORN said that points of principle should not be confused with points of expediency. No mention had been made at the meeting of doctors' economic position under the Act, since that would be an admission that some of the opposition was based on self-interest. The Act should be seen as a democratic measure put forward as the result of a general election at which the plan had been laid before the electorate.

Mr. A. DICKSON WRIGHT held that a free choice of hospitals is as important as a free choice of general practitioners; there was nothing wrong with the voluntary hospitals or their finances. Where commercial organisations were nationalised, dissident elements could be condemned to prison or the peerage; here the Government had to deal with no board of directors, and all that doctors needed to say was that they were not going to work the Act.

Mr. SANGSTER SIMMONDS said that the nature of the service would depend on how doctors did their work; voluntary hospitals had been successful because doctors had worked well. Most of the criticisms had been against points to be settled by regulation, and further improvements might be obtained if the profession negotiated.

A motion regretting the council's decision in favour of discussing regulations (see p. 854) was not voted on. The meeting agreed, without a formal motion, that the main body of the profession should be supported in its decision by the college.

## GENERAL MEDICAL COUNCIL

WINTER SESSION, NOV. 26-28

AFTER the President's address, reported last week, Dr. ROBERT WILLIAM CRAIG was introduced as direct representative for Scotland.

The names of *James Jackson Brown*, *Erich Hohenberg*, *Arthur Patrick Kennedy*, *Matthew Morgan-Daley*, *Brendan O'Carroll*, and *Archibald Walker* were restored to the Medical Register, and the names of *Harry Ernest Best* and *Alfred Horace Myring* to the Dentists Register.

### Penal Cases

On the recommendation of the Dental Board, the council ordered the erasure from the Dentists Register of the name of *Ascott William Harris*, registered as of 29, John Bright Street, Birmingham, 1 (Dentists Act, 1921), for associating in practice with an unregistered person who advertised in Birmingham newspapers a hospital for broken dentures; and the name of *George William Southwood Clark*, registered as of 94, West Street, Gateshead, 8 (Dentists Act, 1921), who had been sentenced to hard labour at Northumberland quarter sessions for breaking and entering a house and stealing goods. Mr. Clark had written a letter to the council stating that he had practised as a dentist for forty years and was entirely innocent of the offence.

### ERASURE FROM THE MEDICAL REGISTER

*Graham George Robertson*, registered as of 25, Mariners Lane, Tynemouth, M.B. Edin. (1934), had appeared before

the council in May, 1944, after dismissal from the R.A.M.C. by court-martial for drunkenness, and after conviction by a police-court of driving a motor-car under the influence of drink. The council then postponed judgment for a year. In May and July, 1945, the council decided that it would have been prejudicial to the health of Dr. Robertson for him to attend, and in November, 1945, when he appeared, the council again postponed judgment for twelve months. Dr. Robertson now appeared, and Mr. S. Winterbotham, of Messrs. Waterhouse and Co., solicitors to the council, read a statement by him that he had been in Bethlem Hospital as a patient and had been unable to obtain employment. The President asked him whether he was at the moment under the influence of alcohol; this he denied, saying that he had last taken alcohol in August. The council directed the registrar to erase his name from the Medical Register.

#### DRUNKENNESS: JUDGMENT POSTPONED

*William Francis Hirsch Coulthard*, registered as of Balwinnam, Aspatia, Carlisle, M.B. Edin. (1927), appeared before the council accompanied by Mr. H. G. Peacock, counsel, instructed by Messrs. Le Brasseur and Oakley, solicitors, for the London and Counties Medical Protection Society. The council found that he had twice in the present year been convicted before petty sessions of drunkenness, on one of these occasions in charge of a motor-car; that under the influence of drink he had used obscene language and assaulted a patient; and that he had twice in the present year requisitioned four ampoules of 'Myocrisin' at the expense of the Cumberland County Council by falsely representing that it would be administered to a patient, whereas none of it was administered to her. Mr. Gerald Howard, counsel, prosecuted, instructed by the council's solicitors. Counsel for Dr. Coulthard admitted that the offences had all been due to excessive drinking but maintained that the doctor had since the last conviction been a total abstainer and intended to remain so. Dr. Coulthard confirmed this resolve in evidence. He said that he had in fact been treating the last patient with myocrisin for four years, and that after she had ceased to be his patient he had inadvertently continued to sign requisition forms. He had not used the supplies.

The President announced that in view of Dr. Coulthard's assurances of abstinence the council would postpone judgment for two years.

*Reuben Denny*, registered as of 64, Twyford Avenue, Acton, London, W.3, L.R.C.P.E. (1929), had been convicted in May, 1946, at Marlborough Street, of driving a motor-car under the influence of drink. He admitted an earlier charge in 1938, for which he had appeared before the council. He said he had not been practising at the time of the recent charge; his health had broken down owing to head injuries, for which he had been sent home from Gibraltar. The council postponed judgment for one year.

*Mrs. Ethel Grundy Toward*, registered as of Brookside, Durham Road, Birtley, Co. Durham, M.B. Durh. (1925), appeared after two convictions before the Gateshead magistrates, one in September, 1945, and the other in February, 1946, of driving a motor-car under the influence of drink. She was accompanied by Mr. Peacock, instructed by the solicitors of the London and Counties Medical Protection Society. She said that she practised in partnership with her husband and had succumbed to alcoholism through overwork, as she had had to run the house in addition to her practice. She had been successfully treated in a home. In the belief that her present appearance would be a warning to her, the council decided that her name should not be erased.

#### CASES ADJOURNED FROM PREVIOUS SESSIONS

*Anthony John Watkin*, registered as of 11, Woodville Road, Newport, Mon, B.M. Oxf'd (1943), had been convicted of attempted abortion and bound over. In November, 1944, the council postponed judgment. He now appeared and presented testimonials. The council decided not to order the erasure of his name.

*John Corboy*, registered as of Freshfield, Lon Dervis, Tycoch, Swansea, M.B. N.U.I. (1939), had been twice

convicted in 1945 of being drunk in charge of a motor-car. Last November the council postponed judgment for one year. In view of satisfactory evidence of his character and conduct the council decided not to order the erasure of his name.

*William Allan*, registered as of 31, Hill Crest, Burnley Road, Sowerby Bridge, Yorks, M.B. Glasg. (1926), had been imprisoned for three months for obtaining £5 by false pretences. In February this year the President announced that the conviction had been proved to the council's satisfaction, and added that from the council's point of view Dr. Allan's record, both as regards his financial dealings and drink, was not satisfactory. The council postponed judgment for two years but desired to see him at intervals during that period. Dr. Allan now appeared and produced testimonials. He admitted that he took a drink on odd occasions but was deriving benefit from psychotherapy. The President said that the council desired to see him again at its session in May, and hoped that he would then produce better evidence of his character and conduct.

#### British Pharmacopœia

Prof. DAVID CAMPBELL, presenting the report of the Pharmacopœia Committee and Commission, said that the whole text of the new *British Pharmacopœia* had been sent to the printers and a part had been returned in proof. While, however, the commission recognised the desirability of producing a new and complete pharmacopœia as soon as possible so as to relieve pharmacists and manufacturers of the necessity of consulting numerous addenda, it regretted that it could not yet suggest a date for the appearance of the new edition.

#### INFECTIOUS DISEASE IN ENGLAND AND WALES.

WEEK ENDED NOV. 23

*Notifications.*—Smallpox, 0; scarlet fever, 1402; whooping-cough, 1773; diphtheria, 319; paratyphoid, 20; typhoid, 3; measles (excluding rubella), 5428; pneumonia (primary or influenzal), 708; cerebrospinal fever, 43; poliomyelitis, 16; polioencephalitis, 0; encephalitis lethargica, 2; dysentery, 69; puerperal pyrexia, 124; ophthalmia neonatorum, 61. No case of cholera, plague, or typhus was notified during the week.

The number of Service and civilian sick in the Infectious Hospitals of the London County Council on Nov. 20 was 959. During the previous week the following cases were admitted: scarlet fever, 46; diphtheria, 19; measles, 16; whooping-cough, 27.

*Deaths.*—In 126 great towns there were no deaths from scarlet fever, 1 (0) from an enteric fever, 1 (0) from measles, 11 (0) from whooping-cough, 5 (0) from diphtheria, 64 (10) from diarrhoea and enteritis under two years, and 18 (3) from influenza. The figures in parentheses are those for London itself.

Sheffield reported the fatal case of an enteric fever. Liverpool had 4 deaths from whooping-cough. There were 11 deaths from diarrhoea and enteritis at Liverpool and 8 at Manchester.

The number of stillbirths notified during the week was 294 (corresponding to a rate of 32 per thousand total births), including 38 in London.

#### On Active Service

##### AWARDS

THE following awards have been made for gallant and distinguished service while engaged in special operations in South East Asia.

M.B.E.

Major J. G. DUMOULIN, M.B. Lond., R.A.M.C.  
Captain E. J. HARRISON, M.B. Camb., R.A.M.C.  
Major ARRON RAPOPORT, L.R.C.P.E., R.A.M.C.

##### CASUALTY

DIED

Captain JAMES WALSH LILICO, M.R.C.S., I.M.S.

The death is announced of Captain Lillico, in October, 1942, while a prisoner-of-war in Japanese hands. After taking the Conjoint qualification in 1937 he joined the Indian Medical Service. He leaves a widow and a son.

## Reconstruction

### THE MINISTER'S REGIONS

#### SOME CRITICISMS AND ALTERNATIVES

FORMERLY it was intended that for hospital purposes England and Wales should be divided into about 30 regions. The white-paper issued when the National Health Service Bill was introduced spoke of 16-20. But in the Government's draft scheme (summarised in our last issue and illustrated in the accompanying maps) the number is reduced to 14. Of these, 4 are so big that they will have to be subdivided, the regional board delegating many of its functions to a committee responsible for part of its area.

In coming down on the side of large regions the Ministry of Health has gone far to meet the "voluntary hospitals" view. On the face of it, the bigger the region which a hospital board covers, the less likely it is to attempt detailed control of individual institutions, and the more it will leave to the hospital management committees. The function of the boards, as the Minister now sees them, is the planning, coördination, and provision of hospital and specialist services rather than the control and management of hospitals, and his plan suggests that the management committees are to have the responsibility and powers they need to attract able men and women to their work.

There are some, however, who, remembering the difficulty of coördinating the activities of voluntary hospitals, fear that any high degree of autonomy for the management committees will prevent the regional board from organising a coherent hospital service. Such a service, they believe, demands more than regional planning and regional coördination: to be effective the board must be able to close, amalgamate, and expand hospitals, to build new ones, to apportion funds, to arrange the bulk purchase of supplies, and to control staff appointments and discipline. They say that if boards are too weak, and management committees too strong, the anarchy of the old voluntary system will begin all over again.

The case for having 30 or more regions, with relatively strong boards, was set out by a *Times* special correspondent on July 12.

"However regarded," he said, "a regional hospital service will be a large undertaking, especially since it is to be directed by a board of part-time and unpaid members, all of whom will have many other duties to occupy their time, including earning their daily bread. If they are to take their hospital board duties seriously, occasional meetings of the full board will not suffice. Much of the work will have to be done through committees, of which at least five—for finance, staff, planning and general purposes, supplies and equipment, and establishment or building—appear to be necessary: and some of these committees will undoubtedly require subcommittees for special subjects, such as mental health services, tuberculosis, and radiotherapy.

"The larger the regions the heavier will be the burden falling on each board, and the greater the time spent by its members on travelling to meetings."

Excessive strain on the members of the board would, he thought, prevent the development of a human and personal service: so far from promoting self-government by the hospitals it might lead to stifling of local initiative through excess of rules and regulations. However this may be, it is clear that infrequent meetings of the board and small attendance at its committees would mean that much of the work would be left to the chairman and the paid staff, and this might favour bureaucratic technique.

Finally objection is raised to the Minister's scheme on the ground that his 14 regions do not take enough account

of "natural hospital areas" but are based primarily on the geographical situation of the universities. Their design starts from the assumption that every region must have a university within its borders; and not all the universities happen to be conveniently situated.

#### UNIVERSITY AND REGION

The choice of a university town as the capital of each region is to many people one of the most attractive features of the scheme. Admittedly the universities and their medical schools have hitherto had little to do with some of the most important parts of the hospital services, such as the provision for infectious diseases, mental disorder, or the chronic sick; and it would of course be a mistake to give them a predominance that would drive out valuable experience of such work. Nevertheless it is easy to see that in the new hospital and specialist services the universities might make the vital difference between mediocrity and excellence, not only because they can insist on scientific and professional standards but because they can offer the incentive of academic status to hospitals and staffs which study to deserve it.

In the *Times* of July 15 Lord Moran pointed out that in future provision must be made for postgraduate teaching for "the whole profession in relays," and this must be undertaken by hospitals not as yet seriously concerned with teaching.

"The particular task of the universities," he said, "would be to see that hospitals in the regions which have been chosen to teach post-graduates are qualified to do so by the competence of their staff and by the nature of their equipment. Each university must demand that every teacher in its region is recognised and approved by its medical faculty, just as all those who now teach in the 12 medical schools of London have to apply to the London University for recognition. In that fashion the faculty will ultimately be largely responsible for the quality of the staffs and in consequence for the efficiency of all sizeable hospitals outside the special 'teaching group.'"

But even those most anxious to promote university influence in the regions do not all accept this as an argument for having only about 14 regions, each with a university inside it. If there were 30 regions it would be possible for each university to adopt two or more in its neighbourhood; for it is not essential that the university should be geographically within the region it is to influence.

This particular argument has been put forward cogently in relation to London.

#### LONDON

In the Ministry's scheme, London is divided into four parts which form the proximal ends of four large regions, one of which stretches to Portland Bill. The division has been made in such a way that each part contains at least two of the dozen undergraduate medical schools at present existing in the metropolis. All four regions will have the advantage of a share in the many important medical institutions of London, whose hospital service is far better developed than that of most of the home counties, and the inhabitants of distal areas will stand to gain immediately by sharing equally with Londoners. On the other hand, it may be argued that in each case the London end of the region will be the tail which wags the dog, and the effect of this will be to prevent the development of self-sufficient hospital services which the peripheral areas could and should build up. How big a part will Canterbury, Brighton, and Maidstone really play in the affairs of a region that includes a quarter of London?

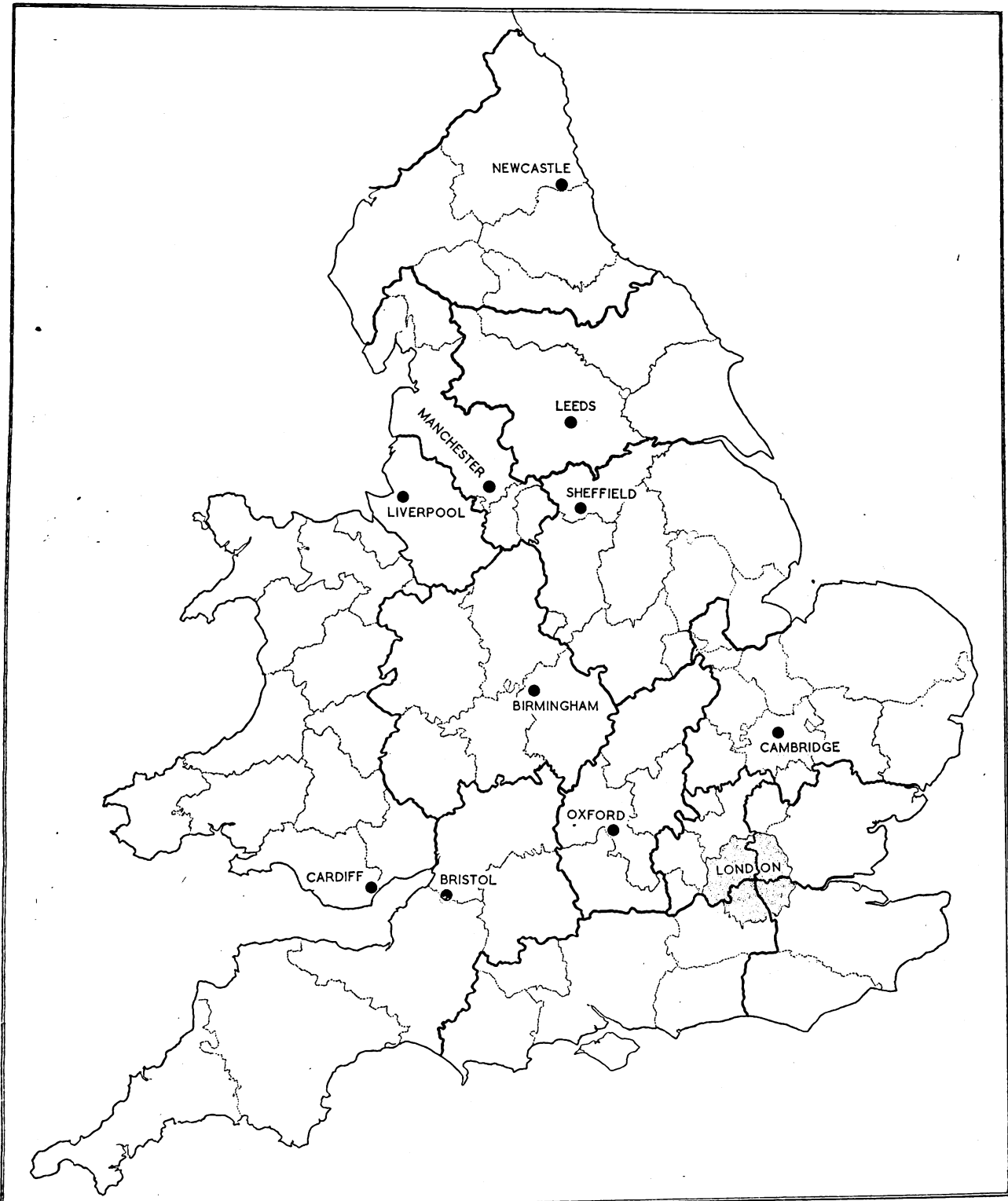
An alternative scheme which has found some support is that London itself, which has historic and functional unity, should not be artificially cut in pieces but should form a region of its own. Its hospital beds would of

course be accessible as at present to the inhabitants of other regions, and its university influence could be exercised on these regions as effectively perhaps as under the Government scheme: the University of London would be represented on their boards, and two or more teaching hospitals would adopt each of them.

SENTIMENT ?

These are some of the questions raised by the Minister's proposals, on which he invites comment by Dec. 15.

Local authorities with large hospital services which will be divided or fragmented by the proposed boundaries may feel that too much emphasis has been placed on the potential rôle of the universities, and too little on the maintenance of going concerns. Again, those who want to see the universities and medical schools in a key position will not necessarily be convinced that the key position must be geographically inside the region—nor that London is the only university capable of interesting itself in more than one region.



The advocates of smaller regions can point to the difficulty of giving life to a regional authority which is too remote to command local interest or evoke local patriotism. And in Wales at least they can point to a region where natural hospital areas have been ignored for extraneous and sentimental reasons.

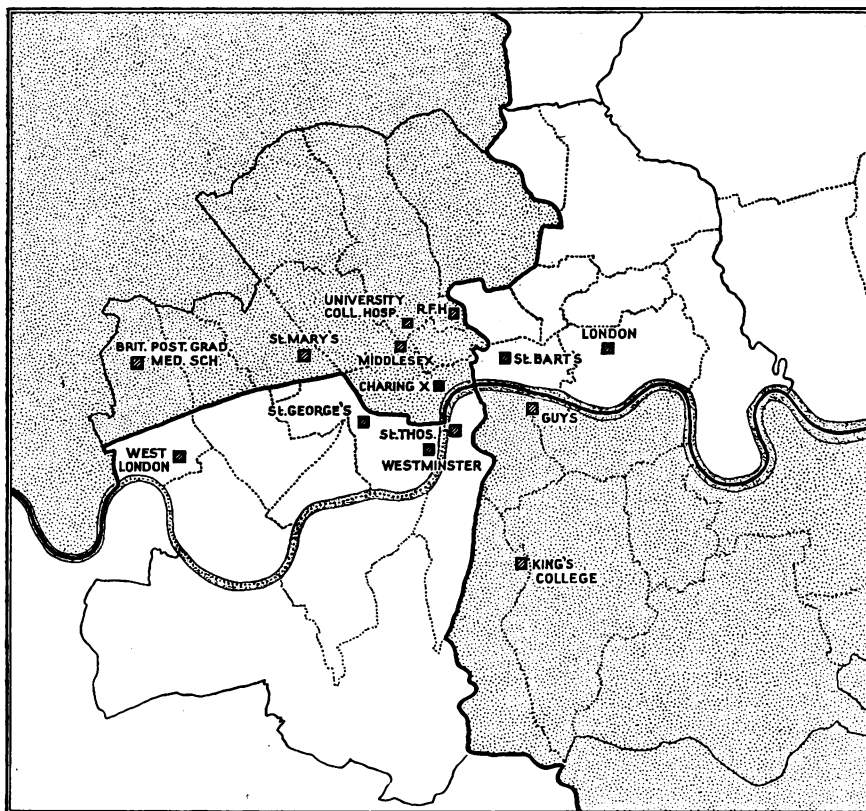
Against these objections, which are undoubtedly valid,

the Ministry can marshal arguments in favour of its plan. On the level of practical politics 14 boards present less difficulty, in appointment and staffing, than 30. On the level of intangibles there can be little doubt that the large region commanding the whole attention of the university which served as its intellectual capital would have more prestige and

personality than the small region which shared with others the attention of a university outside its borders. The smaller the region the more the probability that it will always be merely a unit in a national service. The larger the regions the more chance we shall have of developing a federation of regional medical services, each with a character of its own and striving to prove its worth. This desirable development would be favoured if the regions chose individual names, such as Tyneland, Wessex, and Westland, and if all the services coming under the regional board were called the Tyneland, Wessex, or Westland Hospital Service.

With improving communications, local patriotism and interest may be expected to extend further, and might well attach themselves to a service which explicitly belonged to the region, instead of being just part of an organisation as national as the Post Office.

But if local sentiment is important, what about London? Can it really be wise to begin by splitting the capital city arbitrarily into four zones?



#### NORTH-WESTERN REGION

##### Teaching

Charing Cross (300 beds)  
Middlesex (602)  
Royal Free (327)  
St. Mary's (430)  
University College Hospital (617)  
British Postgraduate Medical School at Hammersmith  
I.C.C. Hospital

##### Voluntary

SS. John and Elizabeth (162)  
Hampstead General (140)  
Royal Northern (484)  
National Temperance (158)  
Italian Hospital (closed)  
London Homœopathic (200)  
French Hospital (70)

St. John's for Skin Diseases  
Princess Louise (100)  
St. Lukes (62)  
West End Hospital for Nervous Disorders (76)  
Western Ophthalmic (42)  
Maida Vale (88)  
Paddington Green (52)  
London Lock (closed)  
Samaritan Free (88)  
Royal Westminster Ophthalmic (100)  
Elizabeth Garrett Anderson (106)  
Royal National Ear, Nose, and Throat (213)  
Metropolitan Ear, Nose, and Throat (22)

Hospital for Tropical Diseases  
Central London Ophthalmic (51)  
Gt. Ormond Street (326)  
Soho Square (81)  
St. Peter's (39)  
National Heart Hospital  
Royal National Orthopædic  
National, Queen Square (265)  
Marie Curie (39)

London Fever (209)  
Royal Dental  
St. Paul's (33)

##### London County Council

Hammersmith (709)  
St. Charles (760)  
Paddington (668)  
Highgate (545)  
Archway (564)  
St. Mary Islington (836)  
St. Pancras (660)  
New End (260)

Sheffield Street (102)  
North-Western (410)  
St. Margaret's (closed)

#### NORTH-EASTERN REGION

##### Teaching

St. Bartholomew's (785 beds)  
London (891)

##### Voluntary

London Jewish (109)  
Poplar (122)  
German (224)  
Metropolitan (150)

Queen Elizabeth Children's (376)  
London Chest (190)  
Royal Chest  
Royal London Ophthalmic (200)  
City of London Maternity (79)  
St. Mark's (72)  
Mother Hosp., Salv. Army (100)

##### London County Council

St. Clement's (397)  
St. Andrew's (630)  
Bethnal Green (650)  
Mile End (568)  
St. Peter's (395)  
St. George-in-the-East (410)  
St. Leonard's (549)  
St. Matthew's (627)  
Hackney (1310)

Eastern (621)

#### SOUTH-WESTERN REGION

##### Teaching

St. George's (436 beds)  
St. Thomas's (583)  
Westminster (405)  
West London (239)

##### Voluntary

Royal Masonic (220)  
Princess Beatrice (88)  
Battersea (85)  
Bolingbroke (135)  
Putney (101)

Queen Charlotte's (87)  
General Lying-in (50)  
Chelsea Women's (126)  
Grosvenor Women's (58)  
Royal Waterloo (130)  
South London (168)  
Victoria Children's (138)  
Belgrave Children's (76)  
Infants (Westminster) (100)  
Royal Cancer (156)  
Brompton (150)  
Royal Incurables' (250)  
Queen Mary's Southampton

##### Borough Maternity

Battersea  
Wandsworth  
Fulham

##### London County Council

St. John's (637)  
St. James (898)  
St. Benedict's (318)  
St. Mary Abbots (832)  
Fulham (716)  
St. Luke's (390)  
Lambeth (1250)  
St. Stephen's (774)

Grove (616)  
Western (517)  
South-Western (363)

Tooting Bec (2355)  
Fountain (680)

##### Middlesex County Council

Springfield (2032)

#### SOUTH-EASTERN REGION

##### Teaching

Guy's (692 beds)  
King's (420)

##### Voluntary

Seamen's  
Miller (172)  
Blackheath (temp. closed)  
St. John's, Lewisham (102)  
Woolwich (137)

Evelina (80)

South-Eastern Children's (100)  
All Saints (55)  
Royal Eye (55)  
British Incurables (100)

##### Borough Maternity

Deptford  
Lewisham  
Lambeth  
Greenwich

##### London County Council

St. Olaves (688)  
St. Alfeges (1107)  
St. Giles (810)  
St. Francis (645)  
Dulwich (723)  
Lewisham (781)  
St. Nicholas (331)

Park (632)  
South-Eastern (484)  
Brook (1151)  
Goldie Leigh (248)

Maudsley (235)  
Grove Park (393)

## In England Now

### A Running Commentary by Peripatetic Correspondents

DOWN here in Brighton we have been having a pre-view of a play dealing with the keen young doctor and his imaginary frustrations by the State Medical Service. Written by Warren Chetham Strode, author of *The Guineapig*, it is called *The Gleam*, though possibly *The Glow-worm* might have more aptly described the mentally conflicted hero, poor "Dr. Alan Boyd, F.R.C.S." Boyd is a young G.P., so we will not cavil at his courtesy title. If some may feel a trifle uncomfortable during his oration on our Vocation ("hands off healing," &c.) it does not spoil the evening's fun, and one is relieved that he had this psychological catharsis; it must have expelled many vapours—which we had noticed with sympathy.

The play goes to London this week. Meanwhile my own views, if I may express them without presumption, are:

(1) That "vocation" applies to firemen much more than to the senior G.P., who usually, though not by any means always, is very cosy and uses his *own* shining conveyance which he does not have to clean himself.

(2) That the *lay* members of committees and boards are much more frightened of doctors than we are of them. Whereas, on the other hand, the medical members can be quite dangerous and oppressive.

The type I most fear is the retired army A.D.M.S. equipped with a Diploma in Medical Administration and Social Coöperation. This is the bird who will make young Tim Cartwright afraid to open his official correspondence. The problem of the medical repercussive punitive poster, armed with higher authority, should now, in good time before appointments are made, be treated as urgent.

I find all this chat about the conservative treatment of perforated ulcer most interesting. Having read the original articles and the subsequent correspondence and resisted the temptation of writing myself to describe the case I once had when, three days after the calculated perforation, I was able to elicit a hitherto unrecorded physical sign—namely, shifting *resonance* in the peritoneal cavity, owing to the escaped gas which had not then been reabsorbed: having got as far as that, my next course was clearly to await the advent of the Right Case.

Yesterday he arrived. Forty-five, three years' dyspepsia, two hours perforated, nothing to eat since the night before, and (to discourage the narcologist) rather a poor chest. All the physical signs were there except absent liver dullness and after all it was early days for that. Two other colleagues agreed that no better case could be found—and at that exact moment my Guardian Angel gave me a prod in the ribs and told me I had better open him up. After I had removed the gangrenous appendix I said to him (my Angel, that is) shall I write to THE LANCET about this? If you do, said he, someone will only write back and say, "Well of course if the poor fool can't diagnose an appendix . . ."

So that's how the matter rests. The other chaps can work out the statistics and explain things to the Coroner from time to time. Like Lord Vansittart I can say with feeling: "Never again."

I called on a very deaf lady one day. At the top of my voice I tried to persuade her that I was not looking for lodgings, but we made no progress. Then with a flash of inspiration I placed my stethoscope in my ears and was relieved to see understanding dawn in her eyes. "Ah, that's bad," she said. "Be you as deaf as I?"

An extract from a recent speech:

"I look forward to the time when some party in power, or perhaps some party seeking office, becomes gravely concerned about the spiritual health of the nation, and devises a comprehensive scheme of salvation at ninepence a week for men and sevenpence for women and children. With free choice of parson. . . ."

"The clerical profession will be expected, indeed will be instructed, to prevent sin; and if any member fail to bring a sinner to repentance within a reasonable time—say three months—an inspector will be sent along to look into the case. . . ."

"Much of the clergyman's time will be spent in making returns, rendering reports, issuing certificates of pardons and indulgences, and filling up the counterfoils. He will in fact once again become a clerk in Holy Orders, but controlled by a layman, who in a previous government was Postmaster-General or Agriculture and Fisheries together with his whacking big administration in Whitehall. . . ."

"I say I am looking forward to this, but I am afraid that it is only a fantasy. Somehow I don't think the churches would allow it to come to pass."

The Medical Exhibition—not perhaps in its old glory, but nevertheless itself, with its free literature, its gentlemanly barkers, among whom the profession go about seedily, trying not to look shamefast at the bulging of their pockets with pharmaceutical baksheesh, its striking similarity to the pre-war Schoolboys' Exhibition, where small boys goggled at the interior of radio sets and guns exactly as we goggle at electrocardiographs and shock-boxes.

Like the B.B.C., it has its three intellectual levels. The highbrows converse with the experienced technicians of Messrs. X and Y or ask awkward questions about one-sweep time-bases and square waves (what fun the radar pundits can have at the expense of the uninitiated—before the war few could rag the oscillograph-makers on their own subject); the middlebrows study bags and baby food; the lowbrows go in for silver pills and polypharmacy. And all of them surreptitiously collect samples. So did I, apologetically. "You shouldn't worry," said the barker, "one of 'em's brought a ruddy great portmanteau." Then there is a certain palatable laxative, which incidentally makes a marvellous cake-decoration. I was sorry for the lonely little woman demonstrating surgical belts, to whom nobody talked. How she must have wished for one of the oscillographs, to show how your belly goes in and out when you wear them!

I do not know where our pharmaceutical colleagues recruit their barkers; it's a hazardous life. They have no means of knowing if the little man who is trying to viva them is a student or a regius professor. The first few answers you get are always ranging-shots, yet only one of the salesmen examined by me would have failed, and only he because he told me that a pill, made largely of oestrogens, would be suitable for children under five. The oscillographers let you twiddle their knobs with an air of deference and one hand ready to make a grab if you look like blowing out the tube. The samples, too—some are bottles of 100, others, pretty enough for a doll's house, have the label arranged so that you can't count the pills; the sternest merchants put three chaste tablets in a little 'Cellophane' bag, and if you don't like it you can leave it. I often wonder what people do with them. I know one colleague who makes toy chemists' shops for his nephews. In any case, it is unwise to go without a poacher's pocket. Full of diabetic chocolate, and bulging with calves-foot jelly, I went home resolved to go next year, and assured that somebody at any rate will send me some parcels this Christmas.

F. D. R.

A statue in a London square? The choice was made for those unborn—to come and stare or "Roosevelt's statue? Yes, I'll meet you there."

For us who heard, for ever he's a voice that pierced the black-out for a friendly chat—so decent of him to drop in and show the neighbours what he felt, what now they know—a voice that told of tools and ships and dawn, and this and that.

But will it show the wasted limb or shun so sad a showing in a London square with lapidary robes? Or shall men stare,

"D'you see the contrast? Yes? that's where one war was won."

## Letters to the Editor

### THE REGIONAL BOARDS

SIR,—Many believe that the regional board will make or mar the future National Health Service. We have been interested to read the views of distinguished members of the medical profession as to how the regional boards might be constituted and administered, and we earnestly hope that Sir Leonard Parsons and Sir Ernest Rock Carling are right in assuming that the primary function of the regional board will be to organise and coördinate a hospital and specialist service which will provide the best possible facilities for the patients in the region. We do not, however, view with equanimity the suggestion of the former that the primary qualification of the chief executive officer should be his "intimate knowledge of the medical aspects of hospital care."

The regional board is not intended to interfere with the medical aspects of hospital care, which responsibility will, we hope, remain with the medical committee of the individual hospital. There is, however, a real danger of this happening by the overweighting of academic and medical representation on the regional board.

I doubt whether many really appreciate the enormous magnitude of the administrative task of these boards, and the great responsibility which rests with them in planning and thereafter supervising their vast hospital service. One of the most urgent duties will be to provide additional beds, and to stimulate recruitment of adequate nursing, domestic, and ancillary staff. The board is also responsible under the Act for the maintenance of existing hospital buildings, their equipment, furniture, and other movable property, and for the proper accounting of moneys granted by Parliament and disbursed to the hospitals in its region. It is obvious that much of the board's work will have to be done through committees and subcommittees.

The members of the regional board are part-time and unpaid. Let us be sure, therefore, that the chief executive officer is one with sound and wide experience of the administration of hospital services. He should be so equipped as to be able to interpret with knowledge the diverse interests of this vast regional organisation, and be without bias in the advice which he gives to his board upon the purely medical aspects of hospital care. In other words, there should be expert technical advice on tap and not on top.

Westminster Hospital,  
London, S.W.1.

CHARLES M. POWER  
House Governor and Secretary.

### CORONARY OCCLUSION

SIR,—Dr. Maurice Newman's review of 50 cases of coronary occlusion in young adults (*Lancet*, Sept. 21, p. 409) and Sir Maurice Cassidy's Harveian oration (*Lancet*, Oct. 26, p. 587) prompt us to send you the following observations from our experience in Vienna during recent years.

*Sex-incidence.*—In 16 cases of coronary thrombosis occurring between 23 and 40 years of age there were only 3 women; while in a collection of 521 cases of all ages which one of us made from the literature, 81% were in men and 19% in women.<sup>1</sup>

*Predisposing Factors.*—The patient is typically tall and more developed in length than breadth with a never-tiring "vegetative hypertensive" temperament. Focal infection is common. Most cases have tonsillitis and dental granulomata, which we always treat after the infarct has healed. Physical strain, in our experience, is a rare cause and no strict time relationship can be established. We consider that tobacco in excess is a predisposing, and may even be a precipitating, cause. Syphilis is rarely even a possible factor; only 4% of our cases had positive Wassermann reactions. The significance of hypertension as an aetiological factor is difficult to assess, since the blood-pressure is lowered after the attack and information about the pressure before the occlusion is usually lacking.

*Onset of Symptoms.*—Careful history-taking shows that coronary thrombosis is not "a bolt from the blue"; all patients in our series had prodromal symptoms. Almost always these consisted in a sensation of precordial

pressure of varying strength during physical exertion and excitement; the distribution may be circumscribed or diffuse.

*Physical Findings.*—Lewis<sup>2</sup> noted that the collapse in coronary occlusion resembled vasovagal syncope. We have studied 51 cases of acute cardiac infarction admitted to hospital within eight weeks of their first attack of pain.<sup>3</sup> Apart from persistent bradycardia attributable to a lesion of the right coronary artery, a temporary slowing of the pulse occurred in 15 cases. Electrocardiography showed this to be variously associated with auriculoventricular block, auriculoventricular nodal rhythm, sinus bradycardia, or simple sinus arrhythmia. We describe a definite bradycardial phase (which we call phase I), with general flaccidity, low blood-pressure, bradycardia, and stupor; the electrocardiogram is characterised by wide high waves, the Q-T interval being at or above the upper limit of normal. We assume this condition to be due to an inhibiting, cardiogenic, vasovagal reflex<sup>4</sup>—a protective mechanism for the acutely diseased heart. This is followed by phase II, with a gradual or sudden onset of motor restlessness and tachycardia, which is certainly not protective and which is probably induced by the release of abnormal metabolites from the damaged myocardium.

Diagnostically and prognostically we consider the recognition of substernal or parasternal discomfort or oppression in young people to be most important. Electrocardiographic records may be valuable, especially when they are made under working stress. We have also used our recently developed methods of investigating the dynamics of the heart by "rheocardiography."<sup>5</sup>

W. HOLZER.  
K. POLZER.

Nervenklinik der Universität, Vienna.

### SULPHONAMIDE GRANULOPENIA IN CHILDREN

SIR,—Your annotation of Oct. 26 does not, I think, sufficiently emphasise that while mild sulphonamide granulopenia is fairly frequent in children, true agranulocytosis is very rare, especially with the less toxic modern compounds.

The benign form of granulopenia, or rather neutropenia, disappears spontaneously when administration is stopped, and no other measures would seem necessary. Although it has become almost traditional to administer large doses of pentose nucleotide, its curative power is very questionable, and it has often proved completely useless.

True agranulocytosis following sulpha drugs is a very serious, but luckily rare, complication. Several clinicians have recently drawn attention to the value of penicillin in preventing and combating the infection which contributes to the fatal outcome of secondary agranulocytosis. In my opinion much more emphasis should be laid on the beneficial effects of whole-blood transfusion; it is at present our most reliable weapon. In assessing the results obtained with folic acid and pyridoxine, it is well to remember that similar satisfactory results have been claimed for nicotinic acid and various liver preparations in the early days of sulphonamides.

French workers have lately suggested<sup>1</sup> that the leukæmic cell, which should be regarded not as an immature white blood cell but as an abnormal element, creates a state of agranulocytosis by crowding out the normal granulocytes; they postulate an agranulocytic syndrome embracing both acute leukæmia and agranulocytosis proper.

I have often wondered whether some of the fulminating agranulocytic complications in children, ascribed to sulphonamides, are not in reality rare instances of acute lymphatic leukæmia in the aleukæmic stage. The child is usually very ill, with pyrexia and sore throat, and sulphonamides are given before the diagnosis is made. Subsequent routine blood-counts may be indistinguishable from those in agranulocytosis. If the condition, with no appreciable enlargement of lymphatic glands, is

2. Lewis, T. *Brit. med. J.* 1932, 1, 873.

3. Polzer, K. In the press.

4. Jarisch, A., Richter, H. *Klin. Wschr.* 1939, 18, 185.

5. Holzer, W., Polzer, K., Marko, A. *Rheocardiography*, Vienna, 1946.

1. Drouot, P.-L., Pierquin, L., Herbeval, R. *Pr. méd.* Oct. 19, p. 677.

1. Polzer, K. *Mitt. Grenzgeb. Med. Chir.* 1943, 46, 169.



rapidly fatal, the true diagnosis may be missed, unless a necropsy and elaborate hæmatological investigations are done.

A boy, aged 6 years, was admitted to hospital following a convulsive attack. He was very ill, pyrexial, and drowsy. The same evening his temperature rose to 105° F, while no satisfactory explanation could be found on clinical examination. In view of the seriousness of his condition, sulphapyridine was given. During the next few days blood-counts revealed a marked fall in the total of white blood cells, with granulopenia. On one occasion the white-cell count was 1140 per c.mm., with 400 granulocytes per c.mm. A tentative diagnosis of agranulocytosis due to sulphapyridine was made, and the child was treated accordingly. A blood-transfusion of four pints improved his condition so much that he was discharged home a month later, apparently cured. He was seen by me again about a year later for a swelling of the right testicle, and the unfortunate child was found to be suffering from lymphatic leukaemia. Death followed rapidly, and the diagnosis was confirmed by post-mortem examination.

St. Charles' Hospital, London, W.10.

A. I. SUCHECKI.

### GONORRHOEA IN THE FEMALE

SIR,—Dr. Neville Mascall (Nov. 16) has put forward a timely plea for care in the use of penicillin, and particularly for full and repeated tests after its administration for gonorrhœa in the female.

As he says, gonorrhœa in women is almost always complicated by the presence of other infecting organisms, and even the complete elimination of gonococci is not synonymous with "cure." It is therefore necessary that specific treatment with sulphonamides or penicillin should be supplemented—usually by some form of local treatment.

What advantages has penicillin to offer? At best it can render the patient non-infective in 12–24 hours; with sulphonamides, as usually given in an outpatient clinic, non-infectivity may be achieved in from 3 to 5 days. With sulphonamides there may thus be a lag of 4½ days, and it would be interesting to know what proportion of patients would be likely to risk infecting others during this time if they were told the diagnosis and its implications. With penicillin treatment observation must be continued for about six months, owing to the risk of its masking or delaying the early signs of coincident syphilis; and with the increased incidence of syphilis such double infections are more frequent now than in the years before the war.

A young married woman was treated with penicillin for gonorrhœa in pregnancy; after delivery sores developed and the Wassermann reaction became positive; the baby also was found to have a strongly positive Wassermann. Reinfection of the mother was virtually ruled out.

It needs very few cases of this sort to counterbalance the problematical gain to the public health of a few days' less infectivity by using penicillin. Up to now the success-rate of penicillin in acute gonorrhœa has been reported to be 90–100%; but if results similar to Dr. Mascall's are obtained by other authorities, then the scale will begin to come down heavily against this treatment.

Experience at the Royal Free Hospital clinic has proved that, with rigid methods of administration, failure to respond to sulphonamides is rare. Advantage is taken of the daily attendance for local treatment in the early stages to combat the incapacity of patients to take the necessary regular doses of sulphonamide. Each patient is given only one day's supply at a time, and each day emphasis is laid on the necessity for taking it according to the instructions on a simple typed slip. Penicillin is given only where the condition does not respond to sulphonamides, or in exceptional circumstances in adults; experience with penicillin in the treatment of gonococcal vulvovaginitis in children accords with that of Dr. Mascall.

In the older textbooks on venereal diseases the authors were often content to say of treatment in the female that it was carried out on the same lines as in the male. Perhaps the disappointing results with penicillin will emphasise that the condition is fundamentally different in the two sexes.

MARY MICHAEL-SHAW

Royal Free Hospital, London.

Director, V.D. Clinic.

### TREATMENT OF ANURIA

SIR,—With reference to the article by Mr. Reid and others (Nov. 23) the following case may be of interest.

A staff-sergeant fell out of a window in Beirut in November, 1945, sustaining multiple injuries including a simple fracture of the right femur at the junction of the middle and upper thirds. He was treated in a slung Thomas splint in abduction with skeletal traction by means of a Kirschner wire through the tibial tuberosity. Leaving Beirut that month I lost sight of this patient until January, 1946, when I encountered him again in Palestine. At that time there was neither clinical nor radiological evidence of any union whatsoever. He had fully recovered from his other injuries, which were comparatively trivial. The diagnosis of delayed union due to the interposition of soft parts was made.

His general condition appeared to be normal, and open reduction of the fracture and internal fixation was decided on. The operation was performed under general anaesthesia without a tourniquet. The diagnosis was confirmed and the fracture reduced and fixed internally by means of a Lane's plate and six screws. After skin closure and during the application of the plaster hip-spica the patient collapsed and it was decided to transfuse him with blood. He had lost quite an appreciable amount during the operation. Cross-agglutination tests were carried out and he was transfused with two pints of citrated group O4 blood. The first pint was run in rapidly and the second pint continued while he was recovering from the anaesthetic. His condition improved and everybody was satisfied until the next morning when it was noticed that both his conjunctivæ were deeply jaundiced.

The transfusion was immediately suspect and the two donors having been traced were recalled and further typings and cross-agglutination tests were carried out. These confirmed that both the donors were group O4 and that no agglutination took place with the recipient's blood. The blood when transfused was 14 days old and had been kept in a refrigerator. No sign of lysis to naked-eye tests had been reported by the blood-transfusion officer before it was given.

The patient presented a very grave picture, with a deepening jaundice, hæmoglobin 40%, and an oliguria amounting to two ounces of very deeply stained urine containing large numbers of red blood cells and casts. The case was seen in consultation with Lieut.-Colonel R. H. Dobbs, R.A.M.C., and it was decided not to try to produce a diuresis by the administration of large amounts of fluids intravenously. The object was to balance input and output and to infuse alkalis and hypertonic glucose. Three or four pints of fluid were given intravenously daily in addition to the fluids he retained by mouth.

In spite of these measures the patient's condition worsened; no urine was passed normally, but two ounces was withdrawn daily from the bladder by catheter. Daily blood-urea estimations had shown the amount to be rising by approximately 50 mg. per 100 c.cm. a day. On the eighth day after the original operation the patient's condition seemed critical. He was still vomiting four or five times a day, the oliguria at two ounces daily, and the appearance and the constituents of the urine remained unaltered. The blood-urea now stood at 400 mg. per 100 c.cm. and the hæmoglobin was 40%, but at no time was there any evidence of œdema.

After consultation with civilian colleagues who had had at that time some experience of peritoneal dialysis it was decided to perform a renal decapsulation. The hip-spica was removed (the thigh incision had healed), and the area was prepared for operation. This was conducted under spinal 'Percaïne' anaesthesia. The right kidney was exposed and the findings on incising the capsule were similar to those described by Mr. Reid. Decapsulation was performed on the right side only and the wound drained by means of a corrugated rubber drain.

The subsequent progress was extremely interesting. From the day after the decapsulation increasing amounts of urine were passed daily with an increasing concentration of urine urea. The blood-urea however continued to rise until the fifth or sixth postoperative day, when the figure stood at 600 mg. per 100 c.cm.; the maximum diuresis was also obtained at about this period and thereafter with a steadily increasing urine urea the figure fell steadily. On the eighth day, just as the picture had begun to improve, a further crisis arose. The hæmoglobin had fallen to 20% owing to the formation of a moderate-sized hematoma in the renal wound. With a great deal of trepidation a further transfusion of two pints of blood was given, without any general or local reaction.

Good progress was maintained, and at the end of four to five weeks the renal condition was normal except for a slight amount of albuminuria. Slight bowing at the fracture site had occurred and was corrected on a Thomas splint. The patient was evacuated to the U.K. seven weeks after the original operation.

The points of interest in this case seem to me to be: first, the cause of the rapid hæmolysis, which I conclude to be lysis in the blood (fourteen days old); secondly, the absence of any reaction at the time of the transfusion, due to general anaesthesia; thirdly, the absence of oedema, due to balanced fluid control and not endeavouring to flog a tired and very sick kidney; fourthly, the very high blood-urea level reached with recovery not beginning until four or five days after the decapsulation; and fifthly, the production of these changes by the decapsulation of one kidney alone.

Childwall, Liverpool.

WILLIAM PARKE.

SIR,—While Mr. Reid and his colleagues (Nov. 23, p. 749) are to be congratulated on the recovery of their patient suffering from anuria, it should surely be emphasised that these patients not infrequently overcome their suppression of urine without all the special procedures suggested. We have recently had a patient at this hospital who had a transfusion reaction due to Rh incompatibility and suffered from severe oliguria, passing only 47 oz. of urine in ten days, compared to an intake of 18 pints by mouth and 11 pints intravenously during the same period. This patient went downhill, becoming more and more drowsy and oedematous, until she was comatose with a blood-urea of 320 mg. per 100 c.cm. Apart from alkalis, sedatives, and fluids (despite increasing oedema) she received no special treatment. Renal decapsulation was considered, but not favoured by the consulting urologist. On the 12th day sudden diuresis most dramatically set in, and the patient subsequently made a complete recovery.

It is agreed that the aim of all treatment must be diuresis, and once the kidneys begin to function again the patient will in all probability recover, even when this happens at a very late stage. One cannot help feeling that renal decapsulation and peritoneal dialysis are serious operations in a patient already dangerously ill and surely must, in such a case, carry a mortality of their own. Are they really justifiable while the causation of this condition remains obscure and patients can recover without surgical interference even if almost moribund?

St. Mary Islington Hospital, London, R. W. DANZIGER.  
N.19.

#### PERFORATED PEPTIC ULCER TREATED WITHOUT OPERATION

SIR,—With reference to Mr. Hermon Taylor's article of Sept. 28, the following case I saw in 1933 is of interest.

A woman, aged 48, had a gastric ulcer of the lesser curvature, as shown in a recent radiogram, which had been treated medically. At 8.30 P.M. on May 20, while standing behind the counter in her grocery shop, she was seized with generalised abdominal pain and collapsed. Her last meal had been at 4 P.M., when she had had bread and butter, fish, and a cup of tea. I saw her at 10 P.M. Her pulse-rate was 140 per min., temperature subnormal, and respirations 40 per min. Her abdomen was board-like and she was continually retching but was too weak to vomit. I diagnosed an acute perforation, but the patient and her husband were strenuously opposed to operation, and against my conscience I continued to treat her, pointing out the hopelessness of the prognosis without surgical treatment.

She was put in Fowler's position, given nothing by mouth, and kept on morphine until the fourth day, when to my surprise her distress disappeared. She was now taking sips of water.

On the seventh day she complained of pain in the 5th, 6th, and 7th left intercostal spaces, radiating to the left loin on the 10th day, and she became feverish. It was thought that she had a subdiaphragmatic inflammatory condition and she was admitted to the Midland Hospital, Birmingham. There was a patch of absolute dullness at the base of the left lung and the chest was explored, but only a little bloodstained fluid was obtained which showed no organisms on culture.

Her temperature gradually subsided and she made an uninterrupted recovery.

Hurst and Stewart<sup>1</sup> mentioned that they had seen three patients with typical signs of perforated gastric or duodenal ulcer recover with starvation and morphine, operation having been refused. In two, recovery was uneventful; the other only recovered after a series of operations performed, during the following 6 weeks, for perigastric and subdiaphragmatic abscesses and empyema. "It is remarkable," was the authors' comment, "that recovery should have taken place in the only three cases we have met in which rational treatment was refused."

Birmingham.

S. SILVERMAN.

#### ICTERUS GRAVIS NEONATORUM

SIR,—I feel that Dr. Third's article (*Lancet*, Nov. 2, p. 635) should not be allowed to pass without comment. His cases were diagnosed during 1944 and 1945. Since that time a large series of publications have appeared, many dealing with the serological complexities of the disease, and I feel that the additional knowledge they provide justifies a rather less pessimistic view than that apparently held by Dr. Third.

Dr. Third has based his observations, as no doubt he will readily agree, upon a very small series of cases, and it is not stated in his protocols for how long after birth the condition was allowed to continue untreated. He was certainly unfortunate in finding two possible imbeciles in his small series, and if more cases had been covered the percentage of mentally affected might have been considerably less. On the other hand it is unproved that the mental changes are the direct result of the yellow staining of the cerebral nuclei; and we are of the opinion that the cerebral degeneration responsible for subsequent imbecility is the result of prolonged cerebral anaemia. It is for this reason that I raise the question of the relationship of the duration of the disease post partum and the date when treatment was first started.

I am in complete agreement with Dr. Third that further investigation is needed to elucidate the problem. There is little doubt that isoimmunisation of the mother may eventually produce different pathological pictures, but seldom is a case so clear-cut as to present, as Dr. Third suggests, a picture of jaundice without hæmolysis. In fact I know of no reliable evidence to support the idea that jaundice in cases of this type is ever truly "toxic" and not solely due to hæmolysis. Dr. Third considers that only the "erythroblastæmic" cases are worthy of transfusion: in our experience the case with a typical blood picture is usually one where the disease has reached its "agonal" stage, and even then transfusion has proved of value. On the other hand, it is desirable that infants should never reach that stage of affection, and whereas we agree that Race's suggestion of injecting the specific polysaccharide hapten (if such it proves to be) to neutralise free circulating antibody is the obvious theoretical desideratum, the early detection of the possibility of erythroblastosis by antenatal serological testing affords an immediately available and practical alternative.

Jessop Hospital for Women, C. CHRISTOPHER BOWLEY.  
Sheffield.

#### THREE IN ONE ?

SIR,—I was most interested in your annotation of Oct. 12, and would like to comment on one point. You suggest that if medical officers worked in turn in all three Services there might be a wider variety of clinical experience than is obtained at present. This is true, but it would endanger a very important part of the medical officer's usefulness.

Practice in the Forces is not merely a matter of prescribing the correct treatment; it is necessary to know the conditions under which the patient is living and the spirit of the Service, so as to understand the mental atmosphere, for instance, on the mess decks in a ship. What is required of a man in the performance of his duty must also be known. The patient has much more confidence in the medical officer who understands these things. Regulations can be learnt from the books, but it is by experience that things are done the best way. Experience alone can teach the medical officer how to

1. Hurst, A. F., Stewart, M. J. *Gastric and Duodenal Ulcer*, London, 1929.

achieve the fullest coöperation between himself and his fellow officers, particularly those in other departments. Conditions vary widely from Service to Service, and it would seem fruitless for a medical officer to have to accustom himself to three types of Service conditions.

These remarks apply more to the general-duty medical officer than to the specialist, and the case for a combined Services medical organisation deserves full consideration. I would like to see a combined *hospital* system, staffed by officers who have been recommended for specialisation from all three Services, the general-duty officer continuing to serve in only one of the Services.

J. C. E. PESHALL.

#### LEFT TURN

SIR,—As one who belongs to no political party—a plague on all their houses—I find the robust, if somewhat démodé, communism of Dr. Kirman rather refreshing.

I wonder how many of my generation, the fifth decaders, have ever thought of themselves as protégés of an ex-ruling class now desperately trying to ally themselves with a decaying bourgeoisie? It is true that doctors are in one sense (and only one sense) a privileged class, their quite special and unique privilege being to serve the sick of all classes; but I should not have thought many of them conscious of any particular "dignity" unless it be the proper pride of decent men and women trying to do a difficult job decently.

Slogans are at best only poor half-truths, but I submit that, on balance, there is more to be said for "government of the doctors, by doctors and potential patients, for patients" than for "government of patients and doctors, by politicians, for politicians."

Crediton.

L. N. JACKSON.

#### PSYCHONEUROSIS TREATED WITH ELECTRICAL CONVULSIONS

SIR,—Letters criticising Dr. Milligan's article of Oct. 12 show considerable ignorance of the nature and effects of electric convulsive therapy. As I have had occasion recently to make repeated visits to St. James's Hospital, I can testify to the good results of the concentrated method for chronic types of neurosis.

Patients do not suffer mental anguish when having electric convulsive therapy, nor does its effectiveness depend, as has been naively stated, on giving a "shock" at the conscious level, and, as it were, frightening the patient out of his illness. It has nothing in common with the "shocks" given in the last century—e.g., at Bethlem when a patient was allowed to fall through a trapdoor into a cold bath. On this principle leptazol would be more effective, since with it the patient may remember horrifying sensations preceding the convulsion. In electric convulsive therapy this never happens and yet it is equally successful. Furthermore, if a patient is always anaesthetised before electric convulsive therapy it is just as efficient. I recently saw a striking recovery from long-standing agitated melancholia where the patient was unaware that she had had electric convulsive therapy, because 'Pentothal' had preceded each shock. The fact that outpatients almost never refuse to go on with electric convulsive therapy shows how little they mind it.

There is no a-priori reason why electric convulsive therapy should be reserved for the psychoses. Only experience can show if the treatment will benefit the chronic neurotic who has failed to respond to psychotherapy and who is tortured by anxiety or by *folie de doute* or endless ritualistic acts. If left alone he is more likely to die by his own hand or by intercurrent disease caused by inanition.

The objection that the patient's brain may be injured is surely one for the neuropathologist rather than the psychotherapist, yet Frostig and others in the U.S.A. have conducted animal experiments over a number of years without finding any irreversible changes with such electric currents. While it is possible that 20 or more treatments with electric convulsive therapy may in cases of idiosyncrasy cause localised organic changes, there is as yet no evidence of permanent impairment from Dr. Milligan's treatment. Since his ex-patients remain under repeated observation any such effects would soon become apparent to himself or the patient's relatives.

Dr. Milligan has certainly made out a *prima-facie* case for this type of treatment in chronic and intractable neuroses. Until further results are available it would surely be advisable for those who have had no experience of the treatment to refrain from highly emotional and even libellous attacks on a responsible and energetic group of psychiatrists.

London, W.1.

A. SPENCER PATERSON.

#### HYPERTENSION AND CALCIUM INTAKE

SIR,—Your review last week of *Studies in Hypertony and Prevention of Disease* attributes to me statements which I never made, and suppresses essential facts which our investigation established. I never stated that the chief villain of hypertony is calcium, nor have I ever claimed that it has been established that calcium is an important factor in the aetiology of hypertony. Only one conclusion is made in regard to this substance: "Calcium administered *per os* has a blood pressure raising action." But it does not follow from this that it is a causal factor in hypertony. The minimum amount of the substance required to raise pressure has never been studied by me.

Out of 114 pages of our book only 14 were devoted to our calcium experiments. We have done a fair amount of work on cholesterol which I hope has advanced our knowledge of the substance considerably. But this is not commented on. The section "influence of high intakes," which contains by far the most important contribution in the book and establishes a principle which physicians and nutritionists will have to heed—a principle which invalidates a good many requirement values and makes nonsense of the phytic acid theory—is not even mentioned in your review. Nor is the very existence of the section under the heading "periodical examinations" brought to the notice of your readers—although this contains in many ways a report on a novel experiment of particular importance at the moment.

Why did you give a distorted description of the book? Evidently your concern was the attitude I have adopted towards the adulteration of our bread, which has offended certain persons in authority.

Even more amazing is the article on page 793 by Kesson and McCutcheon on Hypertension and Calcium Intake which begins: "The statement has been made that a high-calcium diet is an important factor in the production of hypertension in subjects over middle age." Would the authors please give the passages in my book in which I made such a statement?

Why should they have expected to find a low blood-pressure in osteoporosis, seeing that this condition is not a simple calcium deficiency? They naively admit that it is possible to have "calcification of arm and leg vessels" with rarefaction of the bones. It follows from this that we may have arteriosclerosis and even high blood-pressure in osteoporosis. These cases have no bearing at all on our problem. But there are some data which are relevant to it. There is a statement that the affluent classes, whose intake of calcium is unusually high, show a prevalence of arteriosclerosis and allied conditions.<sup>1</sup>

Strange are the experiments of Kesson and McCutcheon in regard to a high calcium intake. Considering that their paper is concerned with hypertony, it is remarkable that no records of blood-pressure readings are given, and no evidence is produced that the myocardium of these patients is in a sufficiently healthy condition to react to pressure-raising substances; nor are we told the type of controls used. The investigators evidently relied on X-ray findings to demonstrate their thesis. I hope they know that we may have arteriosclerosis without hypertony, and vice versa, and that hypertony cannot be diagnosed by X-ray examination. But X-ray does not even lend itself to demonstrate a moderate increase of arteriosclerosis, the method not being exact enough for such a purpose. In rabbits we have demonstrated, by analysing the tissue of the aortas, that a high calcium intake increases enormously the calcium content of these vessels.<sup>2</sup> Heubner<sup>3</sup> kept cats on a high calcium intake

1. Arteriosclerosis, ed. by E. V. Cowdry, London, 1933.

2. Harris, I., Ireland, J. T., James, G. V. *Brit. med. J.* 1941, i, 49.

3. Heubner, W. *Biochem. Zschr.* 1925, 156, 171.

and found that the arteries and tendons contain more calcium than other tissues on it. Judging by the data from animal experiments—and there would not be much left of physiology or pharmacology if such data were not valid for man—the 19 patients under a high calcium intake must have had increased deposits of calcium in the vessels as a result of the treatment; nay, more, a simple calculation shows that a pronounced positive calcium balance, extending over 15 months, and even over 18 weeks, must have caused an enormous accumulation of calcium in these patients, part of which without the slightest doubt must have been deposited in the vessels. The calcium obviously is somewhere in the organism; and this proves that no reliance whatever can be placed on X-ray in an investigation of this kind.

But let us disregard this vital fact for a moment. At any rate one case out of the 19 has shown an increase of arteriosclerosis demonstrated by X-ray whilst under treatment. Kesson and McCutcheon say that this was not due to the high calcium intake. But have they produced valid evidence that this is so? They have not, and they cannot produce such evidence. It is clear that they must admit, to put it at its lowest, that there is a *possibility* that in one case arteriosclerosis increased as a result of the treatment! They naïvely say that they supplemented the ordinary diet with calcium. Clearly a calcium intake which causes a positive balance for 15 months is not given in the interest of the patient. At the beginning of the experiment they could not know the results of this high calcium administration, and according to their own showing there is a *possibility* that they have actually inflicted an injury on at least one of the patients.

By adding calcium to bread the authorities concerned are conducting a larger experiment—on forty million human beings! Every body admits that millions and millions of people do not need the added chalk. The possibility of their suffering injury by it cannot be excluded. These millions are exposed to an unnecessary risk. As a matter of fact it is certain that an intake of such a potent substance as calcium in unnecessary quantities must inflict injury. If it is retained it is bound to do harm, while if an unnecessary amount of calcium passes out via the kidney it causes unnecessary renal strain.<sup>4</sup> There is not a shadow of doubt that the additional chalk must in many instances cause injury and shorten life.

The attack on my calcium experiments can have only one object—to confuse the issue and to mislead. Let me quote what I really say: "In considering it [the adulteration of our bread] the matter in this volume can be disregarded entirely" (p. 10). I have always maintained that the onus of proving their case rests with the authority which forced the added calcium on us. They must produce solid reasons why the adulteration of our bread has become necessary, and they must prove that it cannot possibly do harm. It will be seen from my letter in your issue of Oct. 12 that those responsible for the added calcium have virtually admitted that when the recommendation was made there was no valid reason for it. On p. 9 of my book I say: "No physician outside bedlam would suggest that a high blood-pressure case should consume extra doses of blood-pressure raising substances." And this is exactly what is being inflicted on many people today.

I have suffered calumny and persecution because of my expression of these views. I was prevented from obtaining a research-worker during the war, and it has been quite impossible for me to get a paper published on calcium in relation to hypertension, apart from the intrinsic merit of my effort, simply because no editor dared to offend a highly placed personage! This book was published almost a year ago, yet only one medical journal has dared to review it up till now. And it is quite clear that the only type of review you dare to publish is the one you have actually published; and you have atoned for it by the prompt publication of that precious article with which I deal in this letter.

Well, my book is available, and your readers may judge. My experience is not a happy augury for the shape of things to come, when we shall have fully fledged Government scientists.

Liverpool.

I. HARRIS.

4. Harris et al. High Blood Pressure, London, 1937.

## RESISTANT GONOCOCCI

SIR,—In the autumn of 1943 I had the care of a number of gonorrhœa cases at Mombasa. At that time sulphapyridine was the only remedy available. It soon became apparent that a high proportion of infections contracted in South African ports were resistant to sulpha drugs; so much so that the arrival of a ship from the south was the inevitable prelude to a further batch of cases to be treated by traditional methods. In most of these a definite unstained areola could be seen around the isolated stained gonococcus, and this was assumed to indicate the presence of a capsule. When this areola was demonstrated in the first urethral smears taken on admission it was possible to predict with confidence that chemotherapy would fail. The gonococci involved were thought to be specifically resistant to sulphapyridine as this was the only drug generally accessible for self-treatment in South Africa.

I write to you now because the same phenomenon is appearing in a small group of penicillin-resistant gonorrhœa cases under my care: it may indicate some link between the capsulated gonococcus and resistance to a specific drug, though not necessarily to all forms of chemotherapy at the same time (the first two penicillin-fast cases later yielded to sulphathiazole). Certain strains of capsulated gonococci have been described academically, and the coincidence of capsule and resistance in these cases may be merely accidental. All the same the relation might be worth investigating with better facilities.

S.S. *Arundel Castle*.

W. S. PARKER, Surgeon.

## A MORAL PROBLEM

SIR,—Your annotation last week raised several interesting points. Personally I hope that a serious effort will be made to collect together the results of all the experiments carried out on prisoners in German camps, and that anything of value will be published. The reasons given against such publication seem to me to be simply pernicious sentimentality. If I myself had been a victim, and some results of value or of interest had been obtained from my death, I am sure that I should have preferred to know that this knowledge would have been used and that I had not died entirely for nothing.

At times I have felt a good deal of sympathy for some of those who were responsible for carrying out the experiments. Accounts of the trials leave little doubt that many of the so-called scientists were men of no academic standing, with no idea how to carry out an experiment, and some were no more than irresponsible sadists; all these deserve the appropriate treatment at the hands of the courts. But others were serious research-workers. If one were given the chance of using prisoners for experiments which one believed to be of great importance and value to mankind, what would one do, particularly if government propaganda had convinced one that the victims were dangerous criminals who were anyhow condemned to death, and likely to die in some particularly abominable manner? This is indeed a moral issue, and I am not at all sure what I should myself have done. I have always been most fortunate, in that I have been able to obtain willing and cooperative volunteers when I have wished to carry out experiments on man, but there are many types of investigation for which one must hesitate to use such subjects. I believe that while capital punishment is retained, condemned murderers should be given the opportunity of volunteering to serve as subjects for experiments. The question is rather different when the victims are innocent prisoners, though to a keen research-worker with little contact with the world outside his laboratory and who believes what his government tells him the answer may be simpler.

The method in which these results should be published requires careful consideration. At all costs sensationalism must be avoided, and it might perhaps be as well to grade them as "confidential" and make them available only to bona-fide investigators. Otherwise the press should be taken into the confidence of those responsible for the editing of the reports before publication; the average journalist is a responsible person, and in this way accurate and unobjectionable reporting would be ensured.

KENNETH MELLANBY.

Department of Entomology, London School of Hygiene and Tropical Medicine.

## Parliament

## QUESTION TIME

## Parcels for Europe

IN answer to a question, Mr. JOHN STRACHEY announced that the Government had decided to allow individuals in this country to send food parcels to individuals in any country overseas including Germany. He was arranging for "Save Europe Now" to provide facilities for people who had not friends abroad but who wished to help. Parcels would be restricted to one a month with a gross weight of 7 lb., and only rationed foods, including goods on points, would be allowed. He was happy that it had now proved possible to make these arrangements because it was no longer possible for this country to send bulk supplies of food abroad. The considerable supplies sent last year represented a serious sacrifice. Today our stocks of food, particularly grain, were much lower than at this time last year and it was out of the question for us to make any diversions from them.

## Food Ration in British Zone

Mr. R. R. STOKES asked the Minister of what the 1550-calorie ration in the British zone was comprised.—Mr. J. HIND replied: The composition of the ration varies with the supplies available, and all the items on the ration do not, of course, figure in each day's diet. The following are the details:

Foodstuff	Weight in ounces	Calorific value
Bread .. .. .	12½	875
Potatoes .. .. .	12½	232
Other vegetables .. .. .	2½	11
Skimmed milk .. .. .	4·4	43
Cereal foods .. .. .	1·9	176
Meat .. .. .	0·6	28
Fish .. .. .	0·75	29
Fats .. .. .	0·25	51
Sugar .. .. .	0·9	107
Cheese .. .. .	0·08	5

## World Cereals

Replying to a further question, Mr. STRACHEY said that the total exportable surplus of wheat and coarse grains for 1946-47 was estimated by the International Emergency Food Council at about 25 million tons. Total import requirements of wheat and coarse grains as presented to the council were about 35 million tons. This serious gap between supply and demand would no doubt be somewhat reduced by a careful scrutiny of the requirements submitted by various countries. In fact, however, the general world position was not our main immediate concern. Recent events in North America had gravely affected the ability of both the Canadian and the United States authorities to move wheat for export. The transport position in the United States would govern the flow of cereal supplies to this country over this winter rather than the amount of cereals potentially available in North America. These transport difficulties had already become sufficiently serious to deplete our stocks to a level much below that of this time last year. "It is for these reasons that I must warn the House that there is at present no possibility either of derationing bread or of diverting supplies to Germany or anywhere else. On the contrary, we shall have to take the most vigorous measures to keep our own stocks up to the minimum level at which we can be sure of meeting the present ration."

## Employment of ex-Service Doctors

Mr. S. HASTINGS asked the Minister of Health how many ex-Service doctors were unable to obtain employment in general practice; and if he would make a statement as to the provision of employment for such doctors until the National Health Service Act came into operation.—Mr. BEVAN replied: I regret I have not the information requested in the first part of the question. Ex-Service general practitioners can take the hospital posts and refresher courses available under the Government's postgraduate scheme and it is then open to them to buy or open a practice or to seek assistantships or other appropriate employment in the usual way during the interim.—Mr. HASTINGS: Is the Minister aware of the great difficulty there is among doctors in obtaining assistantships at the present time?—Mr. BEVAN: Yes, I am aware that there is a difficulty. It is a difficulty which always arises immediately before great changes are made. We are doing our best to mitigate the hardships where we can.

## Willesden General Hospital

Mr. E. H. HARDY asked the Minister whether he was aware that the committee of the Willesden General Hospital, a voluntary hospital, had refused to set up a consultative committee in defiance of his advice to all hospital authorities;

and what further steps he proposed to take.—Mr. BEVAN replied: I am drawing the attention of the hospital authority to the recommendation I have already made that there should be a nurses' representative council in every hospital.

## Scottish Bill

In the House of Commons on Nov. 26, Mr. J. WESTWOOD, the Secretary of State for Scotland, introduced the National Health Service (Scotland) Bill which was formally read a first time.

## Medicine and the Law

## Non-consummation and Nullity of Marriage

IN *J. v. J.*, reported in the *Times* of Nov. 23, Mr. Justice Jones refused a wife's petition for the annulment of her marriage where the husband, before the date of the marriage, had undergone an operation which rendered him sterile. Her counsel's arguments echoed phrases heard in the case of *Cowen v. Cowen* last year (*Lancet*, 1945, ii, 183, 215). One of the principal ends of marriage had been frustrated by the husband's operation. Mr. Justice Jones, however, finding that the wife was aware of the disability at the time when she agreed to marry, declined to annul the marriage. The surgeon, it seems, had refused to operate unless both parties signed a statement that they consented to, and appreciated the effect of, the operation. They both signed. The wife's evidence was that she hoped the operation would be postponed till after marriage; but the court found that she married with knowledge that it had been performed.

Her petition alleged inability to consummate or, alternatively, wilful refusal to do so. Before the Matrimonial Causes Act of 1937, sometimes called the "Herbert" Act, inability to consummate was the only ground on which a marriage, though not void, could be avoided. Section 7 of the Herbert Act made a marriage voidable on the additional ground of non-consummation due to the respondent's wilful refusal. Mr. Justice Jones held in the recent case that there was wilful refusal, though, as already stated, he held that the wife's prior knowledge of the husband's condition was fatal to her petition.

Consummation is construed as ordinary and complete sexual intercourse. In the *Cowen* case it was established that there is no consummation if the sexual act is so performed that its natural termination (the passage of the male semen into the woman's body) is artificially and intentionally prevented. Even in the circumstances of the *Cowen* case, however, the court was careful to add the warning that, if this incomplete intercourse took place with the wife's consent, and if she did not object till a later date, her petition for annulment would be rejected unless she could show some justification for the consent she had previously given. The basis of the recent decision in *J. v. J.* is the general principle, however, stated from time to time in litigation of all kinds, that a party cannot "approve and reprobate." The House of Lords speeches in *G. v. M.* in 1885 contain dicta which are important. "Any act," said Lord Chancellor Selborne, "from which the inference ought to be drawn that during the antecedent time the party has, with a knowledge of the facts and of the law, approved the marriage which he or she afterwards tries to get rid of, has taken advantages and derived benefits from the matrimonial relation which it would be unfair and inequitable to permit him or her, after having received them, to treat as if no such relation had ever existed. That explanation can be referred to known principles of equitable and, I may say, of general jurisprudence." The facts of the 1885 decision established no case whatever of the wife's pre-matrimonial assent. The husband in that case was found by the courts to have been impotent; that was not a matter of which the wife could have been aware before marriage. But the observations of Lord Selborne, cited above, were such as Mr. Justice Jones could not ignore.

## Diary of the Week

DEC. 8 TO 14

## Monday, 9th

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1  
8.30 P.M. Dr. F. T. Evans, Dr. Cecil Gray: Modern Anaesthesia.

## Tuesday, 10th

ROYAL COLLEGE OF PHYSICIANS OF LONDON, Pall Mall East, S.W.1  
5 P.M. Sir Arthur MacNalty: History of State Medicine in England: From the Accession of Queen Victoria to the General Board of Health. (First FitzPatrick lecture.)

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1  
5.30 P.M. *Psychiatry*. Leucotomy as an Instrument of Research: Dr. A. Meyer, Dr. T. McLardy (Neuropathological Studies); Dr. S. Last, Dr. G. Greville (Electroencephalographic Studies).

CHELSEA CLINICAL SOCIETY  
6.30 P.M. (South Kensington Hotel, 41, Queen's Gate Terrace, S.W.7.) Dr. Stanley Leader, Mr. Robert Cutler: Plastics in Surgery and Medicine.

LONDON SCHOOL OF DERMATOLOGY, 5, Lisle Street, W.C.2  
5 P.M. Dr. R. M. B. MacKenna: Principles and Practice of Treatment.

EDINBURGH POSTGRADUATE BOARD FOR MEDICINE  
5 P.M. (Royal Infirmary.) Prof. Guy Marrian, F.R.S.: Biochemist's Approach to Problems of Pharmacological Activity.

## Wednesday, 11th

ROYAL SOCIETY OF MEDICINE  
4.30 P.M. *Physical Medicine*. Dr. E. L. Sturdee, Dr. Marjory Warren, Dr. A. R. Neligan: Contribution of Physical Medicine in the Care of the Chronic Sick.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 23, Portland Place, W.1  
3.30 P.M. Sir Allen Daley: Public-health Services of London During the Past Hundred Years.

ROYAL SANITARY INSTITUTE, 90, Buckingham Palace Road, S.W.1  
2.30 P.M. Prof. Harold Burrow: Future Control of Abattoirs and Knacker Yards.

SOCIETY OF CHEMICAL INDUSTRY  
6.30 P.M. (Chemical Society, Burlington House, Piccadilly, W.1.) Mr. D. P. Hopkins: Fertilisers, Manures, and Nutrition.

ASSOCIATION OF INDUSTRIAL MEDICAL OFFICERS: SCOTTISH GROUP  
3 P.M. (Institute of Hygiene, University of Glasgow.) Prof. T. Ferguson and assistants: Symposium on Occupational Medicine.

## Thursday, 12th

ROYAL COLLEGE OF PHYSICIANS  
5 P.M. Sir Arthur MacNalty: History of State Medicine in England: Medical Department of the Privy Council. (Second FitzPatrick lecture.)

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2  
5 P.M. Mr. W. Rowley Bristow: Injuries of the Peripheral Nerves in Two World Wars. (Robert Jones lecture.)

ROYAL SOCIETY OF MEDICINE  
8 P.M. *Neurology*. Dr. L. Guttmann, Mr. E. W. Riches, Dr. D. Whitteridge, Dr. P. Jonason: Treatment and Prognosis of Traumatic Paraplegia.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 26, Portland Place, W.1  
8 P.M. Prof. B. S. Platt: Colonial Nutrition and its Problems.

LONDON JEWISH HOSPITAL MEDICAL SOCIETY  
8.30 P.M. (Woburn House, Upper Woburn Place, W.C.1.) Mr. S. I. Levy: Principles of Urinary Surgery. (Presidential address.)

MIDDLESEX COUNTY MEDICAL SOCIETY  
4 P.M. (Redhill County Hospital, Edgware.) Clinical meeting.

SOCIALIST MEDICAL ASSOCIATION  
7.30 P.M. (296, Vauxhall Bridge Road, S.W.1.) Dr. J. Tylor Fox: Social Aspects of Epilepsy.

LONDON SCHOOL OF DERMATOLOGY  
5 P.M. Dr. F. R. Betley: Seborrhoeic Dermatitis.

## Friday, 13th

ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS, 58, Queen Anne Street, W.1  
5 P.M. Mr. Victor Bonney: Myomectomy.

ROYAL SOCIETY OF MEDICINE  
3.15 P.M. (Manchester Royal Eye Hospital.) *Ophthalmology*. Prof. Geoffrey Jefferson: Surgery of Intracranial Aneurysms. Cases will be shown.

5 P.M. *Clinical*. Cases will be shown at 4 P.M.

8 P.M. *Radiology*. (Joint meeting with the British Institute of Radiology and the Faculty of Radiologists at 32, Welbeck Street, W.1.) Carcinoma of the Stomach: Dr. J. L. Grout (X-ray diagnosis); Mr. H. Rodgers (Gastroscopy).

ROYAL SANITARY INSTITUTE  
10.30 A.M. (Sessional meeting, Warrington.) Dr. S. F. Allison: Welfare of Old People. Dr. J. E. Nicole: Mental Health of the Elderly.

ROYAL INSTITUTION, 21, Albemarle Street, W.1  
9 P.M. Mr. C. R. Harrington, Ph.D., F.R.S.: Body's Chemical Mechanisms of Defence.

LONDON CHEST HOSPITAL, Victoria Park, E.2  
5 P.M. Dr. Franklin Wood: Recent Advances in the Radiology of the Lungs.

## Saturday, 14th

ROYAL SOCIETY OF MEDICINE  
10 A.M. (32, Welbeck Street, W.1.) *Radiology*. (Joint meeting, continued.) Carcinoma of the Stomach: Prof. M. J. Stewart, Mr. Hermon Taylor, Dr. G. C. Fairchild, Mr. Alan Shorter, Dr. D. Jennings.

## Notes and News

## BIRTH-CONTROL

WITH opening speeches by a geneticist, a gynaecologist, a general practitioner, and a judge of the high court, most aspects of birth-control were considered at last week's discussion by the Royal Society of Medicine. Dr. E. B. FORD said that the question of voluntary control because of the risk of transmitting hereditary disease does not arise very often, since most of the conditions themselves restrict procreation. Mutation, he said, is a rare phenomenon, 1 in 150,000 being a high frequency in man; and the balance must be struck between mutation and selection. The chances of transmission depend on whether the condition is heterozygous or homozygous, and on the kinship of the parents.

Mr. ALECK BOURNE, discussing the harm that may possibly be done by the various forms of birth-control, said that chemical spermicides probably do little damage, apart from minor irritation of the vagina with preparations containing quinine, or lactic acid in strengths over 3%; there is no evidence of an increased incidence of vaginitis among women who use this method. The occlusive pessary which along with a spermicide is the method of choice, is also harmless. Intra-uterine foreign bodies, now increasingly fashionable, are liable to cause pressure ulceration and infection. The Gräfenberg ring is unreliable, and acts, moreover, as an abortifacient after conception in the fallopian tubes; it is thus illegal. Douches are useless. Finally, coitus interruptus is both unreliable and bad, leaving the woman, who does not attain an orgasm, with unresolved pelvic congestion; if this is repeated often enough, neurosis ensues. The sustained use of contraceptives deprives the woman of the intangible physiological stimulus, quite apart from the joy of having a family, which is derived from childbearing. It is debatable whether continued contraception causes sterility, except with a foreign body in the uterus, or with coitus interruptus which may interfere with ovulation. There is no substantial evidence that chemicals introduced into the vagina in spermicides interfere with absorption of hormones from the semen; and there is no indication of deleterious effects from the intermittent use of contraceptives to space pregnancies. The epoch has changed inexorably and irreversibly since the Victorian era with its habit of yearly childbearing. Women now view childbearing differently: "those who would abolish contraception must abolish the circumstances which have brought it into being."

Dr. KENNETH McFADYEAN pleaded for premarital instruction by doctors, who should themselves receive more instruction. A chemical contraceptive with an occlusive pessary is, he said, infallible, harmless, and devoid of anatomical or aesthetic objections.

Sir TRAVERS HUMPHREYS said that the practice of contraception is not unlawful. Marriage is a contract, of which consummation is an implied condition; and non-consummation is in most countries a ground for annulment. Last July the Court of Appeal held that a marriage is consummated if penetration is followed by emissio seminis; thus a wife may seek annulment if a rubber sheath is used. The reverse does not hold true: if the wife excludes the chance of pregnancy by herself practising contraception there is no ground for divorce. Abortion is undoubtedly criminal; therapeutic necessity is the only ground on which abortion can be approved or excused, and "I sincerely hope that neither by Parliament nor by the judges will the decision by Mr. Justice McNaughton be doubted." The matter is not so much one of law as of the good sense of the jury. The test is, does the doctor honestly believe that it is essential in the interests of the woman's health to do the operation? Here the doctor is put in the same place as the surgeon; to cut off a leg is a serious assault, and the only reason it is not criminal is the interest of the patient's health and life. The patient's personal wish is no defence in law; any doctor, for example, performing an operation for sterilisation simply at the patient's wish is exposing himself to a charge of criminal assault.

## TUBERCULOSIS ALLOWANCES

FOR dependent children the Minister of Health has authorised, with effect from Dec. 16, the following payments under the scale of tuberculosis allowances laid down in memorandum 266 T:

	s.	d.
aged 11 and under 16 .. .. .	10	6
aged 5 and under 11 .. .. .	9	0
aged under 5 .. .. .	7	6

### APOTHECARIES' HONOURS

THE Society of Apothecaries of London have presented their medals in therapeutics to Sir Alexander Fleming and Sir Howard Florey in recognition of their work on penicillin. At the presentation ceremony on Nov. 28 Prof. E. C. Dodds likened the occasion to the gathering in 1892 at the Sorbonne, in Paris, when Lister delivered the main address at the celebration of Pasteur's seventieth birthday. As Lister said of Pasteur so might it be said of Fleming and Florey: "You have lifted the veil of mystery which throughout the centuries has covered the infectious diseases." These two men had added the final touch to Pasteur's brilliant series of experiments. No two men in history could claim to have saved more lives; and it was an added satisfaction that their discoveries could not be applied to destruction.

In reply, Sir Alexander Fleming recalled how the surgeons' complacency about sepsis had received a severe jolt in 1914. They had started to pour all kinds of chemicals into wounds to kill the microbes, but they had done more harm than good until they returned to their job of cleaning up the wounds. He compared the distressing scenes in a hospital for fractures in Wimereux in 1918 with the relative comfort of fracture cases in this war. Sir Howard Florey remarked on the astonishing series of chances which had led to the introduction of penicillin therapy. There were, he said, some hundred thousands of moulds closely allied to *Penicillium notatum*, and almost all were deadly poisons; yet *P. notatum* was the first to be investigated as an antibiotic. If they had begun with the poisonous species they might well have tired before they reached the one which proved to be non-toxic.

The society also debated the admission of women to its freedom. Mr. T. B. Layton urged the society to make itself a suitable body to play a responsible part in the National Health Service. The Government would not recognise such a body unless it contained women. The question will be decided by the Court of Assistants on Dec. 17.

Finally the Master presented a cheque and scroll to the retiring bedell, Mr. W. T. Withers, in recognition of 59 years of faithful and kindly service.

### THE SISTER KENNY FILM

In a film simply entitled *Sister Kenny*, the RKO Picture Corporation and Miss Rosalind Russell present a restrained biography of this provocative personality, based on Miss Kenny's book, "And They Shall Walk." Her early years as a bush nurse in Queensland introduce her to the disease which she makes her life study; left on her own without medical advice she treats the acute stage of infantile paralysis with hot packs, and then when she believes her patient to be cured she is faced with paralysis. This she treats by careful muscle re-education. Six cases under her sole care do well, and then, the epidemic having subsided, she reports to her nearest medical centre. The local doctor is astounded by her story, which she repeats at his request to the nearby orthopaedic specialist; he is frankly incredulous and mildly insulting, even when she shows him one of her patients. Considerably nettled by this opposition to what appears to this young nurse as self-evident facts she boldly opens a small centre for treating by her methods the failures of more orthodox treatment. This centre is forced to close by local medical opposition, and then she enlists for World War I. She has decided to marry on her return, but a fresh polio epidemic in her home area claims her attention and then she goes, against the advice of her local doctor, to a larger outbreak in Brisbane. Here she meets the full force of orthodox medical opposition, and indulges in a public argument with the eminent orthopaedic consultant. Some years later sees her undecided whether to go to Britain at the invitation of the L.C.C. or to stay at home to give evidence before a Royal Commission on her work; she goes to Britain, but is shortly recalled by public acclaim to a fresh epidemic in Australia. After her return the wholly unfavourable Royal Commission report is published, and a little later her book receives a storm of criticism. Disappointed yet undaunted the now elderly lady goes to U.S.A. on a long lecture tour, but is apathetically received. She decides to return home, but at the last moment is asked by the citizens of Minneapolis to open a treatment centre. Here her lifelong ambitions of treating acute cases early and of describing her methods to medical men are realised in spite of severe criticism of her work by a U.S. commission.

Although it comes from Hollywood, that centre of ballyhoo, and is concerned with a notably controversial subject, the film tells without undue sensationalism a sincere story of devotion to a cause. The medical profession is nobly represented,

whether as the frankly admiring Dr. Alexander or the outraged Sir Charles Brack; but there is no hint that a knowledge of muscle exercises has leaked through to the doctors, who are shown treating their cases only with splints and black despair. Few will deny that doctors are, in the main, conservative, and that they have a deep and often soundly rooted objection to novel ideas on treatment devised by unqualified persons. But in this case, Sister Kenny's idea has been thoroughly examined and as thoroughly rejected by the main body of opinion here and in the U.S.A. Inevitably the film must leave in some lay minds the idea that a wonder treatment awaits but for the doctors' perversity. Is this quite fair to the public? It might be better if RKO had chosen a subject that doctors should have examined but have not. Perhaps they will try again. There should be no lack of suggestions.

### ALL DONE BY SEALS

THE Christmas seals of the National Association for the Prevention of Tuberculosis are now well known. This year the design shows an old-fashioned lamplighter, with his ladder set against the lamp, under a starry sky.

It is impressive to realise how much work for the tuberculous depends on the sale of these coloured stamps. The association has worked for 45 years, by means of education, research, and propaganda, to reduce the disease. During the past year Dr. Santon Gilmour's report on tuberculosis in the West Indies has been published; the N.A.P.T. handbook of tuberculosis schemes has been revised and reissued; a new publication—*Tuberculosis Index and Abstracts of Current Literature*—has been started in association with the Tuberculosis Education Institute; and a new popular quarterly called *Health Horizon* has been founded. The association has continued to advise and educate the public by answering inquiries, by publishing non-technical leaflets and magazines (including one for young people called *The Lamplighter*, launched last June), and by its social welfare department. Refresher courses, conferences, and meetings have also been arranged.

All these activities are financed by the sale of Christmas seals. Twenty-four million of these, the gift of the Canadian Tuberculosis Association, are now available, and are sold at the rate of 4s. for a sheet of a hundred by the N.A.P.T., Tavistock House North, London, W.C.1.

### University of Oxford

The following degrees were conferred on Nov. 23:

*D.M.*—L. J. Bussell (in absence).

*B.M., B.Ch.*—Robert Elsworth Snow, T. A. Madden.

### University of London

Sir Ernest Graham-Little has resigned from the chairmanship of the external council of the university owing to heavy parliamentary work. Sir Ernest has been chairman of the council for nearly 25 years.

### University of Manchester

Mr. A. M. Boyd has been appointed full-time professor of surgery and director of the department of surgery from Dec. 25.

Mr. Boyd was educated at Haileybury, and studied medicine at St. Bartholomew's Hospital, qualifying M.B. in 1929. In 1931 he became a F.R.C.S. At St. Bartholomew's Hospital, after holding several other posts, he was appointed demonstrator in anatomy, and for three years was an assistant in the surgical professional unit. He was surgeon to an E.M.S. hospital in 1939 and 1940, before joining the R.A.M.C. Early in 1941 he was posted to the Middle East, and he served in Egypt and Palestine for four and a half years. In 1942 he was promoted to lieutenant-colonel and placed in charge of the surgical division of 63 General Hospital, Cairo, where under his direction a centre for vascular injuries was established. He returned to England in November, 1945, and resumed his duties at St. Bartholomew's Hospital, where he became an assistant surgeon last April. His special interest has been peripheral vascular disease, on which he gave a Hunterian lecture in 1935; he has published a number of papers on this and other subjects.

### University of Leeds

Dr. R. N. Tattersall has been appointed a full-time lecturer in medicine.

### British Postgraduate Medical School

Dr. Denis Hill has been appointed consultant in medical psychology at the school in succession to Dr. Eliot Slater, who has resigned. The L.C.C. have given him permission to hold this new appointment simultaneously with his present post of electroencephalographer at the teaching and research laboratory at the Maudsley Hospital.

### Courses for Medical Artists

Arrangements have been made for student medical artists to be accepted at the Central Middlesex Hospital for a three months' course at a fee of 15 guineas.

**Royal College of Surgeons of England**

At a meeting of the council held on Nov. 29, with Sir Alfred Webb-Johnson, the president, in the chair, the following resolution was passed:

"The Council desires the Negotiating Committee to enter into discussions and negotiations with the Minister on the Regulations authorised by the National Health Service Act."

Sir Cecil Wakeley was appointed Bradshaw lecturer for 1947. Dr. Frank H. Lahey, of Boston, was appointed to deliver the first Cecil Joll lecture in September, 1947.

It was decided to publish a periodical containing news items and college lectures.

The Association Française de Chirurgie has given 50,000 francs to the college's rebuilding fund.

The council, having acceded to requests from the Royal Australasian College of Surgeons, from the medical faculty of the Egyptian University, Cairo, and from the Director-General of Medical Services in India to conduct the primary F.R.C.S. examination overseas, has appointed the following examiners for this purpose: Sir Heneage Ogilvie, Prof. B. A. McSwiney, and Prof. G. Hadfield. They are due to leave London on Dec. 8, and the examinations will begin in Cairo on Dec. 12, in Madras on Dec. 23, and in Australasia on Jan. 6. The examiners should arrive back in this country about the end of January. Altogether 224 candidates will be examined—32 in Cairo, 65 in Madras, 63 in Melbourne, 29 in Sydney, and 35 in Dunedin.

**Royal Society**

The following have been elected officers of the society for the coming year:

President, Sir Robert Robinson; treasurer, Sir Thomas Merton; secretaries, Sir Alfred Egerton and Sir Edward Salisbury; foreign secretary, Prof. E. D. Adrian, M.D.; members of council, Dr. C. H. Andrews, M.D., Prof. W. T. Astbury, Prof. W. Brown, Mr. E. C. Bullard, Prof. A. C. Chibnall, Prof. C. A. Lovatt Evans, M.D., Prof. N. Hamilton Fairley, M.D., Prof. R. A. Fisher, Prof. S. Goldstein, Prof. E. L. Hirst, Prof. H. W. Melville, Prof. M. H. A. Newman, Prof. M. L. E. Oliphant, Mr. C. F. A. Pantin, Prof. H. H. Read, Sir Reginald Stradling.

The two royal medals for the year have been awarded to Sir Lawrence Bragg, F.R.S., for his researches in the sciences of X-ray structure analysis and X-ray spectroscopy, and to Mr. C. D. Darlington, D.Sc., F.R.S., for his researches in cytology and genetics. The Copley medal has been awarded to Prof. E. D. Adrian, O.M., for his researches on the fundamental nature of nervous activity, and recently on the localisation of certain nervous functions.

**Royal Sanitary Institute**

The Benjamin Ward Richardson lecture will be delivered at the institute on Dec. 11, at 2.30 P.M., by Prof. Harold Burrow, whose subject will be Future Control of Abattoirs and Knacker Yards. At a sessional meeting in Warrington, at 10.30 A.M. on Dec. 13, Dr. S. F. Allison will speak on the Welfare of Old People, and Dr. J. E. Nicole on the Mental Health of the Elderly.

**L.C.C. Mental Service**

The following medical superintendents have now been confirmed in the promotions which they received on a temporary basis during the war: Dr. A. C. Dalzell, Friern Hospital; Dr. J. F. MacMahon, the Manor; Dr. L. T. Hilliard, Fountain Hospital; Dr. J. H. Watkin, Leavesden Hospital; Dr. Louis Minski, Sutton Emergency Hospital; Dr. A. B. Stokes, Maudsley Hospital.

**Dangers of Raw Meat**

The Ministries of Food and Health have circulated a warning against eating pork, pork sausage meat, ham, or any other pork product unless it has been thoroughly cooked. They also call attention to the dangerous practice of spreading raw sausage meat on bread; it will be recalled that this substitute for meat paste has been a potent cause of trichinosis.

**Certificates for Air Travellers**

Doctors who give vaccinations and inoculations to intending air passengers are asked to use the "International Certificate of Inoculation and Vaccination" (Form 3150) when recording them. The forms can be obtained by the passenger from the agency from which he receives his ticket and flight information. The use of any other form may lead to delays and quarantine in foreign countries where only the international certificate is officially recognised.

**Appointments**

BEAL, J. R., M.D. Manc., D.P.H.; senior T.O., Northumberland.  
COLBECK, J. C., M.B. Lond.: director of pathological and laboratory services, West Riding of Yorkshire.  
DAVIS, H. S., M.B. Camb., M.R.C.P.: physician to outpatients, Hampstead General and North-West London Hospital.  
PETERS, H. J., M.B., B.H. Durh., D.P.H.: M.O.H., Stockton-on-Tees.  
SMITHARD, E. R. H., M.D. Lond., D.P.H.: M.O.H., Lewisham.

**Ministry of Health:****Senior Medical Officer:**

LILICO, G., M.B. Edin., D.P.H., M.O.H., Derby, recently seconded to UNRRA.

**Medical Officers:**

BOUCHER, C. A., D.M. Oxfd, D.P.H., formerly A.R.P.M.O., Shoreditch, at present temp. M.O. at Ministry.  
GORRIE, MARY G., M.D. Glasg., D.P.H., regional M.O. for maternity and child welfare, Aberdeen and Kincardine, late temp. M.O. at Ministry.  
HERBERT, ANNE E. M., M.R.C.S., D.P.H., M.O., Welsh Board of Health.  
HIRST, KATHERINE M., M.B. Lond., D.P.H., deputy M.O.H., Islington.  
MACGREGOR, I. M., M.B. Glasg., D.P.H., A.M.O.H., Bristol, late colonel R.A.M.C.  
MANSON, MARGARET M., M.B. Edin., D.P.H., temp. M.O. at the Ministry.  
MARTIN, A. E., M.D. Manc., D.P.H., senior A.M.O.H., Leicestershire.  
MURRAY, L. H., M.D. Durh., D.P.H., superintendent, Lancheater Joint Hospital Board, co. Durham.  
ROSS, J. M., M.B. Aberd., A.M.O.H., Lancashire, seconded as temp. M.O. to the Ministry.  
TAYLOR, I., M.B. Lond., M.R.C.P., D.P.H., divisional M.O., L.C.C.  
WINNER, ALBERTINE L., M.D. Lond., M.R.C.P., consulting medical practice, lieut.-colonel R.A.M.C.

\* Appointments subject to confirmation.

**Examining Factory Surgeons:**

FOSTER, A., M.B. Glasg.: Port Glasgow.  
GAUNTLETT, E. G., C.B.E., D.S.O., M.B. Lond., F.R.C.S.: Braintree.  
GREEN, J. W., L.R.C.P.I.: Waltham Abbey, Essex.  
HENDERSON, A. G., M.B. Edin.: Arbroath.  
JACKSON, F., M.B. Manc.: Kirkham.  
LIDDELL, C. M., M.B. Aberd.: Peterculter.  
SULLIVAN, D., M.B. N.U.I.: Bilston, Staffs.  
WILLIAMS, R. E., L.M.S.S.A.: Godalming.

**London County Council Central Medical Staff Assistant Medical Officers:**

COPITHORNE, R. E. C., M.R.C.S., D.C.H.  
MCKENDRICK, E. M., M.B. Glasg.  
MCMICHAEL, J. K., M.D. Edin.  
SUMMERS, F., M.B. Lond.

**Colonial Service:**

CARUANA, S., M.B., B.S.C.: M.O., Sierra Leone.  
CHARLTON, D. W. F., M.R.C.S.: M.O., Kenya.  
DAVIES, R. G., M.B. Lond.: M.O., Kenya.  
DUFF, A. R., M.B. Edin.: M.O., Uganda.  
EDEY, L. G., M.B. Aberd., D.T.M. & H.: D.D.M.S., British Guiana.  
FURNESS, J. E., M.B. Lond.: M.O., Nigeria.  
GLASS, G. M., M.B. Belf.: M.O., Sierra Leone.  
ISAAC, R. H., M.R.C.S.: M.O., Malaya.  
JOYNER, C. M., M.B.: district M.O., Bahamas.  
LANE, J. P., M.B. N.U.I., F.R.C.S.: M.O., Tanganyika.  
MCADAM, I. W. J., M.B. Edin., F.R.C.S.: M.O., Uganda.  
RAPER, A. B., B.S.C., M.D. Leeds, M.R.C.P.: M.O., Uganda.  
SCOTT, D., M.B.: M.O., Gold Coast.  
SCOTT, EDITH, M.B. Aberd., D.OBST.R.C.O.G.: M.O., Nigeria.  
SMARTT, C. G. F., M.R.C.S.: M.O., Tanganyika.  
STECHEER, S., M.D. Vienna: M.O. (grade C), Trinidad.  
STRUDWICK, R. H., M.B. Birm.: M.O., Nigeria.

**Births, Marriages, and Deaths****BIRTHS**

BROCK.—On Nov. 27, the wife of Dr. Bevis Brock—a son.  
BUTLER.—On Nov. 26, at Buckhurst Hill, Essex, the wife of Mr. E. C. B. Butler, F.R.C.S.—a son.  
CONWAY.—On Nov. 20, the wife of Dr. D. J. Conway—a daughter.  
GRAY.—On Nov. 22, the wife of Dr. George Gray—a son.  
HANBURY.—On Nov. 24, in London, the wife of Dr. Paul Hanbury—a daughter.  
MALLOWES.—On Nov. 26, at Weymouth, the wife of Surgeon Lieutenant H. Russell Mallowes, R.N.V.R.—a daughter.  
SCHRYVER.—On Dec. 1, at Epsom, Dr. Nancy Richardson, wife of Peter Schryver—a son.

**MARRIAGES**

BRADY—AMBROSE.—On Nov. 26, in London, Surgeon Lieutenant Thomas Joseph Brady, M.R.C.S., to Margaret Mary Ambrose.  
LONG—VLASTO.—On Nov. 28, in London, Aidan Long, M.B., to Helen Vlasto.  
ROSE—MIETH.—On Nov. 28, in London, Louis Rose, M.R.C.S., to Johanda Ingrid Gertrud Mieth.  
TRINGHAM—SHERWOOD.—On Oct. 26, at Hong-Kong, Surgeon Lieutenant Robert Tringham, M.B., R.N.V.R., to Junior Commander Ida Seaman Sherwood, A.T.S.

**DEATHS**

GAMGEE.—On Nov. 27, Katherine Mary Lovell Gamgee, M.R.C.S., D.P.H.  
HAYTHORNTHWAITE.—On Nov. 24, at Little Hayes, King's Langley, Herts, Isset Mead Haythornthwaite, L.R.C.P.E., aged 87.  
HERBERTSON.—On Nov. 23, at Ferring-by-Sea, John Richmond Herbertson, M.B. Glasg.  
HONEYMAN.—On Nov. 24, William Murray Honeyman, B.S.C., M.B. St. And., M.R.C.P., squadron-leader R.A.F.V.R., aged 35.  
IRVINE.—On Nov. 21, at Lewes, Sussex, Maurice Lionel Corrie Irvine, M.D. Lond., D.T.M. & H., lieut.-colonel I.M.S.



**MALNUTRITION**

**IN RELEASED PRISONERS-OF-WAR AND INTERNEES AT SINGAPORE**

J. B. MITCHELL

M.B. Lond.

LATELY MEDICAL SPECIALIST  
R.A.M.C.

J. A. BLACK

M.B. Camb., M.R.C.P.

GRADED PHYSICIAN  
R.A.M.C.

This report deals with 1230 patients admitted to the 47th British General Hospital, Singapore, between Sept. 9 and Oct. 8, 1945, mainly from camps in Singapore, Sumatra, Java, Borneo, Sarawak, and Bangkok. Of these, 86% were British Servicemen and civilians, the rest being mainly Australian and Dutch; only 1.6% were women. The greater part were admitted because, in the opinion of the camp doctors, they were not fit to make a voyage in a fully equipped hospital ship.

Nearly all these patients had been in captivity since February or March, 1942. The degree of maltreatment imposed by the enemy varied in the different camps, but usually the diet was deficient in proteins, fats, and vitamins. Rice, the staple article of diet, was usually highly polished. Most camps saw a quantitative reduction in rations early in 1945, which was maintained.

Burgess and Cruickshank (1946) stated that the diet at the military camp at Singapore supplied about 2500 calories daily, though in the last year the figure fell to 2000 calories, and that it was unbalanced in respect of the components of the vitamin-B complex. Bennet (1946), describing conditions in Formosa, spoke of the importance of conditioning factors—the harsh standards of fitness for work enforced by the Japanese and the prevalence of diarrhoea.

One of our patients gave this account of his diet between August, 1944, and August, 1945, when he was doing heavy manual work in Sumatra: rice 320–400 g., tapioca meal 70–100 g., daily; vegetables variable, consisting of jungle roots and leaves; fruit, usually green mangoes, issued occasionally; meat, a cube about the size of a large lump of sugar, issued every fifth or sixth day; meat bones used to be boiled again for soup and finally ground up and eaten.

The diet in a prison holding British civilians in January and February, 1944, consisted of a pint of hot water at 8 A.M., and 1/2 pint of cooked rice with about a dessert-spoonful of curry sauce at 11.30 A.M. and again at 6 P.M. The rice was often rancid.

Rice-polishings and synthetic vitamin preparations were always scarce and often unobtainable.

**ANALYSIS OF CASES**

Nearly all the patients admitted to the hospital in the month under review were extremely wasted. Many men admitted for malaria or diarrhoea had or developed signs of vitamin deficiency. The patients were admitted for the following disorders:

Disorder	Cases
Malnutrition .. .. .	577 (46.9%)
Malaria .. .. .	73 (5.9%)
Dysentery or diarrhoea .. .. .	87 (7.1%)
Surgical complaint .. .. .	82 (6.7%)
Some other disease .. .. .	163 (13.3%)
Mild malnutrition (ambulant cases)	81 (6.6%)
Unclassifiable (inadequate case-notes)	167 (13.6%)
<b>Total .. .. .</b>	<b>1230</b>

In the 577 cases admitted for malnutrition the outstanding lesions were as follows:

Outstanding lesion	Oedematous cases	Non-oedematous cases	Total
Amblyopia .. .. .	8	28	36 (6.2%)
Riboflavin deficiency .. .. .	0	3	3 (0.5%)
Skin lesions .. .. .	9	16	25 (4.3%)
Tongue lesions .. .. .	51	59	110 (19.1%)
Neurological .. .. .	88	64	152 (26.3%)
Other lesions .. .. .	197	54	251 (43.5%)
<b>Totals .. .. .</b>	<b>353</b>	<b>224</b>	<b>577</b>

**GENERAL MALNUTRITION**

Many combinations of signs due to food deficiency were seen. Symptoms and signs varied in severity from simple wasting, with or without oedema, as seen in ambulant cases, to extreme emaciation and inanition.

In the most severe cases there was a history of having been in bed for two months or more and of being unable to assimilate the increased diet on liberation. There was always a history of passing frequent watery stools for three weeks or more. On examination lethargy was present; it took an abnormally long time to make the patient fully awake. Laycock (1944), describing starvation in China, remarked on the tediousness of extracting a history, and we found the same thing. When the patient was fully roused, orientation in time and space was normal. Speech and movements were feeble and slow, the voice weary, and the expression lethargic and immobile. There was no complaint, no desire for food, and apparently no desire to live. Respirations were slow and shallow, pulse feeble, and blood-pressure sub-normal. Emaciation was extreme. The skin was coarse, wrinkled, and dry. Especially over the backs of the hands, elbows, knees, ankles, and neck it was thickened and scaling. The mucosae were pale, and the tongue small and sometimes reddened. The mouth was dry. Oedema varied from a little pitting over the dorsa of the feet to massive oedema with multiple effusions into the serous cavities. Oedema sometimes increased during recovery.

Signs of vitamin deficiency often appeared after an improvement in the diet, occasionally at an unexpectedly late date and after several weeks' hospital diet and vitamin therapy, and they often became more pronounced after a fever. An exception to this was the reduction in oedema which often took place during an attack of malaria or of diarrhoea.

CASE 1.—A male civilian, treated for several months for peripheral neuritis and amblyopia, had been on a good diet and vitamin therapy for two weeks before admission on Sept. 11. He complained of blurred vision and numbness and tingling in the feet. He was very wasted; tongue red and smooth; knee, ankle, and biceps jerks not elicited. The ophthalmologist reported a paracentral scotoma. The patient was given hospital diet, with 6 compound vitamin tablets daily and 10 mg. of thiamine intravenously daily. Nine days after admission he suddenly became weaker in the legs, with gross ataxia of both arms and legs. Three weeks later there was only slight improvement.

CASE 2.—A bombardier, who on admission was grossly oedematous, with ascites and bilateral pleural effusions, severe anaemia, red smooth sore tongue, tachycardia, diarrhoea, and pellagrous skin lesions on the backs of the hands and forearms. After an initial general improvement he developed an empyema five weeks later. Thereafter his condition rapidly deteriorated and a well-marked angular stomatitis appeared. His skin and tongue continued to improve in appearance up to the time of his death.

**AMBLYOPIA**

Ocular deficiency symptoms appeared as early as four months after captivity. The average time was about a year, but some cases did not develop for more than three years. They were often unassociated with other signs of vitamin deficiency.

Photophobia and a burning sensation in and tiredness of the eyes were early symptoms. Supra- and retro-orbital headache was also present. Defective vision usually came on later. Blurring of letters and missing letters and lines when reading print, and failure to recognize faces, were noticed. Of the cases examined, about 13% had a vision of 6/60 or less in each eye, and the remainder 6/18 or less. Visual acuity was about equal in the two eyes.

Corneal and conjunctival sensation was normal, and the corneal changes which have been described in association with riboflavin deficiency were not seen by the

ordinary methods of examination. In the most advanced cases the pupils were dilated and reacted sluggishly to light, and contraction was ill-sustained.

Ophthalmoscopic appearances included normal disks even in some severe cases; temporal pallor exceeding normal limits in most cases; and signs of complete optic atrophy in a few cases. In all the advanced cases and in some of the less advanced a central or paracentral scotoma was found.

A weakness in accommodation and premature presbyopia, without evidence of refractile change in the lens, were noted in many of these cases and in patients without amblyopia.

#### RIBOFLAVIN DEFICIENCY

Manifestations of riboflavin deficiency were transitory, lasting about 4-8 days. Angular stomatitis was the commonest; next came magenta tongue; and cheilosis was occasionally seen. These signs were usually present singly.

Except for a few cases in which signs appeared unexpectedly late, and then usually after an attack of malaria, dysentery, or some digestive disorder, nearly all were seen within the first fourteen days in hospital. A history of signs appearing shortly after going on to a diet of higher calorie and carbohydrate value was usual.

#### SKIN LESIONS

*Hyperkeratosis* was the commonest skin lesion seen. The most common sites were round the ankles, on the backs of the hands, and round the elbows and knees. Hyperpigmentation was often present but not excessive. Underlying erythema was not seen. Itching was commonly absent and never a prominent feature. In cases with much hyperkeratosis, diarrhoea was also present in about half, and a sore red tongue in about a third. On hospital diet and nicotinic-acid therapy (average dose 300 mg. daily) the skin lesions recovered in 10-21 days. Sore tongue and diarrhoea, when present, responded more rapidly than did the skin lesions.

*Dry Skin*.—A dry thin scaly skin was commonly seen in the most severe cases of malnutrition. The condition was most pronounced on the lower abdomen, thighs, and forearms; often a mosaic pattern could be seen. It responded very slowly to routine treatment and to large doses of nicotinic acid. In the few cases tried, an improvement followed the giving of a fat-soluble vitamin preparation.

*Scrotal Lesions*.—These were never seen alone but in combination with hyperkeratosis or dry skin. In some cases the scrotum was thickened, wrinkled, scaly, and hyperpigmented. In others the scrotum was reddened, with a translucent appearance, and was partly covered with scales; these changes were seen when the scrotum was distended with oedema fluid. Itching was common in both types of scrotal lesion.

#### TONGUE LESIONS

Lesions on the tongue were common during the first fourteen days in hospital. They could be classified as follows:

(1) *Sore tongues* were usually reddened, often at the edges and tip, less often all over. Diarrhoea and hyperkeratosis were sometimes present. The soreness responded to nicotinic acid in 4-10 days.

(2) *Pale atrophic tongues* were always associated with anaemia and responded slowly to treatment.

(3) *Red atrophic tongues* were also found in association with anaemia, and were occasionally painful.

(4) *Magenta tongues* were seen in riboflavin deficiency (see above).

#### NEUROLOGICAL FINDINGS

Neurological signs attributable to malnutrition were seen in 170 cases. Their association with amblyopia,

tropical ulcer, and unexplained tachycardia (see below) was tested. The results are shown in table I.

Price (1946), discussing allied prisoners-of-war and internees, remarks that "jungle sores" were common among his cases and some of these were infected with the Klebs-Löffler bacillus, which had caused a peripheral neuritis. None of our cases swabbed was found to be thus infected, and there was no significant association between neurological signs and tropical ulcer, unexplained tachycardia, or amblyopia.

Clinical findings were extremely varied. When the onset was gradual, the neurological symptoms usually

TABLE I—ASSOCIATION OF NEUROLOGICAL SIGNS WITH AMBLYOPIA, UNEXPLAINED TACHYCARDIA, AND TROPICAL ULCER

	Cases of severe malnutrition			Remarks
	Neurological signs		Total	
	With	Without		
Amblyopia—				
With ..	13 (7.65)	35 (8.60)	48 (8.32)	p-p' = -0.95 s.e. = 2.5221 Not signif.
Without ..	157 (92.35)	372 (91.40)	529 (91.68)	
Unexplained tachycardia—				
With ..	22 (12.94)	36 (8.85)	58 (10.06)	p-p' = +4.09 s.e. = 2.7457 Not signif.
Without ..	148 (87.06)	371 (91.15)	519 (89.94)	
Tropical ulcer—				
With ..	11 (6.47)	35 (8.60)	46 (7.97)	p-p' = -2.13 s.e. = 2.4731
Without ..	159 (93.53)	372 (91.40)	531 (92.03)	
Totals ..	170	407	577	Not signif.

began with paræsthesiæ followed by increasing weakness in the legs. Loss of balance, especially in the dark, was sometimes noted. A sudden onset with much weakness in the legs developing within 24 hours was common. In most of these patients there was little or no complaint of weakness, though there was sometimes a history of previous weakness. On examination, absent or diminished ankle jerks, with or without areas of sensory loss to pinprick, commonly of glove or stocking distribution, were found.

Physical examination of the more severe cases showed a dissociated sensory loss. Loss to touch was uncommon; the most extensive area found was a band about 4 in. wide round both ankles. Loss of discrimination between heat and cold was present in 4 out of 5 patients examined, who had extensive loss of sensation to pinprick. In 3 cases the distribution was an irregular band round the ankles, and in 1 case a large area, roughly symmetrical, over the anterolateral aspect of the lower half of the thighs and anterior aspects of the legs. Loss of joint sense and some ataxia were common. The legs were more often and more severely affected than the arms. Loss of sensation to pinprick was sometimes very extensive, and in 2 cases analgesia was present over the whole skin surface; both were patients judged to have well-balanced personalities and in whom no confirmatory hysterical stigmata could be found. Vibration sense was not tested. Loss of power was affected most commonly and most severely in the following muscles in descending order: peroneal group, flexor digitorum, tibialis anticus, quadriceps femoris, and flexor hallucis. Roughly speaking, in the legs and arms, the distal muscles showed weakness first. The affected muscles were hypotonic. Tendon reflexes were either normal, diminished, or absent.

CASE 3.—A civil policeman, aged 32, had been interned at Singapore in February, 1942. Eighteen months before admission to hospital he had noted pins-and-needles in the feet and hands, and weakness in the legs. Later he noted that he was unsteady on his feet and staggered in the dark.

Symptoms continued with intermissions until shortly after the capitulation, when the rice ration was increased. He then became unable to walk. From Sept. 9 to 12 he was given every day 40 mg. of thiamine intramuscularly and 6 compound vitamin tablets by mouth.

On admission (Sept. 12) he was emaciated. The skin was rather dry. He looked exhausted and spent most of the day sleeping. He said he felt ill and weak, especially in the legs and hands. Doing up his pyjama buttons was difficult owing to clumsiness of the fingers. He had a smooth magenta tongue. Pellagrous skin was seen round the ankles and knees, and on the backs of the hands. Extensor hallucis and peroneal muscles were very feeble on both sides; less severely affected were the extensor digitorum, tibialis anticus, quadriceps femoris, forearm extensors, and the grip on both sides. There was disproportionate wasting of the legs, thighs, and forearms. The muscles were hypotonic.

There was a minimal response to all tendon reflexes tested. Abdominal reflexes were not elicited. Sensation of pinprick was generally diminished, increasing peripherally. Below about the middle of the legs and below the elbows discrimination between sharp and blunt was lost. Heat and cold sense was lost in a band about 3 in. wide around the ankles. Joint sense in great toes diminished. Tendo-Achillis sensation reduced. Other systems: no abnormality found. Urine and blood picture normal.

He was given the ordinary hospital diet, with 6 compound vitamin and 6 'Benerva' tablets, nicotinic acid 200 mg., ascorbic acid 50 mg., and 'Vegamite' 3 drachms daily. He took his food fairly well and gained a stone in a fortnight.

Twelve days after the first examination he looked cheerful and well, his face had filled out remarkably, and he had put on muscle, especially about the shoulder girdle. He complained of unsteady gait; numbness, tingling, and clumsiness of the hands; and flatulence after meals. Other changes noted on re-examination were: improvement in power, well marked in the forearms, less so in the thighs, and slight in the legs; tendon reflexes all brisk; ataxia less (could now walk, though with a very drunken gait); loss of joint sense less; loss of sensation to pinprick increased; skin and tongue normal.

There were 2 cases (1 and 4) where severe ataxia developed in hospital.

**CASE 4.**—A male civilian, aged 54, had been interned since February, 1942. Shortly after release he noticed some numbness in the legs and hands. For several months he had had difficulty in reading.

On admission to hospital he was given the ordinary diet, and received every day 6 compound vitamin tablets and 150 mg. of ascorbic acid by mouth, and 50 mg. of thiamine intramuscularly. Nine days after this treatment began he suddenly found that he was unable to walk or write.

On examination general muscular weakness was found, increasing peripherally. Tendon and abdominal reflexes were not elicited. Plantar response minimal and flexor. Sensation to pinprick generally reduced; appreciation of sharp and blunt lost below right knee. Loss of joint sense of thumbs, right wrist, and great toes. Gross ataxia of arms and legs. Some pallor of the disks on the temporal side. Cranial nerves otherwise normal. Mentality and memory normal.

These 2 cases have some features in common with those described by Spillane and Scott (1945). The development of gross ataxia while on large doses of thiamine is of interest; similar observations have recently been reported by Clarke and Sneddon (1946).

#### PETECHIAL RASHES

Petechial rashes were seen in the most severe and least severe cases, and in patients who had been in hospital several weeks. The rash came on suddenly. The common situations were the forearms, round the shoulders, over the tibiae, and on the back just below the shoulders. In most cases pinching or stroking the skin produced ecchymoses and linear petechiae. This test was positive only in the affected regions. Hess's test was negative.

These rashes were not necessarily associated with anaemia, and in those cases where examinations were carried out neither the spleen nor the lymphatic glands were enlarged, and there was no abnormality of the joints, interdental papillae, white-cell counts, clotting-times, or bleeding-times. The condition did not respond to large doses of ascorbic acid or of nicotinic acid. It usually lasted 8-14 days, and in a few cases relapsed once.

#### CARDIOVASCULAR DISTURBANCES

Disturbances of the cardiovascular system could be divided, according to the response to parenteral thiamine, into those which responded rapidly, those which improved in about 5-10 days, and cases of unexplained tachycardia which did not respond. The first group consisted of 2 cases only and these were the only patients who showed engorgement of the veins of the neck.

**CASE 5.**—A lance-corporal, aged 29, had had occasional swelling of the feet for two years. Three weeks before admission his feet became more swollen, and he had breathlessness on exertion, loss of appetite, and slight cough.

On examination he was dyspnoeic at rest, with some cyanosis. Gross oedema of legs and feet; much ascites; basal congestion; and engorgement of neck veins. Pulse-rate 144 per min. (regular); blood-pressure 160/120 mm. Hg; heart much enlarged; gallop rhythm. Intravenous thiamine and digoxin begun.

Three days later there was no dyspnoea or cyanosis; oedema less; no signs of ascites; signs of small effusions at bases; no venous engorgement; pulse-rate 102 per min.; blood-pressure 130/84 mm. Hg; apex-beat had retracted 1 in.; gallop rhythm less definite.

**CASE 6.**—A male civilian, aged 35. Shortly after liberation his ankles began to swell. Three days before admission he felt well but awoke during the night with breathlessness.

On examination: dyspnoeic at rest; cyanosed. Gross oedema of legs and feet; neck veins engorged. Pulse-rate 110 per min. (regular); heart enlarged; sounds of poor quality; diastolic murmur heard all over precordium. Intravenous thiamine begun.

Three days later there was no dyspnoea or cyanosis; oedema less; pulse-rate 98 per min.; apex-beat had retracted about 1 in.; sounds of better quality.

In the other groups tachycardia was a constant feature. It was sometimes accompanied or followed by altered heart sounds—a broadened or split first sound at the apex, and less often a split pulmonary second sound. A precordial systolic bruit was sometimes heard. In severe cases the apex-beat was commonly found outside the midclavicular line.

In the severely emaciated cases blood-pressure was usually subnormal. A few patients collapsed suddenly during apparent recovery. Here the blood-pressure fell, but it returned to normal in about half an hour, though the patient remained only partly conscious and looked extremely weak, with slate-coloured complexion and cold sometimes cyanosed extremities with contracted veins and arteries.

There were 3 cases in middle-aged men where collapse was associated with a pronounced rise in blood-pressure, in one case to 220/110 mm. Hg. They all recovered in 10-17 days. In 2 of these cases albumin and microscopic blood and hyaline casts appeared in the urine after the collapse, but disappeared in a few days. In the same 2 cases the apex-beat moved out to the anterior axillary line, and attacks of pulmonary oedema came on nightly. There was no engorgement of the neck veins, but oedema increased during the attacks. Both patients had received daily large doses of thiamine for more than two weeks before the attack. All 3 completely recovered.

In the commoner form of collapse, with subnormal blood-pressure, respirations were slow and shallow, except when there was oedema of the lungs.

*Unexplained Tachycardia.*—Among the 577 cases of malnutrition there were 58 cases of tachycardia which did not respond to thiamine and for which no cause could be found (not all had chest radiograms taken). Most of these cases had no history of recent sore throat, tropical ulcer, or scrotitis. There was no significant association between tachycardia and neurological signs (table I) nor between tachycardia and tropical ulcer (table II).

It therefore seemed unlikely that these cases of tachycardia were diphtheritic. There was often some pyrexia,

but no symptoms of fever. This form of tachycardia and pyrexia was not seen during the period of captivity in a hospital which served a camp holding on the average 12,000 men (E. K. Cruickshank, personal communication). Manson-Bahr (1945), however, remarks that an irregular pyrexia, seldom exceeding 100° F, has been noted in some epidemic outbreaks of beriberi. The tachycardia and fever often persisted though signs of

TABLE II—ASSOCIATION OF UNEXPLAINED TACHYCARDIA WITH TROPICAL ULCER

	Cases of severe malnutrition		
	Tachycardia		Total
	With	Without	
Tropical ulcer			
{ With ..	3 (5.2%)	43 (8.3%)	46 (8.0%)
{ Without ..	55 (94.8%)	476 (91.7%)	531 (92.0%)
Totals ..	58	519	577

vitamin deficiency disappeared or improved, and the patient put on weight and in every other way appeared to be progressing satisfactorily.

There was sometimes a history of breathlessness on exertion, or fatigue, and a few patients complained of attacks of faintness and palpitations. It was among such cases that the collapsed state, previously referred to, was liable to occur.

CASE 7.—A lance-sergeant, aged 35, was admitted as an ambulant case. He was very thin, with œdema of the ankles, and took his food well. Three days later his morning pulse-rate was 98 per min., and he was ordered to bed. During the afternoon, while walking, he had sudden severe dyspnoea and collapsed.

On examination half an hour later he was cyanosed, feebly fighting for breath, and coughing up watery sputum, with thready and irregular pulse, contracted veins, and cold extremities. Split first sound at apex. Except for left pectoral region, percussion note impaired at all areas; air entry greatly reduced; many bubbling sounds. Thiamine and nikethamide were injected intravenously, and oxygen was given. After half an hour his pulse and colour improved and respiratory efforts became more vigorous. Œdema developed rapidly up to the costal margins. Above the œdema he appeared dehydrated.

Next day he looked worse, being exhausted, with ashy complexion, and signs as on previous day. An hour later he was reported to be failing rapidly; but, when seen half an hour later, the difference in his appearance was striking. He was sleeping quietly, with normal colour, less œdema, and few râles at bases; tachycardia and altered heart sounds still present.

Six days later a relapse coincided with an attack of lobar pneumonia. He was treated with penicillin and recovered slowly.

#### ŒDEMA

In most cases œdema was postural, but in recently admitted patients pretibial œdema which was not postural was sometimes seen. The œdema which persisted was always postural. In the grossly œdematous the œdema often extended to the chest wall and was often accompanied by effusions into the knee-joints, ascites, and bilateral pleural effusions. A few cases of pericardial effusion were seen. Œdema often increased or appeared after admission to hospital. It was suggested that a normal salt intake following a long period on reduced intake was a contributory cause of this œdema. Œdema sometimes decreased during an attack of diarrhoea or a fever; occasionally it increased during a fever. Gross œdema was present in both cases showing engorgement (cases 5 and 6). Left ventricular failure sometimes developed in patients without œdema. In 3 cases albumin, microscopic blood, and scanty leucocytes and hyaline casts appeared in the urine, but the appearance was transitory and did not correspond with change in the œdema.

*Plasma Proteins.*—Total plasma-protein estimations were done in 70 œdematous cases (fig. 1). Though low readings were common in the grossly and moderately œdematous, and higher in the slightly œdematous, the levels were sometimes higher in the grossly œdematous than in the slightly œdematous. There was therefore no significant trend in the level of plasma protein with increasing degrees of œdema in these cases. This statement holds good for cases in which knee and ankle jerks were present (fig. 2). For diagnosis plasma-protein estimations, considered alone, seem to be of little value. The absence of any close relation between œdema and plasma-protein levels was also noted in cases of starvation in Europe (Mollison 1946). Unfortunately it was impossible to have serum-albumin and serum-globulin estimations done.

*Loss and Gain of Weight.*—Twenty-two patients, 6 of whom had slight œdema and 8 moderate œdema, were weighed at weekly intervals. In all but one the œdema was judged to be less or to have disappeared at the end of two weeks. The results were as follows:

Average weight (lb.) Before capture	Average weight (lb.) On admission	Average loss (lb.) during internment	Average gain (lb.) 1st week	Average gain (lb.) 2nd week
155	120	35	5½	5

In another series, where weight lost during internment was calculated from the lowest weight in hospital, the average loss was 41 lb. With more extensive œdema there was usually an initial loss of weight. Fig. 3 shows examples of this in cases 8 and 9.

#### DYSENTERY AND DIARRHOEA

Dysentery or diarrhoea was the reason for the admission of 87 patients to hospital. Besides these, 133 of the 577 cases admitted primarily for malnutrition had diarrhoea, and some of them were transferred to the dysentery ward. Of 115 patients from the dysentery ward 19 had amœbic dysentery; 1 amœbic hepatitis; 21 clinical dysentery; 18 infective diarrhoea; 49 dietetic diarrhoea; 3 giardiasis; and 1 colitis.

Some cases of amœbic dysentery were resistant to emetine; over the previous three years they had had ten or more courses of emetine.

Clinical dysenteries had blood and mucus in the stools, infective diarrhoeas had not; both responded to sulphaguanidine. Dietetic diarrhoeas often started soon after the increase in rations; they did not respond to sulphaguanidine, but did respond to restriction of diet. Several of these patients had sore red tongues and showed an initial improvement on nicotinic acid, but dietetic restriction was usually needed also.

Only one case of sprue was seen.

#### MALARIA

The incidence of the various types of malaria was as follows:

Type	Malaria	Admitted primarily for—		
		Malnutrition	Other disease	
Benign tertian ..	32	20	..	1
Malignant tertian ..	7	3	..	0
Combined ..	1	1	..	0
Clinical malaria ..	28	15	..	1
Blackwater fever ..	1	0	..	0
Effects of malaria ..	4	0	..	0
Totals (114) ..	73	39	..	2

An attack of malaria in a patient with severe malnutrition was nearly always a cause for anxiety until the fever was controlled. In most cases progress from malnutrition was set back considerably and there was a loss in weight of half a stone and sometimes much more.

Many patients with and without malaria gave a history of repeated attacks of fever, some of which were proved cases of malaria. Sometimes treatment had been inade-

quate owing to shortage of drugs and lack of hospital accommodation.

It is therefore surprising that out of 577 cases of malnutrition, 39 of whom developed malaria in hospital, only 21 (3.6%) were recorded as having palpable spleens. This was commented on by several medical officers in charge of wards and splenic enlargement was specially looked for.

PULMONARY TUBERCULOSIS

Of 30 patients admitted with pulmonary tuberculosis, 28 had positive sputum, 25 had bilateral disease, 6 had clear pleural effusions, 1 had a tuberculous total pyopneumothorax, 4 had extensive tuberculosis of the larynx, epiglottis, and tonsillar regions. A few others had a mild chronic non-specific laryngitis.

Three cases were afebrile on a routine of being "up" for two hours daily; the others were all bed patients. The bed patients, classified according to the symptoms and the anatomical extent of the disease, consisted of 12 moderate cases, 6 severe cases, and 9 hopelessly advanced cases (4 of whom died in hospital).

Since the patients were to be evacuated within a week or two, no active collapse therapy was given, except in one case to refill a successful artificial pneumothorax initiated five months earlier in the camp

hospital. The tuberculous pyopneumothorax and two of the effusions were aspirated, diagnostic puncture alone being carried out on the others.

These men all showed some malnutrition, but this improved rapidly on the routine treatment, despite the presence of tuberculosis, except in the most extensive cases.

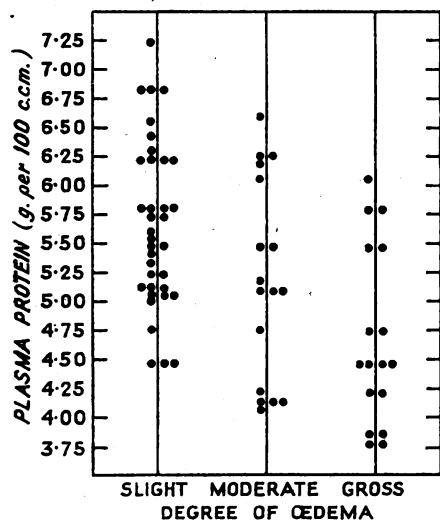


Fig. 1—Plasma-protein levels in 70 cases of oedema.

More than two-thirds of the cases gave a history of illness, referable to the chest, of less than nine months' duration, though the stage of the disease was, on the average, advanced. This suggests that malnutrition hastened the course of tuberculosis.

CAUSES OF DEATH

The causes of all deaths taking place between Sept. 9 and Nov. 30, 1945, were as follows:

Cause of death	Cases
Malnutrition and beriberi .. .. .	8*
Empyema and malnutrition .. .. .	1
Abscess of right thigh and beriberi .. .. .	1
Effects of head injury and malnutrition .. .. .	1
Cirrhosis of the liver and malnutrition .. .. .	1*
M.T. malaria and malnutrition .. .. .	1
Intestinal obstruction and malnutrition .. .. .	1
Pulmonary tuberculosis and malnutrition .. .. .	4
Carcinoma of lung .. .. .	1
Coronary artery thrombosis .. .. .	1
Syphilitic aortitis .. .. .	1

\* Includes the 2 patients who died after plasma infusion.

Necropsies were made in all cases except 1 of malnutrition and beriberi and the 4 cases of pulmonary tuberculosis.

TREATMENT OF MALNUTRITION

Rest.—Patients remained in bed until ordered up by the doctor. This was not always easy to enforce, since after more than three years' captivity the men naturally wanted to be up and about.

Slight oedema of the ankles, sore tongue, angular stomatitis, weakness of the legs, and residual signs of peripheral neuritis were not considered to be indications for rest in bed. The nurses were instructed to put to bed at once any patient found to have a rapid pulse. This was considered to be an important indication for rest in bed. Fever, worsening of the general condition, increasing signs of vitamin deficiency, diarrhoea, and dyspepsia were some of the other indications. Tachycardia at rest, breathlessness, palpitations, and precordial pain, a rising or falling blood-pressure, or any signs of collapse were thought to be indications for absolute rest.

Nursing.—An adequate and efficient nursing staff was looked upon as an important factor in the successful treatment of malnutrition. Secondary factors related to nursing efficiency, such as ward domestic staff, equipment, amenities, food-service, heating, lighting, and water-supply, were almost as important. If these were inefficient the sisters had less time for the patients.

At first a large proportion of the patients had diarrhoea, and some of these were incontinent. Bedpans had to be cleaned quickly, and there was no time for proper disinfection. No ill effects could be traced to this procedure. Bedding had often to be changed. In some wards tow and cotton-wool and sanitary towels were used to save bedding. Bedsores were the rule among the more severe cases. They were usually present on admission, but a few developed in hospital. Mouths needed a good deal of attention, for dry fissured tongue and dirty teeth were common.

By Sept. 20 most of the wards were preparing milk drinks and could do simple invalid cooking in the ward kitchens. The graduated malnutrition diets I, II, and III (table III) were prepared in the wards. The severe cases required individual feeding. This was time-

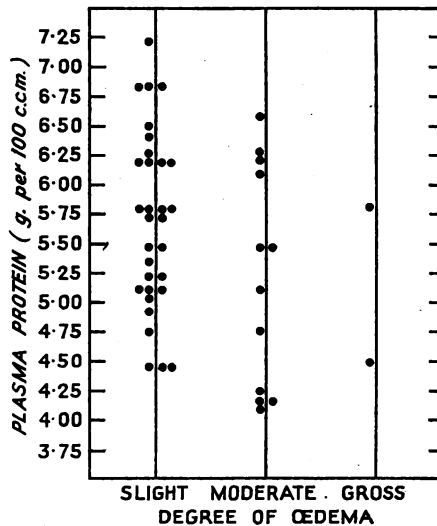


Fig. 2—Plasma-protein levels in 45 cases of oedema in which knee and ankle jerks were present.

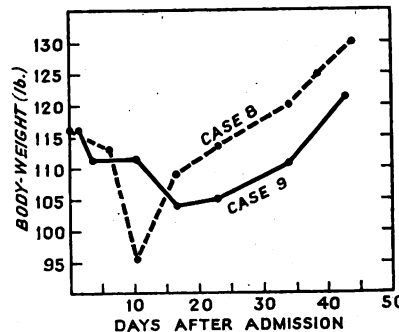


Fig. 3—Examples of initial loss of weight of oedematous patients on admission to hospital. Case 8's pre-war weight was 162 lb. and case 9's 152 lb. Initial loss of weight is due to loss of oedema fluid.

TABLE III—GRADUATED DIETS FOR SEVERE MALNUTRITION WITH ANOREXIA AND/OR DIARRHŒA

Diet	Details and instructions	Total fluid (oz.) for non-œdematous cases	Total fluid (oz.) for œdematous cases	Fats (g.)	Carbo-hydrates (g.)	Proteins (g.)	Calories	Non-fat calories
I	Protein hydrolysate; give 3 oz. two-hourly for 7 feeds. For one day	31	21	0	30	15	180	180
II	Protein hydrolysate; give 4 oz. two-hourly for 7 feeds, each feed followed by egg-and-milk mixture. (Total daily milk mixture: condensed milk 1 pint, two beaten eggs, and 1 oz. of sugar; add $\frac{1}{2}$ pint of water for non-œdematous cases.) Continue until the appetite returns	57	47	60	134	76	1380	840
III	Egg-and-milk mixture three-hourly for 6 feeds. Rolled oats 2 oz., tinned fruit 2 oz., tinned chicken 4 oz. daily. (Total daily milk mixture: condensed milk $1\frac{1}{2}$ pints, two beaten eggs, and 2 oz. of sugar; add $\frac{1}{2}$ pint of water for non-œdematous cases.) Continue for at least three days	68	58	96	170	99	1940	1076
IV	Hospital light diet	80	60	136	412	128	3384	2160
V	Hospital ordinary diet	Ad lib.	Ad lib.	200	495	120	4260	2460

consuming, and during the rush period the sisters had little time for it. Some of the fitter patients and a few volunteer workers who became attached to the ward staff gave valuable help in this work. Fluid charts were often kept by the patient or by one of his fitter neighbours.

*Diet.*—In the case of the hospital ordinary and light diets (table III) four meals were served daily; and, between meals, milk drinks with biscuits, sweets, or chocolates were given. All patients were given 6 compound vitamin tablets daily. To patients with diarrhœa, the tablets were given as an emulsion. 'Marmite' or vegamite was given ad lib. to all patients except those few who disliked them.

Most of the mildly ill patients took these diets without any ill effects, but among moderately or severely ill patients disorders attributed to overfeeding were common. Except for the most severe cases with anorexia, a very large appetite, which was not satisfied by these diets, was the rule. It was evident that in some cases control of diet was important.

The graduated diets shown in table III were used in the severe cases or in cases where it was thought that symptoms were due to overfeeding. Some patients found these diets distasteful, but in those wards where something of the rationale of the treatment was explained to the patients there were no complaints and the best results were achieved.

Overfeeding was often followed by flatulence and abdominal distension, with or without diarrhœa. This usually caused considerable discomfort lasting from a few hours to a few days, but in the more severe cases the digestive disorder was sometimes accompanied by weakness and a rapid feeble pulse, and several cases of sudden collapse, with low blood-pressure, rapid pulse, cold extremities, and stupor were attributed to overeating.

#### TREATMENT OF DIARRHŒA

Some patients with diarrhœa improved rapidly after being in hospital for three or four days; some of these had signs of nicotinic-acid deficiency. Cases of severe diarrhœa or mild diarrhœa which did not improve within two or three days were treated with a kaolin mixture or sulphaguanidine. Wet-film examinations of stools were made, and any protozoal infections found received appropriate treatment.

Patients who continued to have diarrhœa (there were many such) gradually improved over a period ranging from about six days to four or more weeks. In these cases, if the diet was drastically reduced, or if the graduated diet was given, improvement usually took place in a few days. Some patients who were later diagnosed as having nutritional diarrhœa showed a transient improvement while taking sulphaguanidine.

Several forms of treatment were used simultaneously in nearly all the cases, so it was not always clear which had been responsible for improvement, unless treatment was analysed more closely. Fig. 4 shows cases 10–13 analysed from this aspect. It is fairly clear that restriction of diet bears the most constant relationship to improvement.

*Severe Cases.*—The presence of anorexia, lethargy, and diarrhœa demanded a great deal of nursing. The persistence and tact needed in persuading the patient to take his two-hourly feeds was often rewarded by the mitigation of these symptoms in three to five days. Later attention was directed to continuing absolute rest and restricting diet.

*Illustrative Cases.*—The following patients were treated in hospital for five to twelve days before being given the graduated diet. During this time they received compound vitamin tablets 6 daily, nicotinic-acid tablets 3–6 daily, parenteral thiamine 5–10 mg. daily, and a course of sulphaguanidine. They were on the hospital light diet but were reported as being very difficult to feed; the exact proportion of the diet taken during this time was unknown. In 2 cases there was a transient reduction in the number of daily motions while on sulphaguanidine, but over the period their condition had generally deteriorated. On Sept. 22 they were put on the graduated diet.

CASE 14.—A man with a year's history of weakness and numbness of the feet was admitted to a camp hospital on August 27, 1945, with great weakness of the legs and diarrhœa.

TABLE IV—RESULTS OF TREATMENT IN 40 CASES OF ŒDEMA

Treatment	Signs of neuritis	Good response	Delayed response	No response
No extra treatment	With	0	2	2
	Without	0	3	2
Thiamine 10–20 mg. daily parenterally	With	4	6	5
	Without	1	0	2
Thiamine as above and 'Neptal' 1 or 2 c.cm. given 2 or 3 times	With	5*	3	1
	Without	2	1	1

\* The reduction in œdema in these 5 cases followed a profuse diuresis, which occurred soon after the giving of neptal.

On examination (Sept. 21) he was emaciated, drowsy, and apathetic, passing watery motions about 10 times daily. No appetite. Extreme general weakness. Knee and ankle jerks absent; areas of analgesia and partial paresis of legs, with much hypotonia. Mucosæ pale. Pale smooth tongue. Much œdema of legs. Signs of ascites, and bilateral pleural effusions present.

After three days' graduated diet there was much improvement. Appetite had returned, mentality was much brighter, and motions were semi-formed and reduced to 3 daily.

**CASE 15.**—This man was admitted to a camp hospital on August 16, 1945, with a diagnosis of beriberi and ulcers of the feet. Since then he had passed watery stools, about 18 daily, until Sept. 17, when the diarrhoea began to improve. He had had frequent attacks of flatulence and of feeling "blown up" after meals; this had become more severe since Sept. 17, and made him afraid to eat; previously he had been eating all his food.

On examination (Sept. 20) he was emaciated, with gross oedema, ascites, and bilateral pleural effusions. Mucosae pale; tongue reddened at edges and tip. Pulse-rate 100 per min. Ankle jerks absent; areas of analgesia and paresis of legs with much hypotonia. Diarrhoea returned, and he had lost all desire for food.

After four days' of graduated diet the appetite had returned and the diarrhoea was considerably improved. He still complained of abdominal distension and discomfort, which was relieved by tapping the ascites.

Improvement continued until Oct. 8, when he had a further attack of distension and flatulence. The diet was reduced to less than 2000 calories, with relief of symptoms.

**CASE 16.**—Towards the end of July, 1945, this man had been admitted to a camp hospital as a case of beriberi and tropical ulcers. On August 20, 1945, there was a considerable increase in the diet. On the 25th he started passing frequent watery stools. After a course of sulphaguanidine there was some improvement. On Sept. 19 the diarrhoea became much worse and was accompanied by loss of appetite, flatulence, and distension.

On examination (Sept. 19) he was very wasted and mentally depressed, with extensive paresis and analgesia of legs and loss of knee and ankle jerks. Pulse-rate 118 per min. Blood-pressure 124/92 mm. Hg. Split first sound heard at the apex. Extremities cold. Petchial rash on forearms. Eight watery motions in the past twenty-four hours, appetite very poor; complained of acid eructations and distension.

After three days' graduated diet the dyspeptic symptoms had disappeared and the mental depression had gone.

**CASE 17.**—After a reduction in the camp rations in June, 1945, this man began rapidly to lose weight and complained of generalised weakness, especially in the legs. Later his feet began to swell. On August 1, 1945, he was admitted to a camp hospital. On the 20th the rations were considerably increased, and about a week later he complained of a sore tongue and diarrhoea, which had continued.

On examination (Sept. 20) he was emaciated, with dry and scaly skin, red and painful tongue. He was drowsy and apathetic. Some oedema of the ankles and signs of bilateral pleural effusions. Much generalised weakness. Loss of joint sense in great toes. Paresis of legs. Knee jerks absent. Much hypotonia of muscles. Tachycardia. Watery stools, 8 in the past twenty-four hours.

After three days' graduated diet 2 motions had been passed in twenty-four hours, appetite had returned, and mentality was much brighter.

These patients made satisfactory progress and were evacuated by hospital ship on Oct. 22.

*Relapses* following an initial improvement were common, but nearly always responded to further reduction in diet. It was easily possible to be misled by the patients' frequent demands for more food. Several patients succeeded in persuading the Chinese ward orderlies to buy them extra food, in spite of having been warned against overeating. One patient, who became severely ill and collapsed for no apparent reason, was found to have in his locker a large quantity of noodles and other forbidden food. He later admitted having eaten, earlier in the day, several large helpings of noodles.

In the following case the patient suddenly collapsed and died after an initial improvement. It was thought that the sudden increase in diet was a contributory cause of death.

**CASE 18.**—A man had had diarrhoea for ten weeks before admission. It began with flatulence and distension. During this period he gradually lost his appetite. Six weeks previously he noted in his right thigh a lump which gradually became bigger.

On examination (Sept. 19) he was extremely emaciated and lethargic. It took several minutes to rouse him sufficiently

to answer questions; then he spoke very slowly in a monotonous voice. Face expressionless. Extensive dry hyperkeratosis of skin. Tongue and mouth dry. Slight oedema of ankles. Fluctulant swelling about 12 in. long in right thigh. Pulse-rate 80 per min. Blood-pressure 116/70 mm. Hg. Heart normal. Abdomen scaphoid. Pallor of temporal disks. No reaction to pinprick except over face. Tendon reflexes normal. Incontinence of faeces and urine. All food refused.

On Sept. 22 a Ryle tube was passed, and the graduated diet given through it. Pus was aspirated from the abscess in the right thigh and penicillin 200,000 units inserted.

Sept. 30: no incontinence; bowels opened 3 times in twenty-four hours; patient enjoying his food and talking to his neighbours; pulse-rate 120 per min.; temperature 102° F; no signs of abscess in the thigh.

The rapid pulse and fever continued until Oct. 3, when at 6 A.M., while being washed, he suddenly collapsed, dying five hours later.

At necropsy all the organs were small (heart 200 g., liver 850 g., kidneys 200 g., spleen 110 g.). The lungs were oedematous, and the mucosa of the stomach and intestines looked atrophic.

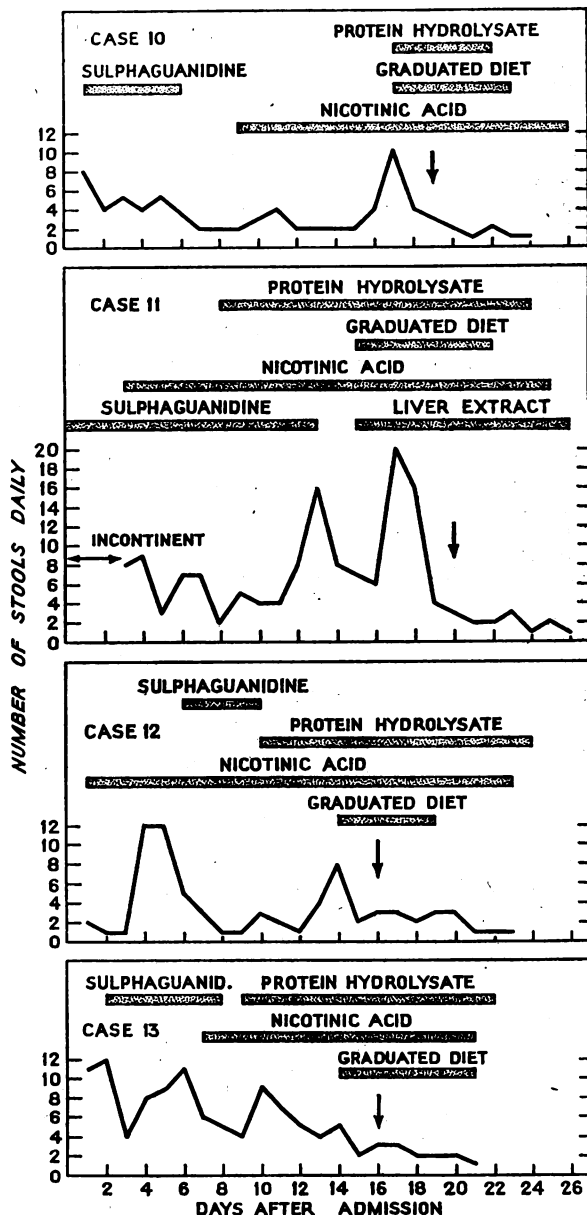


Fig. 4.—Analysis of treatment in cases 10-13, showing that, of the different forms of treatment, restriction of diet bore the most constant relationship to improvement. (The vertical arrow marks the appearance of solid stools.)

## TREATMENT OF OEDEMA

The response to treatment of 40 unselected cases of oedema is given in table IV.

After intravenous neptal a diuresis of 180 oz. or more of urine passed in twenty-four hours was fairly common. Diuresis following thiamine or intravenous plasma was sometimes accompanied by profuse watery diarrhoea.

*Reconstituted Plasma Therapy.*—Intravenous reconstituted plasma was given in a few cases of persistent oedema. On 3 occasions severe pulmonary oedema developed; 2 of these cases were fatal. In 1 of the fatal cases double-strength plasma was given at the rate of a pint in twelve hours. In this case advanced cirrhosis of the liver and a pale flabby heart weighing only 160 g. were found at necropsy. The other fatal case received a pint of normal-strength reconstituted plasma in two hours, followed by 3 oz. of double-strength plasma given in two hours. Necropsy showed oedema of lungs and brain. The heart weighed 230 g., and the myocardium had a normal appearance. For several hours before death this patient was incontinent of urine and faeces, and passed large quantities of urine and watery stools; during this time the subcutaneous oedema and ascites decreased appreciably.

In 2 very oedematous cases, where plasma-protein estimations were done before and after plasma infusion, the level fell though the oedema was less. In a third case, with very slight oedema, the plasma-protein level rose. Alteration in the albumin/globulin ratio would explain this apparent discrepancy.

Blood-transfusion was tried in some cases with severe anaemia, but was given up owing to the high incidence of reactions.

## SUPPLEMENTARY TREATMENT

Nicotinic-acid tablets, each containing 50 mg., were used in patients with pellagrous dermatitis, sore red tongues, scrotal lesions, or diarrhoea. The dose given was 50–150 mg. three times a day by mouth, or 50–100 mg. three times a day intramuscularly. Nikethamide was also used in doses of 1 or 2 c.cm. twice daily intravenously.

There were no definite indications for giving ascorbic acid, but it was sometimes used—e.g., in patients with tropical ulcers and bedsores—in doses of 50–150 mg. three times a day by mouth.

Vitaminised oil, 1 drachm three times a day, and a proprietary preparation in capsules, each containing 4000 I.U. of vitamin A and 400 I.U. of vitamin D, were given to some patients with dry skins.

The average daily dose of sulphaguanidine was 14 g. daily.

Compound vitamin tablets, containing ascorbic acid 25 mg., nicotinic acid 10 mg., riboflavin 1 mg., and thiamine 1 mg., were often given with benerva tablets, which contained 1 mg. of thiamine.

Protein hydrolysate was given by mouth. It contained 2.5% amino-acids in 5% glucose solution.

The liver extract used contained the equivalent of  $\frac{1}{8}$  lb. of fresh liver to the ounce; the average dose was 1 oz. daily.

## SUMMARY

This report deals with 1230 patients, most of whom were too ill to be evacuated in hospital ships. Their previous diet had been deficient, and they came from camps with a high incidence of disorders attributed to vitamin-B deficiency.

At least 577 were admitted primarily for malnutritional disorders. These disorders are described.

Notes on weight loss and gain, tropical ulcer, dysentery and diarrhoea, malaria, and pulmonary tuberculosis are recorded.

A summary of the causes of all deaths between Sept. 9 and Nov. 30, 1945, is given.

Good nursing was found to be the most important factor in treatment.

Though the great majority of mild and moderately ill patients could take the hospital ordinary and light diets without ill effects, the importance of controlling the diet in certain cases was emphasised. Careful dieting and individual feeding were the only effective measures in treating the most severe cases of malnutrition.

In the treatment of oedema some cases responded to thiamine. A further group of cases responded to thiamine and neptal. Other cases did not respond.

The giving of plasma and fresh blood (after cross-matching) was stopped owing to the high incidence of reactions.

The small number of deaths due to malnutrition out of a large number of dangerously ill patients reflects great credit on the nurses.

We wish to thank Major-General Sir A. Biggam and Col. G. S. Musgrove, officer commanding the 47th British General Hospital, for their permission and encouragement in publishing this report; those medical officers of the 47th B.G.H. whose co-operation facilitated the collection of the information which appears in this report; and Dr. D. D. Reid for his invaluable help with the statistical data.

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OBSERVATIONS ON FIBRINOLYSIS  
SPONTANEOUS ACTIVITY ASSOCIATED WITH  
SURGICAL OPERATIONS, TRAUMA, &C.

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SEVERAL workers have observed that, in various pathological states, human blood spontaneously develops fibrinolytic activity. Yudin (1936) found that clotted blood obtained after sudden death underwent rapid liquefaction. Macfarlane (1937), using diluted recalcified plasma, observed fibrinolysis in the blood of about 75% of patients immediately after surgical operation, a finding confirmed by Imperati (1937), though he recorded the lesser incidence of 50%. Mole (1943), working with blood from cases of sudden death, demonstrated fibrinolysis apparently due to a proteolytic enzyme, probably identical with that studied by Christensen and MacLeod (1945) and which they have called "plasmin." Tagnon et al. (1946) recorded fibrinolytic activity in cases of severe burns, hæmorrhage, and barbiturate poisoning. Willson and Munnell (1946) have reported its occurrence in toxæmia of pregnancy and during normal menstruation, but their technique makes it difficult to judge the significance of their findings.

From these observations it appears that fibrinolysis occurs in association with a variety of disturbances in which the common factor is obscure, unless it be covered by that ill-defined term, "shock." The phenomenon is almost certainly due to the proteolytic digestion of fibrin resulting from activation of plasmin, a component of the enzyme system existing in normal blood discussed in a previous paper (Macfarlane and Pilling 1946). The normal function of this system is at present unknown, but its activation under the conditions mentioned suggests that it may take part in the development of "shock" and its sequelæ, or in the reaction of the body to injury



in general. Before its significance in this respect can be studied directly it is necessary to gain further information as to the nature of the stimuli which cause fibrinolytic activity in the living human subject. This paper records some preliminary attempts to identify the disturbing conditions which have this effect.

**METHOD OF DEMONSTRATING FIBRINOLYTIC ACTIVITY**

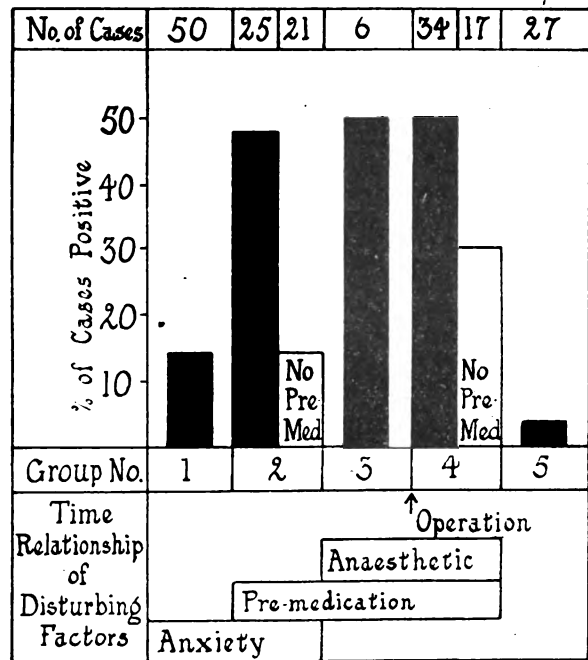
A modification of the method described by Macfarlane (1937) was used, which depends on the fact that dilution favours the dissociation of the normal plasma-antiplasmin (enzyme-inhibitor) complex, so that potential increases in activity not demonstrable in whole blood become apparent.

Blood was taken by venepuncture, mixed with a ninth of its volume of 3.8% sodium citrate, and spun at 2500 r.p.m. for 10 minutes. The plasma was separated and was then diluted 1 in 16, 1 in 32, and 1 in 64, using (a) 0.035% CaCl<sub>2</sub>, and (b) 1/250 thrombin ('Clotting Globulin,' Lederle) both made up in the buffer-merthiolate-saline diluent already described (Macfarlane and Pilling 1946). The final volume of the dilutions was 3 ml., contained in Wassermann tubes which were incubated at 37° C. Clotting occurred rapidly in the thrombin preparations, and in a few minutes in the recalcified plasma dilutions, and in all was sufficiently firm to allow inversion without spilling, with the occasional exception of the 1/64 dilutions. After 24 hours' incubation the tubes were inspected for fibrinolysis, indicated by the disappearance of the clot. In general, the higher dilutions were more sensitive than the lower, and the thrombin-clotted plasma than the recalcified. A weak reaction would be indicated by lysis in the 1/64 dilution of the thrombin preparation in 24 hours, a strong one by the disappearance of fibrin in all six tubes in a few hours. In this paper, however, no attempt is made to analyse the results quantitatively, a positive result being recorded if all fibrin had disappeared from one or more dilutions within 24 hours.

**RESULTS**

**A. Normal Controls.**—It was necessary first of all to determine the results obtainable on normal blood by the method described, so 70 blood samples from 54 normal volunteers (students and medical staff) were examined. A weak positive reaction was obtained in the case of one student on one occasion; in all other samples no fibrinolysis occurred. In view of Willson and Munnell's (1946) observations relating to pregnancy, a large number (137) of normal pregnant women at various stages of gestation were examined; all were negative. In 4 normal volunteers blood taken during menstruation showed no fibrinolytic activity. From these findings it was considered that the method described is unlikely to give positive results under normal conditions.

**B. Patients Undergoing Surgical Operation.**—In previous studies of postoperative fibrinolysis too few blood samples were obtained from each patient to allow analysis of the possible effect of the various factors involved by a surgical operation. The most obvious of these are, in order of time, (a) the condition for which the patient is to be treated, (b) fear of the operation, (c) premedication, (d) anaesthesia, and (e) such results of surgery as trauma, shock, and haemorrhage. In an attempt to analyse the possible effect of these multiple factors blood samples were taken (1) on the day before operation, (2) after premedication, (3) after anaesthetisation, (4) immediately after operation, and (5) on the following day, in a series of 34 patients undergoing operation for a variety of conditions. Not all blood samples were taken in all cases, but sufficient were obtained in each time-group to allow comparison of results, with the exception of group 3 in which only 6 cases were examined. In these 34 cases, 88 observations were negative and 36 positive. There was no apparent correlation with age or sex. The per-



Incidence of fibrinolysis in patients (1) the day before operation, (2) after premedication, (3) after anaesthetisation, (4) immediately after operation, and (5) the day after operation. The white columns refer to patients not receiving premedication.

centage of positive results in each group is indicated by the black columns of the histogram (see figure) related to the probable effective period of the factors under consideration. Group 1 also includes 18 patients of a second series described later.

It will be seen from these results that the occurrence of postoperative fibrinolysis is confirmed, 50% of positive results being recorded in group 4. A considerable proportion of patients showing fibrinolysis in this group, however, had undergone only the most minor physical trauma, such as cystoscopy, ureteric catheterisation, sigmoidoscopy, or injection of haemorrhoids. A more remarkable finding, perhaps, is that the incidence of fibrinolysis is almost equally great in group 2, before the operation or anaesthetic, a result that invalidates any supposition that these latter factors are the major causes of postoperative fibrinolysis. Disturbances occurring during the preoperative period must be at least equally potent. Of the 17 patients giving positive postoperative results, 9 were also positive before operation.

The conditions for which the patients were treated did not appear to provide a likely explanation of these findings. No particular type of abnormality was associated with preoperative fibrinolysis, which occurred, in fact, in patients with complaints no more serious than ingrowing toenail, haemorrhoids, or hernia; in a man admitted for circumcision, and in a woman for an examination of the uterus that showed no abnormality. Moreover, 19 of the patients giving positive results in groups 1-4 were investigated on the day after operation and all had then become negative with the exception of one following circumcision.

The effect of premedication was next investigated. Of the patients examined in groups 2 and 3, 31 had received morphine (gr. 1/4-1/6) and atropine (gr. 1/100) except 4 who had received 'Omnopon' instead of morphine, a substitution that did not affect the incidence of fibrinolysis. In a further series of 21 patients, however, premedication was withheld, and the results for these in groups 2 and 4 are indicated in the histogram by white columns. It will be seen that, when premedication is omitted, there is a considerable reduction in the incidence

of fibrinolysis before, and to a lesser extent after, operation. In order to test the obvious conclusion that premedication induces fibrinolysis, it was applied to 8 subjects (volunteers and coöperative patients) without other disturbing factors. One volunteer showed signs of toxæmia with vomiting, and developed well-marked fibrinolysis; the other subjects remained negative.

A possible factor to be considered is the fear of an impending operation felt in varying degree by most patients. It is difficult to assess the extent of this agitation, since some patients are anxious to conceal it, but in at least 14% of patients before operation it seemed to be the only likely factor responsible for fibrinolytic activation. This conclusion, though of considerable inherent interest, reduces the value of the further investigations described (with extreme brevity therefore) below. It is now uncertain whether the results obtained were related to the mental or to the physical state of the patients.

**C. Accidental Trauma.**—Blood samples from 12 cases of accident were obtained before treatment, and a clinical estimate of the degree of shock recorded. Fibrinolysis occurred in 4 cases—2 of head injury with moderate shock, 1 of Pott's fracture with moderate shock, and 1 of a cut wrist with negligible shock. Two patients with severe multiple injuries and extreme shock showed no fibrinolysis.

**D. Miscellaneous Pathological States.**—No attempt was made to carry out a comprehensive survey, but, to gain preliminary information as to the incidence of fibrinolysis in disease, blood samples were examined from 90 patients undergoing routine pathological investigation. Of these, 11 showed fibrinolysis, and in the following conditions the figures in parentheses indicate the number of patients positive or negative in each category:

Ulcerative colitis (2+, 3-); rheumatic carditis (1+, 1-); serum sickness (1+, 1-); nephritis (1+, 1-); cold agglutination associated with Raynaud's phenomenon (1+, 1-); toxæmia of pregnancy (1+, 5-); cirrhosis of liver (1+); lead poisoning (1+); urticaria (1+, 2-); iritis (1+).

All other cases were negative, including transfusion reactions, drug reactions, sepsis, tuberculous and other infections, peptic ulcers, rheumatoid arthritis, metabolic disorders, anæmias, and malignancy.

#### DISCUSSION

From the foregoing observations, no single factor or process emerges with any clarity as the activator of fibrinolysis.

The surgical and accident cases provide results showing that traumatic shock is not the major agent. This is borne out by the observations of Macfarlane (1937) and Imperati (1937), in which quite minor procedures were associated with relatively intense fibrinolytic activity. These previous investigations did not include the immediate preoperative period, a study of which in the present work has revealed the importance of preoperative disturbances as causes of fibrinolysis. One of these disturbances appears to be premedication. It has been shown that fibrinolysis was induced in a normal subject by morphine and atropine, though the particular subject seemed to be unduly sensitive to them. A similar sensitivity may partially explain the greater incidence of fibrinolysis observed in patients who received premedication as compared with those who did not, but in 7 experimental subjects no activation by morphine and atropine was observed. It would be unwise to attach much significance to the small number of positive results obtained in a miscellaneous group of pathological states, but the nature of the latter might suggest a condition of hypersensitivity as a possible common factor, though it must be remembered that in other cases of hypersensitivity negative results were obtained.

In the absence of any other obvious explanation it is reasonable to suppose that anxiety or fear may have been related to a proportion of the preoperative positive results. This supposition is supported by the observations of Latner (1946), who found fibrinolysis in a few normal persons during air-raids on London. If it is correct, the origin of fibrinolytic activity must be sought in the physiological responses to mental as well as to physical disturbances. This view, taken in conjunction with the other findings in the present and previous work, suggests that spontaneous activation of the proteolytic system of normal blood may be a part of the "alarm reaction" as defined by Selye (1946).

#### SUMMARY AND CONCLUSION

Fibrinolysis occurs not only after surgical operations but immediately before them in about 50% of cases.

The drugs used for premedication may be responsible for some cases of preoperative fibrinolytic activity.

Fear of impending operation appears to cause a further proportion of positive results.

Traumatic shock does not seem to be a major factor in determining fibrinolysis.

The activation of the proteolytic system of normal blood, almost certainly responsible for the phenomenon of fibrinolysis, may be a part of the "alarm reaction" of Selye.

Thanks are due to the surgeons and anæsthetists of the Radcliffe Infirmary whose ready coöperation has made investigation of these cases possible; to Miss E. M. C. Dyke for help in collecting samples; and to Mr. J. Pilling for undertaking much of the work in the laboratory. The general investigation of fibrinolysis is financed by the Medical Research Council.

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## AMPHETAMINE IN PULMONARY TUBERCULOSIS

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CONTRARY to popular belief, euphoria or *spes phthisica* is not often encountered during the active phases of pulmonary tuberculosis. The prevailing mood is commonly one of depression and over-anxiety.<sup>1</sup> The influence of personality is recognised by most clinicians as an important factor not only in the aetiology of many cases of phthisis but also in the prognosis of cases under treatment. Apprehensive, over-anxious, and introspective patients seldom do well. These factors are perhaps particularly important in view of modern developments in treatment which involve major surgical intervention, the patient very often associating successful treatment with major surgery. The patient who enters a modern sanatorium can no longer contemplate a period of tranquillity and freedom from personal anxiety, but must face a series of collapse-therapy measures beginning perhaps with phrenic-nerve interruption or artificial pneumothorax or pneumoperitoneum, and advancing, in the case of failure of these measures, towards the irreversible procedure of thoracoplasty. The effect of this protracted ordeal on apprehensive personalities is often

1. Some of the words and phrases used in this paper have a special meaning in psychiatric medicine. We have not used them in this sense.

disastrous, and some patients are put to too much emotional strain during treatment. As we are well aware, this has a deleterious effect on the progress of the disease.

Apart from surgery, the great benefits of which we do not wish to decry, the very facts of diagnosis and subsequent segregation constitute a severe threat to morale. A long stay in hospital, involving perhaps many months of rest in bed, does not tend to reinforce confidence, and sometimes creates more problems than it solves. To these emotional stresses may be added domestic and economic problems. Long rest in bed is useless without a measure of mental serenity.

With these circumstances in mind we have attempted to assist patients over crises in their treatment by giving them amphetamine sulphate ('Benzedrine'). An adequate summary of the uses of this drug, together with its indications and suggested doses, is given by Bett.<sup>2</sup> Doses much larger than those which we have used can be given, and no ill effects have been found when amphetamine has been administered continually for two years or more.

Amphetamine is a powerful stimulant of the central nervous system, an action which it owes to its ability to increase cerebral respiration. It produces euphoria and allays depression and fatigue, the patient becoming more alert and conscious of a feeling of well-being and increased confidence. In doses of 15 mg. by mouth amphetamine has little or no effect in raising blood-pressure or pulse-rate, though larger doses have these effects, and individual idiosyncrasy has been reported.

The drug has been used in widely different conditions but apparently not in pulmonary tuberculosis. We have used it in two ways: (1) as a short-term policy during thoracoplasty; and (2) to encourage the depressed, apathetic, or over-anxious patient.

#### DURING THORACOPLASTY

CASE 1.—A very apprehensive man, aged 24, developed a large extrapleural effusion after apical thoracoplasty. This led to non-closure of the wound and pyrexia. Four-hourly injections of penicillin were started, but after two days the patient had a complete "nervous breakdown," weeping and shouting when the nurse approached to give an injection or dress his wound. He protested that he could not continue the treatment and wanted to be left alone.

A course of amphetamine sulphate was started, 5 mg. (1 tablet) being given at 8 A.M. (half an hour before breakfast) and at noon (half an hour before lunch). Two hours after the first dose the patient's attitude was completely changed. He became bright and cheerful and told the doctor on his round that he felt "perfectly well" and asked when he might be allowed up.

His injections of penicillin were started again without protest and continued for nine days, when his temperature had settled and his wound healed. Amphetamine was then discontinued. The patient was "graded up" after two weeks, and three months later was back at light work.

CASE 2.—A highly introspective and dejected man, aged 26, had had a total left thoracoplasty for a chronic tuberculous empyema, but after two stages he developed a bronchopleural fistula and spread of disease to the right lung. He became morbidly depressed when told that a right artificial pneumothorax should be attempted before the final stage of his thoracoplasty.

Amphetamine sulphate was given, as in case 1, for three weeks with results so beneficial that the failure to establish a right pneumothorax in no way affected his feeling of well-being. After a period of rest, during which amphetamine was discontinued without reversion to his depressed state, the third stage was performed.

A second course of amphetamine, lasting two weeks, followed this stage. An extrapleural collection of fluid eventually communicated with the bronchopleural fistula, and the patient became greatly distressed when each morning he coughed up 5 or 6 oz. of foul-tasting material.

A third course of amphetamine was given for four weeks, and this enabled him to bear his troubles with fortitude. He

continued to be cheerful and did not complain of his slow progress or of his long period of complete rest in bed. His appetite improved greatly, and he gained over half a stone in a month. He is still under treatment.

CASE 3.—A man, aged 20, who had extensive tuberculous tracheobronchitis and cavitation in his left lung, was treated by pneumonectomy after two years' conservative treatment in this hospital. Postoperatively he had three-hourly injections of penicillin (given prophylactically) and aspiration of the residual pleural effusion on alternate days.

On the ninth day after operation he complained of pain at the site of injection and began displaying concern at his continued pyrexia. He was well aware of the hazards of the operation. Amphetamine sulphate was given as in the previous cases and continued for two weeks. There was an immediate cessation of pain and apprehension and thence an uninterrupted convalescence.

CASE 4.—A man, aged 30, had a partial consolidation of the right upper lobe following anterior-stage thoracoplasty. He became extremely ill, apprehensive, and uncooperative. Amphetamine, given as before, completely changed his outlook and secured his co-operation. After two weeks the acute process had subsided and he was prepared for, and even demanding, the completion of his surgical programme.

CASE 5.—A man, aged 43, was habitually depressed and introspective. Thoracoplasty was only considered feasible in the light of our experience with amphetamine. The drug was therefore given as a routine after the first stage. His postoperative mental outlook and physical "well-being" showed a great improvement on his preoperative condition, notwithstanding the development of a large extrapleural effusion.

In this group no toxic reactions were observed. The dose was moderate and the course short. Since we were concerned about the possible effect of the drug in preventing sleep, we gave a hypnotic at night as a routine in our early cases. This was found to be unnecessary, however, with a daily dosage of 10 mg. of amphetamine, as used in this series. In all cases there was, besides the euphoria, a considerable improvement in appetite, and pains, headaches, and minor complaints disappeared. The beneficial effects observed by us in this series suggest that amphetamine might have a much wider application in general surgery.

#### ENCOURAGEMENT OF OVER-ANXIOUS PATIENTS

CASE 6.—An intelligent and "highly strung" professional man, aged 53, lived in constant dread that he might need collapse therapy; and, when it became necessary to carry out phrenic-nerve crush, a general anaesthetic was needed. The pneumoperitoneum which followed produced a nervous wreck, though a reasonable control of the diseased area in the lung was obtained.

We would have abandoned the pneumoperitoneum immediately had it not been that the result of amphetamine (given as "vitamin tablets") produced a fundamental change in his reactions. He improved both mentally and physically. His spirits became buoyant and his outlook optimistic. His appetite improved and he put on weight. He continued weekly refills without demur up to the time of discharge. Amphetamine was given for two weeks in all.

CASE 7.—An ex-Service man, aged 35, had had dyspepsia four years before admission. This had been associated with the prospect of going overseas, and no somatic cause had been found. While overseas he developed palpitations and cardiac symptoms, which were described as "functional."

On subsequently developing tuberculosis he was sent into this hospital with a recommendation for thoracoplasty. He complained of severe pain centred over the area of disease (he had been informed of its situation) and dyspepsia. No cause for these symptoms could be found.

The onset of hæmoptysis in a nearby patient was the signal for an additional symptom. The patient said he could taste blood in his mouth and must be swallowing the results of his hæmoptysis. This again proved unfounded, and, after attempting to convince him of the truth, we recommended some "vitamins" as a general tonic. Amphetamine, given as in the previous cases, rid the patient of his fears, and he has since been transferred to the surgical block, where he awaits thoracoplasty with equanimity.

2. Bett, W. R. *Post-grad. med. J.* 1946, 22, 205.

CASE 8.—A trained nurse, aged 28, with disease in the right lower lobe associated with atelectasis, had been "difficult," uncoöperative, and emotionally unstable during her treatment in this and other hospitals. Her disease, in these circumstances, made little progress towards resolution, and collapse therapy was unhelpful. She became increasingly introspective and listless and finally became morbidly religious and prepared herself for her end. She made arrangements to return to her home in Ireland.

A course of amphetamine sulphate produced considerable but not dramatic improvement in her state of mind and in her physical well-being. Her temperature settled and she asked to get up. Previously she had feared to get out of bed in case she should have a hæmoptysis. She undertook bed occupational therapy for the first time.

Her passage to Ireland having been arranged, this patient could not be followed up. It was interesting that, as a trained nurse, she knew what treatment she was having, and anticipated and complained of sleeplessness. This was overcome with hypnotics.

CASE 9.—A woman, aged 31, had been diagnosed as tuberculous a few months after a confinement. On admission to this hospital she had fairly extensive bilateral tuberculosis. She complained of headaches and of bizarre symptoms, such as "burnings and tinglings in the head" and "rushing of water through the ears." She was depressed at being admitted to a sanatorium and did not think she would be able to continue treatment.

A course of amphetamine sulphate, given as before, produced some increase in nervous symptoms, and she complained of sleeplessness. The drug was therefore discontinued.

During the next three months the symptoms continued, and no organic cause could be found. A second course of amphetamine was started, and this time improvement was striking. She lost her symptoms, became cheerful and coöperative, and is at present running a football pool in the ward.

In this series the drug was given not to assist the patient over a particularly trying situation but to lessen the strain of a long stay in hospital and perhaps to reverse some of the tendencies which seem to be inherent in tuberculosis.

#### DISCUSSION

In a disease such as phthisis, where the interplay of psychosomatic factors has such an important bearing on the development and progress of pulmonary lesions and on rehabilitation, a safe drug which reinforces confidence obviously has a wide field. An objection to the use of a drug of the ephedrine group might have been its tendency to raise blood-pressure and produce tachycardia. But these are not among the physiological effects of amphetamine in moderate dosage. Again, interference with sleep might have been disadvantageous in a condition where rest is of paramount importance. In the first place, however, amphetamine, as used by us in small doses and administered in the morning, does not produce insomnia. On the contrary, by allaying fears and anxieties, it has tended to have the reverse effect. Hypnotics have only occasionally been necessary in our series. Moreover, amphetamine is not a physical stimulant, and its effect in promoting increased physical effort seems to be psychological. Probably amphetamine should be withheld from excitable patients. We have found it desirable not to tell the patient what drug he is having.

From the limited number of patients treated in this way it is impossible to draw conclusions or to define clearly the type of patient or the circumstances in which amphetamine should be used, but in our preliminary series the impression has been formed that it is valuable and apparently harmless.

#### SUMMARY

An account is given of the effects of amphetamine sulphate (benzedrine) on patients undergoing institutional treatment for pulmonary tuberculosis.

The drug appears to have a definite value, particularly during difficult phases of thoracic surgery and for the restoration of confidence in the depressed or over-anxious patient.

## FATAL USE OF A DANGEROUS UNIVERSAL DONOR

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THE following case illustrates a rare type of incompatibility in transfusing a group-A patient with blood from a group-O donor, where the high-titre serum-agglutinins of the latter caused agglutination of the recipient's corpuscles, followed by hæmoglobinuria, uræmia, and death. Such incompatibility is not revealed by the standard cross-matching tests (donor's cells against recipient's serum) and was only brought to light by subsequent titring of the donor's serum.

#### CASE-RECORD

A healthy soldier, aged 38, was wounded by a revolver bullet, which entered the body 1½ in. below the right costal margin and made its exit through the left flank. The patient was admitted to a military hospital half an hour later, fully conscious. He vomited some dark blood, and at the same time gas escaped from the entry wound. Pulse-rate on admission 84. Blood-pressure 130/76 mm. Hg. He was catheterised before operation, and clear urine was obtained.

*Operation.*—Three-quarters of an hour after admission the abdomen was explored through a left paramedian incision, 'Pentothal,' nitrous oxide, oxygen, and ether being used during anaesthesia. The bullet had passed obliquely through the stomach, from left to right, producing two large wounds of the lesser curvature, very ragged, and separated by a narrow strip of gastric wall. This strip was divided, and the whole wound sutured in two layers. A second wound of the jejunum, involving three-quarters of its circumference, was likewise sutured. A large wound of the transverse colon was exposed, the affected loop of bowel clamped off, and the afferent and efferent limbs gun-barrelled by a running suture, the clamps being left in situ.

During the operation one pint of glucose-saline was administered intravenously, followed by two pints of blood. After operation a third pint of blood was given. All three donors were group O, the blood being cross-matched by the usual slide technique, with no suggestion of incompatibility. During the transfusions the patient was anaesthetised, and no untoward reactions were observed.

*Progress.*—Next day the patient was conscious but still in a critical condition, with a pulse-rate of 140 per minute. Since admission he had had a total of 18 g. of sulphadiazine. On the third day gastric suction and intravenous salines were continued, but the sulphadiazine was stopped. As the patient had not passed urine since the operation he was catheterised, and 6 oz. of dark brown turbid urine was withdrawn.

*Laboratory Reports.*—Hæmoglobin 85%. Urine acid, pH 5.3; albumin +++; urobilin +; benzidine reaction +++; deposit of much amorphous material, with only an occasional red cell; sulphonamides present but no crystals in deposit. Conclusion: slight hæmaturia, gross hæmoglobinuria.

By the fourth day the general condition was unchanged. Pulse-rate 120-140. Only 6 oz. of urine was withdrawn by catheter, still containing large amounts of albumin and hæmoglobin. A further pint of blood was given, with glucose-saline containing 100 c.cm. of 4.3% sodium sulphate to the pint. During the taking of blood for estimation of urea the surgeon noticed that the red cells appeared to settle abnormally quickly. *Laboratory report:* blood-urea 223 mg. per 100 c.cm.

On the fifth day a purpuric rash appeared, the patient was mentally confused, and his general condition had deteriorated. The total urinary output for the day was 3½ oz. withdrawn by catheter. *Laboratory report:* urine clearer in colour; strongly alkaline; albumin +++; benzidine reaction +++; sulphonamides present, but no crystals in deposit.

Later in the day he was cystoscoped, and both renal pelves were washed out with normal saline. The colostomy was active, the pulse-volume good, the pulse-rate 100-120; but during the last three days only 17 oz. of urine had been obtained, by catheter or cystoscope. The patient became more and more deeply unconscious and died the same night, 100 hours after his injury.

*Fluid Balance.*—The fluid intake and output were estimated daily. The intake during the first twenty-four hours, includ-

ing blood and glucose-saline, was 9 pints; the estimated output, allowing for blood-loss, oozing from wounds, gastric suction, sweating, and respiration, was  $4\frac{1}{2}$  pints leaving an excess fluid intake over output of  $4\frac{1}{2}$  pints. During the second twenty-four hours the estimated excess fluid intake over output was 2 pints, the third twenty-four hours  $1\frac{3}{4}$  pints, and the last twenty-four hours 1 pint.

**Autopsy** (nine hours after death).—There were no signs of jaundice. The subcutaneous tissues were œdematous and the blood rather watery. The lungs showed extensive œdema, a common terminal event in acute uræmias of this type, where intravenous fluids are administered after the kidneys have almost ceased to function. None of the tissues showed any sign of dehydration. The wounds in the stomach and jejunum were healing well, fluid passed readily along these viscera, which were not unduly distended, the colostomy was patent, and there appeared to be no obvious reason why the abdominal injuries should not have resolved completely.

The kidneys were swollen, their combined weight being 14 oz. (normal is  $10\frac{1}{2}$  oz.). They showed no evidence of trauma. On section, the renal cortex was pale and swollen, with prominent glomeruli; the centres of the pyramids were pale, but the corticomedullary junction was clearly demarcated. The renal pelvis showed small splashes of submucosal hæmorrhage. The bladder held about 1 oz. of reddish urine containing blood-pigments and albumin.

**Microscopically** the kidneys showed the characteristic changes of an acute nephrosis, such as is found in post-transfusion deaths, the principal features being bloodlessness of the glomerular capillaries, with swelling and increased cellularity of the tufts, and a tendency to clubbing; widening and increased tortuosity of the convoluted tubules, with flattening of the degenerated lining epithelium; reddish or brown finely or coarsely granular material in the tubules of Henle's loops; and a similar substance in the collecting tubules mixed with desquamated degenerated epithelial cells. The pigmented appearance of the casts was preserved in unstained sections.

**Blood Examination.**—In this case there was no real reason to believe that sulphadiazine was the cause of the uræmia. At no time were crystals of the drug found in the urine, and the case was predominantly one of hæmoglobinuria and not hæmaturia. From the time the first specimen of urine was examined we had reason to suspect the transfusion, and during life the following tests on the blood of the patient and the first three donors were carried out. (As the hæmoglobinuria preceded the last transfusion, the fourth donor is not considered here.)

- (1) Blood-group of patient: group A<sub>1</sub>, Rh positive.
- (2) Patient's own cells mixed with his own serum: no hæmolytic or agglutination (a) at room temperature, (b) in refrigerator.
- (3) Test group-O cells mixed with patient's serum: no hæmolytic or agglutination (a) at room temperature, (b) in refrigerator.
- (4) Cross-matching with the three donors, group O: no agglutination between any of the three donors' cells and the patient's serum. During reverse cross-matching agglutination naturally developed between the patient's cells and the sera of the three donors, but in the case of the second donor this was very pronounced.
- (5) Agglutination-titre of the three donors' sera against the cells of three stock group-A and three stock group-B bloods.

(i)	$\alpha 1/256$	$\beta -1/128$
(ii)	$\alpha 1/4096$	$\beta -1/1024$
(iii)	$\alpha 1/512$	$\beta -1/128$

(6) In view of the very high titre of  $\alpha$  agglutinins in the serum of the second donor, this serum was mixed in a watch-glass with group-A blood in proportions approximating to the actual transfusion. Gross agglutination rapidly developed. The red-cell counts of the test blood before and after addition of the serum were 4,900,000/c.mm. and 2,450,000/c.mm.—i.e., allowing for slight dilution of the blood by the serum, nearly half of the red cells had been destroyed in the process. Controls with normal serum showed a drop of only 8% in the red-cell count, to be explained by the dilution.

#### DISCUSSION

The theoretical dangers of transfusing patients of other groups with universal donor blood containing high-titre agglutinins have long been recognised (Levine and Mabee 1923, Freeman and Whitehouse 1926, DeGowin 1937); and Gesse (1935) collected 46 post-transfusion accidents of this type (20 of which were fatal) from the

literature, along with a case of his own where the group-O serum of the donor agglutinated the corpuscles of a group-A recipient in a dilution of 1 in 2048. Muller and Balgairies (1936) reported a case of shock following a transfusion of group-O blood with high  $\alpha$  agglutinin titre to a group-A recipient. Riddell (1939) and Wiener (1943) both advise against giving group-O blood to patients of other groups when the agglutinin titre of the donor is high, but they do not specify at what titre the blood should be rejected.

Earlier papers show some difference of opinion, probably depending on the technique of titring, about what is the normal  $\alpha$  agglutinin titre in group-O blood. More recently Aubert et al. (1942) examined 250 unselected group-O sera and found that in over 70% the titre ranged from 128 to 512, although exceptional titres of 8192, 16,384, and even higher were recorded. At no. 1 Base Transfusion Unit, M.E.F., where 1000 universal donors' bloods were titred, the average range was 64–256 (Buttle).

Aubert et al. (1942) describe an experiment in which they gave 450 c.cm. of group-O blood, with an  $\alpha$  agglutinin titre of 16,384, to an anæmic patient; this was followed by mild intravascular hæmolytic but not by hæmoglobinuria. Similar experiments led them to conclude that "the transfusion of conscious recipients of group A (12 cases) with considerable volumes of group-O serum or plasma containing extremely potent anti-A iso-agglutinins did not produce any reaction which could be classed as dangerous." All showed some evidence of red-cell destruction in the recipient, however, with the symptoms, in some cases, of pain in the back, constricting sensations in the neck and chest, and intestinal colic and nausea; but the suggestion is made that these might be due to unidentified substances in the serum. However, they recommend that group-O blood with an  $\alpha$  agglutinin titre of 512 upwards should be considered undesirable for transfusion purposes.

Various methods of demonstrating the "dangerous universal donor" have been described (Weil 1915, Rous and Turner 1915, and Coca 1918). The best of these appears to be that of Coca, somewhat modified by Levine and Mabee (1923). This test consists of mixing the donor's citrated blood, diluted 1 in 10 in normal saline, with the recipient's whole citrated blood. Dilution and mixing are performed in a white-cell counting pipette, and the reaction is observed on a glass microscope slide. A reaction is read as negative if no agglutination appears at the end of fifteen minutes. It is also possible to determine whether the recipient's or the donor's cells are agglutinated. In the former case nine-tenths of the cells are clumped, while one-tenth of them are free; in the latter case the reverse is found.

The absence of any post-transfusion reaction in our case is not necessarily significant. Wiener (1943) points out that, when the patient is under an anæsthetic, the symptoms may be unnoticed; and that, even when the patient is conscious, the first symptoms may be those of uræmia.

The histological appearances of the kidneys are not peculiar to transfusion deaths and have been described in fatal cases of blackwater fever, crush uræmia, sulphapyridine poisoning, and other conditions. A study of 30 kidneys from one or other of these conditions has led us to believe that the pigmented casts are the debris of degenerate desquamated tubular epithelium and not broken-down red cells, although the discoloration appears to be due to a hæmatogenous pigment. Often these casts affect less than 20% of the collecting tubules, and it is probable that degenerative change in the convoluted tubules, though less conspicuous histologically than the pigment casts, is a more important factor than mechanical blockage. This view conflicts with that of Baker and Dodds (1925) but is in agreement with recent papers by DeGowin et al. (1938) and Bywaters and Dible (1942).

It is fortunate that transfusion accidents of this type are very rare, in view of the difficulty of preventing them. In our case the  $\alpha$  agglutinin titre of the second donor was 4096, an extremely high figure; and dilution by the recipient's serum did not prevent agglutination of the recipient's own corpuscles. Yet, by the ordinary cross-matching technique (donor's cells against recipient's serum) the blood appeared to be compatible; and, as the  $\alpha$  agglutinins of any group-O donor will cause agglutination of group-A cells on a slide, the reverse cross-matching test (donor's serum against recipient's cells) is nearly always omitted. Indeed, the only way in which such incompatibilities can be anticipated is by the method of titring the donor's serum in every case. However, where large numbers of universal donors are employed in blood banks, it appears desirable to accept only those with agglutinin titres below a certain arbitrary level. The titre of 256 for  $\alpha$  seems to be the upper limit of safety.

SUMMARY

A patient with group-A blood died after transfusion with group-O blood containing exceptionally high  $\alpha$  agglutinins.

The clinical, post-mortem, histological, and serological findings are described.

The value of titring donors' sera is discussed in relation to the rarity of such accidents.

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THROMBOSIS OF THE INFERIOR VENA CAVA

TECHNIQUE FOR ITS DEMONSTRATION

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THROMBOSIS of the inferior vena cava is usually regarded as an incidental happening, often difficult to diagnose with certainty and, in any case, of little more than academic interest. Recent investigations, however, reveal not only that it is commoner than is realised but also that it may be of practical importance and call for intervention.

Pleasants (1911), in a review of 314 cases, has classified its causes in the order of frequency: neoplasms; puerperal sepsis; typhoid, tuberculosis, and scarlet fever; disease of liver; trauma; localised infections; and congenital obstruction. He concluded that the obstruction was usually recent when detected, and most often took place in the distal inferior vena cava and spread up from the iliac veins.

The type of case which is most susceptible to treatment, and therefore most important to diagnose, is a spreading thrombophlebitis or a phlebothrombosis, the latter being, according to DeBakey et al. (1943), a form of thrombosis which develops without much, if any, associated inflammation to fix the thrombus. In

such cases ligation of the inferior vena cava is claimed to save life by combating pulmonary embolism and sudden extension of the thrombus to both renal veins (Whittenberger and Huggins 1940).

The first reported therapeutic ligation was done by Trendelenburg in 1911 in a case of puerperal sepsis with thrombosis (Pfaff 1926). After the operation there was a dramatic improvement in the septic condition.

Krotoski (1937), who collected 48 such cases, concluded that ligation of the inferior vena cava and ovarian veins was the treatment of choice for pelvic thrombophlebitis.

Collins et al. (1943) reported on 8 cases so treated and had one death in a patient already moribund before operation. They consider that ligation of the inferior vena cava lowers the mortality as compared with other operative procedures, and that delay in operation or over-conservatism is dangerous.

Gaston and Folsom (1945) reported 2 more successful cases, both of whom had had pulmonary emboli from the lower limbs.

The principle of proximal ligation in the treatment of venous thrombosis in the limbs is gaining ever more authoritative support (Ochsner and DeBakey 1941a and b) and seems to apply with equal force to cases with venous thrombosis in the pelvis, so long as the appropriate ligation is not too severe an operation.

Ligation of the inferior vena cava does not produce more than slight disability, and this only in a few cases.

Wakefield and Mayo (1934) reviewed 19 cases of ligation of the inferior vena cava; 15 patients survived the operation, 2 of the deaths being regarded as due to the operation, the ligature cutting through the vein on the twenty-third day after operation in one case, and in the other case the ligature being tied above the right renal vein. This was therefore not an instance of simple ligation. Of the surviving patients 5 had persistent oedema of the lower extremities, 3 had transitory oedema, and 6 had no oedema. The observation that none developed visible collateral circulation was significant, though it is not known in what proportion of cases, if any, the inferior vena cava was recanalised.

Burch and Winsor (1943) reported an interesting post-operative physiological study of patients after ligation of the inferior vena cava: the elimination of water from the body was unaffected; the venous pressure in the legs was increased after the operation but tended to approach normal after a time; and, though persistent postoperative oedema might be present, erythema, petechiae, pallor, paræsthesia, hyperæsthesia, and tenderness were absent, and arterial pulsations were much diminished.

Northway and Greenway (1944) have suggested that the unpleasant sequelæ in the lower limbs after thrombosis of the inferior vena cava can be reduced by combining ligation with lumbar sympathectomy. This suggestion is based on the view of Homans (1941), Leriche and Geisendorf (1939), and Ochsner and DeBakey (1939, 1940, 1941a and b) that in femoro-iliac thrombosis trophic changes in the legs are due to vasospasm, which can be abolished by sympathectomy.

Hitherto investigation has been hampered by the difficulty of diagnosing cases in the acute stage, when alone treatment might be of use. It therefore seems worth while to record a reliable method of diagnosing thrombosis of the inferior vena cava and its immediate tributaries at any stage of its development.

TECHNIQUE

The method consists of injecting a solution of diodone,\* a radio-opaque substance, into the saphenous vein near its junction with the femoral vein, and making radiograms during and immediately after the injection.

Sensitivity to diodone should always be tested either by the intradermal method (Naterman and Robins 1942) or the ocular method (Robins 1942). In the intradermal method 0.05 c.c.m. of 35% diodone is injected into the skin of the flexor aspect of the forearm. This normally produces a weal 2-4 mm. in diameter. A weal measuring less than 8 mm. and an erythematous area of less than

\* Diodone concentrated solution (70%) supplied by Messrs. May and Baker Ltd., who also gave technical advice about its use.

10 mm. constitute a negative reaction. A control test with saline should be done. As Naterman and Robins (1942) point out, these skin tests do not accurately reflect drug sensitivity, but at least serve as a rough index. In the ocular test both eyes are first inspected, and then one drop of 35% diodone is placed in one eye, the other eye acting as a control. The patient is instructed to close his eyes, and they are then observed at 1½ and 3 min. A positive reaction consists of injection of the conjunctival and scleral vessels.

As a final safeguard, before the full injection of diodone, 2 c.cm. is given intravenously, and the patient is observed for untoward effects over the next 2 or 3 min. Adrenaline solution 1 in 1000 is kept at hand ready loaded in a syringe.

If there is no significant reaction to these tests, the patient is given morphine gr. ¼ and transferred to the X-ray department. A blood-pressure cuff is put in place just above the knee of the more affected leg. Under 2% procaine local anaesthesia the saphenous vein is then exposed at its termination as in the Trendelenburg operation. A main tributary of the saphenous vein is isolated and the needle introduced into it. The patency of the infusion system and the resistance to injection are then tested by injecting a little warm saline. This is followed by the final test dose of 2 c.cm. of 70% diodone. Before the rest of the diodone is injected, the pressure in the sphygmomanometer cuff is raised above the venous pressure in the limb, so that during the injection there shall be less dilution of the diodone with venous blood from the leg. To this precaution we attribute in part the fact that the veins show up with adequate contrast in the radiograms, though the rate of injection is considerably slower than that usually recommended in angiographic work. With a 50 c.cm. Luer-Lok syringe containing about 30 c.cm. of 70% diodone and an 18 B.W.G. needle, 20 c.cm. is injected in as many seconds. This rate is approximately maximal under these conditions, for not only are the bores of the needle and vein small but also there may be the additional resistance of an extensive bed of tortuous collateral vessels. Radiographic exposures are made at 5, 15, 25, and 35 sec. after making the injection, which is maintained at the rate of 1 c.cm. per sec. The optimal shadow is likely to be obtained in the films taken after 10–20 sec. As long as 3 sec. is taken for each exposure at 78 kilovolts and 60 milliamps with an anode height of 42 in. The films are taken with a Potter-Bucky diaphragm.

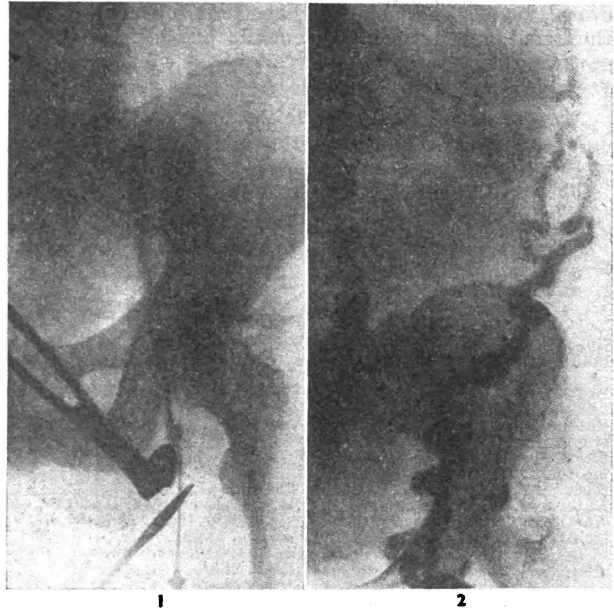
Since no more than a tributary of the saphenous vein is used for the injection, the main saphenous trunk is not sacrificed, only the tributary being doubly ligated before the needle is withdrawn. There have been no untoward complications from the procedure, and it has not been thought necessary to keep the patient in hospital for longer than one night. Contra-indications to this method of phlebography are the presence of severe renal or hepatic disease and sensitivity of the patient to diodone.

#### CASE-RECORDS

**CASE 1.**—A tailor, aged 43, had had attacks of numbness and cramp in the left leg for two years. During that time a fine network of superficial veins appeared on both thighs. There had been no oedema, nor had the varicosities extended on to the abdomen.

On examination he was well developed and rather obese, with no abnormal signs except the prominent veins already noted. These veins were not more than 1–2 mm. wide, and no larger veins were visible, even after the application of a tourniquet. The arteries in the lower limbs were normally palpable, but the left leg was colder than the right. There was no oedema.

In view of the fact that the symptoms, which might have been of vascular origin, appeared at the same time as the abnormal visible veins, it was thought worth while to investigate the venous return from the left lower limb by phlebography. Only 35% diodone was available at the time, but 30 c.cm. of this injected into the left saphenous vein was



**Fig. 1.**—Diodone solution (35%) was injected into a tributary of the left saphenous vein and can be seen coursing up external and common iliac veins. No collateral vessels visible.

**Fig. 2.**—Diodone concentrated solution (70%) was injected into the left saphenous vein. None of the diodone can be seen in the iliac veins or inferior vena cava. There is a large tortuous collateral, probably the inferior epigastric vein. The opacities in the region of the ilium represent injections of bismuth.

sufficient to demonstrate that the external and common iliac veins were patent as far as the inferior vena cava, with no visible collaterals (fig. 1).

**CASE 2.**—A Belgian woman, aged 54, had had attacks of pain in the upper abdomen since childhood, recurrent jaundice for seven years, periodic enlargement of the abdomen for four and a half years, and varicose veins on the legs and trunk for three and a half years. She had contracted syphilis thirty-five years previously, and her blood Wassermann reaction was still positive.

The varicosities had appeared first in the right leg and later in the left leg, and had spread up both legs, appearing at the same time in the groins and sides of the abdomen and lower chest, both anteriorly and posteriorly. The only symptom attributable to the distended veins was a burning pain in the left leg, and this was the immediate reason for her last admission to hospital.

On examination she was a rather plump vivacious woman apparently in fair health. Temperature, pulse-rate, and blood-pressure were normal, and, apart from the varicosities, the only signs of disease related to the liver. The liver-edge was palpable 2 in. below the right costal margin in the mid-clavicular line and felt firm and irregular. The spleen was doubtfully palpable, and there were no signs of free fluid in the abdomen. The palms of the hands were flushed, and a few spider telangiectases were seen. Liver-function tests showed only minimal impairment. The blood-flow in the varices was chiefly towards the heart, though the venous valves were partly incompetent. There was no caput medusae, and the only site of oedema was the left ankle, where it was slight and of the chronic brawny type.

Syphilitic cirrhosis of the liver was diagnosed. The question then to be settled was whether the abdominal varices were secondary to the cirrhosis and possible portal obstruction, or whether, besides the cirrhosis, there was an independent obstruction of the inferior vena cava. The distribution of the abdominal varices, mainly along the flanks and at the groins, favoured the intrinsically less likely double diagnosis. This question was definitely settled by the phlebogram (fig. 2). The injected diodone was absent not only from the inferior vena cava but also from the external iliac vein on the side used for injection. The main channel for the venous return was a large tortuous vessel, probably the inferior epigastric vein.

It is of interest that the varicosities first appeared in the right leg in case 2, because in the development

of the inferior vena cava it is the right longitudinal dorsal venous channels which become incorporated into the renal and postrenal segments of the inferior vena cava and are therefore not available as collaterals if this vessel is obstructed (Keen 1941).

## SUMMARY

A technique is described for demonstrating the patency of the inferior vena cava.

The possible practical importance of such a demonstration is indicated.

We are indebted to Mr. P. Brand and Mr. R. H. Shephard for supervising the operative procedures, and to Mr. J. M. Kenny for his assistance in the radiographic work.

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## Medical Societies

## SOCIETY OF MEDICAL OFFICERS OF HEALTH

IN his presidential address to the fever group in London on Nov. 8, Dr. WILLIAM GUNN spoke on the use in the last twenty years of

## Human Blood Derivatives for Transfer Immunity

With gains in knowledge of plasma and serum, he said, difficulties tended to increase rather than diminish. The loss of serum's protective potency with age, appreciable in less than a year even when stored at 4° C and largely due apparently to the presence of denaturing enzymes, had been countered by freeze-drying in vacuo, whereby further loss was probably averted. Since preservatives tended to interfere with the drying process, various substances had been tried, and phenol, originally selected as the one of choice, was still used because it has the best all-round antiseptic action; the time taken in drying was only slightly prolonged, provided that the ratio of the total volume to the surface area was kept low. A 5% solution was used, to make a final concentration in the serum of 0.5%; the only disadvantage was that in higher concentrations than this phenol caused coagulation of the proteins. After the solution was added, 5 ml. of the contents of the ampoule (always to be preferred to a rubber-capped bottle) corresponded to only 4.5 ml. of actual serum—a point almost invariably overlooked by clinicians in the estimation of dosage.

In some 20,000 administrations no proved case of homologous serum jaundice had been encountered; but the long incubation period and the difficulties of follow-up in a large area such as London must be remembered. In recent years donors had been supervised for 4–5 months after withdrawal of blood, but sub- or non-icteric hepatitis remained a possibility which even repeated blood-counts and van den Bergh tests might fail to bring to light. There was still no conclusive evidence that antiseptics, or drying, or even heating to 57° C for four hours, as had been done on specially stabilised gamma-globulin, was effective in neutralising the causative agent in homologous serum jaundice; probably the complicated physico-chemical processes which take place in the separation of plasma-proteins into their constituent fractions alone sufficed.

Experience had shown that the adjustment of dosage, strictly by age or weight (such as 0.1 ml. per lb. body-weight for gamma-globulin), was not entirely satisfactory; at ages below 1 year and above 3 years the prophylactic

dose against measles tended to be flattened compared with that in the relatively susceptible 1–3 years group, at least in London and other large centres of population. Furthermore, it was not easy to administer the exact dose, especially in fractions of a millilitre, to a struggling child; if protection was imperative, the average dose must be exceeded.

Rubella serum had been collected for prevention among women in the early months of pregnancy, but the appropriate dose had not yet been fixed; it probably lay between 10 and 20 ml., depending on the interval between the date of exposure and time of injection. Preliminary trials had shown the protective titre to be rather lower than that usually found in measles serum, possibly because the infection stimulus was less intense. The gamma-globulin fraction would naturally be much more effective—approximately 25 times more potent, as had been shown in trials of mumps convalescent serum by Gellis, McGuinness, and Peters in 1945.

## Reviews of Books

## Aids to the Diagnosis and Treatment of Venereal Diseases

T. E. OSMOND, M.B. Camb., honorary consultant in venereal diseases to the Army. London: Baillière. Pp. 138. 5s.

THIS is a new volume in the "Students' Aids" series. Venereal diseases were formerly dealt with as a section of dermatology, but the subject has enlarged so much, and—as the author says in his preface—has so little in common with diseases of the skin, that it has been decided to separate the two subjects. Dr. Osmond writes clearly and well, and gives a comprehensive outline of modern teaching in the short space at his disposal. Inevitably the matter is condensed, but there are few gaps. There are some omissions, such as reference to the skin rashes which may complicate sulphonamide therapy, and to the important evidence that post-arsphenamine jaundice may result from faulty sterilisation of syringes and needles. Some of the author's views will not be generally accepted. He states, for instance, that healthy seminal vesicles cannot be felt by the examining finger, and implies that rectal strictures may result from gonococcal proctitis. For those who require to revise under pressure, or those in practice who need a handy and accessible guide to first principles, this book should prove very useful.

## Motor Disorders in Nervous Diseases

ERNST HERZ, M.D., instructor in neurology, College of Physicians and Surgeons, Columbia University, New York; TRACY J. PUTNAM, M.D., professor of neurology and neurological surgery at the college. London: Oxford University Press. Pp. 184. 20s.

Dr. Herz and Professor Putnam have made ten teaching films of the disorders of movement which may be found with lesions of the nervous system. This little book has been compiled to supplement the cinematographic demonstration, and there is no doubt that the whole constitutes a contribution to the teaching of neurology. The book is freely illustrated from the films and from standard anatomical works; but without the dynamic presentation of the films it loses nearly all the authors have to offer. Patients with parkinsonism, hemiplegia, facial palsy, or ophthalmoplegias can so readily be seen and examined that strips of cinematograph film can hardly offer anything new to the student; and it is so easy to show a student how to elicit a tendon jerk that pictures of it appear unnecessary. The second half of the book, dealing with motor disorders of the cranial nerves, is more interesting, but even here the knowledge gained is fragmentary, for the sensory functions of the nerves are omitted. The book by itself has little to offer for those with access to patients; the book and the films together will help to drive home clinical lessons.

*A Primer for Diabetic Patients*, by Prof. Russell M. Wilder (Philadelphia and London: W. B. Saunders. Pp. 192. 9s.), has usefully gone into a sixth edition to meet the needs of the vast numbers of diabetics who are treated and guided to health at the Mayo Clinic. Diet, insulin tests, and the way of life are clearly explained.



# THE LANCET

LONDON: SATURDAY, DEC. 14, 1946

## Origins of Child Care

OUR child-health services have a wide territory to cover—antenatal care and midwifery, infant consultations, nursery schools, health visiting, the school medical service, care of the child in sickness, his protection from neglect and exploitation, care of the unwanted child, and youth organisations. Prof. RICHARD ELLIS, in his recent inaugural lecture in the department of child life and health in the University of Edinburgh, reviewed the beginnings of these services against the background of the industrial revolution. It is instructive but saddening to see how often an advance in the care of children has followed a shock either to the public conscience or to more sensitive private consciences. Captain THOMAS CORAM, ashamed to see the numbers of dead babies thrown on dunghills, got a royal charter for the establishment of the Foundling Hospital; Lord SHAFTESBURY and Dr. BARNARDO worked tirelessly for the protection of destitute and exploited children; Dr. WILLIAM FARR, under the auspices of the Obstetrical Society of London, showed that between half and three-quarters of the confinements in the country in 1869 were in the hands of untrained midwives; the trials of Margaret Waters and of Mrs. Dyer revealed that the mortality of infants entrusted to baby farmers was between 60 and 90%; the low physical standards of the young men recruited for the Boer War stimulated the development of the school medical service; the O'Neil case provoked the Curtis report. It is therefore comprehensible that the child-health services today "are not," as Professor ELLIS said, "a neatly designed and constructed pyramid with a Minister perched like Athena's owl on the summit," but are more like a vast rambling country house.

"By far the oldest structure is the block now labelled Central Administration. Antiquarians have discovered traces of Saxon workmanship in the foundations devoted to local government, while the Norman oubliette is still in constant use for the disposal of troublesome memoranda. An orphan presenting himself at the door may find himself the responsibility of any one of seven ministries or of more than seventy voluntary organisations. While the Lords of the Admiralty, the War Office, the Royal Air Force, and the Ministry of Pensions usually know which babies it is their privilege to hold, the Ministry of Health, the Ministry of Labour, and the Home Office appear to be in some doubt."

He believes that no future child-health programme can be efficient until the whole system of divided and ill-defined responsibility has been overhauled.

The greatest influence for good on the health of the older child, Professor ELLIS holds, has been not a health service or doctor, but the late Lord BADEN-POWELL, who "had the vision to see that there was a place for a non-military, non-political youth organisation," designed to encourage an open-air life, independence and initiative, service to the community, and the fundamentals of good citizenship. His scheme makes these principles attractive

to boys, and canalises their natural interests during the "gang age." The growth of the scout and guide movements, with their membership of five million, is evidence of BADEN-POWELL's grasp of the needs of youth. Several advances in the care of children have been the outcome of wars: the evacuation of Basque children during the Spanish war taught us lessons which were valuable when British children were sent to reception areas; and the verminous condition of many of those children gave a new impetus to the child-care services. The pædiatrician, in fact, must interest himself in more than the care of the sick child. Child health, Professor ELLIS pointed out, is closely related to social and economic conditions—which may depend on international policies and upheavals—and to education in citizenship; and the pædiatrician, like an Eastern deity, must have hands to spare for the obstetrician, the general physician, the parent, the educationist, the child psychologist, the youth leader, the juvenile employment bureaucrat, and all workers in preventive and social medicine. Nor should he be afraid to help in shaping the social policy of the community in which he works. He is one of a team approaching the same goal: that the sick child should be healed, the destitute child cared for, and every child have the chance of a happy healthy childhood with training in citizenship.

## Bacterial Motility

THE student of elementary bacteriology traditionally wastes an hour or two of his practical class-work in attempting to stain the flagella sported by motile micro-organisms, and he can rarely have hesitated, when asked the function of these appendages. Yet now PIJPER,<sup>1</sup> who has for many years been observing bacteria under dark-ground illumination, makes the claim, well supported by argument and illustration, that, so far from being the organs of locomotion, the flagella are the result of this process. By special methods of cultivation it is possible to grow organisms which are motile but lack flagella. In PIJPER's view the single or multiple "tails" seen by staining or other means are composed of the slimy substance that surrounds many bacteria, especially when young, and appears, in the pneumococcus for example, as a capsule. It is the motion of the organism that causes the capsular substance to trail out behind, like the tattered gown of a scholar rounding the corner of Balliol on a March morning. The faster the motion the longer is the tail. How then do motile bacteria progress? Direct observation is difficult owing to the speed of movement. PIJPER overcame this obstacle by suspending the organisms in methylcellulose, an inert substance sufficiently viscous to slow down the movement so that it could be observed directly and by cinematograph. He found that motile organisms progress by spinning on their long axes while their bodies are bent in a slight spiral curve—much as does the rubber "sand-eel" used by pollack fishermen. The classical shape of the cholera vibrio is, in fact, an exaggerated example of that of all motile bacteria.

If these views are accepted some long-standing questions relating to bacterial motility are solved.

1. Pijper, A. *J. Path. Bact.* 1946, 58, 325.

For example, the early bacteriologists gave very varied accounts of the number and position of the flagella of any one species; if the flagella are no more than trailing tags of capsular substance this disagreement is not surprising considering the diversity of methods used to demonstrate them. Such has been the difficulty in deciding by direct observation whether an organism is motile that modern practice has turned to the functional test of the Craigie tube or "motility agar" in which the bacterial growth is seen to spread. One argument of PIJPER's is not quite convincing. He remarks that many motile bacteria, described in the textbooks as "rods," are often seen in stained preparations to be curved; but the same may be said of *Mycobacterium tuberculosis* or *Corynebacterium diphtheriae*. Where too lies the essential difference in cell structure between *Salmonella typhosum* and *Shigella sonnei* by which the first can flex its body, spin, and move, while the second remains in rigid immobility stirred only by the molecular buffeting of brownian movement?

It is probably too near to teleological heresy to ask what advantage motility confers on an organism. Can *Bacterium coli*, like Leander, stem the ureteric stream and reach his Hero in the kidney?

### Dangers of Calciferol

IN the last ten years, with the introduction of concentrated preparations of vitamin D in convenient forms, very large doses have been administered not only in rickets but also in a variety of intractable conditions including arthritis, hay-fever, psoriasis, the common cold, and lately lupus and other forms of tuberculosis. The startling success reported in lupus may well lead to a wider (and wilder) use of these preparations without due regard to their known dangers. Soon after the antirachitic action of irradiated ergosterol was discovered toxic effects of overdosage were reported in animals, and during 1928-31 many cases of toxicity in man were recorded in Germany.<sup>1</sup> These were due to a particular brand of irradiated ergosterol called 'Vigantol,' a German preparation containing a high proportion of toxisterol, which is more toxic than calciferol and has less antirachitic activity. It is not surprising that doses of vigantol as low as 2.5-5 mg. had toxic effects. Unfortunately, however, toxisterol was not the sole cause of the trouble, for in 1932, when pure crystalline calciferol was obtainable, toxic effects in animals and later in man were described once more, though a higher dosage was needed to elicit them.

The toxic effects of calciferol (vitamin D<sub>2</sub>) are identical in animals and man,<sup>2</sup> and appear to be simply an exaggeration of its physiological action. The symptoms of overdosage in children have recently been described by DEBRÉ and his colleagues.<sup>3</sup> These French observers have had personal experience of 9 cases, and have collected published data concerning others, including 10 deaths. Anorexia is the first invariable symptom, and it appears suddenly and may become total in two or three days. Nausea, with vomiting in the more severe cases, appears a little later, equally suddenly. The child complains of diffuse

aches and pains, particularly in the head and epigastrium, and he becomes apathetic, pale, drowsy, torpid, and later cachectic, confused, and stuporose; there is polyuria and polydipsia, with impaired renal function and disordered calcium and phosphorus metabolism. Constipation is usual, sometimes after an initial diarrhoea, and the child gets up at night to urinate and to drink, as kidney function deteriorates. The picture will often suggest tuberculous meningitis, but the cerebrospinal fluid is normal, and the temperature is not raised except in severe cases. Signs of central nervous system involvement, such as apraxia, aphasia, convulsions, and cerebral vascular accidents, have been noted in the terminal stages of fatal cases. Hypertension is a common finding but not an early one; it may not develop until a few days after the drug has been stopped and may persist for several weeks, even worsening for a time, although no more calciferol is given. The urine may contain albumin and calcium phosphate crystals. Kidney-function tests show an impaired ability to concentrate the urine and impaired clearance of phenolsulphonphthalein. The blood chemistry is all-important in the diagnosis. Blood-calcium is almost (but not quite) invariably raised, and there is a high level of blood-phosphorus and blood-urea. Radiography may reveal calcification in soft tissues and lungs and rarefaction of bones. The prognosis is excellent if the diagnosis is made in good time and the calciferol discontinued. As a rule kidney function and blood-pressure return to normal and there are apparently no lasting ill effects.

The pathology is reasonably well known from the small number of necropsies and from animal experiments. At first the excess of calciferol causes an unusually large proportion of the dietary calcium to be absorbed in the gut. Calcium and phosphorus contents fall in the faeces and rise in the urine. The more calcium there is in the diet the easier it is to produce signs of intoxication—hence most authorities agree that the calcium intake should be kept low during massive vitamin-D therapy. Later, when the animal stops feeding, the high blood-calcium level is maintained at the expense of the bones, and osteoporosis results. There is a negative balance of both calcium and phosphorus, and a fall in the blood and kidney phosphatase. Calcium is deposited, following its high concentration in the blood, in renal tubules, bronchi, the walls of large blood-vessels, heart, stomach, and soft tissues. In young animals excessive deposition in the epiphyses takes place, interrupting growth, an effect which has not yet been reported in children. This metastatic calcification apparently occurs where phosphatase is most abundant. All these effects are identical with those caused by an overdose of parathyroid.

The most important question in practice—how much calciferol will cause these symptoms—cannot be precisely answered, because there is a wide individual variation in the toxic threshold. DEBRÉ's children had ingested a total of 60-150 mg. "over a short time"; he thinks that a considerable number of subclinical and undiagnosed cases occur, and that mild toxic symptoms might result from a single dose of 15 mg. of pure calciferol in a child. According to PARKS,<sup>4</sup> a daily dose of over 1 mg. (i.e., 40,000 I.U.)

1. Pfannenstiel, W. *Lancet*, 1928, ii, 845.

2. Harris, L. J. *Ibid.*, 1932, i, 1029.

3. Debré, R., Thieffry, S., Brissaud, E., Trelu, L. *Pr. méd.* Nov. 10, 1946, p. 769.

4. Parks, A. E. *The Vitamins*, Chicago, 1939, p. 513.

should be considered potentially though not necessarily dangerous in a child. In adults daily doses up to 25 mg. (1,000,000 i.u.) have been given, sometimes with ill effects and sometimes without. Some adults get toxic symptoms and reversible renal impairment after taking 5 mg. a day for several months, while others on the same dosage escape. DOWLING and PROSSER THOMAS<sup>5</sup> think that there will be no great risk of serious sequelæ with the maximal dosage they employ in lupus—150,000 i.u., or 3.75 mg., daily—though anorexia and depression were noted in a fifth of their patients. It seems best to make it a rule, as FREEMAN and his colleagues<sup>6</sup> suggest, that in patients receiving large doses of vitamin D for more than a few days a careful watch should be kept for a rise in serum-calcium or incipient failure of renal function, which should be the signals for immediate reduction in dosage. Moreover, it must be borne in mind that in calciferol treatment there is an initial exacerbation of local disease, which may be dangerous. It should be widely known that the most concentrated vitamin-D preparations are not suitable for self-medication, and even under medical supervision should not be administered in large dosage for trivial ailments.

## Annotations

### RELAPSING BENIGN TERTIAN MALARIA

CRITICAL appraisalment of new drugs for the treatment of malaria is by no means the simple matter it might at first appear. At least a decade and a half elapsed before the merits and the limitations of mepacrine were properly appreciated, and it was only under the stimulus of war in the tropics that real progress was made. This stimulus led to intensive search for new antimalarial drugs, among which 'Paludrine' takes a high place. Although it is generally agreed that in most respects paludrine is superior to any of the drugs previously in common use, this drug is not the complete therapeutic answer to the malaria problem. Its outstanding merits are the remarkable range of doses effectively arresting clinical attacks of benign tertian (B.T.) and malignant tertian fever, and its freedom from toxicity or undesirable side-effects.<sup>1</sup> That it will prevent or eradicate a *Plasmodium falciparum* infection has been amply demonstrated,<sup>2</sup> but its ability to sterilise the more chronic and resistant *P. vivax* infections is still unproved. A report by Dr. R. D. C. Johnstone in our last issue records comparative studies of treatment with 50 mg. and with 500 mg. of paludrine daily for ten days, and with combined quinine and pamaquin for a similar period. From these studies it appears that a combination of quinine and pamaquin is more effective in preventing relapse within six months than is either dosage of paludrine. Nevertheless, although the quinine-pamaquin treatment seems to be twice as effective as paludrine in preventing relapses, the relapse-rates after it were by no means insignificant. That the relapse-rate after an acute attack is twice as high with one form of treatment as it is with another is an important observation, but it is only one part of the picture. Against this achievement must be set the facts that quinine in the dosage advocated has unpleasant side-effects, and that the use of pamaquin necessitates the patient's retention in hospital, if not in bed, during its administration.

It has been amply demonstrated that suppressive treatment with small doses (100 mg.) of paludrine twice weekly prevents clinical relapse of B.T. malaria, and that

this treatment can be given for long periods without inconvenience or danger.<sup>2</sup> The relapses which may follow paludrine treatment can thus safely and surely be prevented by subsequent administration of this drug in remarkably economical dosage. Relapses following quinine-pamaquin treatment, on the other hand, cannot be suppressed by a continuation of these particular drugs in any dosage which is free from side-effects, and, in the case of pamaquin, free from the danger of grave toxicity.

It is impossible to forecast which cases of B.T. malaria will relapse after either paludrine or quinine-pamaquin treatment of an attack: it is certain that some will do so sooner or later in the absence of further treatment. In these circumstances it may prove that paludrine can be given more profitably in therapeutic dosage for a day or two only, to arrest the attack, and then in 100-mg. doses at biweekly or weekly intervals over a period of, say, six months. This would involve little alteration in the gross amount of drug consumed, and would ensure that every patient could continue his normal life and vocation throughout this period without interruption by relapsing malaria. A study of the relapse-rate after such a procedure would be interesting. The problem of relapsing B.T. malaria is of immediate importance, and it still awaits satisfactory solution.

### PART-TIME NURSES

"Towards the end of 1945 the position of the county infirmaries in Gloucestershire in regard to the supply of nursing staff became desperate. In some hospitals the matron was the only qualified nurse on duty for long periods, and it seemed inevitable that some, if not all, of the infirmaries would have to close down."

In his foreword to a memorandum<sup>1</sup> from the Gloucestershire County Council, Dr. T. B. H. Haslett is describing a state of things to be found at present, in greater or less degree, throughout the country. The difference lies in the fact that Gloucestershire has solved the problem. Dr. Haslett outlines the transformation in the infirmaries which followed the introduction of a competently planned and well-run part-time nursing service. Mr. W. A. Shee, the public-assistance officer to whom the credit for the scheme must go, first appealed for part-time nurses in February of this year. By a bold and imaginative stroke it was decided that they should be asked not merely to supplement the full-time staff but to *become* the staff, augmented where possible by any full-timers available. This completely new departure could only be managed by rearranging the nursing work in all the county infirmaries; and, thanks to the collaboration of the matrons, this was done. The interests of the existing full-time staff were safeguarded, and the influx of newcomers made it possible to shorten and redistribute their hours of work.

The appeal was for four kinds of recruit—trained nurses, enrolled assistant nurses, nursing attendants, and nursing orderlies—and so could be made to all women in the area. All suitable candidates who came forward and offered to do a few hours' duty were welcomed, and those engaged soon acquired a loyalty to the infirmaries in which they served. Many, when asked, were willing to arrange their home lives in such a way as to do a regular four-hourly shift, and all who were thus regularly employed got privileges which encouraged their steady attendance. A brochure setting out their terms of service has been distributed, and it is written with singular freedom from small tyrannies. The writer clearly does not think in such phrases as: "They have got to understand that . . .", "They will have to . . .", "We can't have them. . . ." The attitude is rather: "What transport, what meals, what uniform do women who take on this work need and deserve?"

The working day has been divided into four shifts: 8 A.M.—12 NOON; 12 NOON—4 P.M.; 4-8 P.M.; 8 P.M.—8 A.M. No

5. Dowling, G. B., Prosser Thomas, E. W. *Lancet*, 1946, I, 919.  
6. Freeman, S., Rhoads, P. S., Yeager, L. B. *J. Amer. med. Ass.*, 1946, 130, 197.  
1. Adams, A. R. D., Macgrath, B. G., King, J. D., Townshend, R. H., Davey, T. H., Harvard, R. E. *Ann. Trop. Med. Parasit.* 1945, 39, 225.  
2. Fairley, N. H. *Trans. R. Soc. Trop. Med. Hyg.* 1946, 40, 105.

1. Part-time Nursing. Gloucestershire County Council, 2, College Street, Gloucester.

part-time nurse need undertake night duty unless she wishes. Those who do 24-28 hours weekly on day shifts, or three nights a week, are regarded as regularly employed. "Reserves" are on the waiting-list for regular duty. Those who do less than 24 hours' day work a week, or less than three nights, are regarded as casual workers.

On day duty trained nurses get 2s. 6d. an hour, enrolled assistant nurses 2s., nursing attendants 1s. 9d., and nursing orderlies 1s. 6d. On night duty the rates are £1 5s. nightly for a trained nurse, £1 for an enrolled assistant nurse, 17s. 6d. for a nursing attendant, and 15s. for a nursing orderly. Any nurses doing more than 28 hours' day duty, or more than three nights weekly, are paid proportionately on the Rushcliffe scale.

These rates, when compared with the present cost of domestic help, cannot be called high; yet they have attracted women to part-time service, which shows that objections to work in hospitals are not primarily financial.

Transport in public-hire motor-cars is provided from approved centres, and travelling time is allowed as an extra. In cases where part-time nurses have to make a considerable journey by bus or train they may be allowed fares. Time is allowed for meals on duty, and night staff have a break of two hours besides the time allowed for meals. All meals are served in the nurses' quarters, not on the wards, and are substantial. The morning and evening shifts, for example, are given a meal of fried sausages, or scrambled eggs, or beans on toast, with tea, coffee, or cocoa; the afternoon shift and those on night duty get a two-course dinner and a cup of tea. Night staff coming from a distance may also be given breakfast on coming off duty. Every part-time worker gets 2 or 3 dresses of the appropriate colour for her rank, and 3 caps and 6 aprons; these are all of modern type, and are laundered without charge.

Regularly employed part-time nurses are given four weeks' leave with pay after the first year's service. They are also allowed sick-pay at reasonable rates.

Some 150 part-time nurses are now working in the nine county infirmaries, and more are wanted, though some infirmaries already have a waiting-list of nursing staff. At no time have any of the infirmaries or their wards been closed for lack of staff; and at one infirmary a new wing of 12 beds for operable cases of malignant disease has been opened, and is staffed almost entirely by part-time nurses.

The scheme has not proved unduly expensive, despite the provision of transport. Sums formerly spent on engaging nurses from co-operatives have been saved, and the authority has not had to provide quarters and personal laundry for part-time workers. The patients are well satisfied: Dr. Haslett describes them as "full of praise for the attention they receive." For one thing, night staff having been reduced to a minimum, all morning bed-making and washing is left to the day staff, and patients are allowed to sleep undisturbed till 7 A.M.; for another, many of the part-timers are older women who take a personal interest in their patients, and thanks to their short span of duty they come to work in a fresh and responsive spirit. The wards are no longer made tidy in time for the doctor's morning visit; and the doctors are glad of it. They see the nurses going on with their work while they make their rounds, and they can judge nursing standards better. The full-time nursing staff now do an 8-hour span of work, either from 8 A.M. to 4 P.M. or 12 NOON to 8 P.M. With the meals allowed on duty their hours have fallen considerably below 48 a week, and they fully approve the part-time system. It is worth emphasising this, because full-time nurses have sometimes objected to the introduction of a part-time scheme on the ground that part-timers get the choice of the pleasant shifts, while the permanent staff are obliged to take the unpopular shifts. Actually, the work of the full-time staff is so much lightened and so much better distributed that this objection has little force. It is also sometimes said that matrons dislike the system because it needs so much organising. This may be answered from Mr. Shee's experience that "there are

no stronger advocates of the scheme in the county today than the matrons."

Here surely is an answer to one of our most acute nursing problems, the care of the chronic sick. Local authorities with infirmaries to staff should write for the Gloucestershire memorandum.

#### GRANULOMATOUS LESIONS OF LIVER IN KALA-AZAR

THE atrophic and fibrotic lesions of the liver due to *Leishmania donovani* in visceral leishmaniasis in man have been described many times. So have the granulomatous lesions of the skin in post-kala-azar dermal leishmanoid, which appears as an occasional sequel to visceral leishmaniasis, usually a year or so after treatment, and has been thought to indicate a readjustment between man and his parasite.<sup>1</sup> But in visceral leishmaniasis of dogs, caused by *L. canis*, which despite its alias is almost certainly identical with *L. donovani*, granulomatous lesions of the liver and other viscera were described by Redaelli.<sup>2</sup> Now Bogliolo<sup>3</sup> reports the discovery of such hepatic lesions in visceral leishmaniasis in man; apart from the granulomatous foci, the rest of the liver presents the appearance which is characteristic of visceral leishmaniasis affecting that organ, there being no other signs of inflammation. He interprets the formation of these granulomatous lesions as a local reaction to the products of disintegration of dead parasites, independent of the atrophy and fibrosis initiated by the living parasites.

#### EXPERIMENTAL ARTHRITIS

THE study of rheumatic diseases in man has been hindered by the absence of spontaneous or easily induced arthropathies in animals. On the bacteriological side it is at least clear that various streptococci can produce arthritis when injected into the joints of rabbits and other animals; and rabbits sensitised by an intravenous injection of streptococci are more likely to develop arthritis after a joint infection than uninoculated controls. These and similar findings have led to speculation about the sequence of events in human rheumatic disease, but the comparison of experimental and human infections does not lead far. One of the more interesting types of arthritis which occurs naturally in pigs and sheep is caused by *Erysipelothrix rhusiopathiae*. Swine erysipelas is not uncommon in this country and takes two forms: an acute septicaemia or "the diamonds," and a chronic infection with endocarditis or arthritis as the main manifestation. At a meeting of the Heberden Society on Oct. 25, Dr. D. H. Collins recalled that he and Dr. William Goldie had shown that in young pigs the disease is contagious and may be conveyed as an arthritis and not as an acute exanthematous disease. With repeated intravenous injections of the organism they were able to produce arthritis in pigs, and examination of the inflammatory changes in the joints showed focal collections of lymphoid and plasma cells in the synovial villi and other changes similar to those found in human arthritis. Human infection with *E. rhusiopathiae* is well known as causing erysipeloid, but this is rarely followed by arthritic changes; and there is no evidence that the organism is important in cases of human arthritis.

With the discovery that pleuropneumonia-like organisms can cause arthritis in wild and domestic animals, many investigators sought these bacteria in human infections, and in 1939 it was claimed that they had been recovered from cases of rheumatic fever. This claim was later withdrawn, and since then they have not been cultivated from either joint exudates or tissues of patients with rheumatoid arthritis or rheumatic fever; but this

1. Naptier, L. E., Krishnan, K. V. *Indian med. Gaz.* 1931, 66, 603.  
2. Redaelli, P. *Ricerche e Studi sulla Leishmaniosi Viscerale del Mediterraneo*, Catania, 1933.  
3. Bogliolo, L. *Arqu. Clin.* 1946, 3, 186.

group of organisms presents many difficulties, and it may well be that they often escape recognition. Dr. G. M. Findlay, at the same meeting, suggested that it might be useful to find out whether streptococci isolated from rheumatic joints are ever contaminated with members of the group; he also thinks that the effects of inoculating streptococci into joints already infected with pleuropneumonia-like organisms should be studied. Two uncommon human diseases in which the group may be implicated are Haverhill fever (generally held to be caused by *Streptobacillus moniliformis*) and Reiter's disease; both conditions are characterised by poly-arthritis, and Findlay suggests that all cases should be thoroughly investigated for pleuropneumonia-like organisms. It must, however, be remembered, as Salaman and others<sup>1</sup> have pointed out, that these organisms are fairly commonly parasitic in man, so their isolation from patients with a particular disease is not enough. Even if investigation fails to show any connexion between the pleuropneumonia group and human rheumatic infection, these organisms can be used to set up an infective arthritis in rodents and thereby provide us with a new, if oblique, approach to a difficult problem.

#### THE MIND IN PHTHISIS

As Dr. George Day pointed out on Nov. 16, resistance to tuberculosis remains a mystery because it does not follow the usual rules. The bacillus often attacks young people whose resistance to other diseases is presumably high; and many of them do not seem to have been subjected to recognised predisposing conditions such as malnutrition, overcrowding, bad working conditions, and exposure. As the share of the mind in the body's ills becomes increasingly clear, it is natural to look closely at the mental accompaniments of diseases which have always been accepted as purely somatic. This Dr. Day has done, with results that whet curiosity. Certainly the prospect of a long illness is not always unwelcome: the young person who finds adult responsibilities heavy, and love denied, may in fact look forward to six months' enforced idleness in friendly surroundings as a respite. Whether this state of mind would encourage his tissues to give the tubercle bacillus "a good home instead of destroying it or imprisoning it for life" is a question which needs studying from many aspects. It is conceivable that anxiety—which can influence the secretion of glands, raise the blood-pressure, and injure the gastric mucosa—can also alter the body chemistry in a way favourable to the tubercle bacillus. Certainly the disease attacks many at an age when the emotional demands of sex are at their height; and an undue proportion of these young patients, Dr. Day considers (though he gives no figures), have recently had an unhappy love affair. He gives an example in which anxiety deriving from this source seemed to hinder the healing process; and other factors, such as escapism and guilt, seem to have been accompaniments in his subsequent cases. The converse of the picture is the rapid and unforeseen recovery of a young woman whom an exacting family life seemed to suit better than the classical remedy of rest. It would be useful to know whether other tuberculosis workers share his experience that some 30% of a sanatorium population are sick in mind as well as body.

It must be remembered, of course, that the patient with tuberculosis has good grounds for anxiety in his disease, quite apart from other troubles; indeed, Dr. Houghton and Dr. Corrigan, whose paper we print this week, find that anxiety and depression colour the prevailing mood more often than spes phthisica. Moreover, instead of the long peaceful illness to which, perhaps, he has been unconsciously looking forward, the modern tuberculous patient must face collapse therapy ranging from artificial pneumothorax to thoracoplasty.

1. Salaman, M. H., and collaborators. *J. Path. Bact.* 1946, 58, 31.

Fear of operations, however slight, is both deep and common, and for an apprehensive patient treatment may itself become a severe emotional strain. Houghton and Corrigan, discarding the customary sedatives, have made bold and successful use of amphetamine ('Benzedrine') in some of these cases, counting on its ability to stimulate the nervous system. Their results will no doubt encourage others to make further trials on the same lines.

#### BRADFORD WANTS A MEDICAL SCHOOL

Colonel M. Stoddart-Scott, M.D., M.P., has presented a memorandum to the Minister of Health stating that a medical school, which would train 50 undergraduates a year, could be set up in Bradford in time to accept its first students next October. The memorandum is the outcome of the deliberations of a conference of representatives of the city health department, the local medical profession, the hospitals, and the Bradford Technical College.

The college, which has applied for recognition as a university college, is already recognised by London University for the first M.B., and its facilities could be expanded to include full preclinical training. Clinical work would be undertaken at the Royal Infirmary and at St. Luke's, a pioneer municipal hospital of high standing. The school would be prepared to train students for the M.B. examinations of London and Leeds as well as for the English and Scottish Conjoint examinations.

Admittedly Bradford is near to Leeds, but its own population is close on 300,000, and with its immediate environs the population of the district exceeds a million. Thus it is at present the largest centre of population without a university. A more potent argument against the new proposals may be the suggestion of the hospital surveyors of the Yorkshire area that Leeds should confine itself to undergraduate teaching and Bradford become the postgraduate centre of the region.<sup>1</sup> The reaction of the General Medical Council, the Minister of Health, and the Lord President of the Council to the memorandum will be awaited with interest, not only in Bradford but in all the other areas where plans for new medical schools have been mooted, so far without success. This proposal, and others like it, will also raise problems connected with the size and shape of the projected hospital regions.

#### TRADE-UNION MEMBERSHIP

WE commented last week on the action of certain local authorities in requiring their staff to join a trade union. As reported in our Parliamentary columns, the Minister of Health has now reminded local authorities that "their primary duty as health authorities is to maintain the efficiency and smooth running of their health services and to ensure the welfare of the patients for whom they are responsible." All other considerations, he points out, must be regarded as secondary. "While the Minister is anxious that doctors, nurses, and members of similar professions should join a trade union or appropriate professional association, he considers that this matter should not be determined by the unilateral action of local authorities."

Last Monday the Willesden council decided to suspend all action on its recent resolutions about conditions of employment.

THE Order of the Garter has been conferred on Viscount ADDISON, F.R.C.S. He is the first doctor to receive this honour.

1. See *Lancet*, 1945, ii, 681.

The *American Practitioner*, which began publication in September, is a monthly journal (50s. a year post free from J. B. Lippincott Co., Aldine House, Bedford Street, London, W.C.2) intended for articles "not of a highly specialised nature in the fields of general medicine and surgery."

## Reconstruction

### THE REGIONS

#### LOCAL COMMENTS ON MINISTER'S PROPOSALS

THE Minister of Health has proposed division of England and Wales into 14 regions, in each of which the hospital and specialist services will be in charge of a regional hospital board. Last week we published comments on the scheme as a whole. The following are comments from doctors working in the particular areas.

#### Bristol

*From Bristol.*—Many experienced administrators in the provinces are concerned that throughout the Minister's scheme too much stress has been laid on population and too little on distances and the natural grouping of areas—which in the south-west are very important. As regards population they maintain that the level has been set too high. Some feel that the "London view" has prevailed over "provincial experience." When areas and population are large, local views and interests are swamped and the service becomes "local government" in name only.

If all areas must be associated with a university medical centre, then Bristol is the natural headquarters of the south-western counties. But in this area distances are long—there are more than 250 miles from the northern end of Gloucestershire to Land's End. The Minister has foreseen some difficulties, and suggests a regional committee for Devon and Cornwall, responsible to the board "with delegated powers and its own offices." Everyone would agree that some division of the area is necessary. On the question whether or not there should be a committee responsible to the board for part of the area, opinions differ. It is not conducive to smooth administration to have a committee which cannot approach its university centre, or even the Ministry of Health, except through a regional board which is itself directly responsible for an adjacent area.

There is much to be said for two regional boards—each associated directly with Bristol as its university centre—even if the Minister rejects reconsideration of the case for having 30 or more regions for the whole country.

*From Devon.*—The hospital survey recommended a region extending from 25 miles east of Cheltenham to Land's End, based on Bristol. Consultants from Devon and Cornwall, meeting at Exeter in August, agreed that this region would better be divided into two.

The precise function of the university centre needs definition. In general, Devon and Cornwall have not looked in the past particularly to Bristol as their academic centre, and except in the last year or so, when resident posts for ex-Service medical officers have been arranged through Bristol, they have not regarded Bristol as a primary source of resident or consulting staff. Hence they would like to advertise their requirements throughout the kingdom and so have the widest possible field from which to draw applicants. An additional or alternative function for a university centre would be to supply experts in comparatively narrow specialties, such as neurosurgery and thoracic surgery. These would make tours of the region and either deal with cases in the area hospitals or move them to a university centre for investigation and treatment. A third function of the university would be to arrange postgraduate courses for practitioners. The consultants of Devon and Cornwall thought that the proposed region was too large and unwieldy to serve these two latter functions efficiently. Truro is about 170 miles from Bristol, and it was felt that such distances precluded satisfactory administrative contact. Finally, the population in the areas encircled by Exeter, Plymouth, and Truro is sufficient to justify the establishment of a separate regional organisation, and the appointment of specialists to cover all branches of medical and surgical work.

In Exeter there is already the nucleus of the university of the south-west, and there is a strong hope that ultimately a medical school will be started in association

with it. Such a hope will be a stimulus to raise the standard of medicine in Devon and Cornwall.

It is suggested that the regional boundary should lie approximately on a line joining Bridgwater and Bridport. Such a line conforms to the existing natural catchment areas for the hospital and consultant services of Bristol and Exeter. The region thus constituted would have as its area centres Exeter, Plymouth, Truro, and possibly Torquay. The choice of a regional centre lies between Exeter and Plymouth. Those in favour of Exeter urge the traditions associated with the county town, with its existing university centre, and by including the Torquay and Paignton group in their area they claim a population not far short of Plymouth. Those who favour Plymouth point to its more central geographical position, its larger population, and its greater hospital resources.

#### Wales

*From the South.*—The Government having refused to appoint a Secretary of State for Wales, the Minister of Health has offered a consolation prize by declaring Wales and Monmouth one hospital region with its university centre at Cardiff. In making this decision, he is acceding to a request made to him unanimately by the local authorities of Wales and Monmouthshire, and it is said that he was greatly impressed to find so much unanimity in Wales on any subject whatsoever!

In the parliamentary debate (*Hansard*, July 2, 1946) Mr. Bevan admitted that Cardiff is not easy of access from North Wales, which pivots on Liverpool, but said that nevertheless "there may be an administrative convenience in having one regional hospital board for Wales, with both Cardiff and Liverpool universities represented on it." The case for administrative convenience has yet to be made out, and it is difficult to visualise any other convenience from the arrangement proposed. From North Wales to Cardiff is a long and tiring day's journey, whereas from North Wales to Liverpool is a matter of an hour or so. So much for the convenience of patients. As to the consultants of Cardiff (who incidentally are said to have joined with the other consultants in Wales in voting unanimately for Wales and Monmouth as a single area), these are over-busy even at present in coping with the demands of Cardiff and its immediately surrounding areas. It is difficult to see how, even with air transport, they could possibly cater for the consultant needs of North and Mid-Wales. It is true that there are consultants also at Newport and Swansea, which are also situated in South Wales; but neither of these is a teaching centre like Cardiff.

Possibly the Minister may have been influenced, in his attempt to marry sentiment with practice, by consideration of the record of the Welsh National Memorial Association, which in 30 years has built up a comprehensive tuberculosis service which is claimed as being as completely efficient in the remotest parts of Wales as in the four county boroughs. But a tuberculosis scheme has been hitherto an ad-hoc scheme, and by the nature of things easier to organise than a multi-purpose general medical and surgical service.

It is understood that the local authorities, in their plea to the Minister to have Wales and Monmouth declared a single area, suggested that, until the hospital and specialist services in the North and Mid-Wales areas are brought up to the necessary standard, the regional board shall be empowered to make arrangements with other regional boards, covering Liverpool, Manchester, Birmingham, and Shrewsbury. In another part of the speech already quoted, the Minister said: "We must have as much flexibility as possible. What is more, after the boards have been set up and we have had experience, we must have modification. We shall certainly have to modify administratively."

The Welsh experiment will be well worth observation. It will be interesting to see whether Welsh national sentiment in action can produce sound practical achievements.

*From the North.*—Administratively and politically it is tempting, especially for a Minister from the south, to make Wales a region for the Welsh. But tradition and mountains stand in the way. The people of the north, with memories of Owen Glyndwr and Mortimer, hold themselves (to put it mildly) different from the

South Walsians, and the country is divided by a central block of mountains through which no road or railway yet runs.

The new region suits South Wales well, for Cardiff is a good centre with good doctors and a competent school. But North Wales for clinical matters cannot depend on Cardiff. To begin with, a patient could only be moved there via Shrewsbury and Hereford after a journey of several hours in ambulance or train, for the alternate west route is tedious and there are no through trains. Similarly North Wales naturally lies in the Liverpool consulting area. A Cardiff specialist is never seen there; as a matter of practical convenience consultants from Liverpool, Manchester, or Birmingham are automatically called in. Again most of the local doctors have been trained at the Liverpool school, which North Wales has come to regard as largely her own. The proposal to set up a medical school at Bangor, which already has a university college, has encountered difficulties, for it lies near the north-west corner of the area and has neither the staff nor the population to become a medical centre.

The local feeling is clear; for at a recent meeting of panel practitioners it was unanimously resolved that North Wales should be attached to Liverpool for clinical purposes, save for a few districts which are linked by transport with Manchester or Birmingham. But a good old British compromise may in the end evolve, for the Minister has himself provided a loop-hole in saying that a region may be allowed to have functions outside its own area where desirable. It is thus possible that the doctors will be persuaded to bow to the politicians, intoning "Wales for the Welsh," provided that in practice, at any rate for the present, they are allowed to stick to Liverpool and Manchester.

### Liverpool

The medical profession here are perturbed at the small size of their region compared with that of their neighbour Manchester. Both cities have medical schools of about equal size, each admitting 100 undergraduates a year. Yet Liverpool has been allotted a population of just under 2½ million while Manchester has nearly 4 million. Furthermore the area assigned to Manchester is 2½ times as large as that of Liverpool. Students will tend to apply for admission to the medical school which is the centre of their area. Liverpool, drawing the same number of students from a smaller area and population, will, it is feared, ultimately have a lower standard of admission and a smaller chance of attracting outstanding candidates. Her school will thus be subordinate to Manchester.

So much for general criticisms. But the boundaries themselves are held in several places to disturb the flow of students and patients to centres to which they are naturally linked by tradition, commerce, and transport. The most serious blow to Liverpool is of course the amputation of the North Wales area, which ignores existing practice and planning alike. The hospital surveyors of the north-west area declared that Liverpool was the main centre for North Wales, and indeed also wished to associate Merioneth and Montgomery with it. Possibly in view of the inaccessibility of Cardiff the Minister has it in mind to set up in North Wales a regional committee with delegated powers and its own office. But if this regional committee were put under a regional board at Cardiff, Liverpool would be left with responsibility but without power or representation.

On the other hand it is felt that the Crewe area, including Knutsford, which at present comes into the Liverpool region, has obvious natural associations with Manchester.

To redress the balance between the Liverpool and Manchester regions the following solution is put forward. North Lancashire and South Westmorland (including Barrow, Lancaster, Blackpool, and Preston) was described by the hospital surveyors as neutral territory between Liverpool and Manchester, and though on the whole the surveyors recommended its assignment to Manchester its transfer to Liverpool would not infringe any medical principles. If this area and North Wales were given to Liverpool, and the Crewe area moved to Manchester, each region would then have a population of about 3½ million and contain an approximately equal territory. Above all it would not leave Liverpool with any feeling of grievance against its friendly neighbour Manchester.

### Manchester

There is a strong feeling here that the proposed areas in the north-west need revision. The basis of the trouble seems to be that North Wales, though generally dependent on Liverpool for its ultimate medical care, is placed under the aegis of Cardiff. In terms of travelling it would probably take three days for a patient or doctor to go from Colwyn Bay to Cardiff, have an interview, and return, whereas a similar visit to Liverpool could be managed in a day. The general opinion in Manchester is that, to make up for this district which it has lost, Liverpool has been given parts of Cheshire and Lancashire which have close associations with Manchester. The most striking anomaly is found in the case of Knutsford, Northwich, Lymm, and Congleton, all nearer Manchester than Liverpool and having no easy connexion with the latter city. Knutsford is in fact a residential suburb of Manchester, and Lymm largely so.

Several towns, including Wigan, Warrington, and Crewe, are almost equidistant from the two cities, and in point of distance and accessibility might be apportioned to either. But through their hospitals, and in some cases through their medical officers of health, these towns have asked that they should maintain their long-standing relations with the voluntary-hospital area of south-east Lancashire, represented by Manchester. A shift to the left would do much to satisfy both Liverpool and Manchester.

A small area in question is that of Saddleworth. This, though on the west side of the Pennines, is in Yorkshire; but its medical connexions are through Oldham and Ashton-under-Lyne on to Manchester. Its communication with the east is much less easy. It would be well allotted to Manchester.

### Newcastle

The proposal to divide the country into regions is the least controversial part of the National Health Service Act. At first the regions will conform to the existing spheres of influence of the university medical centres, but as experience grows we must expect changes through the adjustment of border territories and the creation of new regions. There may be border troubles for some places, such as the clash between Cardiff and Liverpool over North Wales. Common sense and established practice would base North Wales on Liverpool, but Welsh nationalism will resist this. Over the remainder of the country the proposed regions will be accepted without much argument.

Drawing regional maps is the easiest part of the plan. What happens within the region matters. It is a momentous occasion, with an opportunity to provide the hospitals the country needs. But have we the men with the knowledge, experience, and imagination who will devote themselves to the work of the regional boards? Have we the administrative officers who will be capable of entering into the life of the region and of wielding a proper influence? The E.M.S. was good only in parts, and too many of its administrative officers had rôles which were innominate and obscure. From the outset the Ministry must strike a high note of promise and achievement. It will defeat its own purpose if it is too timid. Patience is a virtue only when it is used to a definite end. We have received the first intimations of the Ministry's plan, but we shall await their further proposals with some uncertainty. Is it too much to expect that the Ministry will capture the imaginations of the regional boards by describing some of the standards they expect them to attain? Government buildings in the provinces and regional offices of the Ministry of Health do not give an impression of æsthetic charm or virile energy. Can the regional boards step off on the right foot and avoid the same impression?

One of the boards' chief tasks will be to improve the hospital and specialist services in the big industrial districts. For this they will require the right man working in the right conditions and right environment. A period of work in a non-teaching hospital would be a great advantage, and might give a man opportunity to prove himself both in practice and research, thereby increasing the number of those eligible for return to responsible posts in the university medical centre.

## Leeds

The area for the Leeds regional hospital board almost naturally defined itself. It has one central university, which is sufficiently far from other universities to make it an obviously independent unit; the surrounding population, though parts of it are concentrated into towns which merge almost imperceptibly into one another, is sufficiently separated from populous districts likely to belong to other regions that no difficulty could have arisen in their allocation to the Leeds region; and the population of the area is large enough to provide all the clinical material necessary for a numerous medical consulting staff, to provide enough of the rarer cases to make their advent a matter of intelligent interest rather than a unique occasion, and (most important of all in a university organisation) to provide a steady supply of pathological processes for scientific research and to satisfy all the teaching demands of a medical school.

The proposals defining the region, therefore, offer little ground for criticism. There is one district, however, which has been allotted to another region, which Leeds will probably desire to continue to draw to itself—Goole. Goole is mainly staffed by Leeds consultants and has been so for many years; the natural drainage is towards Leeds, and the reasons for allotting it to the Sheffield area are not very obvious. Northallerton, in the north, has been allotted to Newcastle, and some may feel that it should be part of the Leeds region, while on the other hand, in the south-west, Saddleworth remains with Leeds though its medical trend is towards Oldham and Manchester. Although for administrative tidiness it may be part of the Leeds region, patients will still go to Lancashire.

On a bird's-eye view the general provisions for the region are satisfactory to local interests, and the proposed arrangements coincide closely with the outline drawn by the Nuffield Provincial Hospitals Trust (Yorkshire region) and detailed in the report published by its medical services advisory committee, and also with the suggestion of the hospital surveyors.

## Sheffield

My colleagues seem to be satisfied with the regional area, and no changes have been suggested.

## Birmingham

Little criticism is heard here. The boundaries of our region seem to have been drawn in accordance with the facts of the situation.

## Oxford

It had been feared that the area of the regional hospital board based on Oxford might correspond to Civil Defence Region 6, which included Hampshire and the Isle of Wight and had proved an inconvenient unit. Hence the immediate reaction here has been one of relief on finding that the proposed region corresponds fairly closely to the Berks, Bucks, and Oxon region of the Nuffield Provincial Hospitals Trust. The three counties have been working together closely and harmoniously in hospital affairs since 1940, and have jointly made many plans (some already realised) for coördination of specialist services. When a scheme for a cancer service was drawn up in 1944, Northamptonshire was associated with it, although not actually a member of the regional council.

The area now suggested has a population of about a million, with Oxford roughly at its centre. Though it is generally approved, a little boundary revision will be needed to ensure that natural catchment areas are not unnecessarily disturbed. We recognise that it is reasonable for the Maidenhead, Windsor, Eton, and Slough areas of Bucks and Berks to be included in North-west London, for all that there has been close collaboration of the local authorities and hospitals in this area with those of the rest of the Nuffield Provincial Hospitals Trust region. But we are less sure that this is true of the more westerly part of Bucks, embracing Amersham and the Wycombes; for, though the train connexions with Oxford are bad, and those with London are good, the road connexion with Oxford is excellent and there is a natural flow of patients from these areas to Oxford. On the north and north-east borders no

special comment is needed; but on the north-west there is a strip of Gloucestershire, including Fairford and Moreton-in-Marsh, which from time immemorial has looked to Oxford for its specialist services and feels very strongly that it should not be removed. On the south-west border there is the problem of Swindon and Marlborough. Swindon has been a member of the Nuffield regional council; and, though from population size it might be almost self-supporting for general specialist services, its plurality of hospitals conducted under various bodies has made this difficult. It has been provided with specialist services, as has Marlborough, from the Oxford area, and would wish so to continue.

These boundary adjustments would be small, but are important because they chiefly affect areas which are apportioned to Bristol but are distant from it. They would increase the population of the Oxford region by about 300,000.

Some of our regional services (e.g., orthopædics) extend beyond the proposed boundaries; but in the light of the Ministry's circular we presume they will continue as heretofore.

## Cambridge

The region centred on Cambridge University comprises the counties of Cambridge, Huntingdon, the Isle of Ely, Norfolk, the Soke of Peterborough, and East and West Suffolk. Included within it are the county boroughs of Norwich, Ipswich, and Great Yarmouth, and parts of the counties of Bedfordshire, Rutland, Lincoln, Hertfordshire, and Essex. It is clear that the population will be 1½-2 million.

The principal centres of population are Cambridge, Peterborough, Norwich, and Ipswich, and these are separated from each other by large tracts of rich agricultural land. The turmoil of the industrial revolution affected East Anglia but little, and the growth of modern means of transport has not tended to produce dormitory areas near the great centres of population described. On the other hand, the absence of large industrial centres has meant that hospital development throughout the region has been slow, and particularly the development of municipal hospitals, with the result that general hospital provision is inadequate, and certain specialist services are not readily available. The linking up of the principal centres will ensure that the best use is made of hospital accommodation, and the development and expansion of specialist services in each centre can be so coördinated as to prevent overlapping. For example, Ipswich will become the focal point for the consultant services for the greater part of the counties of East and West Suffolk, sharing at the same time in the regional developments in such special subjects as thoracic surgery, neurosurgery, and long-stay orthopædic units.

The region is fortunate in having Cambridge as its parent university. Plans are now well advanced for a postgraduate medical school, and a number of special departments are already in existence—e.g., pathology, clinical biochemistry, radiotherapeutics, and experimental medicine. Other specialties, such as hæmatology and rheumatic diseases, will shortly be developed, and are to be followed by pædiatrics, dermatology, thoracic surgery, and orthopædics. The defined region is largely agricultural, and the investigation of diseases peculiar to, or prevalent among, an agricultural community will be one of the tasks undertaken by the university research departments.

In many respects the main part of the Cambridge region offers ideal facilities for coördinated and uniform development, and criticism of the Minister's proposals can be restricted to the periphery. His desire that wherever possible the boundaries of the regional areas should coincide with those of the local health authorities is presumably the reason for excluding almost the whole of Essex and Hertfordshire, although the northern parts of those counties, being agricultural, have more in common, in all respects, with East Anglia than with London. It is in the northern part of the region, however, that the most serious grounds for debate arise. There is no university centre between Cambridge and Sheffield, and the latter university is required not only to deal with a vast industrial population but also to extend its influence as far to the south-east as the farm lands of



Lincolnshire. Fortunately, as the Minister has pointed out, the boundaries of regional areas need not, and will not, prevent the free passage of patients from one area to another; and there is no doubt that, as the regional boards become familiar with their regions, readjustments of boundaries will be made.

#### London, North-east

This region is to be based on the London Hospital and St. Bartholomew's, and is to include a sector of the metropolis combined with the larger portions of Essex and Hertfordshire. It therefore brings under one administration the Cockney and the extreme type of countryman, who may be only sixty miles apart in distance but whose outlook on life, including medicine, differs by hundreds of years. Essex villagers can still be found who regard London as "furrin parts."

The northward boundary does very much follow the present sphere of influence of London to the south and Cambridge to the north. Communication by road and rail to the larger centres has obviously been carefully considered and is satisfactory. If the large size of the region is going to do away completely with the hard demarcation line of the county boundary between Essex and Hertfordshire it will be a boon to those who have suffered so long from the jealousies and bickerings of the adjoining county councils. But where one boundary has been abolished, others will be created. And apprehension is naturally felt by doctors who live near the edges of the proposed new regions. The Minister will do well to allay their criticism at once, by reasserting his recent declaration that "the welfare of the patient must have priority over everything else," including administrative irregularities; and that doctors will not be penalised for sending patients over the boundaries of their region.

The other important point is the difference, already mentioned, between the rural and urban populations. The natural centres, such as Hertford, Bishop's Stortford, Chelmsford, and Colchester, must be allowed enough autonomy to be able to continue the good service they are already giving. The connexion with London must continue to help them, rather than to impose administrative restrictions.

It is of course difficult to consider the geographical problems of hospital regions when one knows so little about what they will imply; and it is impossible to give more than qualified approval until more is known about the workings of the regional administrations at different levels. With that reservation, local feeling in this part of the world is one of relief and satisfaction. We sincerely hope that further disclosures of plans will prove them to be as well thought out.

#### London, North-west

The regions centred on the University of London, having an average population exceeding 3 million, will present administrative problems never dealt with previously in this country. The sector scheme destroys administrative machinery already working, increases the size of the problem to be dealt with, and supplies no alternative to the machinery destroyed. Even were it possible for members of the regional board to be fully engaged in their duties, it is impossible to envisage their giving detailed consideration to the needs of an area stretching from Bayswater Road to Bridport. Does any super-specialist development within a hospital region demand a population of 3,843,250 (South-west) in order that it may be adequately organised?

The North-west region seems to have received an undue proportion of "cultural influence" by the inclusion within it of five undergraduate teaching hospitals and the main postgraduate teaching centre. This is the more remarkable when it is noted that its main population basis is the Middlesex County, wherein hospitals are not undeveloped. The separation of the North Middlesex and Chase Farm Hospitals from much of the population previously served will mean these two hospitals attempting to receive cases from areas separated from them by almost insurmountable geographical difficulties. This boundary, certainly, cannot be said to have been drawn for the benefit either of the patients or the local hospitals.

The planning, co-ordination, and provision of hospital and specialist services are stated to be the prime con-

siderations determining the size and extent of the regions. If the regional hospital board is to fulfil these functions adequately it must ensure: (a) a bed bureau service, (b) allocation of function to individual hospitals, and (c) effective inter-hospital specialism. It should provide central legal, engineering, architectural, and purchasing departments, and all these should operate in close consultation with the individual hospitals. Considerable local autonomy should be encouraged amongst all hospital management committees. The efficiency of centralised supply and advice must be enhanced by constant contact with the periphery, where hospitals must enjoy purchase facilities of non-standardised equipment and dietary needs.

The danger implicit in the present suggestions is that efficiency will result in over-centralisation and be associated with an inaccessible bureaucracy. Without such centralisation it seems unlikely that the present non-existent regional machinery will fulfil its broad co-ordinating and supervisory functions.

We should, I think, limit the size of each region around London to approximately 2 million; attempt to base its administration on established organisations; and, where necessary, move the teaching hospitals as soon as possible into those outer regions where both the population and the hospitals have need of them. In the South-west region Southampton should become the autonomous centre, with its own university hospital within a few years.

#### London, South-west

The proposals have been well received here. As a base of academic learning and guidance, London University and its three medical schools, comprising a wide range of medical experience and administration, will, I believe, be more acceptable to the larger centres of population in the region than any alternative university centre. Three of the four larger county boroughs in the South-west London area—Portsmouth, Southampton, and Bournemouth—will also find it more convenient to link up with the metropolis for the inevitable consultations and meetings.

At first sight, the region, with a population of about 3,800,000, appears on the large side; but as Hampshire, Dorset, and the Isle of Wight are to have a regional committee, it is felt that more autonomy will be enjoyed by the group of hospitals within this sub-region. The larger area will also make it more economical to establish hospitals or units for highly specialised treatment—e.g., cerebral surgery, thoracic surgery, radiotherapy, and psychiatry.

The division of the local-authority responsibilities of Dorset and Wiltshire between two regions has apparent disadvantages, particularly as these authorities will have to provide services in both the South-west London and the Bristol regions, including epidemiological field work, and the visitation and follow-up of tuberculosis and venereal disease. However, the close proximity of these local-authority areas to the university centre of Bristol probably outweighs these disadvantages.

The grouping of hospitals and their ancillary services is long overdue, and one accepts the necessity of planning to provide more uniformity throughout the country. Even so, there are many links in the chain which appear to be missing, particularly the link between the hospital, specialist, and local-authority services. For example, in Southampton, where infectious cases arrive on ships, the port medical officer will no longer have any administrative control over the infectious-diseases hospitals which receive these cases. This may lead to difficulties over admissions for observation. It is to be hoped that, when the orders and regulations are considered, these matters, which are of great administrative importance, both locally and nationally, will successfully compete for clarification.

#### London, South-east

*From Sussex.*—The South-east region, based on Guy's and King's College Hospitals, includes only Kent and East Sussex and is about half the size of the South-west, which includes Dorset, Wilts, Hampshire, Surrey, and West Sussex. Moreover, the dividing line runs counter to the existing flow of medical services. It divides Sussex into two, an arrangement already shown to be incon-

venient and sometimes unworkable in the case of the borough and county hospital services, and it cuts through the natural catchment area of the most important hospital centre on the South Coast.

The voluntary hospitals of Brighton and Hove provide a complete hospital and consultant service of a high standard, which now serves an area with a radius of about thirty miles extending equally into East and West Sussex. The area is homogeneous and easy of access for patients and their friends, since trains and buses converge on Brighton. The hospitals on both sides of the border are in some cases served by the same consultants. To divide Sussex, as is proposed, would leave Brighton and Hove, the acknowledged medical centre of the South Coast, on the extreme edge of the region.

To those who know Sussex, with its great health resorts and thriving towns, this appears unfortunate, and the case for including the whole of Sussex in the South-east region is obvious. In the first place it would make the South-west and South-east regions more nearly equal in size; secondly, Kent and Sussex would be grouped conveniently round four centres—Canterbury, Tunbridge Wells, Chichester, and Brighton. Brighton in the centre of the South Coast, with its natural hinterland, is the largest of these and has the greatest number of consultants; it would be wasteful and short-sighted not to use it to its full extent.

*From Kent.*—Though large in its population (which must be close on 4 million), this is a region which is relatively compact and accessible. It is bounded by the Thames Estuary, the Channel, and the county boundaries with West Sussex and Surrey. Except only in London, where the borough of Lambeth has been divided—presumably to allow of the inclusion of King's College Hospital—no existing local-government boundaries have been transgressed. In the whole of the area there are only four county boroughs (Brighton, Canterbury, Eastbourne, and Hastings), and none of these boroughs has provided hospital services that it would prove difficult to integrate into a regional scheme. Radially there are ample and easy communications between London and all parts of the region. Cross-country journeys by rail between different districts are more difficult, but road linkage is more than adequate. The boundaries exclude no large areas that normally find their hospital provision inside the region; nor, with the possible exception of Beckenham and Penge, are any included that would ordinarily look elsewhere for their services. These two districts in Greater London are geographically part of Kent; but in practice they have an orientation more towards Croydon and east Surrey than towards north-west Kent. Their inclusion in the South-east rather than the South-west region should not, however, present difficulty, particularly with King's College Hospital available as a focus for their reorientation.

On all these counts the South-east seems a well-conceived and workable region, once one has accepted two postulates—that the regions shall be limited to 14, and that there shall be quadrisection of London. From a purely local point of view it is this division of London, and its attachment in quadrants to large sections of the home counties, that is likely to give rise to most of the early problems of regional planning. The division of London necessarily breaks up the unity of the municipal services already provided. Hospitals—particularly special hospitals—will be unevenly divided among the different sections, and it may not be possible for some time for each region to be self-sufficient.

Administratively there is a danger that the board in all its affairs will be dominated by London. In all five sections from which the board will be constituted—the university, the medical profession, the local authorities, the public, and the voluntary hospitals—London will loom large, and the more peripheral parts of the region will undoubtedly watch fearfully lest they are unable to obtain that degree of autonomy that might have been theirs had the region been smaller, or had it been a self-contained area looking towards, but not absorbed into, London. They will hope that the very size of the region will necessitate the delegation of real power to the management committees, and that through these committees they may still retain an extrametropolitan corporate entity.

## A NEUROSIS CENTRE

THE L.C.C.'s hospital service, like that of other authorities, has been hampered by shortage of nurses and domestic staff, and many of the buildings have been destroyed or badly damaged. Sir Allen Daley, in his 1945 report,<sup>1</sup> says that for these reasons many patients evacuated during the war had not yet returned at the beginning of this year. Despite these difficulties, however, he is able to record a number of positive achievements.

In May of last year a 350-bedded neurosis centre for returned prisoners-of-war was established at the Southern Hospital, Dartford. Some of the patients had been in P.O.W. camps as long as five years, and they lacked the confidence to mix socially and succeed in civilian work. To restore this confidence they were sent out to work under local employers for short periods each day; they were usually given unskilled work unless they were tradesmen, and change of occupation was permitted once a week. At work they were visited by a vocational psychologist and a nurse, who was responsible for liaison between the psychiatrist and the employer. The value of this arrangement lay not only in the experience of various occupations but also in the opportunities for association with healthy workmen. Men who were likely to be discharged from the Army were seen, within two weeks of admission, by a disablement resettlement officer of the Ministry of Labour. At a later interview, just before the man left hospital, the D.R.O., aided by reports by the psychiatrist and vocational psychologist, helped him to decide on his future employment.

Altogether 1202 patients were treated at the centre during the eleven months that it was in being. The results were good, perhaps partly because the men were on the whole excellent material and partly because every resource for treatment was at hand. The report suggests that with growing difficulties in finding employment as the labour market becomes more stable, an increasing number of patients will need vocational guidance. The establishment of a neurosis centre in collaboration with the Ministry of Labour is proposed. Here outpatients fit only for sheltered employment would be separated from those who might respond to reablement.

## INFECTIOUS DISEASE IN ENGLAND AND WALES

WEEK ENDED NOV. 30

*Notifications.*—Smallpox, 0; scarlet fever, 1383; whooping-cough, 1878; diphtheria, 301; paratyphoid, 19; typhoid, 3; measles (excluding rubella), 6005; pneumonia (primary or influenza), 745; cerebrospinal fever, 47; poliomyelitis, 18; polioencephalitis, 1; encephalitis lethargica, 0; dysentery, 58; puerperal pyrexia, 130; ophthalmia neonatorum, 61. No case of cholera, plague, or typhus was notified during the week.

*Deaths.*—In 126 great towns there were no deaths from scarlet fever, enteric fever, or diphtheria, 2 (0) from measles, 8 (0) from whooping-cough, 64 (6) from diarrhoea and enteritis under two years, and 20 (3) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 294 (corresponding to a rate of 30 per thousand total births), including 29 in London.

## On Active Service

### AWARDS

THE following appointments have been made in recognition of gallant and distinguished service in the field:

O.B.E.

Lieut.-Colonel G. T. M. HAYES, M.C., M.B. N.U.I., I.A.M.C.  
Lieut.-Colonel P. W. KENT, M.B. N.U.I., I.A.M.C.

1. London County Council: Interim Report of the County Medical Officer of Health and School Medical Officer for the Year 1945. Obtainable from P. S. King and Staples Ltd., 14, Great Smith Street, S.W.1. Pp. 63. 2s.

## In England Now

### *A Running Commentary by Peripatetic Correspondents*

"WALKING the hospital" was the term used in the past for the time spent in hospital after the student had served his apprenticeship with a general practitioner. Doubtless he walked much more than his successor, who arrives at hospital by bus, tube, tram, bicycle, or car. But "standing in hospital" would really have been more accurate. Forty years ago, when I entered hospital, the clerk or dresser was never allowed to sit down during ward rounds. These might go on from 1.30 to 4 P.M. or even later, and the physician, clerks, sister, and nurses, one of whom carried an inkpot and a quill pen, stood the whole time. The house-physician alone was privileged to rest one buttock on the locker, and history relates that one who worked for a very painstaking physician was found at 5 P.M. resting on the locker and reading Homer, while his chief was examining the patients in his usual careful way. In the operating-theatres the students used to stand as a rule, though they sometimes leant on the table to hold a struggling patient. Students were allowed to sit in outpatients and during lectures, but while waiting for the ward rounds to begin there was usually nowhere to sit. Doubtless this long standing was of value in learning to maintain a dignified carriage however tired the doctor might be, but it is difficult to see how it can aid the absorption of knowledge.

Nowadays in some hospitals the students are allowed to sit round the bed on stools or chairs, and I am sure that the rounds are not so exhausting as they were. I have never seen anyone fall asleep, as some students (I for one) do at a lecture however interesting it may be. I think the student's attention is less easily distracted when he is comfortable than when he is standing first on one foot and then on the other. Physicians seem more ready than surgeons to allow the clerks to sit down. The surgeon tends to go more quickly from bed to bed than the physician does, so the stools would have to be moved more often in the surgical rounds, but surgeons should at least try the experiment. Not all physicians allow stools, and the suggestion has been made that those who do so are currying favour with the students and thereby trying to attract large crowds. This is an unworthy accusation, for physicians as a whole prefer smaller classes where the clerks can examine the patients without too long exposure. Let us hope that the practice will spread and that standing in wards will become as obsolete as walking the hospitals.

When the business-end of a cow appeared through my office door followed by two-thirds of the animal my first reaction was to grab for the telephone in order to ring up J of the Public Works and say "I told you so." I had always argued that it was a mistake to build a ramp up to the office in place of steps. I decided, however, that it would be wiser to leave by the window before the remaining third of beef won the tug-of-war that was obviously taking place somewhere in the rear. At the top of the ramp a scandalised peon was holding on determinedly to the cow's tail, yelling for help, while just behind him a Hindu veterinary inspector and an unusually burly Bedouin were about to engage in a life-or-death struggle. Next minute a small army of orderlies, sweepers, and bearers went into action and the three actors in the comedy were pushed down the ramp and out into the safety of the yard.

Pandemonium then broke loose. Out of the babel of Arabic, Hindustani, and English I gathered that the Bedouin was complaining against an unjust decision of the vet. The latter said the cow was pregnant, and war-time regulations, still in force, forbade the slaughter of pregnant animals. The Bedouin maintained she was not, and, taking advantage of that cursed ramp, had driven the animal into my office so as to make sure that I saw her. When you sign on the dotted line for the Colonial Medical Service you can be sure of one thing—you will be frequently landed with some out-of-the-way job. My peculiar chore is administration of the Veterinary Department.

Unfortunately nobody has ever enlightened me as to the signs and symptoms of pregnancy in the cow. For

once Macewen failed me and the number of rings on the horns or its classification as cow, heifer, stirk, or quey furnished no answer to the problem. So, keeping Solomon well in mind (after all, this is the Queen of Sheba's reputed embarkation point) I said the animal was to be slaughtered and if she was found to be pregnant the cattle dealer would be prosecuted.

Both parties were agreeable, so I accompanied them on their unpleasant mission to see fair play (Moslem abattoirs do not favour humane killers). While waiting the vet regaled me with endless tales of the dishonesty and general rascality of Arab cattle dealers, but even he was reduced for a moment to complete silence when a grinning butcher put out for our inspection a perfectly empty uterus. Then he found his voice again: "Sir, that she-cow has deceived me, but, Sir, she was so plummy."

\* \* \*

Have you noticed how few statues in London commemorate the achievements of those connected with medicine? There are more than a hundred statues dotted about in the open spaces and thoroughfares of the metropolis, and they celebrate the distinction of royalties, statesmen, explorers, soldiers, sailors, scientists, authors, artists, philosophers, and, last and not least in number, nurses and doctors. Lord Lister looks benevolently down Portland Place, Sir Hans Sloane dignifies the physic garden in Chelsea though his treasures glorify the British Museum, John Hunter's bust is back again in Leicester Square near the site of his anatomy school, and the sculptured features of Miss Aldrich Blake, that noble-minded surgeon, grace the dullness of Tavistock Square. Near Waterloo Place, Florence Nightingale stands close to the statesman who was the means whereby she achieved her purposes in the Crimean war, while those who walk north from Trafalgar Square past St. Martin-in-the-Fields will find inspiration in the nobly resolute figure of Edith Cavell. The visitor to Kensington Gardens can see Jenner seated in sylvan surroundings frequented by the children whom he did so much to benefit. That completes the medical statuary of London streets, and I must confess that Nurse Cavell's is the only one which awakens in me feelings of reverence.

Apart from the statue of Miss Aldrich Blake there is no witness to those who have made the last fifty years the most memorable in the history of medicine, surgery, and pathology. Does that mean that the public do not appreciate our profession at its true worth? I do not think so. Rather it is considered that a statue is a poor way of perpetuating a personality. It is a cold lifeless thing. Though there may be grace of limb or even dignity of gesture, though the features may be correct in line and accurate in proportion, yet the eyes are without expression and the complexion is the mask of death. The Greeks often put colour and gilt on their statues; that would at least give some touch of life, but our taste prefers the bare coldness of the uncoloured stone.

Even when the statue is worthy of its subject it is often erected where it is impossible to see it to advantage—on top of a column or on a high plinth—or in a place where to stand and admire threatens one with instant death from the busy traffic. No; give me a portrait which shows us the eyes in all their colour and vivacity and recalls the complexion and expression as they were in life.

\* \* \*

There was a young psycho of Staines  
Who plugged his aunt in to the mains  
Saying "Two hundred volts  
Should screw up her loose bolts  
And prevent her undressing in trains."

\* \* \*

As a patient I am impressed by my previous ignorance of nursing. The nurses are wonderful but the system—I! It seems that any initial enthusiasm is to be discouraged, intelligent coöperation replaced by discipline, and the whole set in a caste system reminiscent of a public school with an ascending scale of privileges based on length of stay. I'm afraid this system has been its own downfall. Treating women like naughty schoolgirls was always poor psychology, but now that labour is so short and they know that elsewhere they will be treated as adults it is self-extermination.

## Letters to the Editor

## THE ACT

## A MORAL PROBLEM

SIR,—Mr. Kenneth Mellanby states the case of those who believe that there is no inherent wrong in performing vivisection experiments on human beings without their consent, and perhaps in opposition to it. Alternatively he claims that those who would not do such things themselves are entitled to use knowledge gained thereby. He describes as "simply pernicious sentimentality" the opposite view that those who would use knowledge thus obtained are accessories after the fact and become responsible for the actions that gave rise to it.

He shows that there is no borderline at which to stop once the starting-point is passed. He classifies those who have done such experiments as "so-called scientists," "irresponsible sadists," and "serious research-workers." Yet who can say that everyone that works in a laboratory is an earnest seeker after truth, or that there never has been a vein of cruelty in any one of them? And has nothing been found in science except by those of "academic standing"? There is the same want of definition of those upon whom it is justifiable for such investigations to be done. It would seem that even after having accepted the idea that such persons "should be given the opportunity to serve as subjects for experiments" Mr. Mellanby must put in much hard thinking before he can draft rules under which a licence for such vivisection experiments might be granted.

With regard to the "results" of those which have already been done, Mr. Mellanby "would grade them as 'confidential' and make them available only to bona-fide investigators." But the great glory of science is that all knowledge gained by it shall be free to all the world. Is this to be set aside so that investigators classed, by some person or persons unknown, as "bona-fide" may have at their hand results of such research that possibly may be useful but which are hidden from the rest of the world? Useful to whom? To still more investigators? Or to us who are clinicians? We are scientists in that we must use the results of science in our pursuit of the art of healing. For this we must use our critical judgment. We must decide for ourselves whether the work of the investigators is good work and whether it is such that we can confidently recommend it to our patients or try it on them. To exercise this judgment we must have the whole story.

No! If this material is to be touched, it must be published in full. Then and then only shall we be able to judge how much there is of value in it. Then also shall we know the full story of the bestiality under which some, at least, was done, and be able to weigh the rest in the light of this.

Far better however would it be for the whole to be destroyed uncopied and unrecorded, as was indicated in the novel by Miss Josephine Bell to which you have already referred. This book tells of a certain hospital in which a number of persons had died mysteriously. The suicide of a member of the staff brought to light that these deaths had resulted from his injecting patients in a study of anaphylaxis which was then the problem of the day. His "work" was nearly finished. A meeting of the staff was called to decide what should be done with his records which they had before them on the table. One member—a pathologist—urged that they must be given to the world as they were of great importance. But the chairman—a clinician—held the opposite and swayed the meeting to his view. The papers were destroyed in the presence of them all. The words, quoted by you on Nov. 30, that Dr. Bell puts into the mouth of the senior physician will bear repeating: "May I remind you that our duty to our neighbour, our fellow man, comes before even our interest in science?"

London, S.E.1.

T. B. LAYTON.

SIR,—Dr. Mellanby's letter is a warning to those who say "it couldn't happen here," and of the dangers of being a "keen research-worker" with "little contact with the world outside his laboratory," and of "believing whatever his government tells him."

London, S.W.15.

A. NELSON-JONES.

SIR,—The controversy which is at present raging about discussions with the Minister of Health has made me ponder over the factors which would appeal both to the public and to the medical profession as evidence of an earnest wish on the part of the Minister, or a definite promise for better health and better treatment for the sick.

From the point of view of the public this would imply a levelling up of the treatment, especially among the less well-to-do, so that invalidism should be as short as possible and recovery as complete as possible, while the illness itself would be made as little unpleasant as might be.

On the preventive side of health we should first consider better houses and more houses in order to lessen overcrowding; better conditions of work with much less exposure to various industrial risks; and all those measures which will provide better food and safer drink for everyone. It is of course extremely important to cater for adolescent and adult education, so that the greater leisure which machinery will bring can be usefully employed by all.

For the doctors there are many important factors, the first and the greatest of which is the increased facility for acquiring a real knowledge of professional work so that each doctor may be able to treat his patients better. This will largely mean help in various directions, including (1) aids to diagnosis, and (2) help in treatment, which—whether the treatment be carried out in the patient's home or in an institution—means for the patient the ready acquisition of nurses, masseurs, and domestic helps, and for the doctor domestic helps, stenographers, and an attendant nurse. In hospital practice we need more beds, more domestic staff, more nurses, more porters, more stenographers, and more technical assistants, so that not only may the treatment be carried out more efficiently but everyone may have more time to devote to the care of the sick. This would make the work easier and would enable the doctor to get through his work more comfortably and to have leisure both for physical exercise and for reading, so that he would find it much simpler to keep up to date in his professional work, and at large would do his work better and under better conditions.

At present the doctor in hospital, and the practitioner doing general practice, works long hours, usually more than twelve hours a day. He does not get free weekends, for patients are ill both on Saturdays and Sundays, and he can never be sure of a night in bed.

Now the Act does not hold out any promise, either in the immediate or in the remote future, of providing any of the things which have been discussed; indeed the name of the Act is a misnomer for as it stands at present it is merely a measure for the nationalisation of the medical profession. The coördination and the control and the direction of the practice of medicine in all its branches will become more complete, but the patient is offered nothing. Even if the Act were to double the doctor's remuneration it would be unwelcome to the good doctor because it does not give him a chance to do better work under better conditions. The Act merely suggests more work for all and less rather than greater efficiency.

Birmingham.

K. DOUGLAS WILKINSON.

## ABSORPTION AND EXCRETION OF WATER

SIR,—Prof. E. B. Verney's article (Nov. 23 and 30) throws considerable light on problems of variations in renal excretion.

He has endeavoured to demonstrate in dogs that the inhibition of diuresis by postpituitary extract contrasts with that of adrenaline because it produces a different graph of excretion; and he implies that adrenaline acts by reducing renal blood-flow, which is little affected by postpituitary extract. The suggestion is that normal physiological variations in urine flow are achieved by variations in posterior pituitary secretion.

Urine flow can be varied by one of two mechanisms: (1) the reduction of glomerular filtrate, and (2) water reabsorption by the tubules—i.e., tubular concentration. It is apparent that in diuresis due to decreased posterior pituitary secretion tubular concentration is diminished, since the concentration of solids in the urine diminishes;

and I had thought it probable that postpituitary extract exerted its antidiuretic effect chiefly through the tubular concentration. However, normally the tubules in man are concentrating urea, for example, to approximately their maximum, and the urine excretion could not be reduced to much less than 1 c.cm. per minute, as in the experiments, without a reduction in the glomerular filtrate or a gross alteration in the tubular behaviour to the non- and low-threshold substances.

It would be interesting to know how the glomerular filtrate and the tubular concentration separately varied during the diuresis and its inhibition by emotion, adrenaline, and postpituitary extract. This could be estimated for instance by determining the creatinine or inulin clearance (1) in the "resting" dog, (2) during uninhibited water diuresis, and (3) in water diuresis inhibited by adrenaline, emotion, partial compression of the renal artery, and postpituitary extract. It might be possible in this way to distinguish between the mechanisms of these antidiuretic factors.

R.A.F. General Hospital,  
St. Athan, Glam.

BRIAN H. MCCrackEN.

### THE TITCHNER CASE

SIR,—Surely the world is going a little mad! In the recent Titchner case a child comes back from evacuation with what are called "dirty habits." There is nothing very peculiar about this, a distressing, tiresome, miserable way of showing that you are out of joint with the world in which you find yourself. After all, adults have headaches and effort syndrome and colitis and get away with it, and the child rather naturally displays its malcontentment with a reversion to more childish ways. There have been hundreds of such cases. The majority of mothers after a period of alarm or anger and fruitless punishment seek advice, realising that while such behaviour is "nasty" or "naughty" it still requires some explanation, and failing an explanation mothers can only regard it as something about which they are ignorant.

In this case a hysterical wave of publicity colours the whole thing with a falsified glare, with a result that an ugly-looking crowd of men and women storm the house where this unfortunate child lived, and to show their protest at cruelty proceed to behave in a singularly cruel manner. One wonders how many of these same women would have considered it worth their while to call in and offer to advise Mrs. Titchner or take the child off her hands for a half day or even see if the local child-guidance clinic (and there is one) could give any useful advice. We don't seem to hear that anything of this kind, surely a natural reaction to a distressing situation, was ever offered or accomplished. Instead, still all in the name of mercy and justice, an entire family is broken up: a man and a woman are sent to prison, frantic with indignation. The rest of the children, who make no complaint, are sent to an institutional upbringing, about which we seem to have heard some rather harsh things said lately. But here comes the most remarkable feature of all—the unfortunate Jean is showered with toys, sweets, gifts of all kinds, and an embarrassing number of offers for foster-home care. Now everyone knows that it is the hardest thing in the world to find a good foster-home for a child in need of one. People say the money isn't enough or that it is too much trouble or that their husbands wouldn't like it. Some of the children who need foster-homes are normal, happy children unlikely to be in any way as difficult as Jean Titchner, but the lack of good foster-homes constitutes one of the main reasons for having to allow children to grow up in institutions. However, in this case justice was done. Or was it?

How many people experienced in the care of children would care to be cross-examined on evidence obtained by questioning a child in the circumstances in which Jean found herself? How many stable children of her age could behave normally and respond normally in that glare of publicity? And we know from irrefutable evidence that Jean was not stable and couldn't adjust to normal family life. With the journalists sitting around over their morsels like carrion crows, we hear nothing of whether this child was observed quietly, living and playing with normal children. Only in this way could any real information be obtained.

There were times during the war when a display of public feeling was followed by an appropriate action. In this case the appropriate action seemed to be a desire to tear these ignorant and harsh parents limb from limb. Now the law has seen to it that they are punished, but it is difficult to see how separation from their family and imprisonment under protest can do very much to re-educate either of them to mercy and understanding.

It was once very appropriately said, "He that is without sin among you let him first cast a stone"; so now there should no longer be any difficulty in finding foster-homes for difficult children, at any rate in Camberwell. But will it have that effect? It seems to me that, as usual, the slate has been washed clean with the tears of humanity, but all to very little purpose.

London, W.1.

MILDRED CREAK.

### EPIDEMIC THROMBOPHLEBITIS

SIR,—Lieut.-Colonel Manson-Bahr and Dr. Charters (Sept. 7, p. 333) describe this condition in a number of patients, most of them suffering from venereal diseases. In favour of a virus origin, they found relative lymphocytosis, negative bacteriological findings, and a possible relation to infective hepatitis. Mr. Fisher and Dr. Lendrum (Sept. 21, p. 438), referring to a similar condition observed by them, describe a peculiar form of inflammation characterised by extreme proliferation of young capillaries in the disrupted media of the veins and by intracytoplasmic inclusions. Mr. Power (1946, i, 572) describes several cases of thrombosis of spermatic veins, and considers the aetiology obscure. This syndrome had been described as far back as 1908 by Aldo Castellani under the title "endemic funiculitis." All these vascular conditions were recorded in adults.

Thrombophlebitis and thrombo-angiitis of extremities in relation to lymphogranuloma venereum have been described by several authors. In a detailed study of arterial lesions in lymphogranuloma venereum we reported typical inclusions in damaged vessels.<sup>1</sup> Thrombophlebitis and thrombo-angiitis as single manifestations or subclinical forms of so-called non-specific epididymitis have been frequently observed by us in lymphogranuloma venereum (simple or associated urethrogenous penetration of the virus).<sup>2</sup>

In the cases studied in Africa and Ceylon by the British authors no mention is made of a typical inguinal bubo, because it did not exist, and therefore lymphogranuloma venereum was not investigated. With simple urethrogenous infection, or with simultaneous syphilitic or gonococcal infection, inguinal buboes may be atypical or absent.

When syphilis and lymphogranuloma occur together oedema of the prepuce is almost constant, thrombo-lymphangitis of the dorsal lymphatics of the penis or of the sulcus coronarius are very frequently present, and unilateral or bilateral deep iliac lymph-node enlargement is never absent. This last sign, which can only be found when sought, in our experience is almost pathognomonic of lymphogranulomatous genital infection.<sup>3</sup> In almost every such case the Frei test is positive, and microscopic findings in a very high proportion.<sup>4</sup> Rectal or buccal penetration of the virus must be kept in mind. General symptoms, such as fever, arthralgia, stiff-neck, &c., are not uncommon in lymphogranuloma venereum, which is a systemic disease.<sup>5</sup> In abortive or atypical forms (with absence of inguinal bubo) such symptoms seldom occur.

We have also observed epidemics of lymphogranuloma venereum, but almost always the source was found to be among prostitutes.

In 1934 we studied experimentally the possible importance of *Pediculus pubis* as carriers of the virus.<sup>6</sup> Skin over inflamed lymph-nodes is infiltrated and contains the virus, and antigens have been prepared from skin lesions. In 1939 Quintanilla-Braga<sup>7</sup> reported that pediculi might act as vectors of the virus.

Santiago, Chile.

W. E. COUTTS  
Public Health Service.

1. *J. trop. Med. (Hyg.)* 1945, 48, 40.
2. *Nature*, Lond. Oct. 5, 1946, p. 487.
3. *Dermatologica*, Bp. 1942, 86, 369.
4. *Amer. J. Ophthalm.* 1942, 25, 916.
5. *J. trop. Med. (Hyg.)* 1936, 39, 13.
6. *Urol. cutan.* Rev. 1934, 38, 263.
7. *Arch. Biol.* 1939, 23, 41.

## HEALTH CENTRES

SIR,—Last March, in drawing attention to a series of articles on Health Centres of Today, you said that you hoped to follow this with a further series on Health Centres of Tomorrow.

Sometimes the best of plans cannot be fulfilled, and the detailed work of collating material on such a new and complex topic as the "health centre" is likely to take up many precious hours. Nevertheless I feel sure that THE LANCET will not fail us on this crucial question—the keystone of the National Health Service Act.

Time does not wait. The announcement of the regional areas for the regional hospital boards means that the Minister will not wait either. No single medical or political body of any standing has put forward concrete plans on the character of or the detailed content proposed for the health centres. Why is this so? If the Minister is not presented with considerable plans in an advanced state of maturity, how can he act wisely? Discussion around the fundamental principles governing the construction of a health centre has not even begun in the medical journals. I appeal to THE LANCET to meet this crying need, as it has promised to do, and to meet it quickly.

London, S.E.12.

P. W. ROE.

\* \* We hope to fulfil our promise early in the New Year.  
—ED. L.

## SYNDROME SIMULATING ACUTE ABDOMINAL DISEASE

SIR,—During the last three months we have seen 10 patients with symptoms the same as those described by Mr. Goldstone and Dr. Le Marquand (August 24, p. 267). The aetiology and pathology have, however, been differently interpreted.

These patients, British soldiers between the ages of 18 and 25, were admitted with a history of recent sudden onset of severe sharp pain in the right hypochondrium, worse on breathing. In half of them the pain radiated to the right shoulder, and in 2 also to the left hypochondrium. Except for slight general malaise there were no other symptoms. The temperature was 100–102° F, and the pulse-rate 90–100 per minute; the respiratory rate was not significantly increased.

On examination the only positive findings were slightly diminished movement and air entry in the right lower zone of the chest, and marked tenderness and guarding in the right hypochondrium; in 3 cases deep palpation in this area caused pain in the right shoulder. The upper part of the right rectus muscle was in spasm, and the tenderness appeared to be in the muscle itself rather than in the underlying structures. In 4 a localised, transient, but unmistakable pleural rub was heard in the right lower zone of the chest 1–3 days after admission. The rub lasted for 12–48 hours. After the initial pyrexia, which lasted not longer than 2 days, there were no further general symptoms, and the pain disappeared in 5–7 days.

Of these patients, 6 were admitted with a provisional diagnosis of acute abdominal disease and were thought to be suffering from acute cholecystitis, acute appendicitis, or a perforated peptic ulcer. There were, however, no other symptoms suggesting abdominal disease, and peristaltic sounds were always well heard. This emphasises the similarity between our cases and the patients with the "new abdominal syndrome" described by Goldstone and Le Marquand.

The investigations on each patient included examination of the urine, radiography of chest, white blood-cell count, and blood-sedimentation rate; no abnormality was detected.

In view of the symptoms and signs, especially the pleural rub, it is considered that the condition of these patients was akin to the benign dry pleurisy described by Scadding. In our series, however, it was the right lower parietal and the right diaphragmatic pleura which was chiefly involved. Furthermore, in view of the muscle tenderness, it would appear that the connective tissue of the muscles was also affected. Thus benign dry pleurisy and so-called epidemic myalgia are brought into the same symptom-complex, and it is suggested that the two conditions are in fact differing aspects of the same pathological process.

We do not think, therefore, that the symptoms in our cases, in which the clinical picture was so similar, can be caused by "abortive forms of perinephric staphylococcal infection," as suggested, by Goldstone and Le Marquand in their cases. We suggest that this clinical syndrome is caused by an inflammatory process, probably of virus origin, affecting the pleura and other connective tissue. The pain and spasm in the muscles would thus be due to local changes and to referred impulses along the intercostal nerves irritated by the inflamed pleura. Why this condition should mainly affect the right side is a question needing further elucidation.

E. L. FRANKEL.  
P. B. S. FOWLER.  
P. F. BORRIE.

M.E.L.F.

## CORONARY DISEASE

SIR,—Each year I examine post mortem a considerable number of persons who have died more or less suddenly; most of them are elderly—upwards of 60. It is rare to see one that has not some coronary artery disease, even if that has not been the cause of death. It is not uncommon to see this condition at any age after childhood. On an average I examine one subject a week who has died suddenly from coronary artery disease, with either complete or nearly complete occlusion of the artery.

I am therefore very interested in Sir Maurice Cassidy's Harveian oration; but I feel that it perpetuates an unfortunate confusion of terms. After speaking of "coronary disease" he goes on to talk of "angina pectoris," and then of "coronary thrombosis." He pleads for the abandonment of the terms "angina minor," "angina innocens," and "pseudo-angina," saying that either the patient has angina or he has not. He attributes the angina to ischaemia of part of the myocardium, usually the result of coronary atherosclerosis with or without coronary thrombosis or a sublingual haematoma. (Here we have three new terms.) He suggests that severe anaemia alone, or probably with some degree of atherosclerosis, may cause anginal pain; and then he mentions the possibility of spasm of a healthy coronary artery as a cause of coronary pain. (Is this angina?) But he adds that physical examination may be surprisingly negative till coronary disease declares itself by the patient's sudden death. Such vasomotor angina occurs, he believes, without physical signs of cardiovascular disease and with a normal electrocardiogram, and sometimes with vasomotor instability, flushing, or migraine. Later he begins to use the term "coronary occlusion," and thereafter talks regularly of "coronary disease" and "coronary occlusion" with one lapse to "coronary thrombosis," though referring to the sudden deaths of miners in a certain series as due to "coronary atheroma."

To overcome this confusion of terms I offer the following suggestions:

1. Let "angina" be dropped altogether, or used only to indicate a symptom.
2. Let "hypertension" likewise be used only to indicate a physical sign. (It must always be due to increased resistance to the flow of blood through the arteries.)
3. Let "coronary thrombosis" be dropped altogether as a cause of death. (I have never seen a case in which death was clearly due to thrombosis. When there is a thrombus—and this is rare—it is always in front of a mass of degenerative matter.)
4. Let cases be described as "coronary occlusion," partial or complete. (Due to accumulation of atheromatous or calcareous matter, or commonly both.)
5. Let this be recognised as merely a local intensification of a general arterial disease or degeneration. (Similar to cerebral haemorrhage or cerebral arterial occlusion—also erroneously called cerebral thrombosis—aneurysm of an artery, and perhaps some forms of migraine.)

If all these conditions were recognised as special manifestations of arterial disease, their aetiology and prophylaxis would cease to be the exclusive province of the cardiologist and neurologist. Investigators could then concentrate on the causes of arterial disease, which may prove to be some long-continued toxæmia, and might thus be brought into line with other chronic toxæmias, as in rheumatoid arthritis. It is an interesting possibility that there is an antithesis between the tuberculous and

the hypertensive types. (Do acute tuberculous patients ever have arteriosclerosis?)

Mr. Sampson Handley (Nov. 30) speaks truly of pathology as necessarily dealing with "the body working as a whole." He has seen 2 cases recently in which chronic cholecystitis preceded heart trouble. In the last three days I have examined 3 subjects of sudden death.

The first died two hours after taking ill: he had 8 pints of pleural fluid, a heart weighing 27 oz., and a distended and inflamed gall-bladder with adhesions. The second, said to have been asthmatic, died four hours after taking ill; the heart weighed 28 oz., there were small white kidneys, and a gall-bladder, very large, nearly black, and containing about 50 small stones like blackcurrants and 1 larger one impacted in the cystic duct. The third had 6 pints of pleural fluid, a heart weighing 22 oz., advanced calcareous and atheromatous disease of the aortic ring and valves, and a malignant ulcer on the foot with secondaries in the inguinal glands, lung, and kidney; the gall-bladder had numerous adhesions around it. All these cases had coronary artery disease but no complete occlusion. Though they were obviously cases of chronic toxæmia there was no thrombosis. I do not know whether the infective agent was a staphylococcus.

Worthing.

W. O. PITT.

SIR,—I should like to join in on the side of Mr. Sampson Handley (Nov. 30), and support his view that coronary disease is more probably due to chronic bacterial infection than to the "strain of modern life." Leaving aside the particular example of chronic cholecystitis and cardiac disease, of which I too have seen several examples, and also the cases of gall-stones erroneously diagnosed as coronary attacks, I would point out that the increased red-cell sedimentation-rate and the leucocytosis in coronary occlusion suggest the infective nature of the condition.

London, W.1.

G. E. BEAUMONT.

SIR,—We are not likely to understand angina pectoris until we cease to regard it as a consequence of arteriosclerosis. For more than 25 years I have argued that arteriosclerosis is not a disease but a healing mechanism.<sup>1</sup> The disease whose ravages it repairs is arterial atony; in the atonic condition the arteries are damaged by circulatory stresses, and this damage is healed by calcification—a process analogous to the healing of tuberculous lesions or hydatid cysts. The first stage is the deposition of a plastic mass containing cholesterol, and subsequently calcareous matter is formed. The sclerosis is in fact a protection of the weakened arterial wall. All the suggested causes of arteriosclerosis—infections, intoxications, and physical and psychological influences—are conditions which first of all give rise to arterial atony.

Arteriosclerosis, usually with coronary calcification, has been found post mortem in 50% of war casualties between 20 and 30 years of age; yet these subjects had not suffered from angina pectoris. The fact that the proportion of deaths from arteriosclerosis is only 6% suggests that it is usually arrested, and that it is in fact curable. Its increased incidence in recent years and its prevalence among those who bear special responsibilities should provide a clue to prophylaxis.

London, W.1.

J. PLESCH.

### PSYCHONEUROSIS TREATED WITH ELECTRICAL CONVULSIONS

SIR,—In reply to Dr. Chapman, may I point out that I have neither said nor implied that *intensive* electroconvulsive treatment, as used by Dr. Milligan, is ethically right when applied to sufferers from melancholia. I said that convulsive therapy seems likely to take a permanent place in the treatment of melancholia (Nov. 16).

I would agree with Dr. Chapman that if in a case of psychoneurosis all the symptoms are removed, and the patient is made cheerful, coöperative, and happy, his psychoneurosis may be said to be cured, even if, as he says, there be a slight intellectual deterioration after treatment; but there is no satisfactory evidence in Dr. Milligan's paper that his patients were made cheerful and happy, and I would like very much to know how often the patient and his friends were warned before treatment that it might possibly be followed by slight intellectual deterioration.

London, W.1.

J. NORMAN GLAISTER.

1. Plesch, J. *Lancet*, 1932, i, 385.

### REGIONAL BOARDS

SIR,—“Your Correspondent of Nov. 9” in his letter of Nov. 30 points out clearly the danger of a medical chief administrative officer. He has to my mind struck at the crux of the problem.

We have in Britain in the municipal system experienced the defects and failures of two chief medical administrative officers—the medical officer of health, and the medical superintendent of general hospitals. And we should do well to remember the lessons that such a system has taught us. A half-hearted attempt has been made recently by a few local authorities to infuse a little democracy in their hospital systems; but it has not amounted to much. The title of medical superintendent has been changed to medical director, and a medical staff committee has been set up. But what is grudgingly given away with one hand is taken away with the other, for the medical committee's advisory powers are either counterbalanced or cancelled out by those of the medical superintendent or medical officer of health, sometimes acting in unison, at other times separately. Moreover, these two executive officers always have the last word, and always have the ear of the chairman and members of the committee of management at the convenient and strategic moment. F.R.C.S.

### EXERCISE AND CARDIAC HYPERTROPHY

SIR,—More than 25 years ago I remember the late Dr. Strickland Goodall saying, during one of his physiology lectures, that no-one whose heart did not show hypertrophy could hope to be a successful athlete.

Only recently I read a veterinary surgeon's opinion that lack of stamina and sudden death of horses in the hunting field were due to the out-of-season walking exercise which, though admirable in itself, did not produce cardiac enlargement, and that a hard daily gallop should be included to produce this effect. It would be interesting to know if there is any record of a schizophrenic (whose heart is always small) ever having been successful in long-distance or strenuous athletic events.

Keighley.

WRIGHT LAMBERT.

### LEFT TURN

SIR,—Dr. Brian Kirman's letter of Nov. 30 emphasises a fact which we older doctors and people in general do not appreciate. Dr. Dain and all of us around his vintage have experience of two different worlds—pre-1914 and post-1914. We know something of the freedoms, incentives, individual enterprise, and contentment (aye, even among the poor) of the earlier world; a world of good manners and gentility, and politically a world of social reformists. We also know the world of bad manners, low morale, general poverty, general discontent, and social revolution. We are therefore in a position to judge which is the better.

The younger men have only experience of a disturbed world, and not unnaturally want to improve it; with the spirit of speed in the blood they want to cure all the evils at one blow; and I think they really believe they've got the answer in Communism. The really inspiring efficiency of totalitarian war organisation, they believe, can be carried into a world at peace; and they are encouraged in it by men who have material axes to grind.

Dr. Kirman hopes to see us assessed by the public at our true worth to it. That is exactly what we are fighting for. The new proposition is that we be assessed by the Minister of Health; and when we are nationalised it is we who will assess the public, not it us.

St. Osyth.

R. E. CLARKE.

SIR,—Dr. Kirman should try to remember that there are quite a number of good doctors who are quite as common as himself, in the inverted-snob, or proletarian, sense of the word, and yet who still wish to retain a measure of that individuality which has characterised our race, and which is not to be found in politically less evolved peoples. We just don't want, and in fact will not be press-ganged and highjacked into working for, a rapidly developing totalitarian State; and we only ask to be left to work, as always, as hard as we can, but where we want, and with whom we want; governed only by the unwritten but clearly understood ethical rules of our great profession, and answerable only to our patients, rich and poor alike.

London, W.1.

GEOFFREY PARKER.

## Parliament

## FROM THE PRESS GALLERY

## Care of Young Children

ON the motion for the adjournment on Dec. 6, Dr. BARNET STROSS declared that in his view provision for the care and education of young children under five had worsened as compared with the admittedly makeshift arrangements made during the war. The subsidy for the training of assistants under the Child Care Reserve had ceased; for some time trained nursery teachers had not been available, and equipment was not so good. But even the finest nursery, Dr. Stross continued, could only be a complement to, and never a substitution for, a home. In peace-time, he thought, we had no right to ask mothers of children under two to go into factories. Dr. STEPHEN TAYLOR quoted papers from the medical press showing that the incidence of respiratory infection and the absentee-rate in day nurseries for children under two was very high. Many children also did not gain weight satisfactorily. Children of that age, he felt, needed continuity of care, and in nurseries a change of worker from time to time was inevitable.

Mr. SOMERVILLE HASTINGS, F.R.C.S., suggested that though there was a great place for day nurseries and nursery schools in the future, children should spend only half their time there. Let the child go to the nursery while the mother was occupied with her household duties, but for the rest of the time the child should have the undivided attention which he claimed and needed. Mrs. JEAN MANN urged that a healthy happy mother was best employed looking after her own children, but added that she would like to see the nurseries extended to take in the children of mothers who were ill or being confined.

Mr. C. KEY, in his reply, stressed that in the development of these war-time nurseries the motivating force had been industrial, but under normal peace-time conditions the Government believed that the right policy was to discourage mothers of children under two from going out to work, to make provision for children between two and five by way of nursery schools and classes, and to regard day nurseries and daily guardians as supplements to meet special needs. But until normal times came, and while the needs of the home market and export had to be met, provision must be made for the children of mothers who were willing to go out to work. The welfare and local education authorities, after reviewing the needs of their areas, had continued 916 nurseries under their maternity and child-welfare powers as ordinary day nurseries, had converted 300 into nursery schools, and had closed just over 100. The Government were aware of the need to improve the training arrangements and to raise the status of nursery nurses, and all nurseries were being inspected in this connexion and they were about to review the salaries of nursery workers. Fifty ex-Service girls were being trained as nursery nurses under the vocational scheme of the Ministry of Labour and more were to follow. But there was, Mr. Key admitted, a shortage of staff, for one attendant was needed for every five children. The opening of nurseries in factories without reference to the welfare authority presented them with another problem, and he emphasised that it was not easy to adapt a war-time service of this kind to peace-time needs. He believed that the proper way of dealing with the children of mothers who were ill was by developing a system of home helps.

## Priority Milk

On Dec. 3, on the motion for the adjournment, Dr. S. JEGER suggested ways in which the allocation of priority milk might be improved. The categories in the schedule for priorities were, he thought, too vague—dyspepsia and colitis, for instance, might mean almost anything, while other diseases, such as the anæmias, were absent. Industrial workers who were confined to bed should also, he believed, get some priority milk during the first ten days of their illness. He also pleaded for small families, old people who lived alone, and convalescent industrial workers. Certificates could now be given for either 14 pints or 7 pints a week. Could there not, he asked, be a new category of 3½ pints for such people as ambu-

latory gastric-ulcer and tuberculosis patients? Gastric-ulcer patients who received 2 pints of milk a day should, he thought, forfeit their meat ration. It would be easier for doctors if instead of giving the patients certificates for milk they gave statements of illness which could be taken to the food office, where the decision whether milk should be granted would be made. Doubtful cases could be submitted to a panel of doctors not in general practice.

Dr. E. SUMMERSKILL, in reply, pointed out that the priority categories had been established on the advice of the special advisory committee of the Medical Research Council and that they accounted for about 6% of the total consumption of milk in the country. She appreciated the difficulty the general practitioner sometimes had in refusing a certificate, and she thought that if a new category of 3½ pints were introduced it might seem to the doctor an easy way of moving a patient off the chair in the consulting-room, but they would certainly consider the suggestion. The gastric-ulcer patient if given the alternative between milk or meat would be constantly changing according to the state of his health. She regretted that it was impossible to adopt the suggestion of a committee to decide on eligibility for milk. No more work could be put on the food offices, and they would have to continue to leave the general practitioner to decide.

## German Rations

The Chancellor of the Exchequer, in announcing the economic fusion of the British and American zones in Germany, said that the food ration of 1550 calories for the normal German consumer must be accepted for the present, but would be raised to 1800 calories as soon as conditions of world supply permitted.

## QUESTION TIME

## Closed Shop

Mr. J. A. BOYD-CARPENTER asked the Minister of Health what action he was taking to prevent the breakdown in hospital services threatened as a result of the action of the Willesden Council in directing that all nurses at their hospital who do not join a trade union will be dismissed.—Mr. A. BEVAN replied: I am sending a circular to local authorities pointing out that their primary duty as health authorities is to maintain the efficiency and smooth running of their health services and ensure the welfare of the patients for whom they are responsible. All other considerations must be regarded as secondary. While I am anxious that doctors, nurses, and members of similar professions should join a trade union or appropriate professional association, this is a matter which should not be determined by unilateral action of local authorities.

## Dental Settlement?

Mr. J. BAIRD asked the Minister of National Insurance whether he was now in a position to make any statement about the dispute as to the terms on which dentists should undertake National Insurance work.—Mr. J. GRIFFITHS replied: A settlement has been reached on which the Joint Advisory Dental Council are recommending the profession to resume the dental benefit service forthwith. The terms of settlement, which the Government, the leaders of the profession, and representatives of the approved societies have agreed are fair to all parties, are as follows:

As soon as the report of the Spens Committee on dental remuneration is available there will be negotiations between the Government and the dental organisations to agree in the light of the report two things: the method and order of remuneration of dentists in the National Health Service, and an appropriate scale of fees for work done under the present limited dental benefit scheme.

If the scale of fees so arrived at shows that the present one was inadequate to meet the just claims of the profession, the Government will seek parliamentary authority for making payments retrospectively to dentists calculated to meet the difference between the amounts due to them for work paid for on the present scale from a current date and what they would have received had that work been done on the scale to be agreed.

Pending the completion of these negotiations the scale of fees introduced by the Government on Sept. 30 will continue in force and will determine the payments to be made by insured persons entitled to dental benefit and by their approved societies.

## Extra Milk for Sanatorium Nurses

Mr. E. A. HARDY asked the Minister of Food whether he was aware that nurses engaged in tuberculosis hospitals were not allowed a supplementary milk allowance except when nurses were suffering from tuberculosis themselves; and if he would arrange for a supplementary allowance to be given



to nurses and the domestic staffs engaged in tuberculosis hospitals.—Mr. J. STRACHEY replied: I am assured by my medical advisers that there are no medical grounds for granting extra milk to nursing and domestic staff in tuberculosis sanatoria.

#### Shared Staff

Mr. R. W. SORENSEN asked the Minister of Health, in view of the understaffing of nurses in some hospitals and the relative overstaffing in others, whether any consideration had been given to the possibility of the temporary transference of members of the more fortunate hospitals to the less fortunate.—Mr. BEVAN replied: Some help is being given by the better-staffed hospitals on a voluntary basis, but nurses are no longer subject to direction.

#### Birth Certificates

Replying to a question, Mr. BEVAN stated that he hoped to introduce this session a short Bill making it possible, as in Scotland, to issue, at a reduced fee, shortened birth certificates and also shortened extracts from the Adopted Children Register which will contain no reference to parentage or adoption.

#### Fluorine Hazard

Mr. C. WILLIAMS asked the Lord President of the Council if he was yet in a position to say if the report on the fluorine hazard near Port William would be published.—Mr. HERBERT MORRISON replied: Yes, Sir, as soon as it is available.

#### Chemical Standard for Ice-cream

Wing-Commander ROLAND ROBINSON asked the Minister of Food whether he would take powers to define a minimum chemical standard for ice-cream of at least 4% fat content, while retaining powers to review this standard when more fat products were available.—Mr. STRACHEY replied: I should like to fix a minimum standard for ice-cream; but I think this must wait until the supply of the necessary ingredients has improved. For one thing I should not like to start with so low a standard as that referred to, and also fat is not the only important ingredient in good ice-cream.

#### Atomic Research and Thames Water

Sir RALPH GLYN asked the Minister of Supply if he could make a statement in regard to the nature and condition of the water to be returned to the Thames after having been used at the Atomic Energy Research Station, Harwell.—Mr. JOHN WILMOT replied: All water returned to the Thames will comply with purity standards fixed by the Medical Research Council and already agreed by the other authorities concerned. Most careful arrangements will be made to guard against any accidental discharge of radioactive water into the Thames.

Mr. WALTER ELLIOT, who last week took his seat in the House of Commons as M.P. for the Scottish Universities, is well fitted to represent a university constituency, for he is a

graduate in science and medicine of the University of Glasgow, an honorary graduate of Aberdeen, Leeds, Edinburgh, Manchester, and South Africa, and has been rector of Aberdeen University. He qualified in medicine in 1913, and during his service with the R.A.M.C. in the first world war he was awarded the M.C. and bar. In 1918 he first entered Parliament and five years later he was appointed under-secretary for health for Scotland. Since then (till the last election) he has sat continuously in Parliament and has held many high offices. In turn he has been under-secretary for Scotland, financial secretary to the Treasury, Minister of Agriculture and Fisheries, Secretary of State for Scotland, and from 1938 to 1940 Minister of Health. During the late war, with the rank of colonel, he was for a time director of public relations at the War Office. He was elected F.R.S. in 1935 and F.R.C.P. in 1940. He is one of the founders of the new Association of Agriculture, which happily reflects his interest both in the nutrition and health of the people.



Drummond Young

## Obituary

### WILLIAM MURRAY HONEYMAN

M.B., B.S.C. ST. AND., M.R.C.P.

Squadron-Leader W. M. Honeyman, who died on Nov. 24, entered St. Andrews University as first bursar, and graduated B.Sc. in 1932 and M.B. with commendation three years later. After holding two house-appointments, he was awarded a Commonwealth fellowship and studied at Columbia University and at the Phipps psychiatric clinic in Baltimore. On his return from America in 1939 he was admitted to the membership of the Royal College of Physicians and became Halley Stewart fellow in the Medical Research Council's unit at Queen Square. At the end of the same year he joined the volunteer reserve of the R.A.F., and on mobilisation was seconded for duty to the psychological department of Cambridge University, where he worked on problems of applied neurology and psychology in aviation medicine till his tragically premature death.

"One could only admire in silence," writes D. D. R., "the fortitude and courage which sustained Willie Honeyman, so that even when his life was clearly on the ebb, he turned out reports illumined by all the clarity and insight of his fine intellect. Much of his work, for example his researches on after-contraction, was fundamental, but as he showed in his brilliantly ingenious study of the manipulative results of changes in the positioning of aircraft controls, he could respond to the challenge of an immediate practical problem. Had he gone on to full maturity he would certainly have justified the rich promise of his early career. Those of us who knew him well enough to appreciate the warm humanity which he disguised by a dry whimsicality, will remember him not only for his gifts of mind and heart but also for his intellectual honesty. He tolerated no scientific chicanery or humbug, and his merest nod of approval was praise indeed. For all this, and most of all for the inspiration of his conduct in the face of adversity, we shall be always grateful."

### ALEXANDRINA MATILDA MACPHAIL

O.B.E., L.R.C.P.E.

Dr. Matilda Macphail, who died at her home in Edinburgh on Nov. 6, was a daughter of the manse, born in the Island of Skye in 1860, and to the end of her life she retained the slow, soft, pleasant intonation of the West Highlands. After studying medicine at the London School of Medicine for Women, she obtained the triple qualification in 1887, and went to India in 1888 as the first woman medical missionary of the Free Church of Scotland. After some years of pioneer work in Madras she founded the Christina Rainy Hospital, where most of her work was subsequently carried on, though the exercise of her skill often took her to the farthest parts of the Presidency. She also for a time supervised the work of the hospital at Conjeveram, and was active in the founding of the Union Mission Tuberculosis Sanatorium at Madanappalle. She was much interested in the Medical School for Women at Vellore, and after the 1914-18 war assisted for a time in the teaching there. Having been unable to obtain a passage back to India during the war, she offered her services to the Scottish Women's Hospitals, and in 1917 acted as chief medical officer of the Manchester unit for Serbian refugees in Corsica. Later, in 1918, she organised for the Scottish Women's Hospitals their tuberculosis sanatorium for Serbian soldiers at Sallanches in the Haute Savoie.

She retired from her long period of active missionary work in 1929. In recognition of her work in India she was awarded the Kaiser-i-Hind medal in 1912, with a bar in 1918, and the O.B.E. in 1930.

Although often hampered in the course of her life by physical disabilities Dr. Macphail never spared herself, and worked with untiring energy. She was greatly beloved and respected by a large circle of patients and friends, Indian and European, in whom she maintained a warm interest to the end of her life. She died after only a few days' illness, and not long before her death at the age of 86 she was able to travel south to visit friends in London.

B. R.

## Notes and News

### SCIENTIFIC REPORT OF ROYAL COLLEGE OF SURGEONS

DURING the first post-war year the college has been putting its house in order. The report for 1945-46 records that by last June all the anatomical specimens which had been evacuated to dispersal centres were back at the college; though here and there dampness had taken its toll, most were found to be in good condition. But a review of the specimens which survived bombing of the college has revealed heavy losses which can be repaired only by years of work and heavy expense; and the work cannot start until the department has been repaired and re-equipped. The department of pathology, after discarding some 1500 specimens, is left with 2800 specimens of value.

New light has been shed on body function in undernutrition by research teams working for SHAEF in Western Holland and later for the Control Commission in Germany, under Dr. John Beattie, the Bernhard Baron research professor. Heat loss is regulated by nervous control of the skin vessels, while heat production, under conditions of rest, is controlled principally by the endocrines, which in turn may be influenced by nervous mechanisms. In starvation as seen in Western Holland the body temperature becomes stabilised at a low level, but the diurnal variations often exceed those in normal individuals. For the optimum rate of growth the calorie input must be constantly related to the input nitrogen; when the nitrogen input is doubled calorie input also has to be doubled to conserve as much as possible of the nitrogen. The later work in Germany showed that hunger-oedema is not, as was thought, due merely to hypoproteinaemia; it results apparently from a specific defect in the kidney induced by the deficient diet.

### MEDICAL PHOTOGRAPHERS

HOSPITALS wishing to establish photographic departments have probably found difficulty in obtaining suitable technical staffs, owing to the lack of a recognised standard by which to gauge ability and experience. Institutions are understandably disinclined to pay high salaries for uncertain service, while photographers are reluctant to enter a field which offers no guarantee of a reasonable reward. Moreover, the few training centres have hitherto shown little inclination to run courses in medical photography. The decision by the Institute of British Photographers to set aside one part of their final examination to medical photography will thus be welcomed. A fairly comprehensive syllabus has been drawn up, and the first examination will be held in about twelve months. This action should help to place medical photography on a firmer footing.

### U.S. ARMY CENTRE FOR THE DEAF

THE United States army has established at Washington, D.C., an aural reablement centre for 250 "students" with impaired hearing. The unit, according to the *Journal of the American Medical Association* (1946, 132, 219), will have its own laboratory, where dental technicians will make the ear-fitting moulds into which the receiver of the hearing aid is installed. The centre will have a staff of about 50, including 12 instructors in speech reading, 6 acoustic technicians expert in testing and fitting hearing aids, 6 technicians who will teach the use of the device, 5 speech correctionists, and smaller numbers of specialists in other fields. Students will remain about eight weeks. Major H. C. Barnaby, the director, has estimated that not more than 20% of deafness in the army is attributable to blast or other enemy action.

### GOVERNMENT EMPLOYMENT FOR THE DISABLED

UNDER the Disabled Persons (Employment) Act, 1944, the Minister of Labour is empowered to provide opportunities for employment under special conditions of those who are unfit for other work. Accordingly, the Minister has formed a non-profit-making company, known as the Disabled Persons Employment Corporation, which has already established four factories—at Bridgend, Salford, Longton (Staffs), and Birmingham—and hopes to have a further four working by next April; altogether 48 factories, each employing 100-300 workers, are planned. Employees will be trained in wood, plastic, leather, and light assembly work, and, if competent, will be paid at the full trade rate. Special provision is to be made for epileptics and for the tuberculous; the factories will also supply materials and tools to workers who are fit only for employment in their own homes.

### FILM CATALOGUES

The Scientific Film Association, of 34, Soho Square, London, W.1, has compiled two new catalogues. The first, a *Catalogue of Films of General Scientific Interest* (5s.), lists in alphabetical order over 600 such films available in Great Britain, collected from over sixty sources. For each film there are full details of availability and a brief summary of content, while many have in addition a useful appraisal of merit. A subject cross-index at the back shows that over 100 of the films listed are of medical interest. This will be a standard work of reference for teachers and programme committees. The second, a *Catalogue of Films on Anaesthesia* (3s. 6d.), gives details of 26 films in loose-leaf format. For each film is given the title, a catalogue number referring to the work shortly to be published by the association in co-operation with the Royal Society of Medicine, the running-time, gauge, country and year of origin, distributor, and a two-line summary of the content and purpose of the film. Next follow data on the methods used in presenting the material (whether diagram or actuality, studio-made or on-the-spot), an extended summary of the film, in telegraphic style, and—most valuable of all—a severely critical assessment of the value of the film for teaching purposes, based on the collective opinion of groups of people selected by the association from all levels of interest: maker, teacher, houseman, student, and nurse. It is obvious that this system involves a great amount of labour, but the results justify the trouble.

### STETHOSCOPE AMPLIFIER

New Electronic Products Ltd., of 95, Station Road, Hendon, N.W.4, are manufacturing an amplifier for use with an ordinary stethoscope. Two alternative ranges, for cardiac and respiratory sounds respectively, can be emphasised; and reproduction is fairly faithful, even of breath sounds at as low a frequency as 25 cycles a second. Physicians with presbycusis might be well advised to equip themselves with this instrument, which has the advantage of being compact and inconspicuous. The price is about £40.

### University of Cambridge

The faculty board of medicine have recommended the appointment to the department of radiotherapeutics of a reader, and of a physicist with special reference to the application of electronics to radiotherapy. Mr. D. E. Lea, PH.D., and Mr. H. F. Freundlich have been named for the posts.

On Nov. 30 the degrees of M.B., B.CHIR. were conferred on M. C. Joseph (by proxy).

### University of Dublin

On Dec. 4, at the school of physic, Trinity College, the following degrees were conferred:

M.D.—M. O'C. Drury, L. L. Griffiths, R. J. S. Wilson.

M.Ch.—H. A. Daniels.

M.B., B.Ch., B.A.O.—J. R. Bannister, D. S. N. Darling, Daphne M. N. M. Dooley, M. E. Eppel, Robert Esler, J. P. R. Farrell, E. M. H. Forster, D. S. Keaton, P. J. MacCarthy, Esther M. McMillan, Eileen Moriarty, D. T. L. Nash, S. J. Poots, Brian Redmond, D. L. Robinson, Derek Anton-Stephens.

Licences in Medicine, in Surgery, and in Obstetric Science.—Ivor Citron.

### Royal College of Surgeons of England

Demonstrations in anatomy, applied physiology, and pathology will be given at the college between Jan. 6 and March 28, from 10 A.M. to 1 P.M. and from 2 to 3.30 P.M., daily.

### Course in Dairy Technology

A course of twelve lectures on Recent Advances in Dairy Technology is to be held at the Central Laboratories of the Express Dairy Co. Ltd., 133, Euston Road, N.W.1, at 6.30 P.M. on Tuesdays between Jan. 14 and April 1. Application should be made to the Principal, Chelsea Polytechnic, Manresa Road, S.W.3.

### Francis Amory Septennial Prize

The American Academy of Arts and Sciences is offering in 1947 this prize for outstanding work on diseases affecting human reproductive organs published during the last seven years. No formal applications and no essays or treatises should be submitted but the committee will welcome suggestions from any appropriate source that will help them in making a wise selection. Recommendations may be addressed to the secretary, Amory Fund Committee, American Academy of Arts and Sciences, 28, Newbury Street, Boston, Massachusetts.

### British Standards Institution

The 1946 yearbook gives a subject index and a synopsis of the 1300 current British standards. The book is obtainable, price 2s., from the institution, 28, Victoria Street, London, S.W.1.

### Improved Water-purifying Tablets

The United States Army has been experimenting with methods of individual water purification to replace the chlorine-type tablet. Triglycerine hydroperiodide has been found to answer to the requirements: quickly dissolved, safe, and effective, it can be used under a wider range of conditions, and causes a less objectionable odour and taste, than chlorine. Further trials with it will be made in the coming year.

### Convalescent Home for ex-Servicemen

The British Legion convalescent and holiday home at Churchill Court, Sevenoaks, with accommodation for 50 ex-Service men and women of the 1939-45 war, is now operating fully. The home is intended for those in need of: (1) convalescent treatment after a severe illness, or (2) a fortnight's holiday to prevent a breakdown in health. Application should be made through the local British Legion Service committee, or the British Legion and United Services Fund Benevolent Department, Pall Mall, London, S.W.1.

### Association of Industrial Medical Officers

A meeting will be held at the London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1, on Friday, Jan. 24, at 4 P.M. At 5 P.M. there will be a joint meeting with the school medical service group of the Society of Medical Officers of Health, at which a discussion on the Change from School to Industry will be opened by Dr. A. A. E. Newth and Mr. D. T. A. Lloyd-Davies. At 10.30 A.M. on Saturday, Jan. 25, Mr. R. H. Young will give an address, illustrated by a film, on the Diagnosis, Pathology, and Treatment of Intervertebral Disks.

### Dental Controversy Ended

The Joint Advisory Dental Council has recommended dentists to resume N.H.I. work forthwith. The statement by the Minister of National Insurance (reported in our Parliamentary columns) shows, says the council, "that the Government are fully prepared to accept an adequate scale of fees and to regard payments under the scale imposed by the Minister as instalment payments only; that they are willing to negotiate what the fees should be as soon as the Spens Committee report is available; and that payments under any agreed scale will be made retrospective to the date of settlement." The council has been assured that the basis of settlement will not in any way prejudice negotiations on the method and order of remuneration under a future National Health Service.

### New Operational Ration for the U.S. Army

Tests on American Army personnel have shown that men engaged in mountain climbing and mountain field work (described as moderate activity) expend about 3400 calories a day. This has prompted the U.S. Army to increase the "E" ration, which is intended for operational use over a period not exceeding 21 days, from 3331 to 3800 calories a day. The new ration, weighing 5 lb. 3½ oz., is composed of 7 cans, 1 accessory packet, and 1 packet of 20 cigarettes with a book of matches. The cans consist of 3 meat units of 12 oz. each (there are 10 varieties); 2 biscuit units; 1 fruit unit (with 4 varieties); and 1 bread unit, containing 4 oz. of white bread. In the accessory packet are chewing-gum, can-opener, salt, wooden spoon, tablets for purifying drinking-water, and tablets for heating the rations.

### Revision of Geneva Convention

A preliminary conference, attended by 141 delegates of forty-five national red-cross societies and by the League of Red Cross Societies, to revise the Geneva Convention, was held at Geneva from July 26 to August 23 under the presidency of Monsieur Max Huber, president of the International Red Cross Committee. It was resolved to alter the wording of the convention so as to make it applicable to any outbreak of international hostilities, with or without a formal declaration of war, and to civil war. It was also decided to extend the convention to cover all aspects of naval warfare, including the tonnage, routing, and signals of hospital ships. Other recommendations were to extend the protection of the red-cross flag to civilian sick and wounded, and to civilian hospitals in countries at war; and to form non-military zones for the treatment of sick and wounded in such countries.

### Airborne Medical Society

It has been decided to enlarge the membership to all medical and dental officers who are eligible for membership of the Airborne Forces Club, so that all medical and dental practitioners whose business it was or is to go to war by parachute or glider may now join the society. Quartermasters and transport officers of airborne field ambulances are also eligible. Application forms may be obtained from the hon. secretary, 63a, Belsize Park Gardens, London, N.W.3.

### Maudsley Institute

The London County Council has approved in principle the recommendation of the Goodenough Committee that the Maudsley Hospital medical school shall be incorporated as a separate institute from the hospital within the British Post-graduate Medical Federation. Though a constituent of the federation the institute will have its own governing authority, academic council, and dean, and will be autonomous. But it will be financed from the University Grants Committee through the University of London on the recommendation of the federation. The L.C.C., except for its representation on the committee of management, will have no voice in the numbers of staff on the establishment of the institute, and it will pay for the services of the institute's staff who treat patients in the wards of the hospital.

### Selective Localisation with Radioactive Isotopes

Radioactive isotopes show a tendency to settle in specific areas of the body, and may thus provide a new method of attacking neoplasms and other localised diseases, according to Dr. John L. Lawrence, of the University of California. "Radioactive carbon-monoxide, compounded with the short-lived isotope carbon 11, was gobbled up by the liver and held there for a while, before being released. We know that radioactive iodine 131 tends to settle in the thyroid gland. With larger than tracer doses it was possible in rabbits to remove their thyroid glands by slow selective radiation which destroyed the glands without damage to other tissues. Other isotopes concentrate in the bone-marrow, still others in the spleen. If we find such a compound for each vital organ, we can introduce it into the body and hit the abnormal area without damage to other organs. Ultimately," says Dr. Lawrence, "we might find a radioactive compound for each particular organ and for each particular type of cancer."

### British Council for the Welfare of Spastics

A meeting was held at the London School of Hygiene on Dec. 12, with Prof. J. M. Mackintosh in the chair, to set up a council which will integrate all the activities in the United Kingdom directed to the welfare of adults and children suffering from spastic paralysis or allied conditions. The representatives invited included those of the Royal Colleges and various other professional bodies, the Ministries of Education, Health, Labour, and Pensions, the Department of Health for Scotland and the Scottish Education Department, the Ministry of Health and Local Government of Northern Ireland, the Board of Control, the ancillary medical services, the Trades Union Congress, London County Council, educational and welfare societies, St. Margaret's School, Croydon, and Birmingham Day School. The meeting was called to consider the constitution and trust deed recommended by a working party appointed at a previous meeting (*Lancet*, Oct. 26, p. 624), and to elect officers and an executive committee.

### Pharmacists and the Act

About 170 million prescriptions a year will be dispensed under the National Health Service by chemists and health centres in England, according to Mrs. Irvine, vice-president of the Pharmaceutical Society of Great Britain, speaking on Nov. 27. Under present conditions, she said, it was unlikely that many health centres would be set up within the next five or ten years. That gave a fine start to the private shop and she hoped that before the Act came into force pharmacies would be equipped and staffed to deal with such an influx of prescriptions.

Mr. F. C. Wilson, of the society's council, has lately argued that if trade-union principles are followed, not less than four pharmacists will eventually be needed at each of the 5000 health centres he expects to see established. Since pharmacists on the register total only 25,000, there may, he thought, be some difficulty in obtaining them. "However the available number of pharmacists is distributed," he added, "there will be over double the number of patients for whom pharmacists will have to undertake dispensing, because . . . the functions of prescribing and dispensing are being permanently separated."

**Exhibition of Ethiopian Art**

An exhibition of Ethiopian art and industry is to be held at Foyle's bookshop, Charing Cross Road, W.C.2, from Jan. 20 to Feb. 4. Those willing to lend exhibits are asked to communicate with Miss Sylvia Pankhurst, hon. secretary of the Princess Tsehail Memorial Hospital Council, 3, Charteris Road, Woodford Green, Essex.

**Allied Awards to British Officers**

The President of the United States has conferred awards on the following medical officers in recognition of distinguished services in the cause of the Allies.

*Legion of Merit.*—Surgeon Rear-Admiral Sir GORDON GORDON-TAYLOR, K.B.E., C.B., Brigadier H. L. GLYN HUGHES, C.B.E., D.S.O., M.C. (degree of commander); Colonel F. S. GILLESPIE, Lieut.-Colonel A. N. B. ODBERT, O.B.E. (officer); Surgeon Lieut.-Commander A. P. CURTIN, Colonel THOMAS YOUNG, O.B.E. (legionnaire).

*Medals.*—Lieutenant J. D. DEVITT (silver star); Wing-Commander EDNA BUTLER-JONES, Brigadier M. L. FORMBY, Captain T. W. RENTON, Lieutenant J. G. SEARLE (bronze star).

*Typhus Commission Medal.*—Brigadier R. W. GALLOWAY, O.B., D.S.O., Brigadier G. S. PARKINSON, Colonel H. D. CHALKE, O.B.E.

The Prince Regent of Belgium has appointed Major-General Sir Edward Phillips, K.B.E., D.S.O., M.C., a commander of the Order of the Crown.

The Queen of the Netherlands has appointed Major G. F. Bramley and Major Harold Kennedy, M.B.E., knight officers of the Order of Orange Nassau with swords.

**Appointments**

BROWN, ARNOLD, M.B. Manc., D.P.H.: M.O.H., Cheshire.  
 CAHILL JOHN, B.Sc. N.U.I., M.R.C.S.: senior assistant M.O., Middlesex through school health service.  
 EDINGTON, G. M., M.B. Glasg.: M.O., Gold Coast.  
 ELDER, C. L., M.B. Glasg., D.P.H.: M.O.H., St. Albans.  
 GILLAM, G. G., M.D. Lond., M.R.C.P.: senior physician, Selly Oak Hospital, Birmingham.  
 HARTLEY, L. B., M.B. Camb.: ophthalmic surgeon, Woking Victoria Hospital.  
 LEIGH, A. G., M.D. Lpool, F.R.C.S.: surgeon to ophthalmic department, National Temperance Hospital, Hampstead.  
 ORMISTON, GEORGE, M.D. Edin., M.R.C.P.E.: paediatrician, Southampton Children's Hospital and Royal Hampshire County Hospital.  
 PARTINGTON, C. N., M.B. Lpool: assistant bacteriologist and pathologist, Staffs.  
 PLUMMER, N. S., M.D. Lond., F.R.C.P.: physician, Edenbridge and District War Memorial Hospital, Kent.  
 PUGH, D. L., M.R.C.S.: assistant T.O., Kent.  
 RINKEL, L. R. J., M.R.C.S.: medical superintendent, British Legion Sanatorium, Nayland, Suffolk.  
 RONALD, JAMES, M.D. Edin., F.R.C.P.E.: assistant physician, Stirling Royal Infirmary.  
 ROSS, C. M., M.B. Edin., D.P.SYCH.: deputy medical superintendent, Gatohead Mental Hospital, Northumberland.  
 SMITH, G. G., M.R.C.S.: M.O., British Honduras.  
 SPALDING, J. E., M.S. Lond., F.R.C.S.: surgeon i/c Wrexham Emergency Hospital, Denbighshire.  
 STRATTON, G. B., M.R.C.P.: temporary assistant M.O.H., Wimbledon.  
**Chesterfield and North Derbyshire Royal Hospital:**  
 GRAHAM, J. M., M.B. Camb., F.R.C.S.: assistant visiting surgeon.  
 HERBERT, G., M.B. Camb., F.R.C.S.: assistant visiting surgeon.  
 MUIRHEAD, H. C., M.R.C.S.: assistant ophthalmic surgeon.  
 NICOLL, E. A., M.D. Camb., F.R.C.S.E.: surgical director of accident service.  
 POOLER, H. E., M.B. St. And., D.A.: visiting anaesthetist.  
 TAYLOR, V. J. M., M.B., M.CH. (ORTH.) Lpool, F.R.C.S.E.: orthopaedic surgeon.

**Dudley Road Hospital, Birmingham:**

DISNEY, M. E., M.D. Lond., M.R.C.P.: senior physician.  
 FERRIMAN, D. G., D.M. Oxfrd, M.R.C.P.: senior physician.  
 HEARN, G. W., M.D. Lond., M.R.C.P.: senior physician.  
 MAY, K. S., M.D. Lond., M.R.C.P., D.L.O.: senior physician.

**Hospital for Sick Children, Great Ormond Street, London:**

BODIAN, MARTIN, M.D. Vienna, L.R.F.P.S., D.C.P.: morbid anatomist.  
 HULBERT, K. F., M.B. Lond., F.R.C.S., D.A.: orthopaedic registrar.  
 MACNAB, G. H., M.B. Edin., F.R.C.S.: surgeon.  
 MATTHEWS, D. N., O.B.E., M.D., M.CHIR. Camb., F.R.C.S.: plastic surgeon.  
 NASH, D. F. E., F.R.C.S.: surgical registrar.  
 NEWNS, G. H., M.D. Lond., M.R.C.P.: physician to outpatients.  
 SHARP, H. S., M.B. Camb., F.R.C.S.: surgeon to ear, nose, and throat department.  
 WALLACE, E. N. K., M.B. Lond.: outpatients aural registrar.

**St. Mary's Hospital for Women and Children, Plaistow:**

BLACKBURN, F. H., M.B. Durh., D.A.: anaesthetist.  
 BLUNN, D. R., M.R.C.S., D.A.: anaesthetist.  
 JOAD, M. M. G., M.R.C.S., D.A.: anaesthetist.

**Examining Factory Surgeons:**

DELAP, P., M.B. Dubl.: Appleby, Westmorland.  
 HUGHES, W., M.R.C.S.: Ashtou-in-Makerfield, Lanes.  
 REID, A. C., M.B., B.Sc. Edin.: Almondsbury, Glos.  
 ROBERTS, W. H., M.R.C.S.: Buckfastleigh, Devon.

**Ministry of Health:**

*Medical Officer*  
 MACFARLANE, JAMES, M.B., F.COMM. Edin., D.P.H., M.O., Department of Health for Scotland, seconded to the Ministry of Health.

**Diary of the Week**

DEC. 15 TO 21

**Monday, 16th**

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1  
 8.30 P.M. Sir James Chadwick, F.R.S.: Atomic Energy and some Applications to Medicine. (Lloyd Roberts lecture.)  
 HUNTERIAN SOCIETY  
 7.15 P.M. (Pimm's, 3, Poultry, E.C.2.) Dr. Geoffrey Evans: Flatulence.  
 LONDON SCHOOL OF DERMATOLOGY, 5, Lisle Street, W.C.2  
 5 P.M. Dr. A. D. Porter: Vitamin A in Dermatology.

**Tuesday, 17th**

ROYAL COLLEGE OF SURGEONS, Lincoln's Inn Fields, W.C.2  
 5 P.M. Mr. R. W. Raven: Melanoma and Related Tumours. (Erasmus Wilson demonstration.)  
 ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1  
 8 P.M. Pathology. Thrombosis: Mr. H. J. B. Atkins (clinical aspects); Dr. R. H. B. Short (pathology of primary thrombosis); Dr. Helen P. Wright (platelet changes); Prof. H. P. Gilding (anticoagulants).  
 EUGENICS SOCIETY  
 5.30 P.M. (Royal Society, Burlington House, Piccadilly, W.1.) Dr. J. W. B. Douglas: Social and Economic Problems of Childbearing in Britain: Report of a Questionnaire Inquiry.  
 LONDON SCHOOL OF DERMATOLOGY  
 5 P.M. Dr. H. Corsi: Diseases of the Nails.

**Wednesday, 18th**

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.1  
 3.30 P.M. Dr. C. H. C. Toussaint: Tuberculosis—the Objective and its Approach.

**Thursday, 19th**

ROYAL COLLEGE OF SURGEONS  
 5 P.M. Dr. E. Ashworth Underwood: Naval Medicine in the Ages of Elizabeth and John. (Thomas Vicary lecture.)  
 ROYAL SOCIETY OF MEDICINE  
 5 P.M. Dermatology. Cases will be shown at 4 P.M. Dr. W. J. Hohmann (Groningen): Erythematous Initial Tuberculide.

**Births, Marriages, and Deaths**

**BIRTHS**

BALY.—On Nov. 30, at Hillingdon, Middlesex, the wife of Dr. Peter Baly—a son.  
 BLACK.—On Nov. 30, in Leeds, the wife of Mr. George Black, F.R.C.S.—a daughter.  
 COOMBS.—On Dec. 2, the wife of Dr. Gordon Coombs, of Hopton, Norfolk—a daughter.  
 CORBIN.—On Dec. 4, the wife of Mr. John O. Corbin, F.R.C.S., of Cudham, Kent—a daughter.  
 DE SOLDENHOFF.—On Dec. 2, in Ayrshire, the wife of Mr. Richard de Soldenhoff, F.R.C.S.E.—a son.  
 HARRIS.—On Nov. 22, at Langport, Somerset, the wife of Dr. Paul Harris—a daughter.  
 HORNE.—On Nov. 26, at Hampstead, the wife of Dr. N. C. Horne—a son.  
 LLOYD.—On Nov. 30, at Tenterden, the wife of Dr. T. W. Lloyd—a son.  
 MACKEITH.—On Dec. 2, the wife of Dr. R. C. MacKeith—a son.  
 PUGH.—On Dec. 6, the wife of Dr. David W. Pugh, D.S.C.—a daughter.  
 TUCKWELL.—On Dec. 3, at Compton, Guildford, the wife of Mr. Edward Tuckwell, F.R.C.S.—a son.  
 TWEEDE.—On Nov. 15, at Batu Gajah, Malaya, the wife of Dr. D. Reid Tweede—a son.  
 VENABLES.—On Dec. 6, in London, the wife of Dr. Peter Venables—a son.  
 WALSH.—On Nov. 25, in London, the wife of Dr. J. J. Walsh—a son.  
 WARD-MCQUAID.—On Dec. 2, in Amman, Transjordan, the wife of Major Neil Ward-McQuaid, R.A.M.C.—a daughter.  
 WILLIAMS.—On Dec. 9, at Hampstead, Dr. Joy Williams (née Jewson), the wife of Dr. Denis Williams—a daughter.

**MARRIAGES**

CLARKE-HEPBURN.—On Dec. 5, at Worplesdon, Edward G. W. Clarke, M.C., B.M., to Patricia Hepburn.  
 NEVIN-DENNIS.—On Nov. 20, in London, Henry Millar Nevin, M.B., to Josephine Irene Dennis.

**DEATHS**

BAYLIS.—On Dec. 6, at Horns Cross, N. Devon, Henry Edward Montgomery Baylis, M.B. Durh.  
 BROWNIE.—On Dec. 4, in Glasgow, John Douglas Brownlie, M.B. Glasg., F.R.F.P.S.G., L.D.S.  
 GRAHAM-JONES.—On Dec. 6, at Dorchester, John Lawrence Graham-Jones, M.B. Camb.  
 HEWITT.—On Nov. 24, at Redhill, Harry Edward Hewitt, O.B.E., M.D. Lond., D.P.H., aged 73.  
 PRYCE.—On Dec. 6, at Welshpool, Harold Vaughan Pryce, M.B. Camb., F.R.C.S.  
 SMITH.—On Dec. 3, at Reading, George MacIver Campbell Smith, C.M.G., M.R. Aberd., M.R.C.P., lieut.-colonel I.M.S.

In recognition of his services to merchant seamen, Mr. Percival Cole has been made an honorary life member of the Seamen's Union. Mr. Cole has been associated with the Dreadnought Hospital for 35 years, and he was for many years surgeon to the Tilbury Hospital and Queen Mary's Hospital for East London. He is at present surgeon to the Royal Cancer Hospital.

## PNEUMOCONIOSIS IN SOUTH WALES ANTHRACITE MINERS

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This paper is based partly on clinical experience provided by examination of many hundreds of anthracite miners during the last twenty years, and partly on the necropsy findings in 592 deaths among certified silicotics\*: 230 cases in which I was present at the necropsy, and 362 cases in which the necropsy findings were obtained from medical colleagues, in particular Dr. T. W. David, chief medical officer, Amalgamated Anthracite Collieries Ltd., or from the official certificates of the Silicosis Medical Board. The records of the company were also available for analysis.

### CLINICAL FEATURES

In slighter grades there are very often no symptoms, and even in the advanced stage sometimes few or no symptoms.

The main symptom is *dyspnoea*, increasing with advancing damage to lung tissue and often augmented in older men by cardiorenal disease. In advanced stages *dyspnoea* may be present even at rest; but the disease develops gradually, and some men work right up to the end.

*Cough* is variable. In uncomplicated cases it is often absent or unproductive. Associated conditions, such as bronchitis and tuberculosis, may alter its features. *Sputum* may be absent or slight, even in some infected cases. Black spit, if persistent or recurring after an interval, indicates that the lung lesions are breaking down. *Pain* is not a significant feature, but there is often a history of past attacks of pleurisy. *Fever*, rapid pulse, wasting, and other toxic features develop only with added infection and not always then.

*Physical signs* are often slight, even with advanced lesions. Prolonged expiration, impaired percussion note, and reduced expansion are the commonest findings. As the disease advances, the air inspired may be so diminished that the respiratory murmur may be inaudible, especially in the presence of thickened pleura. Definite bronchial breathing suggests tuberculosis. Cavities, even when large, may not be clinically detectable. Adventitious sounds, dry and moist, may be present. Böhme (1939) emphasised as a diagnostic mark of severe silicosis the disproportion between the severity of the whole clinical picture and the slight signs found on percussion and auscultation in men with a history of adequate exposure to dust.

### NECROPSY FINDINGS

The lungs are usually adherent to the thoracic wall, sometimes rendering their removal a strenuous operation. This adherence particularly affects the upper parts of the lungs, but basal adhesions too are common. Adhesions may be widespread or take the form of tough stringy bands. Often the pleurae are much thickened. The surface of the lung may be smooth, but in advanced cases is more often distorted by puckering, most often in the mid or upper zones. Gross emphysema often gives the impression that the lungs are made up of many lobes, somewhat like a bundle of balloons.

The cut surface shows areas of fibrosis, black or blackish and varying in size from small discrete nodules, through patches of various sizes, up to very large areas of consolidation. In men who have worked consistently in hard headings—i.e., been much exposed to dust with

a high content of free silica—it may present discrete nodules, as in "classical" silicosis, with little or no blackening; but such nodulation is often scanty and sometimes not apparent in the lungs of workers at the coal face, the massive type of fibrosis prevailing in colliers. Nodules in rock workers tend to be harder and more sharply defined than in colliers. The massive consolidations may be very large, of lobar dimensions or greater. In one case the normal lung tissue was so extensively replaced by massive fibrosis that I was almost forced to conclude that the patient had developed some extrapulmonary mode of respiration. These consolidated masses cut with a dry surface like solid black rubber. (One doctor jestingly says he uses this rubbery consistence as a test—"if the lung bounces, it is silicotic.") They may be solid and intact but often crumble and disintegrate and are often extensively excavated and filled with liquid or semi-liquid inky material. This material, if it escapes to the air tubes, provides the black spit of silicotic coalminers. Sometimes a whole upper lobe which appears from the surface to be solid is found on incision to be a thick-walled bag of this inky material. Lymph-glands about the lung root are usually enlarged, black, and fibrotic.

### ASSOCIATED CONDITIONS

*Tuberculosis*.—Liability of "classical" silicotics to develop pulmonary tuberculosis is notorious; and, when the "classical" silicotic dies of his disease, tuberculosis is a usual accompaniment. Certain groups of colliery workers who worked consistently in hard headings (tunnelling through rock) provide a parallel to this, but there is less agreement about the incidence of associated tuberculosis in the pneumoconiosis of ordinary coalminers. There are in these cases even more obscuration and modification of the tuberculous element than in the classical silicosis of South Africa, and it is often difficult to recognise tuberculosis in these cases, even in microscopical sections.

Sometimes tuberculosis was evident in lung tissue adjacent to the fibrotic patches, where it had seemingly escaped the trammels of the pneumoconiotic lesion and flared into a tuberculous bronchopneumonia. Sometimes there was a cluster of tubercles adjoining a fibrotic lesion; very rarely a more general miliary distribution; sometimes a more chronic fibrocaceous lesion. In other cases tuberculosis was recognised by greyish mottling of some part of the fibrotic area or by a glandular lesion. Occasionally a case showing features suggesting, perhaps only faintly, tuberculosis in the lung was unmasked by meningeal or abdominal tuberculosis. In some patients whose sputa had been positive it was very difficult to recognise tuberculosis at necropsy.

Belt and Ferris (1942) remark that in a group of cases of identical appearance the tubercle bacillus would be found in one and not in another, but they were inclined to regard all the massive disintegrating lesions as phthisical, and suggested the name *coniophthisis* for the special type of lesion arising from the dust plus tubercle effect, "characterised," as they say, "by a reaction more fibrous, less cellular, more chronic-looking, and more widespread, obscured by a heavy dust deposit present sometimes even in the caseous parts of the lesion, with cavities more heavily encased in solid tissue and less voluminous than those of ordinary phthisis, and with few tubercle bacilli." It is not surprising that tuberculosis so lacking, as in these cases, in its usual clinical features should be correspondingly difficult to detect at autopsy, and in his series of 42 Belt detected the tubercle bacillus in only 8, and in 13 others with lesions of identical appearance he failed to detect the bacillus.

In my series of 230 necropsies tuberculosis was recognised in 59, just over a quarter, but disintegration and cavitation of the fibrotic lesions were noted in many

\* Most of the patients who died had been certified under the pre-1943 schemes as "suffering from silicosis."

cases other than those recognised as tuberculous. Many pathologists do not regard this crumbling and cavitation as necessarily due to tuberculosis (Cummins and Sladden 1930, Cooke 1932, Gough 1940), but Belt and Ferris are not inclined to regard them as formed by disintegration of fibrous tissue, and think they are more probably necrotic from the first. Extensive lesions may show little or no disintegration or liquefaction, and relatively small lesions may show softening and breakdown without obvious tuberculosis. To a great extent opinion will depend on the criteria of diagnosis. If demonstration of the tubercle bacillus is insisted on, the tuberculous nature of these lesions in many instances cannot be proved, for very prolonged and thorough search of many sections may be necessary for its discovery. The comparable difficulty of detecting the bacillus in sputum may be noted. There is, however, an increasing tendency to regard infection as a factor in the production of these massive lesions. In this connexion it must be remembered that infection which was originally an important element in the disease may have retrogressed, and sometimes at necropsy an old apparently healed tuberculous focus is found with a black fibrotic shell surrounding it, without any silicosis of general distribution.

Wasting and other toxic features of tuberculosis were not constant, even when tuberculosis was obvious post mortem. Wasting is often difficult to estimate, but family doctors were usually present to give information on the point. It was exceptional in earlier stages of the disease, unless there was some associated wasting disease. Apart from this, only 1 case of 36 certified "partially disabled" exhibited wasting. It was more common among men with advanced silicosis. Of 161 cases certified "totally disabled by silicosis" wasting was present in 61. Of these, 25 had tuberculosis and 8 malignant disease; 14 had non-tuberculous respiratory affections, and these, together with the remaining 14, all had massive confluent lesions with much necrosis and disintegration of the masses but no recognisable tuberculosis.

Of the 230 cases 59 were ranked as tuberculous on necropsy, and 39 of these showed appreciable wasting.

Uncomplicated silicosis, therefore, even with massive lesions, does not in most cases cause gross wasting, and even of the tuberculous cases found post mortem a third did not show wasting.

Amor (1941) has suggested that the massive lesions are always accompanied by toxic symptoms. This is not borne out by my observations, many cases with massive crumbling lesions showing no toxic features even when there was a recognisable tuberculous element present; but all cases showing wasting and other toxic features had such lesions, apart from those with other wasting disease, such as carcinoma.

A noteworthy feature of the massive lesions was that they were in a considerable proportion of cases of lopsided distribution, being much more advanced in one lung than in the other. Of 230 cases 43 showed gross asymmetry; 30 had recognisable tuberculosis; 3 others were of special interest. One had a smooth-lined (? healed tuberculous) cavity with a surrounding shell of black rubbery fibrosis and no naked-eye fibrosis elsewhere in either lung. Another exhibited a similar condition, but with more marked fibrosis in, and a calcified gland at the root of, the right lung, and on the left side scanty nodular lesions with one larger lesion about  $\frac{3}{4}$  in. in diameter. The third, with an old healed empyema on one side, had an almost wholly consolidated black lung on that side, with relatively minor lesions in the other. In 10 other cases there were massive necrotic lesions on one side, with much smaller though often confluent lesions on the other. Asymmetry of lesser, but definite, degree was noted in 18 other cases.

Infection, whether past and obsolescent, or present and active, whether tuberculous or non-tuberculous, appears

to be the most likely factor responsible for the lopsided distribution of the fibrotic masses.

Silica is an adjuvant to tuberculosis, coal dust is credited with an inhibitory effect (Cummins and Weatherall 1933), and the interplay of these two effects is probably responsible for much of the modification of tuberculosis in silicotic coalminers.

*Emphysema.*—Minor degrees of emphysema are not readily detected at necropsy in the blackened lungs of coalminers, but dilation of air spaces was often perceptible, and gross bullous emphysema was common, being noted in 104 of 230 cases. These were men with severe disablement and massive lesions, except some of the old men certified partially disabled by silicosis and usually dying of extrapulmonary diseases.

Pneumothorax due to rupture of an emphysematous bulla may occur, and one man died shortly after developing a total pneumothorax on the side of his better lung. It is possible that this happens more commonly than we know but is often partial owing to adhesions. I recall one man who had three attacks of pneumothorax, which, owing to limitation by pleural adhesions, presented a puzzling clinical picture.

*Non-tuberculous Respiratory Affections.*—These were found in about a fifth of the cases. The condition most commonly found was bronchopneumonia. Lobar pneumonia was uncommon, being present in only 2 cases. Gardner has remarked on this fact. If pneumoconiosis involves extensive portions of the lungs it will impair the chance of recovery from any pneumonia by reducing the available reserve of functioning lung tissue, but apparently it does not render the patient particularly liable to lobar pneumonia.

*Cardiac Changes.*—Opinion is divided about the effect of pneumoconiosis on the heart, and South African observers (Irvine, Simson, and Strachan 1930) remark that congestive cardiac failure as a mode of death is less common in the recent South African cases than had been reported in the old miners who had been exposed to very heavy dust concentration.

In the present series of 230 cases heart-failure was the most frequent mode of death. Two types of failure were noted in about equal proportions: (1) congestive cardiac failure, with dropsical limbs, ascites, &c., and (2) terminal failure of circulation, with pulmonary oedema and congestion. These men rapidly developed increasing dyspnoea and tachycardia, dying not suddenly but in a few days.

In 84 cases terminating in one of these ways hypertrophy and dilation of the right heart, with chronic venous congestion of the liver and other viscera, were practically constant. In only 4 cases were massive confluent lesions lacking, and these exhibited other cardiac abnormalities.

Of 41 cases of non-tuberculous respiratory affections 24 exhibited right-heart changes and chronic venous congestion of the liver and other viscera. All of these had massive confluent fibrosis.

Of 59 cases recognised as tuberculous at necropsy 29 showed right-heart changes. These all had massive lesions in the lungs, and 10 of the 29 presented a full picture of congestive cardiac failure, which appeared to be the mode of death.

These findings indicate that cardiac embarrassment is a common sequel or concomitant of coalminers' pneumoconiosis, especially in men with massive lesions. This is only what one might expect in view of the extensive destruction of the pulmonary capillary bed, further augmented, as it usually is, by emphysema. Similar cardiac effects in miners in the Ruhr are referred to by Böhme (1939), di Biasi (1939), and Schulte and Husten (1936), and in America by Coggin et al. (1938).

*Carcinoma of the Lung.*—Recently the question has been raised whether there is in silicotics an increased susceptibility to lung cancer. This question has cropped up before in connexion with the increased incidence of lung cancer in Joachimstal and Schneeberg miners, but

TABLE I—MODES OF DEATH IN 227 CASES

Category of certificate	Mode of death			
	Tuber- culosis	Non- tuberculous respiratory affection	Cardiac failure	Unrelated causes
Silicosis plus tuber- culosis .. ..	14	..	2	..
Silicosis—partial disablement ..	4*	4	9†	19
Silicosis—total disablement ..	36	34	64	24
Certified at death only .. ..	5	3	9	..
Total .. ..	59 (26%)	41 (18%)	84 (37%)	43 (19%)

\* Excluding 2 cases later certified totally disabled.

† Excluding 3 cases later certified totally disabled.

there it has been attributed to radioactivity or to arsenic.

In this series of 230 cases there was only 1 case of lung tumour; this was in a man aged 68 and was secondary to an abdominal new growth. Other sites of neoplasm were brain (1), pharynx (1), stomach (4), bowel (3), the men ranging in age from 49 to 68 years. Further, in other cases making with this series a total of almost 400 necropsies, I have noted the following 3 instances of primary lung cancer:

- (1) A man, aged 58, with minimal dust changes and refused a certificate by the Silicosis Medical Board.
- (2) A man, aged 55, with fairly advanced silicosis.
- (3) A man, aged 42, with no fibrosis of lungs (accidental death).

There was, therefore, only 1 case of primary lung cancer associated with pneumoconiosis of coalminers. In view of the fact that nearly all silicotic miners who come to necropsy have reached the cancer age, this low incidence suggests that there is no linkage of cause and effect between coalminers' pneumoconiosis and primary lung cancer. Any increased susceptibility of the silicotic to lung cancer has been attributed to silica, and perhaps a higher incidence might be found in workers exposed to high concentrations of the dust of free silica, but the Miners' Phthisis Medical Bureau of South Africa (1944) have reported that lung cancer does not appear to be more prevalent among silicotic than among non-silicotic miners or even men working above ground. Vorwald and Karr (1938) found no increased incidence of pulmonary carcinoma in persons exposed to industrial dusts as compared with the general population.

#### MODES OF DEATH

In their report on chronic pulmonary disease in South Wales coalminers, Hart and Aslett (1942) give the result of a canvass of general practitioners in the anthracite area in the statement that "cardiac failure and non-tuberculous respiratory affections are common clinical causes of death, while clinical tuberculosis sometimes occupies this rôle." These authors emphasise the comparative infrequency of clinically recognisable tuberculosis, the frequency of cardiac failure, and the opinion of local doctors that severe wasting is common terminally. In connexion with these statements the following analysis of 230 deaths is of interest (cases are arranged in four groups according to the category of certification):

"Silicosis accompanied by tuberculosis" ..	16
"Silicosis—totally disabled" .. ..	161
"Silicosis—partially disabled" .. ..	41
Certified at death only .. ..	17
Total .. ..	235

The excess of certificates over deaths is due to 5 "partial" cases having been subsequently certified "totally disabled."

*Silicosis Plus Tuberculosis.*—There were 16 cases: 14 confirmed post mortem, and 2 not confirmed and dying of congestive heart-failure.

*Silicosis.*—"Total" and "partial" cases, and those certified at death only, revealed no significant difference in their modes of death, except that among "partial" cases a greater proportion died from causes unrelated to silicosis.

Of 41 "partial" cases 5 later graduated to the "total" grade, and 19 of the remaining 36 died of unrelated conditions.

Of 161 "total" cases 24 died of unrelated causes, and 3 were an odd assortment: 1 dying shortly after developing pneumothorax, 1 after operation for insertion of radon needles in a pharyngeal new growth, and 1 dying suddenly with gross aortic valvular and myocardial disease, the Silicosis Board regarding silicosis as a contributory factor.

Omitting the 3 odd cases, the incidence of the various modes of death was as follows:

- 59 (26%) had associated tuberculosis.
- 41 (18%) had non-tuberculous respiratory affections.
- 84 (37%) terminated in cardiac failure.
- 43 (19%) died of unrelated conditions.

These figures are given in table I. All cases are included under the heading of tuberculosis wherever this condition was recognised, even though some of the tuberculous patients appeared to die from congestive cardiac failure rather than from the toxic effects of tuberculosis.

#### AGE AT CERTIFICATION AND SURVIVAL PERIODS

For consideration of these points my personal series of 230 deaths has been supplemented by 362 others, making a total of 592 cases for analysis. Of these, 66 were certified at death only. Table II deals with the remaining 526 cases, giving category of certificate, average age at date of certification, and average period of survival.

For "partial" cases both the average age at certification and the average period of survival in table II are anomalous. The average age at certification is too high, being raised by a considerable proportion of old men certified partially disabled by silicosis, often with total disablement from other causes, who had various diseases incident to advancing age. As the silicosis in these men was often of minor, sometimes of minimal, degree, and their fatal conditions were usually chronic, these older men probably sought certification because diseases of natural origin had brought their working life to

TABLE II—AGE AT CERTIFICATION AND SURVIVAL PERIODS OF 526 SILICOTICS IN DIFFERENT CATEGORIES

Category of certificate	No. of deaths	Average age at certification (years)	Average survival period (years)
Silicosis (or pneumoconiosis)—totally disabled .. ..	370 (70.3%)	53	4 <sup>2</sup> / <sub>12</sub>
Silicosis (or pneumoconiosis)—partially disabled .. ..	103 (19.6%)	54	3 <sup>10</sup> / <sub>12</sub>
Silicosis (or pneumoconiosis) plus tuberculosis .. ..	53 (10.1%)	48 <sup>7</sup> / <sub>12</sub>	1 <sup>10</sup> / <sub>12</sub>

a close. In the 41 cases of my personal series the respective ages at certification and survival periods for the two groups, "silicotic deaths" and "non-silicotic deaths," were 51 and 4<sup>1</sup>/<sub>2</sub> years, and 55<sup>2</sup>/<sub>12</sub> and 2<sup>2</sup>/<sub>12</sub> years.

The true average age at certification for "partial" cases is 46 years, as shown in the last column of table IV, based on all certified cases of a large group of collieries and giving the age-distribution of all cases according to the category of the certificate: "totally disabled," "partially disabled," and "certified at death only."

The survival period is also anomalous, being unduly lowered by the older men mentioned above, and gives a false value for the expectation of "partial" cases, because it refers only to

men who die and not to the far greater number who have survived, and will survive, often to a ripe old age, then to die a "natural" death.

The figure for "total" cases in table IV includes all cases of total disablement, whether certified simply as silicosis or as silicosis plus tuberculosis; but the error introduced by this is not great, as the proportion of men recognised to be tuberculous at certification is small. The average age of

TABLE III—ANALYSIS OF 592 DEATHS AMONG SILICOTICS

	Tuberculosis	Other silicotic deaths	Non-silicotic deaths
All deaths (592)	145 (24.5%)	371 (62.7%)	76 (12.8%)
Silicotic deaths (516)	145 (28.1%)	371 (71.9%)	..

certification for all cases of total disablement in this table is 52, as compared with 53 in table II, where the two categories are given separately.

The average survival period for 370 "total" cases in table II is 4<sup>2</sup>/<sub>12</sub> years.

The relative mortality among men certified totally and those certified partially disabled is very clearly indicated by comparing tables II and IV. From these it is seen that, whereas "partial" certificates comprise over 76% of those issued during life, deaths among "partial" cases amount to less than 20% of the deaths, and a third of these were due to causes unrelated to silicosis. In contrast to this, certificates of total disablement were less than 24% of those issued during life, whereas deaths among "total" cases (simple or complicated by tuberculosis) amount to over 80% of deaths, and of these only 10% were non-silicotic deaths.

The figure for tuberculous cases in table II refers only to men recognised as such when certified, and underrates the incidence of tuberculosis in silicotic miners. This is shown in table III, where it is seen that tuberculosis accompanied silicosis in 24.5% of all 592 deaths and in 28.1% of 516 "silicotic" deaths.

For men certified as silicosis plus tuberculosis the average age at certification is somewhat lower than for other cases of total disablement: 48<sup>7</sup>/<sub>12</sub> as against 53 (see table II). The survival period of this group is much lower than for the other groups, both "total" and "partial," averaging only 1<sup>0</sup>/<sub>12</sub> years for 53 cases. The prognosis for this group is very bad, although some men may carry on for a long time, the longest period in this series being 6<sup>4</sup>/<sub>12</sub> years.

It is only men recognised as tuberculous at certification for whom the prognosis is so poor. The men not so recognised fare better. One man, certified simple silicosis, whose lungs revealed at autopsy silicosis plus tuberculosis, lived 14 years after certification. For the men in my personal series the survival periods of cases grouped according to the three main necropsy findings were as follows:

Cardiac failure	.. .. .	4 <sup>9</sup> / <sub>12</sub>
Non-tuberculous respiratory affections	.. .. .	3 <sup>7</sup> / <sub>12</sub>
Tuberculosis	.. .. .	3 <sup>10</sup> / <sub>12</sub>

If cases recognised as tuberculous when certified are excluded, the last figure becomes 4<sup>9</sup>/<sub>12</sub>.

All the figures so far mentioned afford only a partial guide to prognosis. In an effort to obtain a better guide a follow-up of all men certified in 1935 and 1936 was made.

Of 158 men certified totally disabled by silicosis in an advanced stage 100 were alive at the end of five years; of the 58 deaths, 47 were due to silicosis, 8 to natural causes, and 3 to causes unknown. Of these 158 men 57 survived into the tenth year, 81 having died of silicosis, 10 of natural causes, and 10 of causes unknown. A fairly high proportion even of the old men have survived for long periods, nearly a third (7 out of 24) of the men over 60 at date of certification having survived into the tenth year, among them one old stalwart of 68 who is still alive after ten years.

Of 53 men suspended in the early stage of the disease only 3 were dead by the end of five years: 1 dying of silicosis, 1 of natural causes, and 1 of causes unknown. Of this group 44 survived into the tenth year, the 9 deceased including the 3 men mentioned above and 6 others who died of causes unknown.

A small group of men were certified with "partial disablement by silicosis moderately advanced," and these show

an expectation falling between that of the advanced and early groups. Of 16 men in this group 11 survived five years, and 8 into the tenth year.

In sharp contrast to the above groups, men recognised as tuberculous at certification present a much sadder tale. Of 17 men certified suffering from silicosis plus tuberculosis, 9 were dead at the end of a year, 14 were dead at the end of two years, and only 1 survived four years, living just into the fifth year.

Another feature of tuberculosis cases is a tendency to earlier onset of disablement in men with associated tuberculosis, whether recognised in life or at death only. This is shown in table V, which gives the age-distribution in decades of 592 fatal cases, the age given being that at date of certification or cessation of work, for the three groups, based on necropsy findings, silicosis plus tuberculosis, other "silicotic" deaths, and non-silicotic deaths. Of the tuberculous cases, over a half occur in the two younger age periods (30-50) and over a fifth in the youngest (30-40).

Of the other "silicotic deaths" less than a third occupy the two younger periods, and only slightly over a twentieth occur in the youngest period, the largest percentage falling in the sixth decade.

Of the non-silicotic deaths even smaller proportions occupy the two younger periods, and the highest percentage is in the oldest age period (60+).

PREVENTION

This aspect of the subject can be dealt with only very briefly. In our anthracite mines we have not waited for the solution of the chemical, physical, and biological aspects of the problem to develop preventive methods. Our Silicosis Research Committee have studied the local features of the problem and have attempted to develop practical preventive measures. Briefly, we depend on wind and water: water to prevent the liberation of dust by infiltrating the coal seam before it is worked, to spray dry coal and rock, to water roadways, and to permit the use of wet drilling; wind in the form of an ample ventilating current to dilute and remove such fine dust as escapes the water traps. This fine dust, once liberated into the atmosphere, must, we say, be treated as a gas.

The limited problem of dust suppression in hard headings is not difficult of solution. Wet drilling, spraying of broken rock, precautionary measures with shot-firing, and an ample ventilating current will achieve success—the only insuperable obstacle being the human one, notably the man who will not use the protective apparatus supplied. We now consider hard headings the safest places in our mines. It is a much more difficult matter to suppress dust at the coal face, and total suppression cannot be achieved, but we are reducing the amount. The dust inhaled by the average coal-face worker is not

TABLE IV—AGE-DISTRIBUTION AND AVERAGE AGE OF CERTIFICATION OF DIFFERENT CATEGORIES IN 3745 CERTIFICATES (SILICOSIS OR PNEUMOCONIOSIS)

Category of certificate	Age at date of certification (years)				Total	Aver. age at certification (years)
	Under 40	40-49	50-59	60+		
Totally disabled—silicosis (or pneumoconiosis) or silicosis plus tuberculosis	98 (11.3%)	238 (27.5%)	338 (39.1%)	190 (22.0%)	864 (23.6%)*	52
Partially disabled—silicosis or pneumoconiosis	842 (30.1%)	964 (34.4%)	703 (25.1%)	290 (10.4%)	2799 (76.4%)*	46
Certified at death only	5 (6.1%)	17 (20.7%)	24 (29.3%)	36 (43.9%)	82	57

\* Of 3663 men certified during life.



such a highly noxious material and it will probably cease to be a menace to health long before we reach anything like total suppression. I believe that the sheer bulk of the inspired dust is important, and that, once dust suppression reaches a stage at which a balance between intake and elimination is approached, much of the dust disease will disappear, as the self-cleansing mechanism of the respiratory system will not then be overwhelmed.

I do not consider that aluminium, introduced experimentally in Ontario, is likely to be of any use as a protective agent against the mixed dust encountered by coalminers.

Another preventive step which will probably be taken before long is the medical examination of workmen before employment and periodically afterwards. This I consider important because I believe that in many

TABLE V—AGE-DISTRIBUTION AND NECROPSY FINDINGS IN 592 DEATHS AMONG CERTIFIED SILICOTICS

Cause of death	Age at date of certification (years)				Total
	Under 40	40-49	50-59	60 +	
Silicosis (or pneumoconiosis) plus tuberculosis	29 (20.0%)	48 (33.1%)	42 (28.9%)	26 (17.9%)	145
Other silicotic deaths	23 (6.4%)	95 (25.6%)	169 (45.5%)	84 (22.6%)	371
Non-silicotic deaths	2 (2.6%)	11 (11.4%)	29 (38.1%)	34 (44.7%)	76

cases the seed is sown, or the soil for the silicotic crop prepared, before the boy reaches the mine. Here I enter a strong plea for the exclusion of the man with tuberculosis from the mine. It is probable that the presence of a man with open tuberculosis in the heading is part of the explanation of the deaths of whole teams of "hard headers" such as have been reported in the past. Yet no person or authority has the power to keep the miner with tuberculosis out of the pit.

#### TREATMENT

There are no special therapeutic resources at present available, apart from treatment of complicating infections. It is hoped that the unit at Cardiff for research into the possibilities of treatment and rehabilitation of pneumoconiotic miners in charge of Dr. C. M. Fletcher may evolve something useful. It may be possible to get men back to a useful condition by some form of training.

#### SOCIAL ASPECTS

These are most important considerations. The amendment of legislation in 1943 has led to the suspension of many mine-workers at a comparatively early age. This has created a grave man-power problem. The answer is to rid the mines of dust, but the transition problem remains, for the disease is of slow development.

There is also the social problem of providing for the men suspended. A large proportion of these, especially men suspended in the last two or three years, have little, and sometimes no, disability. Many, even advanced silicotics, have helped to man war factories. Most of the suspended men can do ordinary factory jobs. Provision is being made for them by the introduction of new industries to the coalfields. For the men with more severe disablement it may be possible to provide some more "sheltered" occupation, but it is hoped their numbers will be fewer before very long.

#### SOME UNSOLVED PROBLEMS

We do not yet know why there is a higher incidence in anthracite than in steam and bituminous mines, though King (1945) has hinted that steam and bituminous coals, perhaps by reason of a more intimate mixture with their contained mineral matter, may prevent their

contained silica from acting on the tissues with which it comes into contact.

Another unanswered question is that of varying individual liability to dust disease. That men vary in their susceptibility to the effects of dust is certain. I shall cite only two instances.

One man worked for thirty-five years in hard headings: all his working life he spent in them. Five years before his death he was a robust man with a chest expansion of 5 in. Less than a year before his death he began to fail, and within a few months of ceasing work he died with a classical silicosis, like that of the stone-mason, and a galloping tuberculosis.

Another man died at the age of 65 after fifty-one years of underground work: about four years in hard headings and the rest at the coal-face. He worked in a mine with a very high incidence of the disease, but at death his lungs were little different from those of the ordinary town-dweller.

At the other extreme, men have developed dust disease after only a few years in the mine, but in these tuberculosis has been a prominent factor. There must be personal factors at work to explain this variation in susceptibility to dust disease. Doubtless infection is one factor.

Many facets of the problem of coalminers' pneumoconiosis have been passed over. No explanation for them can be offered at present, and the whole problem is so tangled that a full solution will require many years of work in many fields. We are dealing with a mixed dust of which one ingredient, silica, especially in the form of quartz, is an adjuvant, though not always a whole-hearted one, to tuberculosis; another, coal, is credited with an inhibitory effect on tuberculosis and, either alone or in combination with other ingredients, an antidotal effect on the silica. The addition to these mineral factors of the living variables, the man, the tubercle bacillus, and perhaps other organisms, produces a very complicated polygon of forces; and it is not surprising that the disease presents such an intricate tangle.

#### SUMMARY

The clinical features and morbid anatomy of pneumoconiosis in anthracite miners are described, and associated conditions are discussed with special reference to tuberculosis.

Associated tuberculosis was present in 24.5% of 592 certified miners who died, and in 28% of 516 silicotic deaths. Tuberculosis accompanying pneumoconiosis in coalminers is often lacking in its usual features, both clinically and post mortem, and it is certain that more detailed investigation would reveal tuberculosis in a much greater proportion of silicotic miners who die of their disease.

Gross emphysema was another common accompaniment of the advanced stage of the disease, and emphysema is responsible for much of the disablement in these men.

The predominant modes of death have been indicated. A considerable proportion of certified men died of intercurrent and unrelated diseases, as would be expected when so many of them are old men. Of the "silicotic deaths" about half were due to cardiac failure and half to infection, tuberculosis being found rather more often than non-tuberculous affections.

Signs of embarrassment of the right heart were often found in the men with more advanced pulmonary lesions, even apart from the patients dying of cardiac failure.

This series of cases offers no evidence that there is any increased incidence of primary lung cancer in pneumoconiotic anthracite miners.

The mortality among men in the different categories of certification has been compared. Men with clinically recognisable tuberculosis have a particularly poor prognosis, but many with advanced disease and most of those certified in the early stage survive for many years.

There is a tendency to earlier onset of disablement in men showing evidence of associated tuberculosis in life or at death than in the apparently uncomplicated cases.

Prevention and social and other aspects of pneumoconiosis are briefly referred to.

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## STEEP-WAVE ELECTROPLEXY

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The object of the steep-wave type of electroplexy or electric convulsion therapy (E.C.T.) is to produce therapeutic convulsions with minimal discomfort to the patient, minimal damage to nervous tissues, minimal disagreeable after-effects, and minimal risk of extraneous accidents.

Though from the purely technical point of view much progress has been made in the design and construction of electroconvulsant apparatus—and we ourselves, year by year, have attempted to improve on our own work—it cannot be claimed that there has been any progress involving principle since Bini and Cerletti constructed their first apparatus.

Up to now, all apparatus, good, bad, and indifferent (and there have been some which have been open to serious electrotechnical criticism), have been constructed to deliver an alternating current (A.C.) at a selected voltage over a selected time-interval. In other words, a fit was to be produced by bombarding the cerebral cortex over a relatively wide area with a sequence of A.C. electrical impulses of (theoretically) equal voltage, during the passage of which the transtemporal resistance had been considerably reduced by the first few impulses. The wave-form, on analysis, in all types of A.C.-excited apparatus is approximately sinusoidal.

The noxious effect of this sinusoidal type of current on cortical neurones is still controversial, though the latest work shows that it can be reduced to a negligible factor by proper precautions. Nevertheless, that structural changes do occur, even though they are not

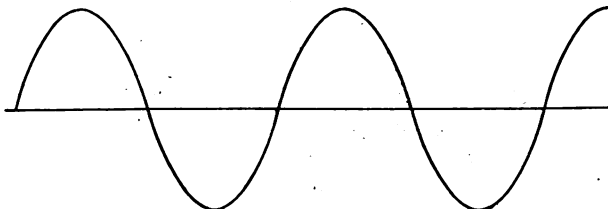


Fig. 1—Wave-form produced by first standard A.C. mains unit.

necessarily irreversible, is shown by the organic type of memory-defect and by the recorded changes in the electroencephalogram which are commonly associated with electroplexy.

It therefore occurred to us some five or six years ago that it would be desirable to induce fits electrically with a type of current (thinking in terms of wave-form) which would be calculated to effect as little structural intracellular or extracellular change as possible. Experience of other forms of medical electricity has shown that, as a general rule, with the steeper wave-forms not only is structure less affected but excessive physiological excitation is avoided (Krusen 1941, MacPhail 1936).

## FIRST EXPERIMENT

Electrotechnically, we have found that the simplest way of administering a steep-wave current is with condenser discharge. Accordingly, very early in our researches we tried to adapt this principle to clinical electroplexy. Our first experiment was unsuccessful, because we did not see our way immediately to overcome the technical difficulties. We should doubtless have been more persevering, had we not been so agreeably preoccupied with the clinical successes that we were piling up with our first portable A.C. apparatus (Strauss and MacPhail 1940).

However, when we decided to construct a universal unit—i.e., a unit which could be used on A.C. or direct current (D.C.) mains supply or with a 12-volt battery—we decided that, on electrophysiological grounds alone, we ought to try and steepen the wave-form. Fig. 1 is an actual recording of the wave-form produced by our first standard A.C. mains unit. It is strongly sinusoidal, and it shows uniform amplitude in both positive and negative phases. Fig. 2 is a recording of the wave produced by our first standard universal unit (a) from

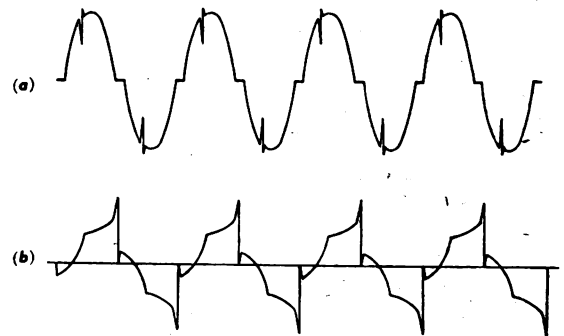


Fig. 2—Wave-form produced by first standard universal unit: (a) from D.C. mains, generated by argotrons; (b) from 12-volt battery supply, generated by vibrators.

D.C. mains, generated by argotrons, and (b) from a 12-volt battery supply, generated by vibrators. The argotron-generated current has a much steeper front than the normal alternating current, and also has a high-frequency spike of fair amplitude in both phases. The vibrator-generated current has a vertical leading front, though the rapid spike-decrement opens out to a lower-frequency component. Though the wave-form has been steepened, the energy factor remains uniform for each impulse, as shown by the absence of train-decrement.

A rapid change in inter-electrode resistance during the first few impulses of the shock current indicates the advisability of using a rapidly damped train of waves. The higher voltages at the beginning overcome the initial resistance, and the subsequent train-decrement ensures that minimal energy is used to induce the fit. In other words, the first few high-voltage impulses initiate the fit, and the subsequent impulses, which taper off rapidly, complete the electrophysiological action. We therefore decided to go back on our tracks and try to overcome the

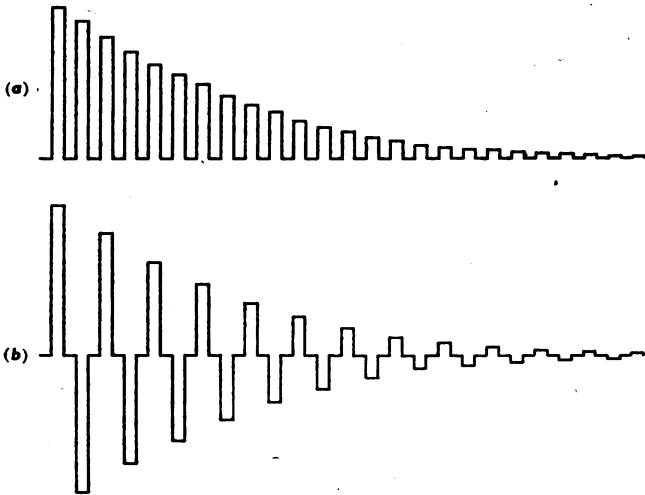


Fig. 3—Wave-form of current passed through patient with the new apparatus: (a) monophasic; (b) diphasic.

technical difficulties by producing a unit which would induce a convulsion by condenser discharge.

There are two ways in which a condenser may be discharged: monophasically (unidirectionally) and diphasically (bidirectionally). Several workers have indicated that different results might be expected from these two types of current. The diphasic wave-form produces more intracellular disturbance than does the monophasic. We therefore decided to construct an apparatus capable of delivering monophasic or diphasic current from condenser discharge, rather than to incorporate this feature in our universal argotron set.

Before we discuss the theoretical and experimentally tested advantages of steep-wave decremental discharge in electroplexy and the apparatus used, it is desirable to give a short account of the MacPhail-Strauss first universal electroplexy unit, if only because, so far as we know, it is the only apparatus of its kind in the world. Moreover, it illustrates the considerable number of electrotechnical problems which have to be satisfactorily solved, before it can be considered safe to produce a piece of electro-medical apparatus of this kind, destined to be used, for the most part, by people with little knowledge of physics.

FUNDAMENTAL CIRCUIT OF UNIT

The fundamental circuit of the argotron electroplexy unit is illustrated in fig. 4.

The transformer T1, T2, T3, T4, T5 may be excited through switches 9 and 12 by A.C. or D.C. mains, through the vibrator (6) and switches 8, 9, and 11, or from 12-volt supply from B through the same switches.

T2 supplies a small A.C. voltage through R3 across R4. This permits a known A.C. current (125 microamps) to flow through the shorted jack, when the calibrated resistance is maximal (1000 ohms). The introduction of the patient's impedance causes a drop in the current flowing. By decreasing R5 till the same current-reading at the reference line is shown (125 microamps), the sub-

tractively calibrated scale of R5 will indicate the patient's impedance directly.

T3 and T4 provide a source of direct current through rectifier V1, which charges timing condenser C3. On throwing the switch TS, the charge excites the relay R, which will momentarily close switches S1, S2, S3, and S4. Calibrated control R6 gives exact timing plus or minus 1/100 sec. from 1/10 to 1 sec. in steps of 1/10 sec. R7 is the minimal timing limiter.

The patient's shock transformer, T6, T7, T8, may be excited from A.C. via centre tap of T6 and switch 14. It may be excited from D.C. via 13 and 14 and argotrons A1 and A2. The "flywheel" of the circuit is C1 and choke 15. Grid-control and phasing is from T4 and R1; and R2, C2 provide bias.

The shock transformer may also be excited from a 12-volt battery through vibrator 7 and T7.

T8, the shock winding, is rated at 200 watts and provides shock-voltage from 35 to 145 volts in 5-volt steps. N2 is a neon pilot showing moment of shock. J2 is patient's shock jackhole.

- N1 is the neon showing when the set is "on."
- 4 is the battery circuit fuse.
- 3 is the A.C./D.C. mains fuse.
- 17 is the patient's circuit fuse.
- 5 is the battery-supply switch.
- 2 is the mains-supply switch.
- 1 is the vibrator dropping resistor for D.C. mains.

ADVANTAGES OF STEEP-WAVE CURRENT

All of the advantages which we anticipated might belong to steep-wave, as opposed to sinusoidal, currents were shown to exist when the method was tried out in practice:

(1) The steep-wave current has a much higher equivalent frequency and a higher potential gradient. From this we deduced (a) that we might be able to dispense with the preparation of the skin, because even a very greasy and sebaceous integument could be calculated to offer but little resistance to this type of current; and (b) that we might be able to reduce the area of electrode surface, so as to deliver the current transfrontally in the form

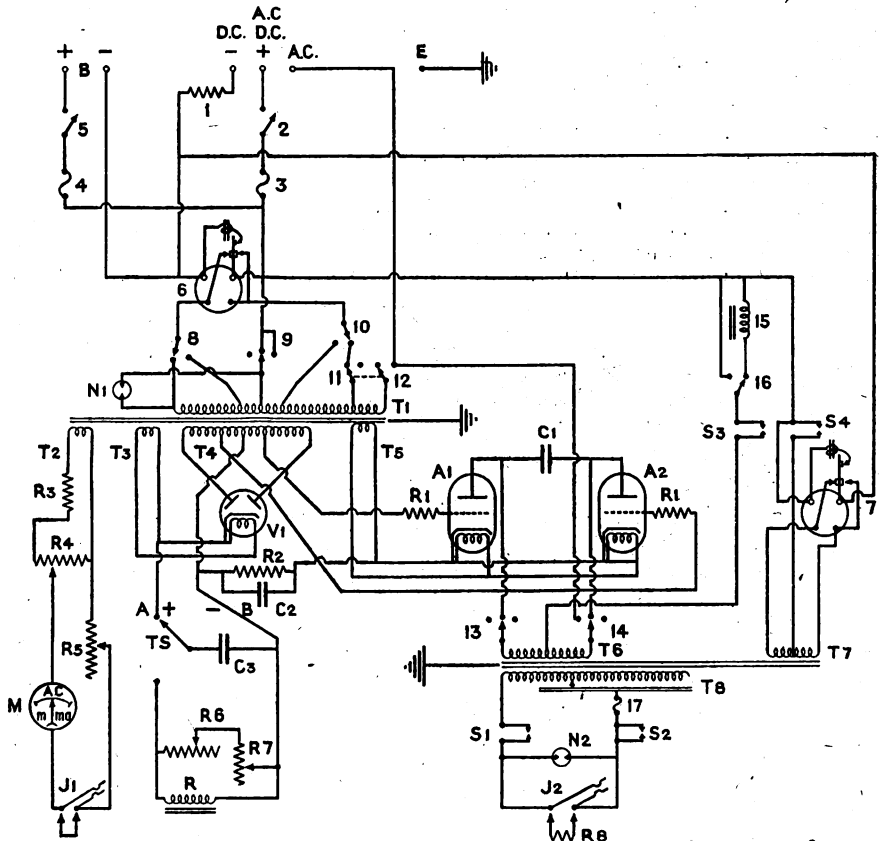


Fig. 4—Fundamental circuit of argotron electroplexy unit. For details see text.

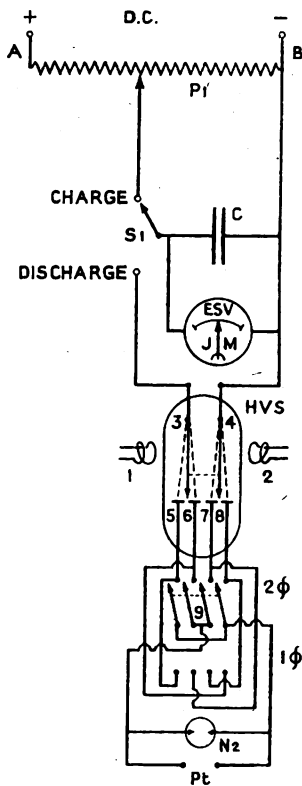


Fig. 5—Fundamental circuit of condenser-discharge E.C.T. unit. For details see text.

of a narrow beam rather than in the diffusely irradiating manner occurring with the much larger A.C. electrode plates.

(2) Seeing that the initiation of a convulsion depends on the impedance-breakdown effect of the first few impulses, it is desirable that the later impulses should show a rapid decrement or damping, so as to minimise subsequent cortical neuronal bombardment, while at the same time ensuring the induction of a major fit.

Fig. 3a is the record of the current through the patient, delivered by our new apparatus (monophasic). It will be seen to be a steep box-wave, highly damped, which is, we believe, the most innocuous form of high-energy current to which the central nervous system can be submitted for this purpose. Fig. 3b shows the same current produced diphasically.

(3) This is a consideration which arises as much out of the use of condensers as from the actual form of the

wave, but which is none the less relevant in this context. It has always seemed to us undesirable and electrically "untidy" in computing dosage to have to reckon in terms of time and voltage and even of current. It seemed to us much more scientific and clinically more foolproof if we could reckon dosage in terms of total energy. A steep-wave current delivered by a rapidly discharging condenser provides the ideal form of electrical discharge to be measured in that way. For obvious reasons, the time-factor does not enter into it, since impedance, on the one hand, and capacity and total discharge of the condenser, on the other hand, determine the natural decrement. We therefore decided to calibrate our shocks in joules rather than in volts.

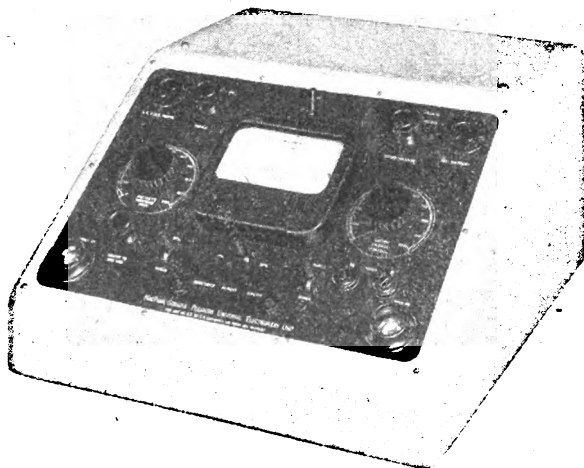


Fig. 6—Universal electroplexy unit with carrier cover removed.

(4) It sometimes happens (very rarely we must admit), when using our earlier types of apparatus, that a patient is found to be almost unconvulsile, even at high voltage and with a long time-base (up to 1/2 sec. and up to 130 volts). It is to be presumed that shocks of this brutal kind (and often three or four are given in succession), even when they do not produce the desired convulsion, are to be avoided as approaching the threshold of damage to nervous tissue. We therefore wished to produce an apparatus which would be calculated to convulse any patient with the first shock.

If the dosage with our new apparatus were calculated in terms of volts instead of joules, the figure would impress the physiologically uninstructed as being very high. For example, 15 joules on our new scale corresponds to 300 volts. But it is important from the start to realise that this figure applies to the first impulse only. In point of fact the human brain can stand the transit of momentary peak-voltages in excess of 2000 volts without sustaining damage.

Since it is the first impulse or so which initiates the convulsion, with our new type of apparatus we can be



Fig. 7—Headgear.

sure of convulsing a patient with a high-peak first impulse, which we can deliver surely, safely, and conveniently.

DESCRIPTION OF APPARATUS

*Circuit.*—The circuit, like that of the universal argotron E.C.T. unit, will operate on either A.C. or D.C. mains 200/250 volts or from a 12-volt battery. The circuit is a combination of fig. 4 and fig. 5; from the mains output to the high voltage D.C. source A, B, the circuit is identical with fig. 4. T5 and all the circuit to the right is omitted, since this of course refers to the argotron converter.

The D.C. source across A, B is applied across the potentiometer P1 (fig. 5). When the switch S1 is thrown to the charge position, the condenser C is charged to a voltage indicated on the electrostatic volt-meter calibrated in joules (JM).

To convulse the patient, the switch S1 is thrown to "discharge," and the charge from the condenser is transferred to the patient via the high-vacuum switch (H.V.S.) through the magnetically operated high-speed switch-points 3, 4 and the fixed switch-points 5, 6, 7, and 8. Switch 9 enables the discharge to occur either monophasically or diphasically. N2 is a neon indicator showing the passage of the discharge. Coils 1 and 2 are the exciting coils producing the high-speed oscillatory movement of 3 and 4.

*Apparatus.*—The apparatus is illustrated, with the carrier cover removed, in fig. 6. It is about 14 in. square and 7 in. high and weighs 25 lb. The cabinet work is of pressed aluminium finished in hospital cream enamel. On the left of the control panel is the patient's resistance

scale, in the centre is the joule-meter registering the dose, and on the right can be seen the shock charge control.

Fig. 7 shows the headgear, which consists of a tempered 'Perspex' band, at the extremities of which are two stainless-steel electrodes,  $1\frac{1}{2}$  in. in diameter, having a ball-and-socket mounting. Each electrode-mounting has a plug-hole,  $\frac{1}{8}$  in. in diameter, which will take a standard wander-plug of stainless steel.

The use of stainless steel throughout prevents saline attack.

#### TECHNIQUE

The technique is substantially the same as with previous equipment as regards the general management of the patient and the precautions, but there is considerable simplification in the matter of electrode application and dosage.

The lint pads are well soaked with 20% saline and are sprung on to the temples, where they are self-retaining.

The position of the electrodes should be such that the lower edge is tangential to a line drawn from the outer canthus to the superior attachment of the pinna, at a point at the junction of the anterior and middle thirds of that line. No scrubbing-up or preparation of the skin are necessary.

Since resistance plays a negligible part in the estimation of dosage, it will be found that all patients have a satisfactory major convulsion with 20 joules diphasic or 25 joules monophasic current.

Monophasic current appears to produce slightly less confusion and makes for a quieter recovery. Diphasic current, because of its large peak-to-peak swing, guarantees a major reaction in subjects who are agitated and very restless, and when it might be difficult in consequence to get good electrode contact. In such cases diphasic current will overcome poor contact difficulties.

#### CLINICAL OBSERVATION

The indications for steep-wave electroplexy differ in no way from those for other types of E.C.T., and the clinical results appear to be identical.

Up to date, we have formed the impression that (1) the convulsions are less violent and sooner over; (2) recovery from the fit is more tranquil and more rapid; (3) the dispensing with scrubbing-up much shortens the whole procedure, so the patient is spared many anxious moments and receives the shock in a more relaxed state of mind and body, which, we are convinced, reduces the liability to muscle-strain and fractures; and (4) the time taken between the patient's mounting the couch and receiving the shock is, with our present type of apparatus and headgear, only a second or two—a great advantage in an agitated or hesitant patient.

#### SUMMARY

Our previous work on electroplexy has been briefly surveyed to indicate the factors which led us to construct a new type of apparatus.

A method of inducing electrical convulsions by a steep-wave current with a rapid decrement is described.

The technical and electrophysiological advantages of steep-wave current derived from condenser discharge are assessed against the effects of currents with other wave-forms of lower frequencies (including simple alternating currents).

The construction of the apparatus and its use are described in detail.

The clinical advantages to be expected from steep-wave electroplexy are outlined.

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## PSYCHOTHERAPY OF ULCERATIVE COLITIS

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To call a morbid condition psychogenic or psychosomatic is to recognise that emotions play a large part in its causation. Therefore it is natural to hope that emotions can play a large part in its cure. Sometimes such hopes are realised; too often they are not. A disquieting feature of the psychotherapy of many psychosomatic disorders is a tendency to relapse.

It is important to remember that all psychotherapy works by altering emotions. Emotions are very labile; they are much more easily changed than are most organic states. Often they can be radically altered for a time. But, unless we can introduce a profound new understanding of himself to our patient, or tap an unfailing source of new confidence within his own mind, any temporary relief of anxiety which our self-confident explanations may produce is unlikely to cause more than transitory relief of any complex psychosomatic disorder. The old emotions become reinstated. And a physical disorder may be awaiting their return. Such, for instance, is a case of duodenal ulcer with remissions of duodenal spasm.

How far must one go in psychotherapy? What must one attempt to do? The following cases are recorded because, in demonstrating a real but very precarious psychotherapeutic success in warding off a dangerous organic malady, they offer an opportunity of reviewing our methods of approach to the psychogenic factor in physical illness.

#### CASE-RECORDS

CASE 1.—A trade representative, aged 36, was admitted to the Royal Infirmary, Edinburgh, on Oct. 30, 1944, complaining of the passage of frequent bloodstained stools. For three months he had passed 6–10 motions daily. He had also had abdominal discomfort and distension, and at the onset of the attack he had vomited five times.

He had had three previous milder attacks. The first was in 1940 just before he was discharged from the R.A.F. with a diagnosis of fibrosis of the lung. It had lasted seventeen days. The second was in March, 1944, and the third in July, 1944. The second attack had lasted on and off for three months, with stool frequency of 6–8 a day, reduced by medicines to 3 or 4 a day.

On admission the patient was very thin and anxious-looking, hollow-eyed, and hollow-cheeked. He looked ill and dehydrated. Muscles poor in tone. Abdomen distended and hypotonic. No abdominal rigidity. Tenderness along caecum, ascending colon, and descending colon. Per rectum he was very tender, with a very tight anal sphincter and a narrow contracted rectum. The stool contained frank blood, epithelial cells, and pus cells, but no cysts, ova, or abnormal organisms. A barium enema was not given until Nov. 28, when it showed a spastic smooth-walled colon with loss of haustration, and some dilatation of the terminal ileum. Ulcerative colitis was diagnosed.

At first the patient was treated with a low-residue diet, ascorbic acid 150 mg. daily, ferrous sulphate gr. 3, and mist. catechu  $\frac{1}{2}$  oz. four times daily, and phenobarbitone or 'Soneryl' at night. He did not improve. On Nov. 4 his weight was 7 st. 6 oz., on the 11th 7 st. 1 lb., 14th 7 st. 6 lb., 18th 7 st. 2 lb. His motions, though less frequent than before admission, were never less than three a day from Oct. 31 to Nov. 14. They continued to be fluid stools containing blood and mucus. Patient continued to eat poorly and to worry over every detail of diet and treatment.

*Psychological Investigation.*—The patient had vouchsafed on admission that he thought his first and second attacks had been connected with the onset of air-raids in 1940 and the flying bombs of 1944. Thirteen days after admission, on Nov. 11, a fuller history was taken of the relationship of emotion to his attacks of diarrhoea. This showed that his first attack of severe diarrhoea had developed in a military

hospital, whither he had gone because of dyspnoea on exertion. At that time (1940) he had been oppressed by the comparative roughness of his military life and by his lack of promotion from the ranks. He had felt that he could have joined the Army as an officer, and he had looked for some recognition of the fact that he had chosen the harder way. Actually he had entered the R.A.F. as a volunteer in 1939, but opted for the Balloon Barrage because he "did not mind defence in war but could not bear to attack."

Immediately after this period in hospital with "bronchitis" and diarrhoea he had secured his discharge from the R.A.F. with a diagnosis of fibrosis of the lung and the comment that he should never have been in the Forces at all. He felt that he had collapsed on the very threshold of danger with the onset of the "blitz," and that his discharge on medical grounds was a thinly disguised defeat of his more courageous self. Yet, once out of the R.A.F., he had rapidly recovered his health.

In 1943 he had been in a civilian occupation which he had felt to be less cultural than the architectural metal work in which he had travelled before the war. He had become unable to deliver the goods to his customers owing to war-time restrictions. He had become "browned off" and worried that he was not really earning his money. So he had resigned his post voluntarily. Shortly afterwards, in March, 1944, there had been some dive-bombing near his home; his nerve had given way, and his diarrhoea had recurred acutely. By June he had recovered.

Next, in July, the flying bombs had come, and "Bang I went again," with gastric pain and diarrhoea, this time with the passage of blood. Not the least of his emotions then had been shame at his pusillanimity in the presence of his seven-year-old daughter, who had been anxious to block the air-vent of the family shelter with her body "to be sure of feeling the blast." By August he had improved again after obtaining a good job in Scotland, entailing security and a new house.

In September, 1944, immediately after seeing a war film, he had been strolling through the streets, brooding on the misery of the world and his inability to secure even himself against injustice, when a precipitating accident, very characteristic of neurotic illness, had happened. A sun-blind outside a shop slid down suddenly and hit him on the head. He had not been hurt, but deeply offended. He had reproached the shopman on the grounds that "it might have been a child that was hit." That same day he had relapsed into his latest and most severe attack of bloody diarrhoea.

The first diagnostic interview closed with an introductory explanation of the effects of emotion on bodily states, including the eliminative processes. Next day the stool frequency fell to two and the patient's weight began to increase.

Five days later (Nov. 16) a second psychological interview was directed to further elucidation of the patient's character type and his boyhood anxieties. His position in the family lay between two girls, with one much younger brother. He was extremely tidy in his habits—a statement borne out by his dapper appearance. His ideal had always been to help, to give way, and to forgive; to set an example and to prove that everybody could be won by kindness—an example which he felt that both his parents had in their turn set him. Sexual feelings had always been much repressed, but for years he had feared that he had caught venereal disease from a totally inadequate boyhood experience. Throughout his childhood, anxiety or injustice had always precipitated diarrhoea. He could not tell a lie.

Such accounts of himself were immediately related to the stresses he had been under in peace and war. This second interview aimed at explaining things to the patient. It contained a rough classification of character types, and a further account of the functions of the colon and its response to emotion. It occupied fully an hour.

Immediately after this interview the stools became normal in frequency (1 or 2 a day) and were usually partly formed. Signs of anxiety vanished. Patient ate well, his face filled out, and by Nov. 22 his weight was 8 st. 3 lb., an increase of 1 st. 1 lb. in twelve days.

On Nov. 28 a barium enema was given by a nurse, clumsily perhaps, but at least without warning to him and causing him pain, intense anal spasm, and renewed acute apprehension. Next day he vomited, and profuse diarrhoea recurred, with oliguria, thirst, and abdominal pain.

On Dec. 2, at a third interview, there was great resentment at the unsympathetic and painful rectal injection.

The incident was used to confirm patient's anal sensitivity; and his sensitivity to injustice and indignity were canvassed more fully than before and related to this physical sensitivity. For a few days patient had to be seen daily, each time for a short revision of the findings.

The setback lasted a week and was most severe; his weight fell to 6 st. 8½ lb. (Dec. 3) and 6 st. 5 lb. (Dec. 9). But after the first two days he became confident that he would recover, and his recovery when it came was very rapid. This time he gained 1½ st. in seven days. He was discharged on a normal diet less roughage on Dec. 22, and his weight, which had reached 7 st. 12½ lb. before discharge, rose rapidly to 9 st. early in the New Year.

For six months after his discharge he was on full work and he only occasionally had fluid stools, lasting twenty-four hours and relieved by an opium and catechu mixture. During these months he was "a little keyed up" from time to time and had one attack of acute anxiety while driving his car along a well-protected cliff road. Looking back, he now attributed his first attack of diarrhoea to "worry over the war, the state of the world, and the way things were going."

In subsequent months (to December, 1945) he had some return of diarrhoea on the following occasions: (1) on finding that his father, who lived alone, had become senile and was neglecting himself; (2) after rushing in to assist the victim of a motor-cycle accident; and (3) on hearing of the atomic bomb. On the last occasion he had to give up work for eight weeks, during which he could not keep his mind off the subject of Japanese atrocities. The relapse was attended with little loss of weight and no passage of blood. He returned to work nearly free of symptoms, though his stools were more often fluid than solid.

A follow-up for 1946 indicates that this patient suffered from temporary "spasms" and diarrhoea twenty minutes after a threatened road accident in February, while in April a severe relapse occurred immediately on hearing the noise of dive-bombing as a sound-accompaniment to a Mickey Mouse film—a sound which he associated with London air-raid panics and the feeling that "at best half of us may survive." About the same time he became troubled over the appropriate attitude for him to adopt to a new and domineering chief. Treatment by free association was now instituted at his home, but it failed. Despite the recovery of much semi-forgotten memories of the drunkenness and violence of a loved father and other early domestic anxieties, he continued to have diarrhoea, now with much abdominal distension and renewed loss of weight. He was admitted to another hospital, where his physical treatment was active and varied and included blood-transfusions, sulphathiazole, multiple vitamins, charcoal, kaolin, desiccated pigs' intestine, and sedatives. This was accompanied by the psychotherapy of being an interesting case in the eyes of distinguished physicians who demonstrated him as such to students. He slowly improved and was discharged home after two months. Here his convalescence became rapid after he gave up the anxieties of a job among strangers which was on a commission basis. Returning to the south of England he took up work again in the secure, familiar, more appreciative, and less competitive surroundings of his old pre-war firm (December, 1946). We can only speculate about 1947.

CASE 2.—A *chef de cuisine*, aged 34, married but without children, who had served as cook in the Merchant Navy and had been in good health until 1939, was admitted to the Royal Infirmary, Edinburgh, on Jan. 2, 1946, with ulcerative colitis.

The first onset of diarrhoea (thought to be dysenteric) had been in Montreal just before the outbreak of war. A subsequent attack had occurred in 1940 about the time of, but not coincident with, a bombing attack on his ship in the Manchester Canal. During the bombing "something had tightened up" inside him, and he thought this had led to the diarrhoea. In 1941 he had been twice torpedoed and once dive-bombed, but he had taken hold of himself and prevented it from "flying to his stomach." Since he had taken work ashore as a clerk in a shipping office, attacks had come on after dealing with quarrelsome crews. Attacks of sudden diarrhoea had also followed five minutes after drinking a cup of tea. Nowadays they were produced by any sudden noise, such as the back-fire of a car.

In childhood he had been devoted to his mother, and both proud and scared of his father, who had been kind and considerate when sober but violent when in liquor, especially to the mother. Violence from his father had given him the same

abdominal sensation as dive-bombing had done later, and the uncertainty of his father's moods had been a very important factor in his childhood.

*Character Type.*—Slight, nervous, and readily truculent. Very short in stature, with a limp dating from childhood. A strong feeling of inferiority ("everybody is before me"), apprehension of violence for which he always felt he must be prepared and with which he was determined to cope. Careful in dress, meticulous in habits. He had become a skilful cook with a very inadequate apprenticeship. Dependent on his wife, but inclined to domineer over her.

*On admission:* no wasting; pale pasty complexion; abdominal tenderness in caecal region; frequent passage of fluid stools containing blood, pus, and mucus, but no abnormal organisms.

*Barium enema:* loss of haustrations and variable spasm of colon. Immediately after the patient was startled by a sudden noise the barium was seen to be shot far into the small bowel.

*Sigmoidoscopy:* pain and spasm; mucosa much inflamed, oedematous, and readily bleeding, with numerous small superficial ulcers.

*Treatment:* non-residue diet and mild palliative physical treatment only. Psychological treatment included about twenty hours of elucidation of his character type and the significance of fear and aggressiveness in relation to his bowel contraction, with full recognition by patient of the significance of his early childhood memories in this regard.

*Progress:* rapid. Urgent fluid stool only after drinking hot tea in the morning. Patient discharged in a month, with decision to give up "arguing"—i.e., offering fisticuffs—and to take a public-house business of his own. He remained well and at work for at least three months, with occasional diarrhoea under stress, but no blood or pus.

**CASE 3.**—A married lady, aged 45, was admitted on Feb. 2, 1946. An only child, at the age of 15 she had lost her mother, to whom she had been devoted. Her father had married again when she was 16, and she had "never forgiven him" for that. For ten years she had suffered under the violent temper of her stepmother, who had later been admitted to an asylum. Her father, now aged 77, lived with her and her husband. There were two children. Her father was alcoholic, a reprobate and a tyrant. ("I have to wait on him hand and foot.") Her first attack of diarrhoea, in 1945, had been accompanied by the passage of "white skins" a few days after a New Year's Day celebration of her father's, during which she had found him covered with blood from a fall in the street.

A second attack had occurred in March, 1945. It had been attributed to tinned pork. Her son had had mild, and she severe, diarrhoea. But her father had just taken to bed for ten days, giving her "more work and worry." On March 20, 1945, a female cousin, to whom she had been greatly devoted, had died of phthisis. Thereafter her diarrhoea had become constant, 9 or 10 liquid stools per day and 1 at night, usually thin and brown, sometimes green, with "lumps of red" and frank blood.

*Character Type.*—Fastidious over food, house-cleanliness, and clothes; sensitive to criticism, tyranny, and tempers, finding her husband "difficult" and her father dirty and untidy. Inclined to get her own way through illness. In childhood she had vomited every Saturday after her father had been ill-treating her mother. Readily hysterical. Probably much deep unconscious guilt.

*On admission:* pale thin anxious face with wide eyes and small mouth. Moderate general abdominal tenderness. Fluid stools containing no abnormal bacilli, cysts, or ova, but pus, blood, and mucus.

*Barium enema:* absence of haustration in sigmoid and descending colon; walls of ascending colon and sigmoid irregular; appearances those of colitis.

*Sigmoidoscopy:* oedematous congested mucosa, with extensive superficial ulceration and numerous bleeding points.

*Treatment.*—Penicillin 30,000 units 4-hourly for eighteen days, sulphathiazole, belladonna, ascorbic acid, 'Luminal.' Severe anaemia (Hb 48%) required two transfusions. Psychological treatment included about twenty hours of elucidation of patient's character type and its relation to the emotional experiences which brought on diarrhoea, all being fully explained to patient.

*Progress.*—Rapid cessation of bleeding and diarrhoea. Setbacks at all domestic crises which were reported to her, until her father was admitted to an almshouse and her

husband's working conditions improved. Thence almost uninterrupted recovery. Sigmoidoscopy (March 25, 1946): much improved, but granular mucosa and one or two bleeding points. Thrombophlebitis of one leg followed second blood-transfusion.

*Subsequent History.*—No return of colitis, patient remaining constipated. Two months after admission, however, and when convalescence was nearly completed, patient passed rapidly into a psychotic state with profound guilt over her treatment of her father, and became demented and bedridden.

#### DISCUSSION

These cases illustrate characteristic features of ulcerative colitis and raise again the question of the mechanism of its development. The two most striking features of the cases are the prominence of psychogenic factors in causation, and the readiness of remission of symptoms.

*Psychogenic Factors.*—The connexion between the onset of the symptoms of ulcerative colitis and emotional disturbances, apparently little regarded in the earlier literature of the disease—e.g., Hurst (1921) and Hern (1931)—was fully recognised by Murray (1930), who also noted the frequency of fearfulness, emotional immaturity, strong maternal ties, difficulties over marriage, and emphasised the value of an "unburdening of repressions" in bringing about the intermissions which characterise the disease.

The tendency of patients with ulcerative colitis to be neat and fussy was noted by Sullivan (1935), who also emphasised that their high intelligence was often combined with an inability to throw off the effects of emotional episodes. This neatness and fussiness and the widespread inability to adjust the self to the demands of ordinary adult environment clearly place many cases of ulcerative colitis in the category of the obsessional character type. But Wittkower (1938), following up the conviction of Cullinan (1938) that in ulcerative colitis there were "emotional disturbances superimposed upon an unusual or abnormal personality," showed that among his 40 cases the character types were very diverse. They included 17 obsessionals and 12 hysterics; the obsessionals became ill through inadequate external events interacting with powerful internal conflicts, and in the hysterics the onset of diarrhoea was largely affected by dramatic external events. In Wittkower's series the second group was confined to women. Such diversity suggests that common psychological grounds for ulcerative colitis must be looked for at deep levels of primitive feeling or else in some common emotional drive at the time of the illness. There is psychoanalytical evidence that the tendency for emotion to become unduly linked with one particular bodily system or organ depends on psychological patterns laid down deep in character and early in life. One such pattern is that of Freud's anal type (Freud 1903, 1913), the more passive anxieties of which may possibly lead to a greater distortion of character in men than in women.

*Remissions.*—In ulcerative colitis there are abrupt but unstable responses to varied treatments (Hern 1931). Dramatic remissions, both of symptoms and of severe ulceration as seen by the sigmoidoscope, have followed the administration of antidyenteric serum (Hurst 1921, Maister 1928). Similar results have followed psychotherapy (Sullivan 1935).

In case 1 we do not know the actual state of the mucosa of the colon, since sigmoidoscopy was not attempted; but the contents of the stool and the radiological appearances after a barium enema suggested that severe ulceration was present. At the time of radiography the patient was in a phase of acute relapse, emotionally induced. He was passing much blood, mucus, and pus, and was about to lose 1 st. 8 lb. in five days. But during the ten previous days he had passed almost normal stools at normal frequency and had been rapidly gaining weight.

The course of events was subsequently reversed again when the patient was again emotionally reassured.

We must ask what common property can be found in the remissions of symptoms by such diverse means as succeed in these cases. This question applies not only to ulcerative colitis but also to some cases of asthma and to many cases of conversion hysteria. Physical agents may be various, and successful psychotherapy may come from various schools and vary much in personal handling. But the common features for the patient are two: (1) in the emotional field there is relief of anxiety; and (2) in the physical field there is relief of a dysfunction which, both in asthma and in colitis, is an overfunction of muscle—a muscular spasm.

*Mechanism.*—Moschowitz (1943) has placed ulcerative colitis among "hyperkinetic diseases." Such diseases include essential hypertension, Graves's disease, peptic ulcer, cardiospasm, spastic colon, mucous and ulcerative colitis, manic-depressive psychosis, and paranoia. Their common pathology consists of an exaggeration of normal function. In ulcerative colitis the functions which are increased are tone, peristalsis, and secretion of mucus. Moschowitz holds that in all hyperkinetic diseases the patient's ego is involved in a maladjustment with his environment.

An experimental attempt has been made to clarify the physical changes of ulcerative colitis by means of explants of the colon of the dog (Lium and Porter 1939). These experiments showed that ulceration of the mucosa could develop within twenty-four hours of the operation if the colonic muscle remained in spasm, and that the ulcers could heal again in 10–14 days if the muscle became relaxed. Colonic muscular spasm and hypersecretion of mucus are produced by various agencies, including mechanical stimulation, acetylcholine or other parasympathomimetic drug, and dysentery toxin. Thus Lium and Porter regard ulcerative colitis as "a specific reaction to a number of influences which can initiate spasm of the colonic musculature." They add that "once the colon becomes spastic it is an organ that can produce severe damage to its own surface structures." The radiological appearances of the "pencil colon" would make it easy to accept colonic spasm as a physical basis of ulcerative colitis, were it not that experienced clinicians incline to regard the "pencil colon" as a more common feature in those cases of colonic spasm which do not proceed to ulceration (Ryle 1945).

One further experimental observation deserves recording. It is that fright will cause pallor of the explanted colonic mucosa of the dog, and that additional, more localised, patches of pallor then follow mechanical stimulation (Drury et al. 1929). This reaction is not caused by adrenaline and occurs after adrenalectomy.

It does not then seem an improbable explanation of some cases of ulcerative colitis that anxiety causes muscular spasm and mucosal changes in an organ, previously rendered susceptible either by a psychological or a physical sensitisation, or by both. The diarrhoeal response to frank anxiety is well known; it is shown by many ulcerative colitis patients, including the present cases. But much of the anxiety of these cases is unconscious; it is part of their unconscious fantasy life. Deep anxiety over problems of emotional aggressiveness characterises both ulcerative colitis and asthma, and they betray their origins early in psychoanalysis. Asthmatics may have colonic spasm, or "colon neurosis," though apparently seldom or never ulcerative colitis (Ryle 1939, Hardy 1945). In both organs the response is parasympathomimetic.

The adrenaline-sympathetic response to emotions which are naturally productive of activity is well known. The emotional significance of overaction of the parasympathetic system is less well understood. From the psychological data it is arguable that that system

mediates not only the anabolic phases of nutrition but also deep mortal anxiety and fear-of-death complexes such as can be found by the psychoanalyst to be associated with deeply repressed aggressive impulses and unconscious guilt. There is a sort of *angor animi* which occurs in asthma and also sometimes in cardiac neuroses with bradycardia, and a similar mechanism may occur in some cases of ulcerative colitis. But it seems as if psychological mechanisms that could turn one case of deep unconscious anxiety to asthma and another to ulcerative colitis must either be inherent or lie in very early environmental factors. The physical determinants of such organ sensitivities remain unknown.

*Principles of Treatment.*—In the treatment of pathological anxiety accompanied by physical symptoms success may come quickly if the reassurance is intense enough. In all cases the immediate measure of success is the reduction of anxiety and removal of the symptom, the two going hand in hand and reacting on each other. I consider that to relieve anxiety more skilfully the physician should know enough of the Freudian unconscious to guess at some of the underlying psychological mechanisms of the case he is handling, though he must not display these to the patient beyond the stage of innuendo. Only experience can tell the therapist how far he can go without incurring a resistance and repudiation which may involve him in a long analysis. In my opinion this experience can be acquired by the general physician if he will submit himself to a comparatively short period of special training. In case 1, a man of rectal sensitivity who was also of pacifist tendencies and had an ego-ideal of neatness, kindness, and pleasing others must be expected, *ex hypothesi*, to harbour problems of repressed aggressiveness. If he does so, his anxiety will almost certainly be connected with those problems. Thus the patient's apprehension over affronts against his person, property, and dignity must be handled with great sympathy, and much of his anxiety must be laid at the door of such affronts. When it comes to interpretation, it is also of immense value to an intelligent man to have an explanation of his bodily symptoms which is at once intelligible and physiologically true. On the other hand, too early or too deep psychoanalysis may expose more unconscious problems than it can alleviate and thus may aggravate, even dangerously, the course of the physical illness.

Essentially what cures a psychoneurotic is an emotional change and not an intellectual one. Anxiety has to give way to confidence in all cases. The feeling that "it's all right now" may come from faith alone, or through faith aroused by words, by increased self-knowledge, or by a soothing hand being laid on a tender spot of half-conscious anxiety or guilt. Arguments too may play their part. Intellectual mastery is one way to emotional satisfaction in the experience of all obsessional characters. There occur opportunities of giving acceptable interpretations and crucial reassurances at many stages in the voyage up that long river of access to the deeply unconscious mind which a traditional psychoanalysis pursues. The object of quick psychotherapy must be to recognise the earliest of these opportunities, steer towards it, secure good anchorage, and discharge cargo.

#### SUMMARY

A case of severe ulcerative colitis (case 1) is described in which relief followed two sessions of psychotherapy, relapse developed in response to an imagined callous affront, and a considerable measure of temporary "cure" was effected by calculated reassurances based on an assumed Freudian psychopathology.

Two subsidiary cases are recorded with resolution of the colitis, though one patient subsequently passed into a psychotic state in which guilt played a prominent part.



Such cases draw attention to the possibilities of psychological diagnosis and treatment in the early stages of ulcerative colitis in which colonic spasm is still (despite the presence of blood in the stools) the predominant feature.

They further serve as a reminder of the extent to which fundamental bodily machinery may be at the mercy of ideas, and of the high degree of reversibility which exists in psychosomatic illness when the psyche can be treated appropriately and in time.

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FOLIC ACID IN TROPICAL SPRUE

REPORT OF A CASE

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THE treatment of tropical sprue has always been one of the least satisfactory aspects of tropical medicine, and, despite intensive research in India and elsewhere during the war, no real improvement in treatment was achieved. This report describes the rapid and dramatic recovery of health when a long-standing and serious case of tropical sprue was treated with folic acid.

The patient left England for India in March, 1943, at the age of 27 years; he was category A1, and weighed 10 st. 8 lb.

In February, 1944, he first noted that his stools were bulky, greasy, biscuit-coloured, and of unpleasant smell; but, except for purgative pills, he received no treatment before entering Burma for a three months' campaign with the Chindits.

"Inside" he was given three courses of sulphaguanidine, which stopped the diarrhoea but caused vomiting of similar foul-smelling matter, and between the courses the stools became larger and more sprue-like.

In August, 1944, when his weight was 6½ st., he was at last able to get proper treatment, consisting of controlled milk and orange diets, liver extract by mouth and injection, and nicotinic acid.

Neither this treatment nor return to the U.K. restored his previous health, though on his discharge from the Army a year later he could perform light duties. The stools were too large and too greasy; he averaged two or three bowel movements daily, and any dietary excess was immediately punished. His weight varied from 8½ to 9 st. but never approached his previous normal.

A year in civil life has been similar to his last year in the Army; even light tasks have taxed his strength, and every moment of leisure has been spent in bed. Special diet, with extra meat, eggs, and milk, twice-weekly intramuscular liver injections, and nicotinic acid by mouth did not prevent the steady deterioration in his appetite and weight, and did not check his glossitis, breathlessness, anaemia, and diarrhoea with bulky, greasy stools. In September, 1946, he again sought hospital treatment.

On admission he was thin, pale, dehydrated, and very listless; appetite poor; weight at 7 st. 1 lb. was 3½ st. below normal; skin dry, desquamating, loose, and inelastic, even over a grossly distended abdomen; tongue smooth and sore, with marginal glossitis; typical sprue stools, passed three

or four times in twenty-four hours, totalled 24 oz. daily. Blood-count showed megalocytic anaemia: red cells 2,430,000 per c.mm., Hb 50%. The gravity of his condition, especially the emaciation and dehydration, at first suggested that his life could only be saved by continuous drip blood-transfusion.

*Treatment.*—It was impossible to obtain folic acid for the first week of his treatment in hospital, during which time treatment differed little from his previous routine: controlled diets, predigested milk feeds; liver extract 'Plexan' 4 c.cm. given intramuscularly daily; nicotinic acid 100 mg. daily; and riboflavine 3 mg. daily. There was no pronounced improvement.

*Folic Acid.*—After a week the only medicine given was folic acid 10 mg. daily for five days by mouth. Liver extract and nicotinic acid were then resumed, and after ten days the plexan was reduced to 4 c.cm. on alternate days.

The effect of the folic acid was dramatic, and must compare with the recovery of the Cuban lady described by Spies et al.<sup>1</sup>

On the fourth day of the course of folic acid the patient said he felt fitter than for many months, his appetite became healthy, and he was soon allowed full normal hospital diet. Three days later the soreness of the tongue had ceased, though slight marginal redness persisted; the abdomen was not distended; and the skin had almost completely regained its normal elasticity. Most remarkable of all was the total absence of flatulence or of any abdominal discomfort. Within ten days he was taking exercise outside hospital, and his voice and mental outlook had changed to that of a healthy man confident in his health.

The improvement, as shown by the body-weight, the daily weight of the stools, and the blood picture, is depicted in fig. 1. From the third day of folic-acid treatment he passed only one daily motion, which was soft but formed and had lost the colour and offensive odour of the sprue stool. The total weight of faeces passed had fallen to an average of about 10 oz. daily, though occasional excessive stools continued for a week.

A fractional test-meal the day after completion of folic-acid therapy showed no free HCl in the fasting juice, a slightly increased excretion after the meal, and rapid emptying of

1. Spies, T. D., Frommeyer, W. B., Garcia Lopez, G., López Toca, R., Gwinner, G. *Lancet*, 1946, i, 883.

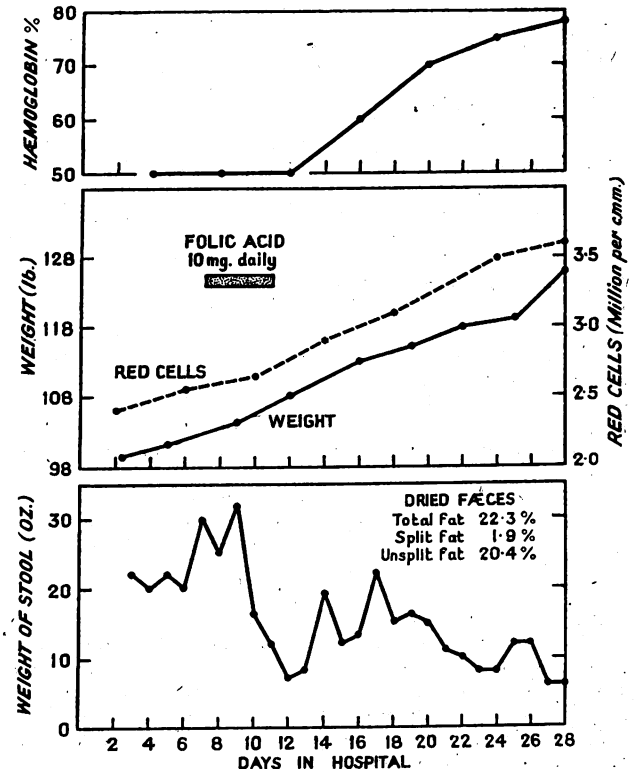


Fig. 1.—Chart showing rapid improvement of patient with sprue on treatment with folic acid.

the stomach (fig. 2). A fortnight later the test was within normal limits (fig. 3).

DISCUSSION

A minimal amount of folic acid was used—one phial of ten 5 mg. tablets, which was all that could be obtained. Other clinicians in U.S.A., notably Spies et al.<sup>1</sup> and Vilter et al.,<sup>2</sup> have studied the effect of folic acid on the macrocytic anæmias, using doses as high as 100 mg. daily and a total course of over 1000 mg. Such extravagan-

gance is still impossible in this country.

Perhaps such large doses are necessary to obtain prompt hæmopoietic response in cases in which macrocytic anæmia has long been untreated and folic acid is a substitute for liver therapy.

Spies emphasises the importance of ensuring that no previous treatment is still acting during the experimental period. This report, however, primarily concerns the nature of the stools and the well-being of the patient. The hæmopoietic response was pronounced but not dramatic, owing to the long previous liver therapy and the consequent absence of very severe macrocytic anæmia at the start. Nevertheless, some credit must be given to the folic acid, since the previously resistant anæmia then started to improve and continued to improve after the resumption of liver injections.

Similarly, the immediate improvement of the stools was most remarkable; and, though there were subsequently a few days when they were too bulky, diarrhœa did not recur, and a fairly constant daily total amount of faeces was passed, which on analysis

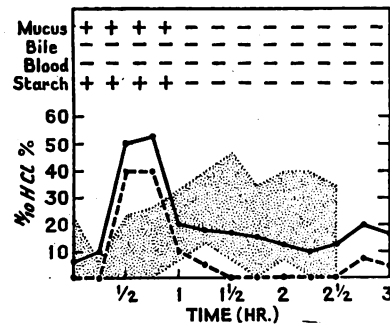


Fig. 2—Test-meal findings on the day after completion of course of folic acid.

of the dried stool for fat gave figures compatible with normal (fig. 1). This may have been due in part to the improvement in the anæmia, but there is no doubt that folic acid was the immediate cause of the improvement, and that this continued even after folic acid had been withdrawn.

Perhaps folic acid may provide the switch by which the vicious circle of these diseases can be reversed, after which further recovery can continue without its aid.

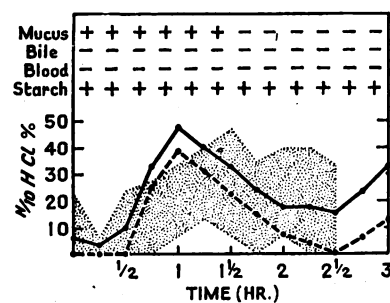


Fig. 3—Test-meal findings a fortnight later than in fig. 2.

SUMMARY

A case of tropical sprue, which had resisted the usual treatment for two years in India and England, was treated with folic acid, 10 mg. daily by mouth for five days, whereupon there was a very rapid and great improvement, which has been maintained since the folic acid was discontinued. The patient now (Nov. 21) weighs 10 st. 7 lb. and is in perfect health.

2. Vilter, C. F., Spies, T. D., Koch, M. B. *Sth. med. J., Alabama*, 1945, 38, 781.

SAUERBRUCH CINEPLASTIC AMPUTATION

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THE cineplastic amputation of Sauerbruch was described at the International Conference on Amputations in Ottawa in 1943 by Kessler, who is one of its exponents in America. A recent visit to Sauerbruch's clinic in Berlin enables me to describe the method used there now, including modifications introduced since 1943. Prof. P. Gohrbandt, chief assistant at the clinic, kindly arranged for surgeons, limb-makers, secretarial staff, interpreters, and patients to give their full time to completing this survey. There were some 30 inpatients awaiting some phase of the treatment, and the study included photographs to illustrate the principles of the operation and of the prosthesis used.

SELECTION OF CASES

The cineplastic amputation is applicable only in the upper limb. As is well known, the success of an artificial limb depends primarily on the patient's will to succeed. As a result, the dexterity achieved with the limb is enhanced in bilateral cases, where the patient is forced to use the limb, and it is greatest in the more intelligent patients. Accordingly the cineplastic amputation is chosen more for bilateral cases and with consideration for the patient's intelligence and the type of work he will be doing, though some believe it is the best amputation with adequate screening even in unilateral cases, provided that patients without the necessary intellect or will to succeed are excluded.

The youngest patient in whom this method was used was 8 years old. The shortest stump in the forearm in which it may be used is 7-8 cm. from the anterior elbow crease. In shorter forearm stumps a tilting ring type is used with the same hand mechanism. The best results are obtained in forearm amputations, but upper-arm amputations may give nearly as good ones.

PRINCIPLE

Unlike earlier methods of suturing tendons into loops and covering them with skin, the principle now adopted consists of making skin-lined tunnels through the flexor and extensor groups of either arm or forearm muscles (fig. 1). Through each tunnel is passed an ivory pin, which is connected by a chain to a bar, much as the two traces are used in harnessing a horse to a cart. From the lower end of this bar a metal rod goes to the hand mechanism. The hand mechanism operates like a Cornet's forceps of which one side is the thumb and the other side the index finger and the rest of the hand. Thus, pushing forward on the rod opens the hand, and pulling back on the rod closes the hand and approximates the thumb and index finger with a grip of appreciable power (fig. 2).

METHOD

The sine qua non of this operation is a movable scar at the end of the bones, inasmuch as the degree of up-and-down movement of the pins determines the extent of opening and closing of the hand that will result. Since many amputations were done under war conditions and have fixed scars, reamputation is often the first step. The bones are divided 2-3 cm. shorter than the muscles; and the deep fascia, but not the muscles, is sutured over the ends of the bones to give a free scar. Within 5-10 days active exercises and massage are instituted, and constant practice is insisted on so that the patient learns to pull the terminal scar backwards and forwards.

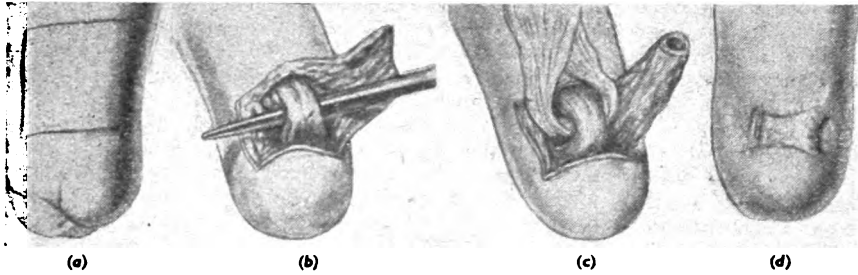


Fig. 1—Making the skin tunnel: (a) flap outlined; (b) muscle tunneled; (c) skin tubed; (d) tunnel through muscle skin-grafted.

**Making the Tunnels.**—The most important feature, after having enough length, having muscle present in both flexor and extensor groups, and having a movable terminal scar, is the making of good tunnels. This is done under local anaesthesia so that the best muscle groups may be selected for the tunnel. The operation takes about twenty minutes. Both tunnels and even both arms may be done in one sitting.

An area of about three finger-breadths or about 5 × 5 sq. cm. is mapped out about 5 cm. from the end of the stump. Three sides of this square are freed to form a flap with its base either on the medial or on the lateral side (fig. 1a). The flap consists of skin and subcutaneous tissue including the deep fascia. This flap is next formed into a tube with the skin surface on the inside, the sutur-

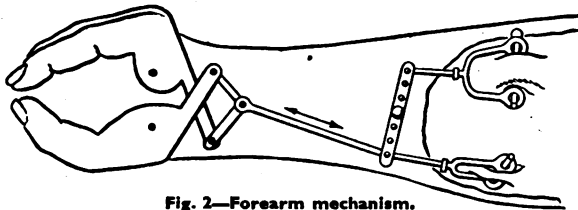


Fig. 2—Forearm mechanism.

ing being by subcuticular catgut so as not to pierce the skin surface (fig. 1c).

The next step is to select the site for the tunnel in the muscle. It must be at right angles to the axis of the limb and in the plane of action of the muscles. On the extensor surface of the forearm it is parallel to the dorsal surface, but on the flexor surface it is at a slight angle with the plane of the radius and ulna, because the main muscle mass bulges more on the ulnar than on the radial side of the forearm. Next, a blunt-pointed muscle dilator is passed through the muscle-fibres along a track about 1.5 cm. long and 0.5–1.0 cm. deep, only a thin layer of muscle-fibres being picked up (fig. 1b). The tube of skin is then passed through this tunnel in the muscle and is fixed with three sutures to the skin edge of the side opposite the base of the tube. One suture is taken at each of the four corners of the raw area to close the angles somewhat. A Thiersch skin-graft is cut and sutured in place over the remaining raw area (fig. 1d). A

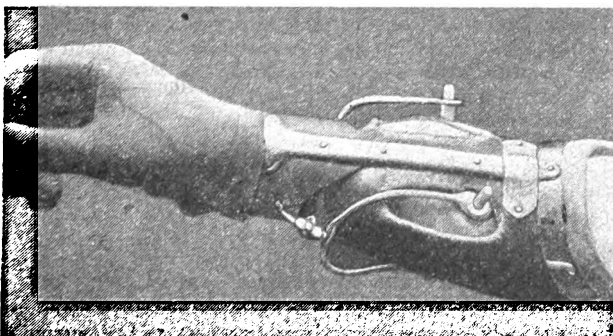


Fig. 3—Right forearm artificial limb.

soft-paraffin gauze wick is passed through the skin tunnel, and the skin-graft is suitably dressed.

The first dressing is done in ten days. Then the pins, 5–10 mm. in diameter, are inserted. The patient is instructed in care of the skin tunnels with cleansing, alcohol, and powder. Exercises are maintained, and in about three months an artificial limb is fitted.

THE PROSTHESIS

The artificial limbs are of light aluminium covered with leather. There are windows where the pins emerge to be attached to a metal loop at each end (fig. 3). The mechanics of the elbow and hand mechanism are somewhat intricate. The principle of the limb for the forearm is illustrated in fig. 2, and for the upper arm in fig. 4. In the forearm, contraction of the flexor group opens the hand, and contraction of the extensor group closes the hand. In the upper arm, contraction of the biceps

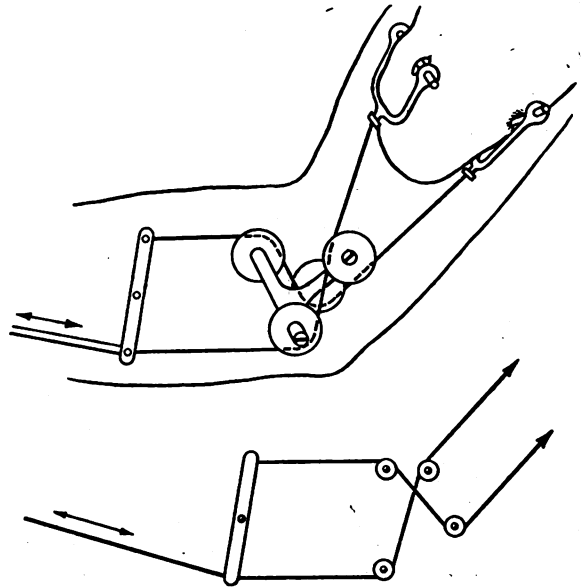


Fig. 4—Upper-arm mechanism.

closes the hand, and contraction of the triceps opens the hand; a strap from the ipsilateral shoulder pronates the hand, and a spring supinates it again; a strap from the contralateral shoulder flexes the elbow, and gravity extends the elbow. There are locking devices, easily manipulated by buttons on the outside, that lock the elbow in a fixed position, and the forearm in a fixed position of rotation, if desired; and there is one at the wrist that locks the hand grip. It is arranged so that

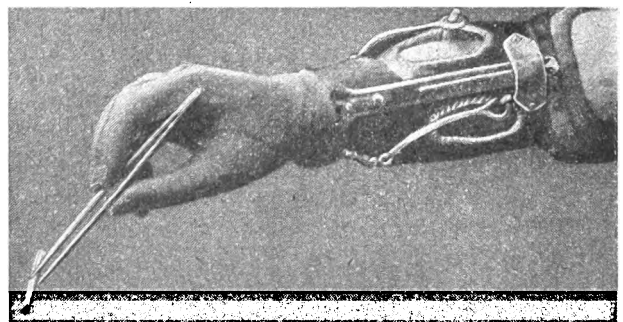


Fig. 5—Patient picking up forceps.

the muscles grasp an object—e.g., a pencil—between the thumb and opposing hand, then by locking the hand mechanism the grip will be maintained without muscle effort (fig. 5). The hand can close further but cannot open.

#### RESULTS

Patients at Sauerbruch's clinic demonstrated the movements that they had learnt. They could write with normal legibility and could pick up a match with forceps (fig. 5) or with the hand, pick out a cigarette and light it, and attend to their clothes. They showed the strength of the limb by lifting up and carrying a pail of water. Some described the development of a sense of touch whereby they could distinguish, for example, a watch from a pencil in a pocket. One patient with both forearms amputated had been a switchboard operator at the hospital for some years but had been killed by a bomb.

#### CONCLUSION

The cineplastic amputation as developed by Sauerbruch appears to have the advantage of permitting more dexterous movements under more normal muscle control than prostheses utilising special accessories for special routine tasks. To the intelligent man with a bilateral amputation of the arm or forearm this may offer a wider range of less stereotyped activity, which may open to him wider spheres of enjoyment and employment.

### RETINAL MECHANISM OF VISION

F. W. EDRIDGE-GREEN

C.B.E., M.D. Durh., F.R.C.S.

SPECIAL EXAMINER AND ADVISER ON VISION AND COLOUR  
VISION TO THE MINISTRY OF TRANSPORT

A SIMPLE experiment shows that the stimulus in vision is photochemical and movable in the retina. If a bright light on a dark ground is looked at for the shortest possible time, with one or both eyes, and then the eyes are closed and covered, a positive after-image of the light will be seen. If the eye or eyes are moved to the right, the positive after-image will change its relative position in the field of vision, moving to the right of the negative after-image which is seen clearly defined at the fixation point. The positive after-image is distorted, but not the negative.

When an object is moved in front of the eyes, and the eyes are kept still, multiple objects are seen, owing to the persistence of vision, which is the basis of cinematography. This persistence of vision is due to the positive after-image, as can be shown by numerous experiments. It will be noted that there is no apparent persistence of vision when the eye is moved—not even a trace of a blur. If there were persistence of vision when the eyes are moved it would be difficult to read, because the type would appear confused, as it does when a book is moved in front of the eyes.

The positive after-image which causes persistence of vision can be seen when it is looked for. When the eye is moved to the right, the external rectus, on contracting, besides moving the eye to the right also presses on the back of the eye, shifting the photochemical fluid in the interretinal space to the right, so that the image of the object appears to the right of the fixation point. This image appears distorted and may even appear broken up. Thus a small chromium clock will appear distorted though clearly recognisable. If a small red square 1 cm. × 1 cm. is viewed at a distance of 2 metres on a white ground, and then is shifted rapidly to the left, it will be followed by several red spots resembling the microscopical appearance of the cones in the retina.

An easy method of seeing the shifting of the positive after-image is as follows. A white flower is placed on the right of a red one and viewed at a distance of 3

metres. If the observer looks first at the red flower and then transfers his gaze immediately to the white one, the white flower will be seen clearly, but the red positive after-image of the red flower will be seen on the right of the white flower.

In the past there has been much discussion about why moving objects are occasionally seen quite clearly momentarily, as if stationary, but the conditions in which this occurs can be defined. When the eyes have been moving and suddenly fixate a moving object, they momentarily see this object quite clearly, as can be seen with a speaker in a cinematographic picture, or a moving cricket or tennis ball.

#### FUNCTION OF THE INTERRETINAL FLUID

Vision takes place through sensitisation of the fluid in the interretinal space which surrounds the cones. This fluid is sensitised by the visual purple, the rods not being percipient elements but the nerve elements regulating the sensitising of this fluid. The cones are the sole percipient elements, but they are sensitive not directly to light but only to the photochemical changes in the liquid surrounding them. The response to the perception of form corresponds to the cone distribution of the retina. Marshall and I have seen and demonstrated the visual purple in liquid form surrounding the cones in the fovea (Marshall and Edridge-Green 1902). Kühne (1878) found the visual purple in liquid form in the retina of a shark, but he did not recognise the significance of the observation. The remarks of Hartridge (1946), therefore, can only apply to the cones.

I have always classified the defects of colour perception of mankind according to the number of distinct colours seen in a bright spectrum, naming them as heptachromic, hexachromic, pentachromic, tetrachromic, trichromic, dichromic, and totally colour-blind.

The fovea may at one moment be the most sensitive part of the whole retina, and the next moment the least. Various currents in the field of vision, not due to the circulation, are due to the flow of currents of sensitised retinal fluid.

In certain conditions the central portion of the retina becomes insensitive to light while the remaining portions remain sensitive. If a piece of black velvet is attached to a dark door, and a pin in the centre of the velvet is viewed from a distance of 3 metres in a dull light, the velvet and then the door will disappear, the wallpaper appearing to meet over the door, with corresponding contraction of the field of vision.

If a piece of black cardboard about 30 cm. × 15 cm. is placed on a persian carpet or wallpaper, and viewed at a distance of 3 metres in a dull light, the pattern of the carpet or wallpaper will appear to invade the black cardboard until the whole card seems to be covered by it. The cardboard appears to have become transparent, and the carpet appears to be visible through it.

The influence of one colour on another may be seen if on half of a pale purple ground there is a bright green pattern, and on the other half a bright purple pattern. The ground with the green pattern will appear green, and the ground with the purple pattern purple. Or if one takes two strips of pure green and places two yellow strips adjacent to one green strip, and two violet strips adjacent to the other, the green with the yellow adjacent will appear yellow-green, and the green adjacent to the violet will appear blue-green or blue.

None of the above observations is idiosyncratic. Each had been confirmed many times before publication by observers who did not know what they were expected to see.

#### REFERENCES

- Hartridge, H. (1946) *Nature, Lond.* 158, 303.  
Kühne, W. (1878) *On the Photochemistry of the Retina and on Visual Purple*, London, p. 34.  
Marshall, C. D., Edridge-Green, F. W. (1902) *Trans. ophthalm. Soc. U.K.* p. 300.

## Medical Societies

### ROYAL SOCIETY OF MEDICINE

THE psychiatry section met on Dec. 10, with Prof. AUBREY LEWIS, the president, in the chair, to discuss

#### Leucotomy as an Instrument of Research

Dr. A. MEYER and Dr. T. McLARDY showed from observation of 27 brains how great are the unintentional variations in the leucotome's cut. The bilateral lesion through the whole of the white matter, generally aimed at, is rarely attained; the most medial regions of the white matter are seldom involved, and the striate body is often damaged.

Interruption of the thalamo-frontal radiation connecting the dorsomedial nucleus of the thalamus with the prefrontal region is widely considered to constitute the rationale of prefrontal leucotomy. Walker concluded from his study of this projection in monkeys that a dorsoventral axis of the prefrontal lobe corresponds roughly to a latero-medial axis of the dorsomedial nucleus. Dr. Meyer's observation of human brains has confirmed the existence of an organisation similar to but more complex than that described by Walker; the projection of the magnocellular part of the nucleus is limited to the medial half of the orbital cortex, comprising area 12 and part of area 11. Since the magnocellular nucleus is connected with hypothalamic centres, it may be assumed that this orbital projection forms part of a pathway serving autonomic functions—a pathway which may well furnish the substrate for recent physiological findings from which workers have postulated a vagal cortical representation in the orbital region. This pathway might explain some of the autonomic changes which may occur after prefrontal leucotomy.

As regards long association fibres, prefrontal leucotomy should involve the superior frontal, cingulate, subcallosal, uncinata, and inferior fronto-occipital fasciculi. So far, said Dr. Meyer, degeneration has been seen only in the uncinata, the cingulate, and the most medial part of the superior longitudinal fasciculi.

The concepts of localised and holistic mental function are not mutually exclusive; they are complementary. The psychiatrist has long been accustomed to a pluri-dimensional approach to diagnosis; in other words, the results of cerebral lesions must be evaluated in relation to the individual's constitution, life history, age, and present environment. The contention that the frontal lobes are particularly concerned in the highest mental activities would seem to require qualification in the light of recent work; for instance, the volume of the frontal lobe is not significantly greater in man than in the chimpanzee—in striking contrast to the temporal and parietal lobes which steadily enlarge from monkeys to man. A specific personality change from frontal-lobe lesions has not been generally accepted: further studies of leucotomy should give a decisive answer.

#### ELECTROENCEPHALOGRAPHIC STUDIES

Mr. G. D. GREVILLE, PH.D., and Dr. S. L. LAST said that in 35 cases operated on by Mr. G. C. Knight, using Freeman and Watts's together with Crombie's technique, it was found that after operation the voltage of the alpha rhythm (8–13 cycles per second) tends to increase, as also does the amount; these changes may be due to better relaxation. On the other hand, the voltage of the fast activity (over 13 cycles per second) tends to decrease, as does its amount.

Delta activity (under 4 cycles per second) was found at one time or another in more than half the cases; it usually appears, if at all, one day after operation, and certainly within the first ten days. Immediately after operation it may occur all over the cortex, but soon it becomes prominent in the frontal areas; there may then be some extension to central areas, but this gradually disappears during the first three weeks. The material shows no correlation between age and the occurrence of delta rhythm; but this rhythm appeared a little more often in those with clinical improvement than in those with none.

Theta rhythm (4–7 cycles per second) is more common than delta and tends to persist much longer.

#### AUTONOMIC CHANGES

Dr. F. REITMAN reported an investigation of vagus function after leucotomy. Operation, he said, is followed by a slight increase in the total gastric acidity; the peak of total acidity is reached earlier, and the emptying-time is quicker. Moreover the total volume of gastric juice following the intravenous injection of 'Prostigmin' 1 mg. is greater after operation.

#### MENTAL FUNCTION

Dr. M. B. BRODY said that patients do intelligence tests as well after as before operation. Nor is there evidence of deterioration in abstract thinking, as judged by the Goldstein tests. Goldstein, however, has reported deterioration, basing his conclusion on an analysis of behaviour. It would seem that after leucotomy the capacity is unimpaired but that the patient does not use it except under the stimulus of test conditions. The prefrontal area thus plays no part in mental tests. It may be that the capacity depends on integrated activity of the cortex as a whole or on some area other than the cortex: in Pick's disease, for example, mental changes are correlated with changes in the dorsomedial nucleus of the thalamus. It may be that ideation is intellectualised emotion. What is needed is a 'standardised approach to the study of all mental changes.

## New Inventions

### MUSCLE FORCEPS FOR SQUINT OPERATION

THE instrument (fig. 1) is built as an artery forceps and has two catches. It grips the muscle firmly and does not slip. The shanks are bent at an angle of 30° so that the

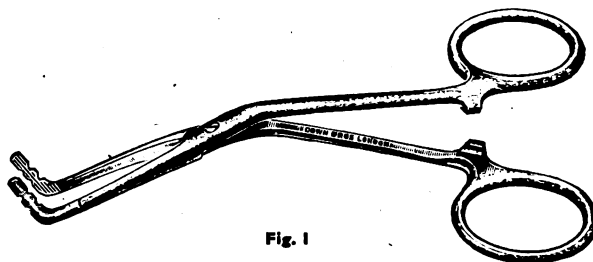


Fig. 1

hand controlling the forceps is not in the way of the hand holding the hook. The blades have notches on both edges to guide the needle, and should be applied so that the notches are symmetrically disposed in relation to the muscle.

The shaft of the forceps is grooved 6 mm. from the proximal edge of the blades. This mark, in conjunction

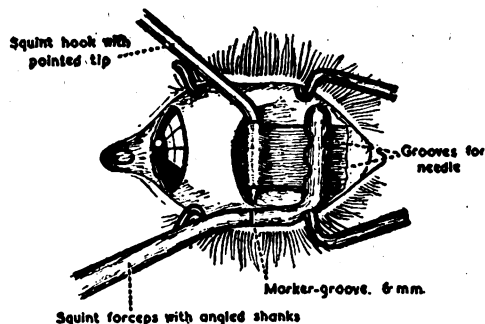


Fig. 2

with a pointed hook, can be used for measuring or estimating the distance from the line where the forceps grips the muscle.

Fig. 2 shows the use of the instrument during operation. Naturally, the hook can be inserted from beneath, and the forceps from above, if preferred. Both the forceps and the hook have been made for me by Down Bros. and Mayer & Phelps Ltd.

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Associate Surgeon and Biochemist,  
Central London Ophthalmic Hospital.

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## Reviews of Books

### An Introduction to Clinical Surgery

CHARLES F. M. SAINT, M.D., M.S., F.R.C.S., F.R.A.C.S., professor of surgery, University of Cape Town. Cape Town: for the Postgraduate Press by the African Bookman. Pp. 293. 25s.

Prof. Charles Saint is due to retire after 25 years of surgical teaching at the University of Cape Town. Those who served with his students in the Middle East and Italy, and saw the care of the wounded in South Africa, know of the high standard of his teaching. This book is a fitting epilogue to his labours. Disciplined in the school of Rutherford Morison, Professor Saint believes that the student must not only appreciate nature's methods but must get the habit of orderly examination of the patient; he must learn that diagnosis is not for the sauntering gaze, that "spot" diagnosis is an evil, and that the mechanism of the patient's pain must be analysed. To illustrate these principles he has packed into this book a mass of clinical experience, described in memorable phrases: "A firm narrow tongue with a point like a spearhead usually indicates good health and a good appetite"; "in the small breast there is much less intervening tissue to traverse before dissemination occurs"; "the patient attaches much more importance to the claudication than to the ulcer on his toe, whereas actually the toe condition is far more serious from the angle of preservation of the limb and possibly his life." Two outstanding chapters are on appendicitis and peripheral vascular disease.

The main responsibility of the surgical teacher should be the quickening of all the senses of the student, and among these Professor Saint includes common sense. That quality, above all others, pervades his book.

### Milk: Production and Control

(2nd ed.) WM. CLUNIE HARVEY, M.D., D.P.H., M.O.H. for Southgate; HARRY HILL, F.R.San.I., A.M.I.S.E., F.S.I.A., sanitary inspector for Axbridge R.D.C. London: H. K. Lewis. Pp. 512. 37s. 6d.

THERE have been numerous changes since 1935 in the handling of milk, many of which are described in this book. The chapter on heat treatment, including a description of the new high-temperature short-time process, will be valued by medical officers of health and sanitary inspectors; and, as before, the chapter on milk legislation is a handy compendium. Methods of cleaning rail and road tanks are not considered, though they are of some concern to the dairies in many of our large cities; and the section on bottle-washing is a little disappointing. The recommendation that the final treatment of all bottles should consist in sterilisation by steam is impracticable with the continuous method of processing and bottling. More attention might perhaps have been paid to the design of milk bottles, particularly with respect to the pouring lip; but taken as a whole the book remains a useful guide, and this second edition is welcome.

### Les phénomènes d'allergie non spécifique dans la tuberculose et les fièvres typhoïdes

JEAN ALBERT-WEIL. Paris: Librairie Maloine. Pp. 83.

THIS essay on the pathogenesis of infectious diseases, with special reference to tuberculosis and typhoid fever, is largely a review of the published work bearing most nearly on the author's view that non-specific allergy contributes as much to the production of disease as do specific factors. Inspired by a lecture of Prof. R. Leriche, he accepts the view that the various mechanisms of allergy play an important part in the fundamental processes of infectious diseases. Except in overwhelming infections the make-up of the patient—his diathesis—contributes considerably to the severity of the disease; in certain cases there would be little or no illness following infection but for the responses of the body. The anatomical lesion causes satellite phenomena of a vasomotor type which may be of more clinical importance than the anatomical lesion itself. In the production of such a disease as tuberculosis specific allergic reactions play their part; but non-specific allergy and the reactions

of a hypersensitive vegetative nervous system are responsible for certain pathological processes such as the hæmorrhagic complications of infectious diseases. The mechanisms of non-specific allergy are not well known, and this book presents them fully and lucidly with special reference to the phenomena of Sanarelli and Shwartzman. In non-specific or hetero-allergy the animal is sensitised to one substance and reacts allergically to others. The sensitising or "preparatory" substance is of the nature of a complete antigen; the second or "provoking" substance is a simpler chemical and includes a wide range of substances such as starch, agar, bacterial preparations, and animal sera. Dr. Albert-Weil's theory is that such a mechanism plays an important part in the onset and evolution of lesions. He follows Friedmann in attributing hetero-allergy to a reaction not of the tissues but of the vegetative nervous system, which, in the course of many infections, acquires a sensitivity to many antigens. The provoking substance may be organisms other than the specific causal agent of the disease; but his emphasis on *Bact. coli* as a common agent in the pathogenesis of disease is reminiscent of a phase of British medicine which passed with the death of a famous surgeon.

### Diabetes

*A Concise Presentation.* HENRY J. JOHN, M.D., F.A.C.P., lieut.-colonel M.C.A.U.S., Cleveland, Ohio. London: H. Kimpton. Pp. 300. 17s.

THIS is a difficult book to review fairly. It aims at helping "the busy practitioner to rationalise and to utilise the current knowledge on diabetes," but it often tackles diabetic problems with too much theoretical and too little practical detail. The English is not very clear, some sentences having no subject and almost no object. The book covers the usual range of diagnostic tolerance tests, insulin, diet, and so on, but its practical dictates are not well arranged or easy to find. Nevertheless there is much of interest to read of Dr. John's long and wide experience of diabetes. He has always been interested in glucose-tolerance tests, and his definition of the normal is that generally accepted. What makes the book fresh and unusual is his constant recourse to the particular and the personal—detailed descriptions of his cases and personal remarks about them. The whole book is interlarded and enlivened by these reminiscences. His personal tastes and interests predominate and make sections on hyperthyroidism and the salivary glands full and absorbing, whereas subjects of such importance as cardiovascular and eye complications are not even listed in the index. It is hardly a practical book, and certainly not a reference book, but it is an interesting expression of the personality and vitality of the author.

### First Aid to the Injured

(Supplement.) St. John Ambulance Association. Pp. 32. 6d.

THE last issue of the "First Aid Textbook" of the St. John Ambulance Association was published in 1937; this short supplement embodies the knowledge gained by the experiences of the late war. There is a good account of shock, emphasising that the patient must go to hospital because he will almost certainly need transfusion. The dangers of overheating are well stressed. For transport of the fractured spine the supine position is advocated: though it is not made clear why there should be any greater risk in leaving him in the prone position, into which he will usually be turned for reduction of the fracture. Good rules are given for the treatment of the incised wound, on the use of local pressure, and on elevation of the limb to cope with venous oozing. Advice on the treatment of burns is to avoid the breaking of blisters, apply only saline or soda bicarbonate solution, meddle as little as possible, and keep the patient warm. The special appendix on the rocking-stretcher method of artificial respiration is also sound: "commence Schafer's method of artificial respiration. Do not take the patient to the rocking stretcher; the stretcher must be brought to the patient." Medical students might profitably study the diagram on the last page showing how to arrange the blankets to keep the patient warm; this method could be used for patients leaving the operating-theatre.

# THE LANCET

LONDON: SATURDAY, DEC. 21, 1946

## Risk or Opportunity ?

THE profession has given the negative answer. Why? Firstly, because the leaders of the British Medical Association have presented a partial picture of the National Health Service scheme, continually emphasising its risks and imperfections rather than its opportunities. Secondly, because practitioners are indignant at the Minister's handling of the dispute over insurance capitation fees. Thirdly, because it was widely, if erroneously, felt that proper consultations had never been held. Fourthly, because Mr. BEVAN would not renounce the basic salary, though this was not essential to his project. Fifthly, because Willesden provided a gratuitous example of political interference in medical work. Sixthly, because restrictions, controls, and loss of privileges have bred in the middle classes a mood of irritation in which they gladly canalise their grievances through the answer No. Lastly, because the Act gives the Minister power to create a bad service. (Not a conclusive reason, perhaps, for refusing to help him to create a good one.)

When the B.M.A. council met last week its more experienced members must have known that the majority—then thought to be 56-44% but now nearer 54-46—does not justify non-coöperation with the Government of the day. They must have known how resistance at this stage would strike the public, which is tired of sectional bodies that prefer direct action to negotiation. On the other hand, if they decided to continue negotiations they would have the unenviable task of explaining to their constituents why the majority vote was being ignored. If the necessity for a two-thirds or three-quarters majority had been explained before the plebiscite, the rupture of negotiations could have been averted. As it was, a situation has been allowed to develop in which the B.M.A. finds itself standing bravely, on untenable ground, with little over half its forces mustered.

The council's decision has yet to be ratified by the special representative meeting called for the end of January. But the representative body of the association is representative only in the sense that it represents the majority in each division,<sup>1</sup> and, since the distribution of Yes and No is fairly even throughout the country, the large minority will as usual have few spokesmen. We may take it therefore that the B.M.A. has now effectively dissociated itself from the shaping of the National Health Service at its present most critical stage, and that it will discourage doctors from advising the Minister or accepting any kind of appointment such as membership of a regional board. But though the association held 16 out of the 32 places on the Negotiating Committee, there are a number of other constituent bodies which may have different opinions about the proper attitude of the profession at this moment. For example, judging by their attitude so far—which seemed to find no

expression in the committee's report sent out with the voting papers—the governing bodies of the English colleges are unlikely to refuse counsel to the Minister on matters within their own sphere. Where he is deprived of the help of official bodies, Mr. BEVAN can turn to unofficial advisers—who will at least have the merit of wanting the Act to succeed—or can evolve regulations within his own office. The one action he cannot possibly be expected to take is to introduce an amending Bill as prescribed by Dr. DAIN.<sup>2</sup>

Though the Minister cannot go back to Parliament and ask it to reverse major legislative decisions, he could conceivably compromise with the B.M.A. by altering the time-table of his scheme. This is the proposal lately made by Sir HENRY BASHFORD,<sup>3</sup> who suggested that the Government should go ahead with their plans for hospital and specialist services but should leave general practice as it is. In so doing they would be following advice given to their predecessors by Lord DAWSON and others who wanted progress by stages: moreover, any good compromise has charms for men of good will, especially at the present season. But the Government's programme of social reform has now gone so far that only the united opposition of the profession could enforce such a capitulation. The Bashford plan would do nothing to remove the economic barrier preventing housewives and children from seeking early aid from their doctor; indeed by providing a free hospital service it might lead patients to short-circuit general practitioners whenever they could. It would do nothing to distribute doctors better, to equip them better, and to encourage their coöperation with each other or with public-health workers, or to employ demobilised doctors satisfactorily. Nor would it provide machinery through which the new benefits of the National Insurance Act and the National Health Service Act could be satisfactorily administered. The compromise, in fact, will not serve.

The Minister announces that the full scheme for a comprehensive medical service goes forward. It remains for him to persuade us that it will preserve those things we rightly value: but in confining its present rôle to destructive criticism the principal medical organisation has made a mistake; and unless the representative body reverses this decision the profession will be split. Even so, however, there need be no more than a sober agreement to differ for the time being. When the scheme is complete enough for judgment there will be a chance for united participation, or united opposition, based on facts rather than emotion; and in either case the profession could regain its effective unity. Meanwhile, with so close a division of opinion on policy, the majority will be wise to refrain from accusations of disloyalty against colleagues who mostly have the same causes at heart. Everyone who understands this conflict will recognise that honest and intelligent people can hold opposite views about it. To some it is natural to emphasise risks, to others opportunity. For our own part we see in the new service a chance of realising great aims. All forms of organisation are alarming and may be dangerous to freedom; but those who concentrate on the dangers of standardisation and regulation forget the strength of the English genius for liberty,

1. See *Lancet*, 1944, II, 84.

2. *Brit. med. J.* Nov. 16, p. 747.

3. *Times*, Nov. 19, p. 5.

inequality, and multiformity. They forget, too, the inherent strength of our own calling.

In face of opportunity a provisional Yes is better than a final No. We need "the faith of the sail, not of the anchor."

### Postoperative Chests

THE chest complications of operations are an ever-green topic among surgeons and anæsthetists, and have been the cause of acrimonious discussions without number. It is now generally accepted, albeit grudgingly, that a postoperative chest complication is more likely to be due to the hand in the abdomen than to ether in the lungs. As BROCK<sup>1</sup> says, "to imagine that the simple replacement of inhalation anæsthesia by local or spinal . . . will avoid such a complication shows a child-like faith born of inexperience or insufficient observation." Yet many anæsthetists and surgeons still believe that the particular routine they adopt in abdominal operations confers immunity to chest complications, despite the evidence drawn from painstaking observation and statistical analysis. DRIPPS and DEEMING<sup>2</sup> now take up the battle-stained cudgels once more. They report that in one series of 250 abdominal operations the incidence of post-operative atelectasis was nearly three times as high (11%) after inhalation anæsthesia as after spinal (4.2%). "Since it has been conclusively proved by many investigations that the anæsthetic agent and technique are not major factors in postoperative morbidity," they remark, "it was evident that something was wrong." They were right: something was wrong. Investigation showed that the administration of these anæsthetics was left to nurse anæsthetists and junior interns, while the postoperative care of the patients from the point of view of "chests" was, to put it mildly, haphazard. In a second series of 990 upper abdominal operations the incidence of atelectasis after spinal anæsthesia remained virtually unchanged (5%), while that after inhalation anæsthesia had now fallen to 4.1%. In this second series, however, the anæsthesia and postoperative care were conducted by specialists.

During the last decade fashions have been sweeping anæsthesia, each purporting to be more "modern" than its predecessor. During each fashion wave the toast of the moment invariably possesses the virtue of conferring freedom from "chests." There is no little danger with this background that the once-scotched idea may again take root—that post-operative chests can be banished by curare, 'Pentothal,' local, spinal, or what have you. To believe that any one drug or method, even if labelled "modern," will by itself prevent a postoperative chest condition is to forget the knowledge and experience laboriously gathered by two generations of anæsthetists and surgeons. Two outstanding papers of recent years, for example, one statistical by KING<sup>3</sup> and the other clinical by BROCK,<sup>1</sup> convincingly show that the factors determining the onset of "chests" are mainly the site of operation, pre-existing respiratory infection, and sepsis, while close on their heels in the postoperative period comes immobility, whether the result of pain, morphine,

or instructions from nurses and doctors. While active search for means of preventing "chests" is not to be deprecated, too little attention is still paid to the treatment which is so important in the first day or two after operation if extensive atelectasis is to be avoided. "Freedom of the bed" is the right of every patient who has had an operation, notwithstanding a possible reluctance of the nursing staff to give up the old-established back-rest and their aversion to the natural resting position—the horizontal.

Perhaps we could well dispense with a little modernity in the anæsthetic room in exchange for a little more in the ward. Let us have fewer respiratory depressions, apnoeas, inflations, resuscitative injections, and even a little less of that hatred of ether which is coupled with a love of anything else. Let us encourage the patient to move about in bed and to cough; and impress on nurses the present-day concepts of atelectasis. Lastly, let us aim at a uniform accuracy in reporting pulmonary as well as other operative complications, whether in writing or discussion, so that new anæsthetic agents and methods can be properly assessed, at any rate with regard to their effects on the chest, for the sake of those who depend for guidance on the words of the elect.

### Cineplastic and Krukenberg Amputations

THE unused muscle bellies in amputation stumps of arm and forearm have long challenged the ingenuity of surgeons; nor has the design of upper-limb prostheses yet advanced far enough to discourage attempts to utilise the power buried in these stumps. Of the mechanical hands that have been devised and adopted in this country and in the United States, those of SIMPSON and HOBBS, and the Norden hand which contains a free-wheeling device and may be described as a prosthesis within a prosthesis,<sup>1</sup> all give a grip and a greater range of function than is possible with any single adjustable appliance, but their mechanical function is limited, and they are cosmetically crude. The appearance of upper-limb prostheses has not received the attention it deserves. From this point of view the acrylic hand constructed at the Walter Reed Hospital and the 'Vultex' hand described by CLARKE,<sup>2</sup> of Baltimore, are probably the best. The magnitude of the problem can be judged from the number of casualties submitted to amputation. As a legacy of the late war, some 15,000 British Servicemen have amputation stumps, about a quarter of these being upper-limb amputations and a little over 5% double amputations, whereas in the first world war there were over 40,000 British soldiers with amputations. This difference roughly corresponds to the ratio between the total casualties in the two wars.

Up to the end of 1945 the Allied medical services had made little use of cineplastic amputations. Few, if any, were done in Britain, but RANK and HENDERSON<sup>3</sup> practised the method successfully in Australia, and the operation had been done several times at the United States Navy hospitals at Mare Island and Philadelphia. The earliest attempts to harness the

1. Brock, R. C. *Guy's Hosp. Rep.* 1936, 86, 191.

2. Driggs, R. D., Deeming, M. van N. *Ann. Surg.* 1946, 124, 94.

3. King, D. S. *Surg. Gynec. Obstet.* 1933, 56, 43.

1. Bunnell, S. Quoted in War Office Report on U.S. Plastic Centres, by Major Patrick Clarkson, March, 1946.

2. Clarke, C. D. *Facial and Body Prostheses*, St. Louis, 1945.

3. Rank, B. K., Henderson, G. D. *Surg. Gynec. Obstet.* 1946, 83, 373.



muscle power of amputation stumps, by passing skin-lined tubes through them, were made in Italy, but the cineplastic operation owes its full development to Prof. FERDINAND SAUERBRUCH, who introduced the use of big, well-buried skin-tubes of local tissue. Visitors to the Putti Institute at Bologna will remember the reversed abdominal tube pedicle which was made to provide the skin tunnel in forearm stumps. Since 1918 over 7000 cineplastic amputations have been performed at SAUERBRUCH's clinic at the Charité Krankenhaus in Berlin, and over 500 in the clinic of Prof. MAX LESCHE in Munich. Few aspects of German surgery have attracted more attention from Allied surgeons since VE-day, and both parties and individuals have paid many visits to Berlin and Munich to see this work. On another page Major MAGEE describes the cineplastic amputation as it is done in Berlin, where a local flap of skin, subcutaneous tissue, and deep fascia about 2 in. square is used to form the skin tunnel and the secondary defect is covered, not always completely, by a skin-graft. The operation is done under local anaesthesia. Professor LESCHE's skin-flap is larger, perhaps 3 in. by 3½ in.; the muscle tunnel is at least 1¼ in. in diameter and lies deep to three-quarters of the diameter of the muscle; the skin and fat tube is rotated through 90° before being passed through the muscle tunnel, so the suture line is proximal and away from the pressure of the peg; and the secondary defect is completely covered by a free graft. Observers have appreciated the advantages of attention to such details.

A properly made skin-tube buried in the forearm muscles or in the triceps should give an excursion of 1-2 cm. to a peg about 7 mm. in diameter lying transversely in the tunnel, and should be capable of exerting a power of 15-20 lb.; when buried in the biceps or in the pectoralis major the excursion of the peg should be 5 cm. or more and the power over 40 lb. This power is used to give grip to an artificial hand. Extension of the digits can be provided by a spring device in the prosthesis or by a skin tunnel through the extensor muscles which give voluntary movement—according to the choice of the surgeon. Cineplastic prostheses are fitted with blocking devices which allow the grip to be maintained without continuous muscular effort. The essential for success in the cineplastic method is prosthetic services of the highest order. Each of these cases is an individual problem, and successful function will depend largely on the skill and experience of the limb-maker. Surgery of this kind, except with close coöperation between surgeon and limb-maker, is useless. When properly made the cineplastic prosthesis has a fairly wide range of function—writing, use of cutlery or tools, and driving. This range is wider than that of any *single* appliance which can be fitted to a standard prosthesis. The advantage of the cineplastic amputation over the adjustable appliances is the great one of convenience; but most observers agree that neither the range nor the quality of function is as good as a well-trained patient can attain with the set of adjustable appliances in standard use in Britain.

In the Krukenberg forearm amputation, a pincers-like grip is provided by splitting the stump through the interosseous membrane between radius and ulna. The value of this amputation for African natives,

who either could not obtain or would not use a modern prosthesis, was emphasised by PURCE<sup>4</sup> and SQUIRES.<sup>5</sup> Such circumstances remain one of the chief indications for the amputation, but German experience suggests that there are others. At operation, the cleft between radius and ulna is usually deepened to 12 cm., or at least a third of the length of the stump, and is so cut that there is local skin to cover either the ulna or the radius; as a rule, cover for the denuded side is provided by a free graft, but Professor HERLYN at Göttingen uses a belly-arm flap and incorporates an excess of abdominal skin at the depth of the cleft to ensure that there is a fold of flap here, not a suture line. In cutting the cleft, care is taken to preserve the pronator teres, since it is the action of pronation which approximates the two limbs of the pincers. In the cases observed at Göttingen by FETTES<sup>6</sup> these pincers gave a definite function to the limb, independent of prosthesis. Thus the patients could control a fork, perform their personal toilet, and use certain tools. None of the patients was concerned about the appearance of the lobster-claw-like stump. If necessary an ordinary upper-limb prosthesis can be fitted to the stump on occasion. The value of the Krukenberg amputation is limited, but it seems to be worth considering for men who have lost both upper limbs, and particularly for those who are also blind. It is these blind men who have lost both hands who make the greatest demands on surgical and medical ingenuity if their life is to be tolerable. For them a Krukenberg amputation, at least on one side, is worth considering because it can make them independent of a prosthesis and able to perform their own toilet.

In contrast to the end of the first world war, there has this time been remarkably little in any field of surgery for us to learn from Germany. Some aspects of amputation practice are possibly the sole exception. If the cineplastic and Krukenberg amputations developed by the German surgeons are to be given a trial here, it would be helpful if the limb-makers, and indeed some of the patients who have developed the maximum use of their stumps from clinics such as LESCHE's or SAUERBRUCH's, would visit this country to give us the benefit of their experience.

### ABC of the Act

THE sections of the National Health Service Act to which its opponents object must by now be familiar to everyone. The able and persevering presentation of these objections has perhaps deflected some from studying the measure as a whole. For these and for others who would like to know more about the new service Mr. David Le Vay has written an account<sup>1</sup> which explains how it will affect citizen, patient, doctor, health worker, hospital, and local authority. Success, he says, will depend on two related factors—freedom from bureaucratic control and whole-hearted coöperation by the profession. The author emerges as a somewhat uncritical advocate of the service, but he has not allowed personal opinion to divert him from his principal aim, which is to explain its terms.

4. Purce, T. *Brit. J. Surg.* 1939, 27, 419; 1946, 83, 373.

5. Squires, B. T. *Ibid.* 1937, 25, 464.

6. Fettes, D. War Office Report, Nov. 27, 1945.

1. *Your Guide to the National Health Service.* By A. David Le Vay, M.S., F.R.C.S. London: Hamish Hamilton. Pp. 78. 3s. 6d.

## Annotations

### CHRISTMAS IN THE MEDICAL FAMILY

DAILY bread is a fine thing, but much improved by butter; and if this year we must spread the butter rather thin it should help us to remember that in many countries today, and even in some homes in England, it is spread even thinner. The Royal Medical Benevolent Fund has a special concern with the butterless bread of one group of people at Christmas. Sir Arnold Lawson's letter<sup>1</sup> will have recalled to readers that the Fund tries to give a substantial Christmas present to medical men or their families who find themselves in need, and that last year it was possible to give a cheque of £4 to each recipient. He asks that this year the profession will make the same gift possible by sending the Fund £2000. Last year his appeal was exceeded by more than £100, and this year, they tell us, we all have more to spend and less to spend it on. Most doctors will gladly do a kindness if reminded. This is the reminder.

### PARÆSTHESIÆ IN THE LEGS

PERVERTED sensations in the limbs—numbness, tingling, prickings, burnings, and so on—are a common symptom, and their causation in the hand has been clarified by the differentiation of the syndromes of costoclavicular compression and of lateral prolapse of cervical intervertebral disks. Similar symptoms in the legs and feet may be the manifestations of organic neurological diseases such as peripheral neuritis and subacute combined degeneration of the cord, or of deficiency of some factor of the vitamin-B complex, a condition often seen among prisoners-of-war and internees in the Far East<sup>1</sup>; but there are cases where the cause remains obscure. Ekholm<sup>2</sup> in Scandinavia, Allison<sup>3</sup> in Canada, and Martin<sup>4</sup> in London have drawn attention to paræsthesiæ in the feet and legs ("restless legs," or "leg jitters") which wake the sufferers at night and may keep recurring for years without signs of organic neurological or vascular disease developing.

Now Schepers<sup>5</sup> in Johannesburg has approached the problem afresh by studying 100 patients in an institution for chronic diseases who suffered from paræsthesiæ in the legs, and excluding cases of frank organic neurological disease or manifest psychoneurosis. There were five main groups among these cases. The largest group (47%) were suffering from organic diseases of the lower abdominal viscera—ureteritis associated with prostatitis or cervicitis, salpingo-oöphoritis, or chronic colitis. In these patients there were areas of hyperæsthesia on the thighs, lower part of the legs, and feet, the distribution to some extent depending on the abdominal condition. The explanation offered for the sensory disorder in these cases is either spread of inflammation to the lumbosacral plexus or involvement of the autonomic nerves and retrograde reflex irritation of spinal cord segments. The second main group (28%) were cases of macrocytic hyperchromic anæmia in which there was either impaired superficial sensation in the distal parts of the legs, thought to be due to degeneration of the termination of the peripheral nerves, or spread of the sensory impairment up the back of the thigh and buttock in the distribution of the sacral dermatomes. In this group Schepers suggests that ischæmia of the spinal cord plays a part in causation, and the paræsthesiæ always disappeared when the anæmia was corrected; it seems possible that they were early cases of subacute combined degeneration. In two groups, one

associated with gravitational œdema (9%), often only slight, and the other with peripheral vascular spasm (4%), ischæmia of the nerve-endings was thought to be the cause. Finally there were 12 cases of "masked" hypothyroidism, in which scattered patches of hyper- and hypo-æsthesia on the legs disappeared with adequate substitution therapy. Here the terminal parts of the peripheral nerves were thought to be constricted as they pierced the deep fascia, either because of increased turgidity in the nerves or because the fascia became "fluid-logged" and rigid as a result of the endocrine defect.

### O AND ANTI-O

THE groups of human red blood cells are determined by the presence or absence of two specific antigens, A and B. Thus the four main blood-groups are AB, A, B, and O (i.e., zero, neither A nor B). Von Dungern and Hirsfeld<sup>1</sup> postulated that the inheritance of the A and B factors depended on two independent pairs of allelic genes, A and a (not A) and B and b (not B). But Bernstein<sup>2</sup> demonstrated mathematically that this view was not supported by statistical data, which did, however, fit in with a theory assuming three allelic genes—A, B, and O (or R), where A and B are dominant over O. This theory has now been generally accepted. It differs from that of von Dungern and Hirsfeld in supposing that group O is determined by a positive antigen. The discovery of sera which will react with group-O red cells has lent additional weight to Bernstein's hypothesis.

Twenty years ago Landsteiner and Levine<sup>3</sup> found irregular iso-agglutinins in some rare human sera of groups A<sub>1</sub>B and A<sub>1</sub>, which, though weak and acting only in the cold, would agglutinate red cells of groups A<sub>1</sub> and O. Since then more potent iso-sera have been described in two persons of group A<sub>1</sub><sup>4,5</sup> and two of A<sub>1</sub>B.<sup>6,7</sup> In three of these four cases iso-immunisation by transfusion or pregnancy may have increased the activity of the atypical iso-agglutinin, so that it became active against the appropriate cells at body temperature. The serum of the latest example with group A<sub>1</sub>B, described this year by Henry, agglutinated not only O and A<sub>2</sub> red cells but also, though less strongly, some red cells of groups A<sub>1</sub>, B, and A<sub>2</sub>B.

Schiff<sup>8</sup> showed in 1927 that cattle sera sometimes contained an agglutinin which would agglutinate human group-O red cells. Eisler,<sup>9</sup> by immunisation with Shiga bacilli, produced in goats an antibody which also would agglutinate group-O red cells. Both the natural ox sera and the immune goat sera agglutinate all human red cells, but those of groups O and A<sub>2</sub> much more strongly than those of groups A<sub>1</sub>, B, and A<sub>1</sub>B. Furthermore, even as some individuals of groups A and B secrete in their body fluids—notably the saliva and gastric juice—substances which have great A and B activity as measured by inhibition of anti-A and anti-B sera, so some individuals of group O secrete a substance capable of inhibiting anti-O sera.<sup>10</sup> Morgan and van Heyningen<sup>11</sup> have noted that an even better source than saliva of A, B, and O active substances is the material from pseudomucinous ovarian cysts. However, whereas "secretors" of A and B substances usually secrete in their saliva not only A or B but also O active substance, cyst fluid from A and B persons has not, except in one

1. *Lancet*, Oct. 12, p. 545. The Fund's address is 1, Balliol House, Manor Fields, London, S.W.15.

1. Cruickshank, E. K. *Lancet*, Sept. 14, p. 369.  
2. Ekholm, K. A. *Acta. med. scand.* 1945, suppl. 158.  
3. Allison, F. G. *Canad. med. Ass. J.* 1943, 48, 36.  
4. Martin, J. P. *Brit. med. J.* 1946, 1, 307.  
5. Schepers, G. W. H. *S. Afr. med. J.* 1946, 20, 437.

1. von Dungern, E., Hirsfeld, L. *Z. Immunforsch.* 1910, 6, 284.  
2. Bernstein, F. *Klin. Wschr.* 1924, 3, 1495.  
3. Landsteiner, K., Levine, P. *J. Immunol.* 1926, 12, 441; *Ibid.* 1929, 17, 1.  
4. Morzycki, J. *Z. Immunforsch.* 1935, 84, 80.  
5. Davidsohn, L. *J. Amer. med. Ass.* 1942, 120, 1238.  
6. Wiener, A. S., Oremland, B. H., Hyman, M. A., Samwick, A. A. *Amer. J. clin. Path.* 1942, 11, 102.  
7. Henry, N. R. *Med. J. Aust.* 1946, 1, 395.  
8. Schiff, F. *Klin. Wschr.* 1927, 6, 303.  
9. Eisler, M. *Z. Immunforsch.* 1930, 67, 38.  
10. Schiff, F., Sasaki, H. *Klin. Wschr.* 1932, 11, 1426.  
11. Morgan, W. T. J., van Heyningen, R. *Brit. J. exp. Path.* 1944, 25, 5.

instance, shown significant O activity. Morgan and Waddell,<sup>12</sup> using purified O active material from ovarian cysts, have immunised rabbits and obtained a serum with anti-O activity stronger than the natural anti-O serum obtained by selection from over 100 cattle sera. The titres against A<sub>2</sub> and O red cells of both this immune serum and of good ox serum were high; some B red cells reacted as strongly as A<sub>2</sub> red cells, and the reaction of A<sub>1</sub> red cells varied.

On the Bernstein theory, it might be expected that all heterozygous A and B red cells (i.e., AO and BO) would be agglutinated by powerful anti-O sera; but Hirsfeld and Amzel,<sup>13</sup> using a powerful immune goat serum as anti-O, could find no evidence of this. And Moureau<sup>14</sup> has reported a family AB x AB with 10 children—4 with AA, 2 with BB, and 4 with AB—in all of whom the red cells reacted with anti-O serum. Hirsfeld and Amzel regard the receptor O as almost ubiquitous in the human species and therefore almost a species factor (cf. Witelski and Okabe<sup>15</sup>). Matta<sup>16</sup> has rejected the theory that anti-O is a species antibody, since some AB, A, and B cells cannot completely absorb from a powerful anti-O serum all its anti-O activity, and anti-human sera do not agglutinate O cells more strongly than red cells of other groups. Wiener and Karowe<sup>17</sup> appear to accept the theory that anti-O is a species antibody, and attempt to explain diagrammatically why this serum reacts with O cells and heterozygous A<sub>1</sub>, A<sub>2</sub>, and B cells; but they do not explain its reactions with A<sub>2</sub>A<sub>2</sub> and A<sub>2</sub>B cells, which were found to be positive by Wiener.<sup>18</sup> Wiener explains this by comparing anti-O to anti-Hr' (anti-c), and the O and A<sub>2</sub> agglutinogens to Hr' antigens (c), which appear in the rh and Rh<sup>r</sup>, Rh<sub>0</sub>, and Rh<sub>2</sub> genes of the Rh series—in other words, the genes contain a common antigen. The apparent presence of O antigen in Shiga bacilli, hog-gastric mucin, and probably other animal tissues excludes the possibility of its being a species-specific antigen. The bulk of evidence goes to show that it is almost universally present in human tissues but that it varies in quantity. It could be argued that it is a heterophile antigen. Eisler has shown that it is not the Forssman antigen, but it may be of similar type, originally universally present and still practically ubiquitous in human red cells, as described by Hirsfeld and Amzel. These workers describe a descending degree of reaction with anti-O serum, from O to A<sub>2</sub> to A<sub>1</sub> to A<sub>2</sub> to A<sub>1</sub>—and to four grades of A<sub>1</sub> (A<sub>m</sub>, A<sub>p</sub>, A<sub>1</sub>, and A<sub>2</sub>), and a similar descending degree from O to B<sub>2</sub>, B<sub>m</sub>, B<sub>p</sub>, and B<sub>1</sub>; they postulate the presence of B<sub>0</sub>, B<sub>1</sub>, and B<sub>2</sub> at one end of the scale and B<sub>3</sub> at the other. They suppose that in each case, by mutation through these stages, O is converted to A or B; thus, they argue, there is only a quantitative difference between the subgroups of A. Wiener<sup>19</sup> and Boorman et al.,<sup>20</sup> however, claim to have shown that there is a qualitative difference at least between A<sub>2</sub> and A<sub>1</sub>, in that persons of group A<sub>2</sub> can have an anti-A<sub>1</sub> iso-agglutinin in the serum, capable of agglutinating in vitro and hæmolyzing in vivo red cells of subgroup A<sub>1</sub>.

It is possible to fit all the facts into a hypothesis which assumes that the O is a fundamental antigen, that the common A is a separate antigen, and that the A<sub>1</sub> antigen develops by mutation from O. Thus all A<sub>2</sub> and O cells would react strongly with anti-O, and A<sub>1</sub> red cells would react according to the degree of mutation of O to A<sub>1</sub>. When mutation was complete, anti-O could

appear in the serum of such a blood without infringing Landsteiner's law. A similar postulate would be needed for group B, although as yet no qualitative difference between human B antigens has been proved. Whatever the hypothesis favoured, there is sufficient evidence that the O antigen detected with these many anti-O sera differs from that of Bernstein's hypothesis. This does not disprove that hypothesis; it does, however, necessitate a revision of terminology, unless we revert to the use of R as the third antigen to A and B in Bernstein's hypothesis; but this might lead to confusion since the Rh antigen is sometimes known as R. Before new theories and terminologies are accepted it must be established that all these various anti-O sera have the same specificity.

#### MORE EXCITING GIVING

THE first proposals for the nationalisation of the hospitals under the new Act seemed to many to endanger much that was of value in the voluntary system. But the chairman at the annual meeting of King Edward's Hospital Fund for London last week, Lord Catto, said that the concessions made by the Minister in the process of transmuting the Bill into an Act have gone a long way to allay misgivings. Indeed he suggested that for the first time in the history of the hospitals it has become possible to give "without the mental reservation that the gift may be swallowed up in routine expenses."

The changes about to take place in the organisation of medicine will give scope to courageous pioneers, and the King's Fund are determined to make the most of their opportunities. Their influence is widening, for the abolition of the distinction between voluntary and municipal hospitals will allow them for the first time to help all the hospitals of London. Among the things on which the Fund propose to continue to spend money, Lord Catto mentioned the improvement of hospital catering, the recruitment of nurses and the provision of preliminary training schools for them, and the provision of special equipment and amenities. The Fund are also interesting themselves in accommodation for convalescents, and have lately appointed a committee which, with the Institute of Hospital Almoners, is surveying the needs and possibilities of these homes.

In proposing the vote of thanks to the chairman, Sir Herbert Eason, F.R.C.S., pointed out that the Fund during its existence had adapted itself to the varying needs of the voluntary hospitals, and he was confident that it would also adapt itself to the needs of the future.

#### TUBERCULOSIS IN NEWFOUNDLAND

IN July, 1945, the Newfoundland government invited Dr. T. O. Garland and Dr. D'Arcy Hart to investigate tuberculosis on the island. Their report<sup>1</sup> shows a serious state of affairs. About half the population of 320,000 live on the Avalon peninsula (including St. John's, the capital city of 50,000), while the rest live in tiny scattered settlements on the very long coastline. Radiographic surveys of samples indicate an average of about 3.5% of active cases of tuberculosis (adding previously known active cases to those newly discovered), but great variations were found in different places, suggesting local pockets or epidemics. Although the tuberculosis death-rate decreased from 236 per 100,000 in 1926 to 143 in 1943, it is still nearly three times that of Canada or Great Britain; in fact, Newfoundland is now where England and Wales were in 1910. The rate of decline in recent years has been approximately the same in the three countries, with the significant exception that in Newfoundland it started rising in 1932 and reached a peak in 1937, this rise coinciding with the years of severe economic depression. More women than men die

1. Tuberculosis in Newfoundland. Department of Public Health and Welfare, St. John's, Newfoundland. 1946. Pp. 58.

12. Morgan, W. T. J., Waddell, M. B. R. *Ibid.* 1945, 26, 387.  
 13. Hirsfeld, L., Amzel, R. *Ann. Inst. Pasteur*, 1940, 65, 251, 386.  
 14. Moureau, P. *Sang.* 1935, 9, 484.  
 15. Witelski, E., Okabe, K. *Klin. Wochr.* 1927, 6, 1095.  
 16. Matta, D. Egyptian University, Faculty of Medicine, Publication no. 11, 1937.  
 17. Wiener, A. S., Karowe, H. E. *J. Immunol.* 1944, 49, 51.  
 18. Wiener, A. S. *Science*, 1944, 100, 595.  
 19. Wiener, A. S. *J. Immunol.* 1941, 41, 181.  
 20. Boorman, K. E., Dodd, B. E., Loutit, J. F., Mollison, P. L. *Brit. med. J.* 1946, 1, 751.

of tuberculosis, which may be partly explained by their very hard life; besides housework, and perhaps minding the garden, they help with fishing, preparing baits, and mending nets.

The diet of many of the islanders is glaringly deficient in fresh fruit and vegetables, and in milk,<sup>2</sup> and could be improved by such means as home preparation of vitamin C from local berries, and by keeping goats for milk (cows are a rarity, and bovine tuberculosis does not play an important part). Houses are bad only in St. John's, but the general standard of living is low: in 1937 a third of the population was on relief and the allowances are wholly inadequate, sometimes "forcing a tuberculous household into the most abject poverty." It is suggested that special allowances be made to tuberculous patients and their families, and that industries should be obliged to take a proportion of those recovering from the disease. There is at present only one sanatorium for the whole island, and hospitals and dispensaries are needed. Training will be required for the doctors and nurses staffing these institutions, and Dr. Garland and Dr. Hart want to see more mass radiography, using the miniature film, and tuberculin-testing of children to act as a pointer to open cases.

#### LOUSE-BORNE TYPHUS

COMPLICATION and simplification seem to alternate in the classification of the typhus group of fevers. This statement applies equally to tick-borne, mite-borne, and louse-borne typhus.<sup>1</sup> Up to about forty years ago only one form of louse-borne typhus was recognised—that now called epidemic exanthematous typhus, caused by *Rickettsia prowazeki*, and conveyed by *Pediculus humanus*—but about that time Wolynian fever, caused by *R. wolhynica*, was described as a specific entity in Poland. In the war of 1914–18 a third entity, trench fever or five-day fever, was recognised and attributed to *R. quintana*. In the interval between that war and 1939 very little was heard of trench fever; but a fourth form of louse-borne typhus, in laboratory workers, was described by Mosing,<sup>2</sup> who named the causal organism *R. weigli*. Weigl's prophylactic vaccine against typhus exanthematicus is prepared by injecting suspensions of *R. prowazeki* into lice per rectum and after an interval removing their intestines and grinding them up in formol-saline. For this method very large numbers of lice are needed and these have to be fed on laboratory workers; it was these workers who contracted the disease. A few years later, however, it was considered that *R. quintana* and *R. wolhynica*, the causal organisms of trench fever and Wolynian fever respectively, were identical, and that *R. weigli* was probably the same organism.

An outbreak similar to that described by Mosing took place at Addis Ababa in 1941–42, soon after the occupation by British troops. It involved seven laboratory workers engaged in feeding lice for Weigl's method of making prophylactic vaccine, and is described by Codeleoncini,<sup>3</sup> who details the isolation of a rickettsia from such cases, the laboratory findings, and experimental work on guinea-pigs and monkeys (*Papio doquiera*), all of which convince him that trench fever, the disease described by Mosing, and the Ethiopian disease are identical and due to one and the same rickettsia, which is the common louse rickettsia, *R. pediculi*. Codeleoncini further suggests that the disease develops only when enormous numbers of lice are present—e.g., in trench warfare and in laboratory feeding of lice for making Weigl's vaccine—and that probably an endemic focus in Russia acts as a reservoir between outbreaks.

2. See *Lancet*, 1945, 1, 760.

1. See *Lancet*, Oct. 12, p. 531.

2. Mosing, H. *Med. dobn. spol.* 1936, 21, 218 (abstr. in *Arch. Inst. Pasteur, Tunis*, 1936, 25, 373).

3. Codeleoncini, E. *Boll. Soc. ital. Med. Igiene trop. (sez Eritrea)*, 1946, 6, 129.

#### CAUSE OF NUTRITIONAL ŒDEMA

NUTRITIONAL œdema is usually thought to be due to hypoproteinæmia, especially a deficiency of serum-albumin, which normally maintains the osmotic pressure of the plasma, thus preventing the escape of fluid from the blood-stream. This view was put forward in 1896 by Starling, who did not, however, postulate that hypoproteinæmia was the sole cause of the œdema. Bayliss later showed that a second factor was a high venous pressure. When the hydrostatic pressure in the venous capillaries is raised fluid filters from the plasma through the vessel walls to swell the intercellular fluid of the tissues—e.g., in the œdema of chronic heart-failure.

There is yet a third possible cause of nutritional œdema. Peters<sup>1</sup> has emphasised the importance of the cell membrane as a physiological boundary separating the cells and intracellular fluid from the intercellular fluid. Consequently it is imaginable that œdema can also be produced by leakage from intracellular to intercellular fluid. This supposition is supported by Bachet,<sup>2</sup> who found that 17 cases of early œdema among 120 cases of nutritional œdema had a normal serum-albumin level, and estimations of serum-albumin in non-œdematous patients who subsequently developed œdema showed no hypoproteinæmia anticipating the œdema. Further, he found that signs of heart-failure were rare in the early stages of nutritional œdema. These findings militate against the theories that nutritional œdema is caused, in the first instance, by hypoproteinæmia or by high venous pressure, though both of these mechanisms come into play in the later stages and increase the existing œdema. Bachet therefore argues that nutritional œdema starts in the cells, and that it is only later that the serum-albumin level falls—in other words, that nutritional œdema is due to an insufficiency of proteins in the diet, leading to a deficiency of albumin in the tissues. On the other hand, the occurrence of œdema with a normal serum-protein may be due to some factor which interferes with the function of the vascular endothelium—vitamin deficiencies, for example—rather than to actual protein lack within the cells. For the present the verdict on Bachet's hypothesis must be "not proven."

Lamy and his co-workers,<sup>3</sup> in a study of 38 prisoners-of-war, have confirmed the lack of correlation between serum-protein levels and œdema and have carried the investigation a step further. They measured the serum-protein levels and the osmotic pressure of the serum in 8 prisoners-of-war suffering from malnutrition, 2 with no œdema, 2 with slight malleolar œdema, and 4 with severe œdema, and found that a lowering of the osmotic pressure of the serum was clearly correlated with an increase in œdema, though the serum-protein level was normal in all cases. They conclude that the serum of the patients with œdema contains an abnormal protein of low osmotic pressure, and that this protein is derived from muscle. They do not, however, believe that the low osmotic pressure alone is responsible for the onset of œdema in malnutrition, and support the view that the main factor is an increased permeability of the capillary walls.

Sir WILLIAM COLLINS, K.C.V.O., F.R.C.S., who died on Dec. 11 at the age of 87, will be remembered as the creator of the London Ambulance Service. As chairman of the London County Council, as Member of Parliament, and as ophthalmic surgeon to several London hospitals, he served medicine both inside and outside his profession. He was also British plenipotentiary at conferences on the control of dangerous drugs.

1. Peters, J. P. *Body Water*, London, 1935 (see also *Lancet*, 1940, i, 794).

2. Bachet, M. *Etude des troubles causés par la dénutrition dans un asile d'aliénés*, Paris, 1943, and *Bull. méd.* 1945, 59, 1.

3. Lamy, M., Lamotte, M., Lamotte-Barillon. *Pr. méd.* Dec. 7, 1946, p. 814.

## Special Articles

RESPONSIBILITY FOR THE "CHRONIC" SICK  
THE HISTORICAL PERSPECTIVEA. G. L. IVES  
M.V.O., M.A. Oxfd

ONE sometimes hears it said that the voluntary hospitals have failed in their duty to the incurable or chronic case, and the inference is drawn that one of the achievements of the National Health Service Act will be to return them to their original wider purposes by bringing all the sick—acute and chronic alike—under a single administration. Since we are on the eve of one of the greatest changes in hospital history in this country, it may be of interest, and possibly of some value in adjustment of perspective, to inquire to what extent this is true. In part at least it represents a modification of the facts of history to suit our present outlook.

## FUNCTION OF HOSPITALS

Let us attempt a very brief résumé of the past history of the function of the hospitals. The story falls into three main phases.

The hospitals of pre-Reformation days, of which St. Bartholomew's and St. Thomas's are our only two remaining examples, certainly accepted a very wide interpretation of their duty, in common with most other medieval hospitals. The earliest hospital appeal of which we have record is that which followed the fire that destroyed St. Thomas's in 1215. "Behold at Southwark an ancient hospital built of old to entertain the poor. . . ." "To entertain the poor"—the phrase reflects admirably the wide scope of the word "hospital"—it extended even to the destitute.

After the dissolution of the monasteries and the refoundation in the 16th century of St. Bartholomew's and St. Thomas's this conception was in practice modified though not abandoned. The citizens of London made a careful census of those for whom they wished to provide, as follows: fatherless children 300; children overburdening their parents 350; sick and lame persons 200; aged and infirm 400; poor householders 600; idle vagabonds 200. Christ's Hospital was to take care of the children, while Bridewell took charge of the idle, and Bedlam the insane. St. Bartholomew's and St. Thomas's between them cared for the remainder, curable and incurable alike. The churches, streets, and lanes were daily filled with "sick and infirm poor men lying begging." It was the fact that the refounded St. Bartholomew's could not receive a tenth of them that inspired Bishop Ridley to urge upon Edward VI the propriety of refounding "the late hospital of Thomas Becket in Southwark." In the refounded St. Thomas's there was for many years a "night lodgers' ward" into which the hospitaller admitted such cases as he deemed deserving. The poor were put to "such convenient occupations as they are most apt unto." But in the century and a half between 1552 and 1700 the two hospitals carried between them the whole burden of caring for the sick of London, and the pressure upon their resources was such that the incurable had to give way to the curable. The abstract of orders for St. Thomas's for the year 1700 specifically records "No incurables are to be received."

A few years later Thomas Guy recognised the need for provision for those excluded from the two royal hospitals, but he had doubts about the practicability of his purpose. The wording is illuminating, and discloses very plainly the nature of the dilemma: it explains and justifies the action of the royal hospitals. Within a few years of his death the governors republished the words of his will, and pointed out that people had

generally understood by it such as "laboured under distempers, loss of limbs, blindness, and other natural and accidental infirmities, and even age itself." If taken in such a sense it would soon have become an almshouse; he had accordingly described the persons for whom his hospital was intended—"to be such as were capable of relief by Physick and Surgery." Guy's thus came into line with the other two hospitals.

The voluntary hospitals of the 18th century followed suit. The Westminster Hospital limited the stay to a month, and excluded incurables. The London Hospital was for "relieving the poor in case of sickness or accident." A similar view was taken at Edinburgh; though the records are not explicit, the implications are clear enough. And so with the others. It is a mistake to suppose that the voluntary hospitals of the 18th century were founded with a wide all-embracing purpose, and that their malign successors have gradually excluded the incurables. The object of the restriction was to prevent abuse of their facilities; otherwise they would have become almshouses rather than hospitals.

## UNDER THE POOR-LAW

The provision of inpatient accommodation under the poor-law dates from 1723, when an Act was passed empowering parishes to unite in "unions" for the purpose of building workhouses. In them were usually provided quarters for inmates who fell sick, but the intention was that those who seriously required medical treatment should "if possible" be removed to a hospital. By 1864 the neglect in the workhouses had become a scandal, as the famous investigation by THE LANCET showed—"a mere simulacrum of real hospital accommodation."

Three years later the Act of 1867 established the Metropolitan Asylums Board and made provision for poor-law infirmaries absolutely separate from the workhouse. Thirty years later conditions were still such as to earn the vigorous condemnation of Sir Henry Burdett, though the scale of the provision made had been vastly increased.

Legislation permitting, but not requiring, local authorities to provide general hospitals besides hospitals for infectious diseases under public-health powers goes back to the Public Health Act of 1878. But as late as 1929 Bradford was the only county borough which exercised these powers. Administrative convenience was all on the side of provision by way of the poor-law. The Act of 1929 confirmed the option, giving local authorities in terms the right, though not the duty, to provide hospital accommodation under public-health powers; but by the beginning of 1937 only 36 county boroughs had exercised their option, and many still today make this provision under public-assistance rather than public-health powers.

In 1928 Sir George Newman, in his annual report, spoke of the "clear direction" given that the process "known for the last twenty years as the break-up of the Poor Law should be put in hand in a practical manner." But the fact is that there is no formal obligation upon anyone to provide for the incurable unless they be also destitute and fall under the poor-law.

## UNDER THE NATIONAL HEALTH SERVICE ACT

The new Act changes this; it becomes the responsibility of the Minister to provide "to such extent as he considers necessary to meet reasonable requirements . . . hospital accommodation." "Hospital" is defined as meaning an institution for the reception and treatment of persons suffering from illness, and "illness" in turn includes any injury or disability requiring medical treatment or nursing.

This brief survey of hospital history may serve to correct an impression which seems to be gaining ground that the voluntary hospitals have neglected their clear duty in regard to the "incurable" side of hospital work.

To substantiate the contention one has to go back many years before the foundation of the vast majority of the voluntary hospitals in the 18th and 19th centuries, and reinterpret the very word "hospital"—to give it, in fact, a medieval connotation. That is what the present Act really does; and it is all to the good. But to be fully in line with the early meaning of the word it would be necessary to go much further still, and to include within the ambit of the hospital services not only all suffering from illness that require medical or nursing care but also all the poor and necessitous. Maybe one day we shall, and the hospital will become once again a place "to entertain the poor," and care, rather than cure, become the accepted translation of *cura*.

YES OR NO ?

RESULTS OF B.M.A. PLEBISCITE

THE British Medical Association on Nov. 15 sent the following question to 56,671 members of the medical profession: "Do you desire the Negotiating Committee to enter into discussions with the Minister on the regulations authorised by the National Health Service Act?"

By Monday last 38,872 replies had been received from civilians, of which 17,688 (45.5%) were Yes and 21,184 (54.5%) were No. Of the 34% of Service doctors whose replies had been received by Monday, 56% voted Yes and 44% No.

In view of the special difficulties attending the Service poll, Service voters will be given until Jan. 6 to record their votes. A final report on the plebiscite, embodying civilian and Service figures, will be made soon after that date. Meanwhile the accompanying tables give figures up till Dec. 16.

STATEMENT BY DR. DAIN

On Dec. 12, explaining the decision of the B.M.A. council, Dr. GUY DAIN, the chairman, said that "the medical profession has stated plainly through its Negotiating Committee that the National Health Service Act as passed is in conflict with the principles of the profession." Having received the results of the plebiscite, the council had had to consider whether there was a majority and, if so, whether this was sufficient to justify not entering into discussions with the Minister. Its answer to both questions was in the affirmative. It had decided to call a special meeting of the representative

2. SOME IMPORTANT PERCENTAGES

	Total % voting	% voting "yes"	% voting "no"	% not voting	Of those who voted	
					% voting "yes"	% voting "no"
<i>All civilian categories:</i>						
Great Britain .. .. .	81	37	44	19	46	54
England and Wales only .. .. .	83	38	45	17	46	54
<i>Groups 1 to 4</i> (Consultant or specialist, general practitioner principals and assistants, whole-time voluntary hospital):						
Great Britain .. .. .	92	37	55	8	41	59
England and Wales only .. .. .	93	38	55	7	41	59
<i>Groups 2 and 3 only</i> (General practitioner principals and assistants)						
Great Britain .. .. .	88	32	56	12	36	64
England and Wales only .. .. .	90	32	58	10	36	64

body of the association on Jan. 28 to consider the results of the plebiscite and to approve the following resolution:

"That the Negotiating Committee be advised that in view of the results of the plebiscite the Minister be informed that because of the divergence between the principles of the profession and the provisions of the National Health Service Act, the committee is unable to enter into discussions with the Minister on the regulations to be made under that Act."

Examination of the results showed that of the doctors mainly concerned—i.e., the general practitioners—64% had voted against negotiating. As was to be expected, this situation was reversed in the case of men already in whole-time salaried appointments, though the large proportion of those actually in Government service voting against negotiation was regarded as significant. The poll of civilian doctors was just over 80%—an extraordinary response comparing more than favourably, for example, with the poll at the last two General Elections. The Service poll was inevitably small, on account of distance and difficulty of tracing units, only 32% replies being received at the time of speaking. Examination of the analysis showed a consistent picture: "in the general practitioner group the young doctors

1. CIVILIAN PRACTITIONERS

Group	Description	England and Wales		Scotland		Ireland		Totals		Total replies received
		Yes	No	Yes	No	Yes	No	Yes	No	
1	Consultant or specialist. . . . .	1905	2130	200	283	23	56	2128	2469	4597
2	General practitioner principal . . . . .	4736	8835	585	970	148	198	5469	10,003	15,472
3	General practitioner assistant . . . . .	814	1175	135	189	23	33	972	1397	2369
4	Whole-time voluntary hospital . . . . .	1821	1335	248	239	41	36	2110	1610	3720
5	Whole-time local-authority general hospital . . . . .	946	504	94	48	11	12	1051	564	1615
6	Whole-time local-authority special hospital . . . . .	709	303	95	53	22	6	826	362	1188
7	Whole-time public-health service . . . . .	1121	659	146	90	21	15	1288	764	2052
8	Whole-time Government service . . . . .	436	216	85	38	11	4	532	258	790
9	Whole-time teacher . . . . .	241	109	66	35	4	6	311	150	461
10	Whole-time research . . . . .	190	65	23	11	1	3	214	79	293
11	Whole-time non-Government post . . . . .	211	197	18	22	1	5	230	224	454
12	Medically qualified dental surgeon . . . . .	65	160	13	36	—	2	78	198	276
13	Retired . . . . .	1131	1753	139	240	15	23	1285	2016	3301
14	Unclassified . . . . .	992	900	170	172	32	18	1194	1090	2284
	Totals . . . . .	15,318	18,341	2017	2426	353	417	17,688	21,184	38,872

3. AGE-GROUPS (PERIOD SINCE QUALIFICATION)

Description	0-7 years				8-14 years				15-21 years				22 years and over				No age given			
	England and Wales		Scotland and Ireland		England and Wales		Scotland and Ireland		England and Wales		Scotland and Ireland		England and Wales		Scotland and Ireland		England and Wales		Scotland and Ireland	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Consultant or specialist ..	71	74	20	11	426	295	55	43	463	511	41	72	917	1218	100	209	28	32	7	4
General practitioner principal ..	327	528	67	112	813	1454	114	180	1192	2261	173	250	2327	4502	373	609	77	90	6	17
General practitioner assistant ..	428	634	103	141	231	314	28	48	75	95	12	10	71	120	12	18	9	12	3	5
Whole-time voluntary hospital ..	1319	1082	198	212	387	184	71	42	49	22	5	4	43	28	9	10	23	19	6	7
Whole-time L.A. general hospital ..	514	351	76	46	239	82	20	9	95	30	3	4	83	33	2	1	15	8	4	—
Whole-time L.A. special hospital ..	234	126	51	32	176	70	26	14	129	38	18	4	163	65	16	7	7	4	6	2
Whole-time public-health service ..	119	51	21	13	237	120	37	23	276	152	44	27	456	327	64	41	33	9	1	1
Whole-time Government service ..	90	37	26	15	94	29	21	9	73	31	14	4	170	116	30	13	9	3	5	1
Whole-time teacher ..	63	30	19	11	59	30	18	3	52	15	10	12	61	32	21	12	6	2	2	3
Whole-time research ..	90	25	12	11	48	11	6	1	16	3	2	1	32	25	3	1	4	1	1	—
Whole-time non-Government post..	29	25	3	4	40	39	7	6	60	54	—	4	76	78	9	12	6	1	—	1
Medically qualified dental surgeon..	6	22	—	3	12	22	5	9	14	34	3	2	28	80	5	24	5	2	—	—
Retired ..	10	17	6	5	26	25	4	3	42	42	8	14	1027	1625	122	232	26	44	14	9
Unclassified ..	502	340	127	98	209	172	41	30	98	94	9	16	166	274	23	41	17	20	2	5
Totals ..	3802	3342	729	714	2997	2347	453	420	2634	3382	342	424	5620	8523	789	1230	265	247	57	55

effectively support the majority against negotiation. There is no question of age overweighting the decision."

"The B.M.A.," Dr. Dain continued, "is a democratic body and in the light of these figures the council has no mandate to negotiate. The position therefore is that the B.M.A. is not empowered to accept any invitation that may be given by the Minister to the medical profession to join him in discussing the regulations to be made under the National Health Service Act. He may have many offers of help, but none from the main body representing the profession."

"It is important to remember that the National Health Service Act is not a Conscription Act and that a decision not to join the service is not disloyalty to the country. Whatever the ultimate outcome the doctors will be loyal to their calling and to their patients to whom, as always, they owe their first duty."

In answer to questions from the press, Dr. Dain stated that in reaching its decision the council had been influenced by the high negative vote among general practitioners and their assistants. Whether the B.M.A.'s withdrawal would mean the end of the Act was for the Minister to decide. The Act could not be carried out with 55% of the profession withholding their services, and even if 100% were in favour they would not be able to work it in its present form. He saw no way out except an amending Act.

Dr. CHARLES HILL, secretary of the B.M.A., explained that the profession would go on doing its work: "there is no strike here; no question of pay or conditions of service arise." As quoted in the *Manchester Guardian* (Dec. 13) he added:

"We believe in a comprehensive service available to all who need it; we believe in the merging of municipal and voluntary hospital services; we believe in the regionalisation of hospital services."

It would be necessary, he said, for the profession to make its proposals towards these ends.

THE MINISTER'S COMMENT

After the announcement of the result of the plebiscite the following statement was issued by the Ministry of Health:

"The Minister has learnt that the B.M.A. are placing the results of the plebiscite before a special representa-

tive meeting with a recommendation that the profession should refuse to discuss with him the steps to be taken to bring the National Health Service Act into operation. He hopes that before any final decision is taken accepting this recommendation, wiser counsels will have prevailed; and he feels sure that the medical profession will take no steps which would make it difficult for them to take part in the comprehensive health service which the people of this country so ardently desire.

"Meanwhile, the Minister has a clear duty to carry out the instructions of Parliament as expressed in the Act, and he can no longer postpone the consultations which are a necessary preliminary to the setting up of the administrative machinery. He is, therefore, proceeding to consult all the many other interests which will be concerned in the National Health Service. He is also considering what ought to be done—and this is a matter to which he attaches great importance—to give the medical profession the opportunity of assisting to shape, and of playing its part in, the new service."

TRADE-UNION MEMBERSHIP

THE following letter, signed by Dr. Charles Hill as secretary, is being sent by the British Medical Association to all local authorities:

The Association has considered, with particular reference to medical officers in the local government service, the position arising from the repeal by the Trade Disputes and Trade Unions Act, 1946, of the Trade Disputes and Trade Unions Act, 1927, Section 6 of which made it illegal for any local or other public body to require as a condition of the employment of any person that he should or should not be a member of a trade union.

Some local authorities have passed resolutions imposing on their employees a requirement of membership of a trade union or other organisation. In this connection I am instructed to inform you that the British Medical Association, which represents the great majority of doctors and enjoys a membership of over 54,000 and is the negotiating body for the medical profession, recognised as such by the Ministry of Health and the associations of local authorities, is opposed on principle to a practitioner being required to join any body, British Medical Association or other—this does not of course apply to membership of medical defence societies. The Association prefers that its membership should be voluntary, the strength of the Association remaining an expression of the profession's confidence in its representative body.

I should be glad to hear from you on this matter with regard to appointments under your Authority.

On Dec. 11 the council of the B.M.A. decided that—

Where an authority imposes upon its officers or candidates for office a requirement of a membership of a particular body or bodies, B.M.A. or other (but excluding medical defence societies), the Association should protest to such authority, and afford financial help to any practitioner who suffers as a result of accepting the advice of the Association. All advertisements for whole-time public health medical officer appointments of such authorities, submitted by such authorities for publication in the *British Medical Journal*, shall be rejected and the profession advised not to make applications for such posts.

## DEVELOPMENT OF NEUROSURGERY

REVIEW BY MR. CALVERT

WITH Prof. W. W. D. THOMSON in the chair, the annual address to medical students of the Royal Victoria Hospital, Belfast, at the opening of the winter session, was given by Mr. C. A. CALVERT, F.R.C.S.I., who spoke on the history and development of neurosurgery.

Though neurosurgery is one of the most youthful of the surgical specialities, surgery of the skull was, he said, one of the earliest crafts. In the Edwin Smith papyrus, of about the 16th century B.C., 27 cases of head injury are described, and the occurrence of deafness in fracture of the temporal bone is noted, together with the advice that in closed head injuries decompression should be performed at the point of contusion. Hippocrates emphasised that no head injury was to be considered trifling, since even a scalp wound might prove fatal. His classification of skull fractures was almost modern, and he advised the use of a trephine in certain cases and that, when the instrument becomes hot, it should be cooled from time to time, the greatest care being taken to avoid injury to the dura. His subsequent dressing, a preparation of either wine and honey or of tar, was virtually an antiseptic application.

Under the Romans surgical operations were carried out for many different conditions, and the surgeons were equipped with many well-constructed instruments. Some of Celsus's observations on head injuries included the serious prognostic significance of prolonged unconsciousness and bleeding from the nose and ears. Galen, unfortunately, said that surgery was to be regarded merely as a branch of medicine, and this was interpreted by the Arabs (to whom is due the credit for preserving many of the works of the ancient Greeks) as meaning that surgery is an inferior kind of work. As a result, in medieval times physicians came to regard any method of treatment which involved the shedding of blood as being beneath their dignity.

After Vesalius's publication of his treatise on human anatomy the spirit of investigation once more stirred abroad, and the great French military surgeon of the 16th century, Ambroise Paré, introduced a rational attitude in the treatment of wounds. In 1760 Percival Pott published an important treatise on head injuries and gave an admirable account of extradural abscess. Instead of using the cruciate incision of the ancients, Pott exposed the skull by cutting out a complete circle of scalp, and he divided skull fractures simply into those with, and those without, depression, his practice being to operate on all cases of depressed fracture. But though Pott added considerably to our knowledge of head injuries, and men like himself and Cheselden did much to improve craftsmanship, no new principle was introduced into surgery from the time of Ambroise Paré until the advent of John Hunter towards the close of the 18th century.

During the first half of the 19th century surgical technique had developed to a state that could scarcely be excelled, but anaesthetics were still not available until Morton, in America, introduced ether in 1842 and Simpson, of Edinburgh, discovered chloroform in 1847. Even then the spectre of postoperative sepsis precluded any widening of the application of surgery, and operation on the body cavities was not attempted until 1867, when Lister introduced the principle of the antiseptic treatment of wounds. By this time knowledge of diseases of the nervous system had already been considerably advanced.

In 1862 Broca discovered that the posterior end of the third left frontal convolution was the centre for articulate speech in right-handed persons. He was the first to trephine for cerebral abscess, the situation of which could now be defined by his theory of cortical localisation. In the latter half of the 19th century neurologists unravelled the syndromes of neurological disorders and built up, with the experimental physiologists, pathologists, and others, the foundations of modern neurosurgery. The first removal of a cerebral tumour was carried out in 1884 by Mr. Rickman Godlee, but the pathology and life-history of tumours was not fully understood, and the hydrostatic factors which complicated space-occupying lesions within the skull had still to be learnt by bitter experience.

In the last two decades of the 19th century knowledge of cerebral localisation increased immeasurably. Horsley may be said to have established the surgery of the central nervous system on a scientific basis. He standardised the methods of operative approach for brain and spinal-cord tumours, and was one of the first to realise that vision could be preserved, headache relieved, and life prolonged by decompression. Working in association with Gowers, he carried out the first successful removal of a spinal-cord tumour in 1887. One of the fields in which encouraging results were first recorded was in the treatment of intracerebral abscess. Sir William Macewen's classical work on the subject was published in 1893; of 20 cases on which he had operated all except two recovered. These results have not been surpassed, or perhaps even equalled, up to the present day.

In the opening years of the present century Harvey Cushing, in America, gradually built up a school of neurosurgery. There was a steady flow of new ideas from his clinic. The physiology of the pituitary was worked out by Cushing, and the enlargements to which it was subject were clearly defined.

At one time all tumours arising within the brain were lumped together as sarcomas. Neuropathologists demonstrated that these tumours arise from the supporting cells of the brain in the glia, and they renamed them gliomata. Recognition of their varying degree of malignancy and rate of growth helped greatly in directing the neurosurgeon when to stay his hand and when to try and effect a complete removal.

The diagnostic value of X rays was not utilised to the full in neurosurgery until after 1918, when Dandy demonstrated that air could be used as a contrast medium to outline the ventricular system, thus providing a method whereby not only the situation but also the size of most brain tumours could be determined. Another new form of radiological investigation was that of cerebral arteriography. A contribution of signal value was the adoption of the high-frequency current for the coagulation and excision of intracranial tumours by Cushing and Bovie in 1926. Diathermy served a dual purpose: it reduced the incidence of bleeding and paved the way for extirpation of many tumours whose removal previously had to be abandoned because of difficulties of access. Two very recent additions to our operative resources are substances prepared by the fractionation of human blood-plasma and named fibrin-foam and fibrin-film by their originators, Ingraham and Bailey, of Boston. The foam is of immense value as a hæmostatic agent, and the film provides an excellent dural substitute. Also great advances were made in overcoming sepsis by the introduction of the sulphonamides and penicillin. In the 1914-18 war the death-rate from wounds in which the dura had been penetrated was 55-60%, though Cushing, in his final series of selected cases, reduced the mortality to 28.8%. In the war of 1939-45 the death-rate from all forms of penetrating wounds of the brain, transventricular cases included, was about 8.9%.

Finally, Mr. Calvert said, neurosurgeons have had the temerity to invade the territory of the psychiatrist. Though the range of application of frontal leucotomy, originally devised by Moniz and Lima, and precise knowledge of the tracts in the brain to which section should be restricted still await accurate definition, many hundreds of leucotomies have been performed, and the results indicate the undoubted merit of the procedure in carefully selected cases.



## Reconstruction

### HOSPITALS

#### REGIONAL SURVEY OF NORTH-EAST

THE last of the hospital surveys,<sup>1</sup> dealing with the north-eastern area, which has now been published, is of the same high quality as earlier volumes in the series. The area includes two counties (Durham and Northumberland) and part of a third (North Riding of Yorkshire), eight county boroughs (Newcastle, Tynemouth, Darlington, Gateshead, South Shields, Sunderland, West Hartlepool, and Middlesbrough), and 81 minor authorities. The population exceeds two and a half million, served by 112 local-authority and 54 voluntary hospitals, with 11,634 and 4490 beds respectively. The survey area is coterminous with the region of influence of the Newcastle school of medicine, which should, in addition, extend to Carlisle and Cumberland, and a small area of Yorkshire around Whithy.

#### HOSPITAL BEDS

The surveyors follow the usual plan of dealing seriatim with the various kinds of hospital services—acute sick, chronic sick, accident services, ambulances, &c.—and then considering the facilities provided by each hospital, grouped into natural hospital districts; five of these are recommended, based on large towns which are social and business centres, but ignoring local-government boundaries. The surveyors comment on the interest of hospital managing bodies and of local doctors in the future of the hospitals, and their recognition that the services are not at present meeting all needs.

For the acute sick there should be more beds, more consultants (these, as elsewhere, can at present earn a living only in the teaching centre), and more up-to-date buildings; despite housing and school priorities, some new hospital building is urgently necessary. In the meantime, consultants should be trained. The general hospitals in which the acute sick are treated are classified into three main groups:

- (1) The *teaching hospital* at Newcastle, the Royal Victoria Infirmary, which, with the municipal general hospital and the special hospitals, should form a centre whose influence and example would be felt throughout the region.
- (2) *District or main hospitals* of 600–800 beds (some of which would be formed by combining several existing hospitals) which should be fully staffed by consultants, responsible for the treatment of both in- and out-patients.
- (3) *Cottage hospitals*, which fulfil a useful purpose within their proper sphere. They are essentially general-practitioner hospitals, and, while they need some out-patient facilities, they should not retain patients needing special investigation and treatment.

The chronic sick, here as elsewhere, receive insufficient provision, both medical and social. Full investigation and any treatment should be available in large general hospitals before their admission to other institutions. Consultants should regularly visit the wards and institutions containing the chronic sick, among whom there is a large field for clinical research.

The accident services in an area of heavy industry such as this are already good in many places—the Victoria Infirmary probably treats more fractures than any other English general hospital—but further expansion of both accommodation and expert staff are needed in some parts. Rehabilitation should be available in every orthopaedic department, special rehabilitation centres should be provided for long-stay inpatients, and each hospital district should have its own accident service. The ambulance services should be more closely co-ordinated, preferably on the basis of hospital districts; each of these should have a central bureau which would be available day and night.

1. Hospital Survey: the Hospital Services of the North-eastern Area. By Sir Hugh Lett, Bt., C.B.E., D.C.L., F.R.C.S.; and A. E. Quine, M.B., F.R.C.S., D.P.H. H.M. Stationery Office, 1946. Pp. 132. 6s.

### SPECIAL SERVICES

For the orthopaedic service the surveyors recommend the integration of an expanded service organised in three sections, for Northumberland, Durham, and the North Riding. The tuberculosis service, with 2146 beds, also requires some expansion, partly because more cases are recognised as needing treatment and partly because of the conditions imposed by modern therapy. Any accommodation which ultimately proves surplus to this particular work will be invaluable as a country open-air hospital. The tuberculosis service should be more closely associated with that of the general hospitals; closer attention, for the sake of both patients and staff, should be given to the kind of accommodation provided for advanced cases; and a better service would result from the grouping of authorities.

The surveyors hold the same opinions on the future provision of infectious-disease accommodation as their colleagues of other regions. The community-value of isolating these diseases is secondary to the advantage the patients can derive from expert treatment in large units. The existing 49 fever hospitals (with 2649 beds) should as a first step be reduced to 17 (with 1973 beds); but the apparent 34% loss of beds would be largely compensated by the increased provision of cubicle blocks, allowing of the easy treatment of different diseases in the same block with a minimal risk of cross-infection. The final concentration should be into 6 or so large hospitals; and in the meantime, infectious-disease units at general hospitals should be developed on an experimental basis. Smallpox, whose infectiousness still demands circumspection, may at present still be allotted to 16 hospitals, some of which are fit only for permanent closure. The use of specially built and isolated blocks inside the curtilage of large fever hospitals merits consideration, and one or two of the best fever hospitals to be disbanded should be kept in reserve to meet emergencies.

While the surveyors disagree on the desirable total of maternity beds, they are at one in recommending that the 434 beds available for a proportion of the 45,000 annual births should be supplemented by at least a further 200. Many, for normal deliveries, should be in small units, but all should be linked, on the basis of hospital districts, with the principal maternity hospital.

In the section on paediatric services, the appointment of a professor of child health at Newcastle in 1942 is commended, and his importance in the training of future paediatricians emphasised.

The North of England Joint Cancer Committee was formed in 1945, and covers not only the greater part of the survey area but also Cumberland and Carlisle. Investigation and follow-up are centred on the Newcastle hospitals; the central bureau is at the Victoria Infirmary, and non-surgical cases are mainly dealt with in the cancer unit at Shotley Bridge Emergency Hospital. Other approved hospitals will come into the scheme as associated hospitals; a cancer unit will be established at Cumberland Infirmary and joint consultation between clinician and radiotherapist to decide appropriate treatment is an accepted principle.

As elsewhere, existing pathological services need augmentation; pathologists, technicians, and laboratories are insufficient for the work which should be done. But in this field, as in many others, the needs of the region have already been considered at the instigation of the North-eastern Hospitals Regional Council. Durham, Newcastle, Gateshead, and Tynemouth have already agreed to establish a joint committee to take over the management of the university and city laboratories, and to co-ordinate the work with that of the Northumberland county laboratory; the nucleus of an authoritative epidemiological centre will thus be established. There should be association of the laboratories at South Shields and the Hartlepoons with that at the Sunderland Royal Infirmary. There is also need for a pathological institute at Middlesbrough, and laboratories at Darlington and Durham.

### NURSES

Here, as elsewhere, the demand for nurses exceeds the supply; but even before the war insufficient nurses were appointed for the number of hospital patients. This

must be rectified, and the necessary increase in hospital and sanatorium beds will intensify the problem. Encouragement can be drawn from the fact that between 1936 and 1944 the number of nurses entering for the preliminary State examination increased by 75%; but wastage during the training period amounted to over 50%, so that the number qualifying increased by only 34%. The awkward gap between school-leaving age and the age of entry for nursing training may be partly surmounted by the introduction of preliminary courses in secondary and technical schools; 14 such schools have been approved in the north-eastern area. For the rest, the establishment of preliminary training schools and of the State roll of assistant nurses are steps in the right direction.

#### DISTRICT ORGANISATION

The surveyors recommend the organisation of the hospitals in the region on the basis of five hospital districts.

- (1) *Newcastle*, with a population of almost 1¼ million, to include Northumberland, part of Durham, and the associated county boroughs. There is a general need for more beds and a particular need for more medical beds in Newcastle itself even when Durham's services are fully developed. The hospitals should have as their focusing-point a hospital centre in Newcastle, to include the Royal Infirmary and six of the special hospitals. When this becomes possible, a further 350 beds, to bring the total to 1250, will be needed, as well as more consultants, who should also be on the staffs of other hospitals. Other needs in this district are enlargements at Gateshead, a new hospital at Bedlington-Ashington, more maternity units, and more and better accommodation for the chronic sick. The local application of the surveyors' infectious-disease concentration policy is specified in this and the other districts.
- (2) The *Sunderland district* has a population of nearly 360,000 and needs more acute beds (to be provided by additions to existing units), more consultants, and more maternity units.
- (3) The *Middlesbrough district* also has a population of about 360,000; and a large new general hospital of not less than 800 beds is needed in Middlesbrough itself.
- (4) The *Darlington district*, with a population of 170,000, should have the size of its municipal hospital almost doubled.
- (5) The *Durham district*, with its 288,000 population, has mainly relied on Newcastle for its hospital services, and is short of indigenous facilities, which should be established round a new hospital at Dryburn and the Durham County Hospital.

In addition to these five districts, the surveyors give some consideration to the Hartlepoons, where, at the time that their report was written, local considerations might have necessitated the development of a hospital service for the 120,000 people living in the area. In view of the proposals in the National Health Service Bill, however, the services in this area will probably develop in association with those of either the Sunderland or Middlesbrough district.

This report reflects the coöperation between all hospital services, municipal and voluntary, which has steadily developed in this region. This is further illustrated in the report for 1945 of the North-eastern Hospitals Regional Advisory Council which, under the active chairmanship of Lord Eustace Percy, has outlined development plans which should be of great use for the future. The pathological and accident services, maternity-bed provision, the hospital centre for Newcastle, the requirements of an outpatient polyclinic, and various other matters have been fully explored by special committees and subcommittees of the council.

"... It is easier to build a new hospital at the cost of a million pounds than to make sure that old-fashioned methods of treatment and nursing are not preserved inside those new walls."—Dr. HARLEY WILLIAMS in *Doctors Differ*, London, 1946, p. 99.

## In England Now

### A Running Commentary by Peripatetic Correspondents

THE psychiatrists have had a go—in fact a good many goes—at Hitler. It is time the neurologists had a chance, and here are some data for them which are at any rate more concrete than the speculations on which the psychiatrists have based their diagnoses from a distance.

Mr. H. R. Trevor-Roper, writing about Hitler in the *Daily Telegraph* on Nov. 29, says: "In 1943 the first symptoms of physical alteration became apparent, Hitler's extremities began to tremble, especially the left arm and the left leg, his left foot dragged upon the ground; and he developed a stoop. The tremor was not, as has often been stated, a consequence of the explosion of July 20, 1944, it had already been obvious for some time, and the visible decline of the Fuehrer's health had even been the subject of an emotional broadcast by Dr. Goebbels in April, 1943. . . . All witnesses of the final days agree when they describe his emaciated face, his grey complexion, his stooping body, his shaking hands and feet, his hoarse and quavering voice, and the film of exhaustion that covered his eyes." Now these, allowing for the fact that they are the observations of laymen, are a remarkably accurate account of the symptoms of parkinsonism. Moreover, Mr. Trevor-Roper records that Hitler was being given a preparation containing belladonna, of which he took two to four pills with every meal. Mr. Trevor-Roper takes the view that Hitler's symptoms were due to the variety of drugs which he was given, but if Hitler had parkinsonism belladonna was the appropriate remedy. There must still be enough witnesses, perhaps even medical witnesses, to clear up the point.

If indeed Hitler had parkinsonism, was it due to encephalitis lethargica? And was his illness in 1918, when his eyes were affected, not hysterical at all but the initial attack of acute encephalitis which was epidemic at that time? If so, was this disease responsible for his aggressive temperament and all that followed from it, and also for his final downfall? Has the history of Europe in the last twenty-five years been merely a commentary on the activities of a neurotropic virus in one man's brain?

Wives of G.P.s with a char for two hours a day, a child of four, and a consulting-room in the house will anticipate what I mean when I say that it has been one of those days.

It was 7 P.M. with a gale howling when my husband was called out for the fourth time and 7.15 when the door bell chimed. A man stood on the step with his left hand swathed in a handkerchief. Poor devil, I thought, another injured hand. I was prepared to do my stuff. He glared at me and shouted angrily, "What have you done to your gate? Looks like wet paint. Why don't you put up a notice? And why don't you have something done about the street lights? Doctor's house, isn't it? Ought to be lit up."

"We are having the house painted," I explained mildly. "There was a notice but I suppose the gale has blown it away. The doctor is out on a call, but if you'll come in . . ." &c., &c. I felt fed up, but I warned myself that the man might be a neurotic under stress, his wife might be in labour, his children might be . . . "It's my little boy," he said, "I'd better wait."

I took him into the surgery, got a wad of cotton wool and some turps and handed it to him. I pulled a chair up and offered some magazines, including that morning's issue of *Punch*. "No thanks," he growled, "they're always months old." I felt myself getting hot where a man wears a collar. A crise de nerfs was pending. To my horror I found myself offering him a blank sheet of paper and saying, "In that case will you be good enough to write out another *Wet Paint* notice? I have a lot to do and the doctor has had nothing to eat since . . ." The phone shrilled. I was able to leave the man with considerable dignity.

I am wondering whether Mr. Bevan is going to get many applications for my job when 1948 comes round. In the meantime I'm reading *Yellowlees* on "The Human Approach" and taking phenobarb. After a few chapters of this excellent handbook for doctors' wives I realise that my caller should have been more explicit if

he wished to enlist my sympathy. Instead of "It's my little boy" he should have said "It's the little boy in me." I might have liked him then. Maybe.

I wish that some authority would solve my difficulty. Recently in speaking to a lady who was medically qualified I referred to another qualified lady by the word "doctor" prefixed by the word "lady." To my astonishment I was not allowed to proceed until I had listened to an impassioned protest against the use of such a designation. In mentioning this to another lady in the same qualified category but of a succeeding generation I was amazed to find that she eagerly supported the protest. Each lady objected strongly to being called a woman but did not find fault with the term "woman-doctor." For myself the latter term offends the few æsthetic susceptibilities which I retain and I refuse to include it in my vocabulary. But what word can I use? "Female doctor" is unthinkable, and "feminine doctor" might with truth be applied to some of the male gender. A "doctor of the softer sex" might have been accurate years ago but would be a euphemism now. So far as I can see the only solution is to use a suffix instead of a prefix and speak of a "doctress." I see that the Oxford Dictionary prefers "doctress" but allows the longer form. In spite of everything I think my original term (which in deference to the ladies I have not used in this note) is quite as correct, more polite, and æsthetically inoffensive.

When Mrs. Jones, a panel patient 5 months pregnant, had a spontaneous rupture of the membranes the other day she started labour practically forthwith. After some cajoling on the telephone, the district midwife, evidently an exponent of the closed shop ("not really my case under 28 weeks"), went into action. She delivered a five months' fetus (Albert I) which, unforgivably (as you'll see), made a respiratory movement and cried feebly for a moment or so after the cord was cut. Mr. Jones was informed of the fact and telephoned me, "Will you come at once, doctor, the baby's breathing." On my arrival the fetus was as defunct as the proverbial doornail, and the midwife was engaged in delivering a twin of the same proportions (Albert II), but this one made no respiratory or vocal effort to enter this wicked world.

All this may seem very humdrum and commonplace, but what about the disposal of the dead? Albert I was obviously not entitled to a stillbirth, birth, death, extra coal, milk and egg, corset, or hot-water bottle certificate, but no undertaker could accept him without some such legal document; at the same time the off-hand disposal of his remains into the fire (indelicate and impractical anyway in these days of fuel shortage), the earth at the bottom of the garden, or my bag (a last resort) might be the subject of idle or malicious neighbourly gossip. Legally Albert I had never been a living being; factually he had, for a brief glorious moment, led an independent existence of which his parents were aware.

The coroner's officer was the only man to provide the answer: "Oh, a miscarriage that squeaked?" (How much better, how much more descriptive than technical jargon!) "Well you don't give any certificate, and do what you like with the remains."

The sum total of this little matter is that I have a couple of fetuses for sale to offset a considerable telephone account (behind the scene backchat with midwife, fellow practitioner, fuel office, and coroner's office) and a large amount of time which might have been charged to Mrs. Jones's account—only as I said she's a panel patient and apparently all this comes within the scope—all for fifteen bob a year, in other words.

Our V.A.D. clerk in the Medical Division is obviously suffering from "mal du siècle" (20th-century version). Her latest typewritten report on a barium meal reads: "Stomach J shaped, atomic. . . ." Staggered by this discovery, I wondered who was in more urgent need of attention, the trooper whose stomach gracefully sagged, or the V.A.D. who had revealed such explosive forces in her subconscious mind.

"Oh yes, I've met *him*, of course—awfully decent fellow and all that, but frightfully Third Programme!"

## Letters to the Editor

### ETHER ANÆSTHESIA IN 1817?

SIR,—In the *Edinburgh Medical and Surgical Journal* of April, 1847 (vol. 67, p. 564), there is an article entitled "Facts and Observations on the Inhalation of Sulphuric Ether Vapour as a Narcotic and General Anodyne, with a Description of the Instruments commonly used." The article is unsigned and, from the impersonal style of wording, it appears to be of the nature of an editorial commentary on the then recent employment of ether "anæsthesia," although that word is nowhere used by the writer. The greater part is devoted to an account of the work of Jackson and Morton in America, of that of Boote and Liston in London, of a fatal case at Colchester, and of five different patterns of ether inhaler, four of which are illustrated in the accompanying plate, including those used by Squire and Snow.

Apparently the writer does not accept as a new discovery the recent introduction of ether. He writes. "We do not allow that there is, in the administration of this agent to the human system, anything positively new"; and later, "To us it appears to be merely the application in an officinal form, of an agent, the anodyne and narcotic effects of which have long been known." The most interesting part of the article, to present-day readers, is the description of a case thirty years previously in which ether had been used for the relief of pain. "In the year 1817," states the writer, "a woman was brought to the Royal Infirmary of this city, by persons who stated that, in eating soup, a bone had stuck in the throat and threatened to choke her. She was labouring under great and agonising difficulty of breathing, could not speak, and often pointed to her throat as the seat of all her sufferings." At first the surgeon, whose name is not mentioned, could detect no foreign body, while his assistant "thought that inhalation of the vapour of ether might afford relief." This was used with excellent effect, and next day the surgeon "felt the end of some firm body" and, introducing forceps, he "withdrew a fragment of the superior maxillary bone of a hare." Two days later the patient left the hospital, cured. "The inhalation of the ether, however imperfect, had both relieved the present symptoms of the patient, and had enabled her to undergo more easily than she could otherwise have done the pain of examination for the splinter of bone, and afterwards that accompanying and following extraction."

It is not easy to understand why the writer, in 1847, should feel obliged to go back thirty years in order to find a case to illustrate his remarks, but he proceeds to state that the "narcotic and anodyne effects" of ether inhalation have been "long well known," and he appears to doubt whether "the present mania for etherism previous to operations can do all that is expected from it." He concludes by suggesting that in another twelve months' time the subject may "be considered in its true light and on its actual merits."

It is curious to read this critical contemporary evaluation of what we now regard as a major discovery, and to speculate on what might have happened if that Scottish surgeon of 1817, to whom the writer refers, had pushed his ideas—and his ether—a little further. It would be interesting to know who he was, who thus so nearly discovered the anæsthetic value of ether thirty years before Morton. Or did he actually discover it, while failing to realise its significance?

Edinburgh.

DOUGLAS GUTHRIE.

### CALCIFEROL FOR TUBERCULOUS ADENITIS

SIR,—In reply to Dr. Bell's inquiry in his letter of Nov. 30, calciferol therapy has been extensively employed at this hospital during the last few months. It was first started in the treatment of lupus vulgaris under the guidance of Dr. G. B. Dowling, and secondly it has been used in a series of cases of tuberculous adenitis. It is as yet too early to give the results in this latter group, but it is hoped to publish a paper on the subject with full pathological investigations in the next few months.

SUZETTE GAUVAIN.

Lord Mayor Treloar Cripples' Hospital.

### ERYTHROBLASTOSIS FŒTALIS AND ITS TREATMENT

SIR,—Your editorial (August 17, p. 242) included a comprehensive evaluation of current methods of treating erythroblastosis fœtalis.

The frequent failure of repeated transfusions with Rh-negative blood, and the benefits of the exsanguination-substitution technique are especially important. A number of factors may influence the outcome in these cases. The effect of the stroma of lysed erythrocytes is hypothetical.<sup>1</sup> Toxic manifestations apparently can occur from the administration of red-cell stroma. This was shown by Wiener,<sup>2</sup> who attempted unsuccessfully to use this substance as a desensitising agent in the mother during pregnancy. It is also widely recognised that infants with hæmolytic disease often show listlessness, lack of tone, and inability to take food—symptoms which are frequently associated with toxicity in the newborn.

Consideration should also be given to the effect of the antigen-antibody reaction *per se*, and the resultant chemical substances which produce an effect similar to anaphylaxis. Inhibition of liver function attendant upon improper oxygenation owing to the shock-like state may also be a factor. The effect of overwhelmingly large quantities of bilirubin upon a liver already damaged, with the resultant morphological counterpart of intra-hepatic biliary obstruction, has already been stressed.<sup>3</sup> Individually or collectively these influences may well result in liver failure.

The significance of individual reaction to hæmolysis has recently been called to our attention by Rh-positive triplets born to a Rh-negative mother. All three showed varying intensities of hæmolytic disease, although they were all undoubtedly subjected to the same variety and amount of antibody. Similar experiences have been reported by others with regard to twin pregnancies,<sup>4</sup> but with a different interpretation. It was suggested that morphological variations of the placental vessels permitted the return of differing quantities of maternal antibody to each twin. While this theory may apply to the "leakage" of red blood cells, it does not appear likely that anatomical defects are necessary for the return of the antibody molecule through the capillary walls. It appears more probable that the antibody will pass through to each twin in equal concentration and at the same time. Thus the varying degrees of clinical erythroblastosis seen at birth are apt to be affected by differences in susceptibility or individual reaction on the part of the infant.

The concept of a direct action of the antibody upon tissue cells does not appear to be acceptable. This theory would postulate the presence of the antigen in those cells—a condition which is quite rare for the Rh antigen, if it exists at all. Even if present, these antigens should not be expected to behave in an exceptional manner, completely different from that of other iso-agglutinogens known to be more frequently present in tissue cells and secretions as the A and B substances. The low incidence of hæmolytic disease due to the iso-agglutinins anti-A or anti-B would seem to argue against such a mechanism with regard to the Rhesus antigen.

Whatever mechanism will be eventually proven as the cause of a poor prognosis in many of these infants, it appears likely that the removal of most of the Rh-positive cells and of the circulating antibody shortly after birth prevents the incidence of the more severe pathological and physiological changes. The choice of blood-vessels for the performance of the substitution must depend upon the experience of the operator in the techniques of bleeding. The umbilical vessels should be an excellent route for both the withdrawal and replacement procedures. They can only be used, however, if the decision to perform the substitution is made before birth, and universalised Rh-negative blood is prepared for the replacement.

According to our present knowledge such a course should be followed only when there have been siblings with severe or fatal erythroblastosis. One cannot rely solely upon tests for antibodies in the mother's serum as

an accurate indication of impending disease. It is often necessary to establish the criteria for therapy by observations of the newborn infant's clinical and laboratory status. The colour of the amniotic fluid and the vernix caseosa, the presence of jaundice, œdema, and splenomegaly, and the response of the baby to stimuli should be noted. Blood studies, including the extent of anaemia, the nucleated red-cell count, serum proteins, blood-group, and Rh status, should be performed. The few hours needed to make these observations do not appreciably affect the safety period so far as the institution of treatment is concerned, but do render the use of the umbilical vessels impossible.

We have thus far treated 12 infants by the substitution technique. The sagittal sinus has been used for bleeding in 10 cases and the radial artery in 2. We have as yet encountered no complications with the fontanelle route. Of the 12 treated, 9 have recovered. Of the babies who died, 2 were treated forty-eight hours or longer after birth, and both showed autopsy evidence of fully developed kernicterus and liver damage. The third was given heparin to facilitate bleeding from the radial artery, and at autopsy showed a tentorial laceration with marked hæmorrhage. Since it has been shown that silent intracranial injury is relatively common,<sup>5</sup> it would appear that heparin is a dangerous drug to use in the newborn infant.

In conclusion, permit me to say that your clear-cut discussion of the problem was most enjoyable, and that it should prove of considerable assistance in determining the paths of further research.

Erythroblastosis Fœtal Clinic,  
Jewish Memorial Hospital,  
New York.

HARRY WALLERSTEIN  
Director.

### ICTERUS GRAVIS NEONATORUM

SIR,—I was pleased to read Sir Leonard Parsons's friendly criticism (Nov. 30) of my article published on Nov. 2. The paper invited criticism, and with such a big subject I had found it difficult to be concise.

Muir's *Textbook of Pathology* (5th edition) divides jaundice into: (i) hepatogenous, (a) obstructive and (b) toxic; and (ii) hæmatogenous. The name "toxic hepatogenous jaundice" is applied in this textbook to conditions arising from damage to the liver parenchyma, of which acute yellow atrophy and icterus gravis are cited as outstanding examples. Under the heading of hæmatogenous jaundice are included such conditions as acholuric jaundice, pernicious anæmia, sickle-cell anæmia, and "the type of transient jaundice occurring in newborn children known as icterus neonatorum." Cappell<sup>1</sup> seems to agree that this is essentially a hæmolytic disease, but further on he writes of the "immature" antibodies and the "mature" (blocking) antibodies as gaining a concentration sufficient to damage the foetal tissues. "Certainly," he concludes, "many infants show severe liver damage and the occurrence of cerebral necrosis with kernicterus is well recognised." There are many other factors to be considered: the incidence of the disease, with the suggestion that some may inherit the susceptibility to isoimmunisation; the influence of a hetero-specific pregnancy, with the so-called competition of the antigens; the sometimes grave illness of the infant out of all proportion to the amount of antibody in the maternal serum; and, most significant, the severe illness of the child with so little evidence of it in the peripheral circulation. And so, rightly or wrongly, I took the view that true icterus gravis could not be wholly hæmolytic, but was a toxic condition.

Secondly, Sir Leonard Parsons criticises my opinion that blood-transfusion is satisfactory in erythroblastæmia only. I would inquire as to the average present age of his series of 250 babies, and whether they have been examined, as mine were, at an average age of 18 months with special attention to possible abnormalities in the central nervous system. I also thought that some babies gravely ill with icterus gravis showed features suggesting the possibility of future kernicterus—deep jaundice, a feeble cephalic cry, extreme hypersensitiveness to light and touch, some suggestion of head-

1. Wallerstein, H. *Science*, 1946, 103, 583.  
2. Wiener, A. S. *N.Y. St. J. Med.* 1946, 45, 296.  
3. Davidsohn, I. *J. Amer. med. Ass.* 1945, 127, 633.  
4. Demy, N. G. *Amer. J. Obstet. Gynec.* 1944, 47, 554.

5. Potter, E. L., Adair, F. L. *Fetal and Neonatal Death*, Chicago, 1940.

1. Cappell, D. F. *Brit. med. J.* Nov. 2, p. 641.

retraction, and an overall picture of an infant having a posture unlike that of a healthy infant.

"Finally," Sir Leonard Parsons writes, "Rh antibodies have been found in breast milk, but the evidence that these have any ill effect on the child is, so far, insufficient to warrant artificial feeding in preference to breast-feeding, although it may be wise to express the breast milk and boil it before giving it to the child." Cappell advises simply heating the expressed milk (how much is not stated), while on the other hand Taylor and Race recommend that the child should be taken off the breast.

I would again stress the importance of homologous blood-transfusion; no female in or below child-bearing age should be given whole blood without investigation of her Rh group, and all Rh-negative donor panels should be revised in the light of present knowledge. If this is not done we will in future years reap a rich harvest of anamnestic reactions and perhaps a higher incidence of icterus gravis.

Nelson, Lancs.

HENRY THIRD.

### WELFARE OF DEAF CHILDREN

SIR,—As your annotation of Nov. 30 (p. 800) implies, the Education Act offers hope for better training of deaf school-children, but there is still very little being done for the deaf preschool child. It is between the ages of 2 and 5 years that *preferential* consideration is needed because:

1. At this stage the child is keen to learn—is in an "appetitive" phase and more receptive of simple tuition.
2. For the partially deaf child there is enormous value in the early learning of sound language.
3. If the deafness is not recognised by the age of 2 years and training started immediately the child becomes mentally backward as well as having both hearing and speech defects. This handicap cannot easily be overcome later.

It is not generally recognised that there are so many deaf children in Great Britain. Recent figures by the Ministry of Education<sup>1</sup> show that among children under 15 years 1 in every 1000 is deaf and 1 in every 1000 partially deaf: this means that 2 in every 1000 school-children need consideration. Since 22% of the present population are children up to 15 years of age,<sup>2</sup> it follows that in each community of 120,000 persons there are about 50 deaf or partially deaf children; this is enough to call for a separate school with five classes in it. Before school age these 50 children are in need of urgent help.

It is questionable whether it is advisable for very young children to go to a residential school. The tearing away from home associations at an early life has many disadvantages. If facilities for day schools and home tuition were made then the child would profit.

It is therefore important to stress:

1. The need for early recognition of deafness by parents and general practitioners. Any child not talking or obeying instructions by the age of 2 years should be suspected of deafness.
2. The need for advisory centres to tell parents and G.P.s when to send the child for (a) recognition of actual deafness, and treatment if possible; (b) grading of the deafness into the recognised groups of slight, moderate, severe, and total.
3. The need for more teaching centres for (a) preschool children; (b) school-children.
4. The need for more teachers of the deaf. Without these nothing can be done to provide for no. 3.

It is hoped that the Medical Research Council sub-committee on educational problems of the deaf will soon release useful and constructive findings both for future experimental work and for present-day clinical and social improvements. While awaiting this release other plans can be considered:

*Long-term Policy.*—(1) Foundation of a centre in London similar to that in Manchester and several in the U.S.A. with full scope for training teachers, teaching children, and research.

(2) Amalgamation of all the different educational, social, religious, and medical societies dealing with, and interested in, deaf children into one vital force.

1. Special Educational Treatment. Ministry of Education Pamphlet, no. 6.  
2. Current Trend of Populations of Great Britain, March, 1942.

*Short-term Policy.*—(1) Enrolment of teachers for the deaf from demobilised men and women at once.

(2) Arrangement of small "nursery" clinics for preschool children where tuition could be given to the child and the parents. This is explained more fully below.

(3) Arrangement of lectures and meetings for parents.  
(4) Provision of speech amplifiers to parents for home use with small children.

(5) Provision of more hearing-aids to individual children (in some even at the age of 4½ or 5). It is reasonable to expect that soon the school authorities will allow children in the "moderate" group of partially deaf to go to ordinary schools, with aids which are efficient and strongly made, if preschool tuition has brought the child up to a suitable standard.

(6) Provision of more class amplifiers in schools for the deaf. A "moving up" of some of the moderately deaf would allow more facilities for the remaining more deaf pupils.

(7) Steps to make the hearing public more aware (e.g., by short films, &c.) of the plight of deaf children if neglected, and what can be done for them.

*Nursery Clinics.*—The preschool child need not, in these days of shortage of teachers for the deaf, be instructed by a fully qualified teacher. A speech therapist with training and experience in teaching lip-reading to infants, or a person with suitable background of the "nanny" type, could, with hearing-aid auxiliaries, take charge of small clinics. The clinics would be attached to ordinary nursery schools or to hospitals and welfare centres. In the clinics the child would be made conscious of the importance of language, as are the children trained by Miss Sylvian Martin at the late Infants Hospital, Vincent Square. Here the preschool child is able to grasp a vocabulary of about 200 words.

Setting up these preschool clinics would cover the time-lag before the educational scheme comes in and increased facilities are made available for this group of children.

So great is the need to "do something" now that hundreds of parents have already banded themselves together to form the Deaf Children's Society, which aims to push forward the urgent claims for better conditions. The society is keen to finance bursaries to the Department of Education of the Deaf, Manchester University, for students intending to become fully qualified teachers, and also to pay for one-year "courses" for the proposed preschool clinic teacher.

*Research.*—It is a heartening fact that many medical men are becoming more aware of the need for this branch of research; many are conducting research into various pathological and epidemiological aspects, such as deafness caused by intra-uterine infection from the virus of rubella, and the prevention of otitis media in the exanthemata of childhood. Further fields for exploration lie in (1) electronics in audiometry, hearing-aids, and teaching of voice control; (2) electroencephalography in deaf children; (3) all virus diseases as a possible cause of congenital deafness; (4) genetics as applied to deafness; and (5) advance in rational psychology of the deaf child.

105, Gower Street,  
London, W.C.1.

ELISABETH EDWARDES  
Secretary, Deaf Children's  
Society.

### INVESTIGATION OF MALE INFERTILITY

SIR,—Might one appeal through your columns to pathologists throughout the country to establish a more expert and uniform service for undertaking seminological investigations?

The investigation and treatment of female infertility has advanced greatly within the last few years, but many of the excellent gynaecological advances are made ineffective on account of inadequate investigation and treatment of male infecundity. It is now accepted by authorities that in nearly one-half of the barren marriages some infertility is contributed by the male, and in perhaps one-fifth of all cases the causative factor lies exclusively with the husband. The fact that healthy young males who give no history of a genital lesion frequently produce an azoospermic semen, or one where the proportion of abnormal sperms is excessively high and their viability too short, implies a very serious need not only for adequate diagnosis but for the study of the as yet almost unexplored subject of treatment. If more laboratories would give better service in this work and would agree to make their

reports in a more uniform way, it would greatly encourage the clinician in exploring the important matter of therapy.

For the last eighteen months the Family Planning Association has run a laboratory entirely for the purpose of making seminological analyses and of studying post-coital cervical mucus. The laboratory is now working beyond capacity, and the physician in charge is willing to accept part-time clinical assistants and a certain number of grade I technicians for training. Many laboratories may be glad to send an assistant to acquire this experience and thereby contribute to the possibility of advancing a service of urgent national and individual importance. Correspondence should be addressed to Dr. H. A. Davidson, F.P.A. Laboratory, 33, Wimpole Street, W.1.

ALECK BOURNE  
Chairman, Subfertility Committee,  
Family Planning Association.

London, S.W.1.

### SULPHONAMIDE GRANULOPENIA IN CHILDREN

SIR,—In his letter of Dec. 7 Dr. Suchecki draws attention to the suggestion of Drouet and colleagues that a so-called agranulocytic syndrome possibly embraces both acute leukaemia and true agranulocytosis. He describes the similarity of routine blood-counts in the early stages of both diseases and then states that the true diagnosis may be overlooked in those that are rapidly fatal. He goes on to claim that only "a necropsy or elaborate haematological investigations" will reveal the true state of affairs.

It cannot be too often stressed that the information obtained from routine examination of the peripheral blood alone in these cases is misleading. In order to differentiate between true agranulocytosis and acute leukaemia with leucopenia (aleukæmic leukaemia) more definite information must be obtained, and without this information a reliable prognosis cannot be given or rational treatment undertaken.

A careful search for enlarged lymphatic glands, however slight, should be made with a view to biopsy in the obscure case, but the sternal-marrow biopsy should never be omitted since the smear obtained is often of extreme value in diagnosis. The technique of sternal-marrow puncture is very simple and safe, whether performed on adults or children, and this should never be regarded as merely another superfluous clinical investigation of an "elaborate" nature and of academic interest only. Experience is, however, essential if the smears are to be interpreted correctly.

Royal Infirmary, Manchester.

FRANK FLETCHER.

### VARIATIONS IN THE FEMALE PELVIS

SIR,—Dr. Nicholson and Mr. Sandeman Allen in their article of August 10 state that they have produced evidence to disprove three propositions, of which the first is as follows:

1. "The android pelvis is, as its name implies, a male pelvis; it is caused by some abnormality in sex differentiation, and is associated with male stigmata in the female."

I am puzzled by their statement that "obstetricians who accept the theory hold views on genetics, embryology, and anatomy which would be regarded as unorthodox by the geneticist, the embryologist, and the anatomist." There is considerable evidence that females may have pelvis with many features of the type one associates with the male. Elliot Smith and Wood Jones, from their archaeological survey of Nubia, mention that in 5 of the bodies found it would have been impossible to fix the sex had not foetal bones been found in the body cavities. They go on to say that they would otherwise have classified them as males. Furthermore in Prof. Wingate Todd's collection of skeletons of known sex in the Western Reserve University of Cleveland, Caldwell and Moloy found that 32.5% of white women's and 15.7% of black women's pelvis were "android." By "android" they mean a pelvis with some or all of the following features:

*Inlet* blunt, heart-shaped or wedge-shaped.

*Fore-pelvis* narrow, and the anterior pubo-iliac limbs of the fore-pelvis straight.

*Widest transverse* close to the sacral promontory.

*Posterior iliac portion* short.

*Sacro-sciatic notch* narrow and high arched; thus the posterior segment of the inlet is wide and flat.

*Sacrum* set forward in the pelvis, decreasing the posterior sagittal measurement.

*Pubic rami* long and straight-edged with a deep true pelvis. *Bones* heavy, angular, and less graceful than in the female.

They add that the fore-pelvis may be wide, as in the android-gynæcoid pelvis, and in this case there may be a wide subpubic angle to compensate for a male type of hind-pelvis. They conclude that in the worst types the prognosis for vaginal delivery is poor, and often indicates caesarean section; and also that the worst types of all are seldom seen outside sterility clinics, and often occur in women with amenorrhœa.

The remaining propositions mentioned by Dr. Nicholson and Mr. Sandeman Allen were:

2. "The android pelvis and to some extent the anthropoid pelvis are associated with a narrowing of the outlet of the pelvis, particularly with contraction of the pubic angle."

3. "The android pelvis is associated with difficulty in labour."

"The evidence in rebuttal of these two propositions," they say, "is drawn from the radiographical measurement of 307 women who were eventually delivered in the hospital at full term as vertex presentations during the years 1936-43 inclusive." The series is very small, and one naturally asks how much abnormal material is likely to be encountered in eight years in a small country hospital which X rays only about 35 patients yearly from the obstetric point of view. Compare the series of 1000 clinically suspect pelvis presented by Méave Kenny (*J. Obstet. Gynec.* 1944, 51, 277). In these 1000 cases, taken from 10,000 consecutive deliveries, she found, using the Caldwell and Moloy classification:

Gynæcoid .. .. .	348	Pitheoid (anthropoid) ..	64
Gynæcoid-android ..	110	Platypelloid .. .. .	18
Android .. .. .	203	Rickety flat .. .. .	5
Android-gynæcoid ..	251	Osteomalacic .. .. .	1

The 307 cases are stated to include full-term vertex presentations only. What happened to abnormal presentations and to those cases subjected to caesarean section? Also were any patients subjected to surgical induction of labour? Méave Kenny found that 56% of the 1000 suspect cases had android pelvis of one type or another, and reckons that, in normally fertile women, only about 3% of the pelvis are likely to be of a pronounced android type. Thus one might expect to find only about 9 cases in a series of 307 unselected healthy adult English-women. If that were so, the exclusion of all abnormalities, such as malpresentations and cases treated by caesarean section, which at the lowest must total 5% of all cases seen, tends to negative the value of this investigation.

The authors suggest that the posterior sagittal segment ratio, at the brim, is one on which they rely for the identification of the scutiform pelvis. If they identify the android with the scutiform pelvis, their statement appears to be at variance with the findings of Ince and Young in their anthropological survey of 500 pelvis by X-ray methods (*J. Obstet. Gynec.* 1940, 47, 130). These authors say that the posterior sagittal segment ratio at the brim is only slightly less in the male than in the female, and that it does not appear to be as important in differentiating android from gynæcoid types as Caldwell and Moloy suggest. At all events if one is going to rely on the posterior sagittal index (percentage ratio of posterior sagittal measurement to that of whole conjugate) why adopt an index of 30 as the upper limit of android or scutiform pelvis? This, as the authors say, leaves about 10% of their cases in the scutiform class; yet the impression of those seeing large numbers of pelvic X rays is in agreement with Méave Kenny's view—namely, that only 3-5% at most of normal fertile women have android pelvis. Had they, for instance, chosen 25 as their sagittal index limit, the "scatter diagram" would show only 4 scutiform pelvis instead of 28. I contend, in other words, that by eliminating all abnormalities before they start, and by including as scutiform many pelvis which might more properly be called gynæcoid, they "prove" that the scutiform

or android pelvis is not the fearsome thing that we have been led to believe.

Méave Kenny found an interference rate of 76.4% for android-gynaecoid pelvis and one of 82.5% for pure android pelvis, compared with only 12.9% for her 348 gynaecoid cases. She concluded that the android hind-pelvis plays a most sinister part in the causation of dystocia.

London, W.1.

D. G. WILSON CLYNE.

### THE ELECTRONIC AND HUMAN BRAIN

SIR,—Many will support, with you, Dr. Walshe's timely plea for more conceptual thinking. It is, as you say, in line with the developments of modern science. But why limit your exemplifications to the "opposite" schools of Eddington and Bertrand Russell? Why is no mention made of dialectical materialism? Here we have a philosophy which is, I think, quite satisfying to the scientific mind. It rejects metaphysics, but not conceptual thinking about observed facts. It rejects mechanistic materialism, as modern science must reject it, but insists that no concepts and entities extraneous from Nature must be introduced in the explanation of natural phenomena. It explains, in general terms, the laws of development and change, and thus helps in the investigation of particular changes. Finally, whilst preserving a strict respect for facts, it stresses the importance of man in changing the facts, when he acts on them *secundum artem* and not by mere whim or desire.

This is a school of thought sufficiently important, in Britain and abroad, not to be passed over in silence.

London, W.1.

E. MONTUSCHI.

### CHILD HEALTH

SIR,—Prof. Richard Ellis, in the lecture you reviewed last week (p. 871), spoke of the work of the late Lord Baden-Powell of Gilwell as the greatest influence for good on the health of the older child.

Gilwell Park is synonymous with camping at its best, and throughout the country other camping grounds, under the auspices of the Boy Scouts' Association, are teaching the elements of hygiene and creating the physique and psychological outlook inalienable to good health. The boys have to do everything for themselves, utilising every muscle in their frames, as well as their wits, and the results fully confirm the high opinion of the movement expressed by Professor Ellis. The Boy Scout movement has prepared boys to render signal service to the injured and those in danger of loss of life, and we are not unmindful of those boys with a physical handicap, for whom special tests are devised so that they may join in and enjoy the benefits of scouting.

The more that doctors examine the aims and objects of the movement as concerning the health of the child the more they will understand the need for full collaboration.

Kew, Surrey.

AUSTIN WILLIAMS.

### R.N.V.R. OFFICERS' COMMEMORATION FUND

SIR,—During the war no less than 2700 doctors held commissions in the Royal Naval Volunteer Reserve. They served with great distinction in all classes of ships and in all parts of the world. Many lost their lives. It may therefore interest members of the medical profession to know that the R.N.V.R. Officers' Commemoration Fund has been opened to commemorate in a practical way the part R.N.V.R. officers played in the war, and in particular those who lost their lives. The fund has two objects: (1) to purchase and equip the new premises of the R.N.V.R. Club; and (2) to start an adequate welfare fund to help R.N.V.R. officers and their dependants who may stand in need.

The new club will have a memorial tablet, and relatives of officers who were killed may through this fund have officers' names inscribed on it. This club, started during the war, has grown from nothing to an institution with 10,000 members, and it provides good and cheap meals, accommodation, and amenities, particularly for junior officers. But it must leave its war-time premises, and

without help it cannot get into new premises. The administration of the welfare fund is closely integrated with that of King George's Fund for Sailors.

We sincerely hope that many members of the medical profession, so many of whom served in the R.N.V.R., will give their support. The money is urgently needed. R.N.V.R. officers themselves have generously supported the fund, but most of them are young, and it is hoped that the outstanding part that they played in the war (when they formed 80% of the officer strength of the Navy) will commend this appeal favourably to their fellow-countrymen.

Cheques should be sent to Commodore Earl Howe, R.N.V.R. Club, 52, Pall Mall, London, S.W.1.

London, S.W.1.

W. W. ASTOR  
Chairman.

## Medicine and the Law

### Death after Gold Salt

At an inquest in Manchester recently evidence was given that a 47-year-old woman had died from cerebral hæmorrhage following injections of gold. In 1942 the patient, who had rheumatoid arthritis, had received this therapy in hospital. The condition had improved, but a year later relapsed; she attended hospital for further injections as an outpatient; but since she was unable to make the journey the treatment was continued by her own doctor. In January, 1945, she was again admitted to hospital, where the white-cell count in the blood was found to be below normal; the last two counts before discharge were just within normal limits.

Gold treatment was resumed by the patient's doctor in September, 1945, and the first sign of intolerance appeared after the seventh injection. Even after the eighth injection, which resulted in a bruise on the arm, the patient felt quite well; but subsequent symptoms caused the doctor to discontinue treatment and refer the patient to hospital. A verdict of death by misadventure was recorded by the city coroner, who added that even if a general practitioner himself had no facilities for a blood-count this could be obtained at a hospital.

## Public Health

### Tuberculosis Allowances

THE Ministry of Health has produced a circular (no. 221/46) giving local authorities guidance over the effect of family allowances and the recent increase in the rate of old-age pensions on poor-law relief, tuberculosis allowances, financial assistance under the Blind Persons Act, and contributions towards the cost of hospital treatment and of maternity and child-welfare services.

The purpose of the Family Allowance Act, the Ministry says, is to supplement a man's wages, which otherwise take no account of the size of his family. The allowances payable to the tuberculous under memorandum 266 T already vary according to the size of the family, children's allowances being paid at the rates published in our issue of Dec. 7 (p. 852). If ordinary family allowances were paid in supplement to them, double provision would be made for dependent children, and it is a cardinal principle of the comprehensive insurance plan and health service now being created that double allowances of this kind should be avoided.

### A DEPUTATION TO THE MINISTRY

The future of tuberculosis allowances was discussed by a deputation from the Joint Tuberculosis Council and other bodies which waited on the Ministry of Health on Nov. 15. Introduced by Dr. C. K. Cullen, the deputation was received by Sir Arthur Rucker, with Sir Wilson Jameson in the chair. Representatives of the Ministry of National Insurance, the Assistance Board, the Department of Health for Scotland, and other officers of the Ministry of Health were also present.

The Ministry, it was explained, fully accepted the view that tuberculosis calls for special provision; but this would have to be made within the general pattern of the new social legislation. The National Insurance Act would provide benefits in various adversities. For those who needed something more, this would be forthcoming under a National Assistance Bill (now in preparation) which was to sweep away the poor-law and give effect to a new concept of Government assistance. Tuberculosis patients would be basically provided for in this way; but, by virtue of their special needs, the Assistance Board would, it was hoped, be empowered in the new Bill to make payments to needful persons under treatment for pulmonary tuberculosis on a scale higher than the normal scale of assistance applicable to the community as a whole. It was intended that the tuberculosis officer and the dispensary organisation should be associated with the administration of this assistance; and the grant of the special rate of assistance would be conditional on the patient undertaking approved treatment. The discrimination against so-called chronic cases of pulmonary tuberculosis under the present scheme would disappear.

The higher level of assistance would, however, be limited to cases of pulmonary type. In the Ministry's view, persons suffering from non-pulmonary tuberculosis were in a rather different category: it was not necessary to induce them to give up work, while still capable of it, in order to undertake treatment and to lessen the risk of spreading infection. The non-pulmonary patient would be able to receive, besides insurance benefit, supplementary allowances from the Assistance Board, and help from the care committee; and representations to the Assistance Board regarding any individual case would always receive sympathetic consideration.

The deputation sought to urge that the position of the susceptible family of a tuberculous patient was the same whether the case was pulmonary or non-pulmonary. But the Ministry held that, important as this consideration was, it was not of overriding cogency, and to attempt at this stage to extend the special provision to non-pulmonary patients might involve the risk of failing to obtain it for pulmonary patients, for whom a much stronger case could be made out.

It was explained that care and aftercare work for the sick, including the tuberculous, would be the responsibility, under the National Health Service Act, of local health authorities. They would be precluded from giving monetary assistance, but if a voluntary body participated in such work there would be nothing to prevent it using its funds as it wished.

The Ministry took note of criticism regarding the deduction of family allowances from payments under the present tuberculosis scheme, and the alleged inadequacy of the general scale-rates under this scheme.

#### Infantile Gastro-enteritis

An outbreak of gastro-enteritis in the maternity nurseries, affecting 36 newborn babies, led to the closure of the maternity department of the City General Hospital, Leicester, on Dec. 11. An infant died of gastro-enteritis in the nurseries on Sept. 6, and up to Nov. 17 there were 7 isolated cases, 3 in one nursery and 4 in another, 5 of them proving fatal. Between Nov. 28 and Dec. 1 there were 6 further cases. On Dec. 4 and the succeeding few days there was an explosive outburst, involving 25 further babies, the infection having spread to another emergency nursery. Among the total of 38 cases since Sept. 6 there have been 15 deaths. The diarrhoea or vomiting has developed between the third and sixteenth days, the average day being about the fifth. Some children have had pyrexia and others none. Most of the children who have died have survived until the second week. In treatment, penicillin, sulphaguanidine, and sulphathalidine have been used, but in the severe cases these drugs did not alter the course of the illness. No pathogenic bacteria have been discovered in the stools and the supposition is that the infection is due to an unidentified virus. During the same period some mothers developed mild diarrhoea, and no pathogenic organisms were isolated from their stools.

Similar outbreaks have occurred in St. Joseph's Hospital and Sharoe Green Hospital, Preston, and Cowley Road Hospital, Oxford, at which the maternity wards have been closed.

## Infectious Disease in England and Wales

WEEK ENDED DEC. 7

*Notifications.*—Smallpox, 0; scarlet fever, 1277; whooping-cough, 1783; diphtheria, 313; paratyphoid, 6; typhoid, 7; measles (excluding rubella), 6466; pneumonia (primary or influenzal), 677; cerebrospinal fever, 40; poliomyelitis, 14; poliomyelitis, 1; encephalitis lethargica, 1; dysentery, 76; puerperal pyrexia, 128; ophthalmia neonatorum, 60. No case of cholera, plague, or typhus was notified during the week.

*Deaths.*—In 126 great towns there were no deaths from scarlet fever or enteric fever, 4 (0) from diphtheria, 3 (0) from measles, 6 (1) from whooping-cough, 69 (6) from diarrhoea and enteritis under two years, and 21 (6) from influenza. The figures in parentheses are those for London itself.

The number of stillbirths notified during the week was 264 (corresponding to a rate of 27 per thousand total births), including 24 in London.

## Parliament

### FROM THE PRESS GALLERY

#### Scotland's Turn

MOVING the second reading of the Scottish National Health Service Bill on Dec. 10, Mr. J. WESTWOOD pointed out that it differed from the English Bill in some respects, as was but fitting, for Scotland had her own legal system, traditions, and system of local government. Moreover, the geographical distribution of her population was different.

#### THE HEALTH CENTRES

In the general-practitioner service, the only difference concerned health centres. Local conditions varied widely, and, as the country was not an unmanageable unit, he had thought it best that the early steps in health-centre development should be undertaken directly by the Secretary of State. In that way the lessons of the early years could best be learned and generally applied. The Scottish local authorities had made no serious objection to this course, and the medical profession had preferred that it should be so. The Bill allowed these to be delegated to local authorities, but Mr. Westwood said he did not intend to exercise that power in the early and experimental years of the service.

In Scotland, as in England, although payment by capitation fees would represent the larger part of the doctor's remuneration, there would also be an element of basic salary. That doctors in Scotland should look upon this fearfully surprised Mr. Westwood, for basic salaries by another name had for the last thirty years been an essential feature of the Highlands and Islands Medical Service, to which so many tributes had been paid by doctors themselves. As in England, sale and purchase of medical practices coming within the new service would be prohibited, and Scottish doctors would share in the £66 million provided by the Government as compensation.

The Committee on Scottish Health Services, which reported in 1936, had expressed the view that hospital administration should be one service and should be organised on regional lines. But while everyone accepted the need for a regional hospital system, it was not equally appreciated that it was not possible so long as there were two different forms of hospital administration and ownership. In Scotland there were 250 hospitals belonging to 55 local authorities, and about another 220 voluntary hospitals, practically every one of which had a separate governing body. With such a multiplicity of authorities there would be overlapping, unnecessary competition, and, worst of all, gaps in the hospital service. As far as he could judge from his discussions, these proposals were generally acceptable to those in Scotland who had to work in hospitals, and even to some of the local-authority and voluntary-hospital people, whose responsibilities were being taken away. The maximum independence would be left with the boards of management, and he intended so far as he could to leave the five regional boards to get on with their job.



## OTHER DIFFERENCES

Three features of the hospital proposals, he continued, were peculiar to Scotland. The English Act put the responsibility for the ambulance service on the local health authorities, but the Scottish Bill put it on the Secretary of State. This was the right thing to do in Scotland where the local health authorities were smaller in area and population.

The next difference concerned the teaching hospitals. From an early stage of the Government's discussions he had been clear that the English arrangement was unsuitable for Scotland. Although the number of hospital beds in Scotland was only about a tenth of the total for the United Kingdom, Scotland was training about a third of the medical students—a remarkable achievement. Therefore, if the teaching hospitals were taken out of the regional ambit, the core of the Scottish hospital service would have gone. He had therefore tried to frame an alternative scheme with the same general aim of safeguarding the position of medical education. He thought that the universities would accept generally that the Bill would enable them to discharge their responsibilities to their own satisfaction. The Bill laid a clear duty on the responsible Minister, and through him on the regional boards and boards of management, to make available all the necessary facilities for clinical teaching and research. When the regional board drew up its scheme for the constitution of boards of management for hospitals it must consult the university to establish in which hospitals teaching was to be carried on, and on the boards of these hospitals the university must be represented. There would be a medical education committee in each region to advise the board on all matters relating to the hospital services which affected medical education.

The Bill also provided that boards of management, whether of teaching or non-teaching hospitals, would in the first place retain the endowments of their hospital. In the new conditions, when many endowments would not be needed for their original purpose, some review and reallocation was necessary.

Turning to the local health authorities, Mr. Westwood said that their most important function in the future was the social side of health care. This was linked with their broad duties in connexion with the control of infectious diseases. But they had yet another part to play in the new service. They represented the consumers, and for this reason they nominated a third of the members of the executive councils responsible for the general-practitioner services. They would also be consulted in the appointment of regional boards and boards of management. In framing the regulations under the Bill it would be the earnest desire of the Government to have full and free discussions with all the interests concerned, including the organisations of professional men and women on whose good will and co-operation the success of the health service depended.

## THE DEBATE

On behalf of the Opposition Mr. J. S. C. REID moved an amendment calling for the rejection of the Bill. It put, he declared, too much power in the hands of the Minister and left too little scope for initiative and responsibility on the part of those who were to run the service. Almost all the objectionable provisions which injured the patient by undermining the independence of the medical profession centred on the control of the distribution of doctors, yet the average number of people per general practitioner in Scotland was 2000, and only 3 areas could be held to be underdoctored. He was amazed that the teaching hospitals had been treated so much less favourably than in the English Bill and for such flimsy reasons. In England the teaching hospitals through their board of governors were in direct contact with the Minister and with the universities, and kept their endowments. In Scotland in future they would only have boards of management and become mere units in a large scheme, while all their endowments were subject to reallocation.

Sir JOHN GRAHAM KERR dubbed the Bill the product of diligent artificers working in the murky recesses of a Whitehall office. At present the finest material was coming into the science of medicine. It was the leaders

of the profession who were training it. But they did that work because they realised that it would give them an opportunity to inspire their students, and that they would be paid back, indirectly, by forming a great clientele of practitioners who would come back to consult them later on. The type of man who went into a university, or other school of medicine, and later into the profession, was not the sort of person who was interested in a salaried service in which promotion went merely by seniority. If the Bill were passed into law it would be one of the greatest disasters to the health of the people.

Colonel WALTER ELLIOT held that the Bill would be a better one if it followed Scottish traditions instead of trailing at the heels of the English Bill, or indeed of its Welsh instigator. Why had the Hetherington report been thrown overboard and this new parentless institution brought in? In carrying out the Highlands and Islands Service it had not been found necessary to nationalise a single hospital.

In summing up, Mr. G. BUCHANAN, joint Under-Secretary of State, said they had sought to avoid the difficulty of defining a teaching hospital; and to leave out of this new experiment 230 hospitals—almost half the total—would make a sham of the whole scheme. They had been criticised for not giving enough power to local government. But nowadays it was said that there must be some form of workers' control. And here the workers were the doctors. They must be given some rights and on the whole they did not want the local-authority set-up.

## Petition against Vivisection

In the House of Commons on Dec. 12 Mr. PETER FREEMAN presented a humble petition protesting against the practice of vivisection on live animals with or without anaesthetics. The petition, signed by 1972 petitioners, declared vivisection to be morally unjustifiable, scientifically useless, dangerous, and demoralising to the community, and earnestly prayed that the House would pass a Bill withdrawing the sanction of the law from its practice.

## QUESTION TIME

## Psychiatrists on Selection Boards

Mr. GEOFFREY COOPER asked the Secretary of State for War on what grounds a decision had been made to remove qualified psychologists and psychiatrists from officer selection boards, in view of the fact that these experts devised the successful techniques now in use.—Mr. F. J. BELLENGER replied: The function of the Service psychiatrist is to advise the executive authorities on matters of mental health and adjustment. It is open to the presidents of officer selection boards to consult the Service psychiatrists, or specialists in other branches of the medical profession, if they find reason to do so. Psychiatrists and psychologists are both consulted in the formulation of the technique adopted by the boards.

Mr. COOPER: Have psychologists and psychiatrists been dropped? The answer does not make that point clear.—Mr. BELLENGER: They have not been dropped, but they are not now necessarily members of these selection boards.—Mr. COOPER: Does the Minister know that the presence of psychologists and psychiatrists on these boards during the war won the confidence of the serving men, and increased the number of other ranks who applied for commissions?—Mr. BELLENGER: As long as the services of psychiatrists are made available, if necessary, that is all, I think, my hon. friend can ask for. I may tell him that there was a good deal of objection to these psychiatrists among the men.

Brigadier A. H. HEAD: Is the Minister aware that all other ranks did not share the view of the hon. member, and that some of them referred to the psychiatrists as "trick cyclists"?—Mr. COOPER: Was that on the part of senior officers or other ranks?—Mr. BELLENGER: I am well aware of that, but I think we ought to get this question in its correct perspective. Psychiatrists were of great value in many cases.

## Release of R.A.M.C. Officers Serving in India

Major E. A. H. LEGGE-BOURKE asked the Secretary of State for War if he would state, by age and service groups, the number of R.A.M.C. officers now serving in the India Command whose release had been compulsorily deferred, distinguishing specialist and general duties officers.—Mr. BELLENGER replied: Up to Nov. 15 there has been no case

of compulsory deferment of either a specialist or a general-duty R.A.M.C. officer during the last three months.

#### Supersonic Sound and Health of Workers

Mr. C. W. DUMPLETON asked the Lord President of the Council whether research was proceeding into the possible effects of supersonic sound upon the health of workers in the manufacture of turbo-jet aero-engines.—Mr. HERBERT MORRISON replied: The Medical Research Council are making preliminary inquiries on the subject, and when these are completed consideration will be given to the question of a programme of research.

#### Board of Control

Mr. R. SARGOOD asked the Minister of Health what was the annual cost to the National Exchequer of the Board of Control of Mental Hospitals and Institutions.—Mr. A. BEVAN replied: The net cost of the board for 1945-46 was £237,000, of which £58,000 was in respect of the board's office, the remainder being the cost of grants for ex-Service mental patients and the cost of the State institutions for mental defectives of dangerous propensities.

#### Social Surveys

In the course of a reply, Mr. GLENVIL HALL stated that the staff of Social Survey were engaged on an illness survey (for the Ministry of Health), a survey of the incidence of deafness in the country (for the Medical Research Council), and one on the employment of miners with pneumoconiosis (for the M.R.C. and the Ministry of Fuel and Power).

#### Preparation of Sera

Mr. PETER FREEMAN asked the Home Secretary whether a licence was required where experiments on living animals were claimed to be used for veterinary purposes; whether he was aware of the unsatisfactory condition of many horses and other animals used for the preparation of sera for such conditions; whether such institutions were visited by his officers or the police; and whether he had any record of the number of such institutions.—Mr. CHUTER EDE replied: I am advised that a licence under the Act of 1876 is required for experiments made to discover or test sera to be used for veterinary purposes, but not for procedures undertaken merely for the production of such sera. Places used solely for this purpose are neither visited by my inspectors nor registered by my department. The police do not visit them as a matter of routine.

#### Mass Radiography

Replying to a question, Mr. BEVAN stated that nineteen mass radiography units were operating in England and Wales. Up to June 30 approximately 1,111,000 persons were examined, of whom 4200 were diagnosed as suffering from active tuberculous conditions.

## Obituary

### ANTHONY RICHARD NELIGAN

M.D. LOND., D.T.M. & H.

Dr. A. R. Neligan, who died on Dec. 8 in Birmingham at the age of 68, had been carrying on his consulting work in Droitwich till two days before his death.

Born in Tralee, co. Kerry, the son of Dr. J. W. Neligan, he studied medicine at Barts, where he carried off the Brackenbury scholarship, the Matthews Duncan gold medal, and the Skynner and Burrows prizes. In 1903 he graduated M.B., and he took his M.D. three years later. After holding house-appointments at Barts, he was appointed in 1906 physician to the British legation at Teheran, and the next twenty years he spent in Persia. As British representative on the Persian Sanitary Council he did much to improve the public health of the country. And in a balanced and comprehensive survey of the Persian health services, published in our columns in 1926, he was able to describe the introduction of a public vaccination service, the establishment of a Pasteur institute, and some progress in sanitation.

After leaving Teheran in 1926 he spent over a year visiting rheumatic hospitals, clinics, and spas in Europe and America, and on his return to England he was appointed superintendent of the Red Cross Clinic for Rheumatism, in London. In 1931 he finally settled in Droitwich, where he was appointed physician to the Royal Brine Baths Clinic. A member of the International

Society of Medical Hydrology, the International League against Rheumatism, and the Royal Society of Medicine, Dr. Neligan made valuable contributions to their discussions on fibrositis and arthritis. He had an ideal training for his own specialty, but over and above this he had a wide background of knowledge, and he remained all his life a student, reading widely and keeping himself abreast of advances not only in his own department but also in general medicine.

Dr. Neligan leaves a widow, a daughter, and a son, who is also a doctor.

### ROBERT LEE MOORE

L.R.C.P.E.

Dr. R. L. Moore died on Nov. 30, at Bangor, co. Down, where he had carried on an extensive practice for over fifty years. Born in Belfast, he was educated there at the Royal Academical Institution and at the Liverpool Institute. In 1890 he took the Scottish Conjoint qualification. Closely associated with the Bangor Hospital from its beginning as a small cottage hospital, he was a life governor of the present institution. He was also a justice of the peace. His fund of stories about old Bangor personalities and events was inexhaustible, and he was an authority on co. Down folk-lore and dialect. A member of the Royal Ulster Yacht Club and the Bangor golf club, Dr. Moore was a noted athlete and association football player in his youth. His wife survives him with three daughters and two sons, one of whom, Dr. B. P. L. Moore, is clinical pathologist to the Mater Hospital, Belfast. A third son died in Java while a prisoner-of-war.

## Births, Marriages, and Deaths

### BIRTHS

- BETTS.—On Oct. 28, the wife of Dr. J. W. Betts—a daughter.  
 BLANSHARD.—On Dec. 11, in London, the wife of Dr. Paul Blanshard—a daughter.  
 CLARKE.—On Dec. 11, the wife of Dr. J. G. R. Clarke—a daughter.  
 COOPER.—On Nov. 18, at Newcastle, the wife of Captain J. R. Cooper, R.A.M.C., of Darlington—a daughter.  
 CUTHBERT.—On Dec. 10, in London, the wife of Dr. J. B. Cuthbert—a son.  
 DAVIES.—On Dec. 8, in London, the wife of Dr. J. V. S. A. Davies—a son.  
 DEMPSEY.—On Dec. 10, in London, the wife of Major Austin Dempsey, R.A.M.C.—a son.  
 DENNISON.—On Dec. 8, at East Grinstead, the wife of Dr. E. J. Dennison—a daughter.  
 DRURY-WHITE.—On Sept. 20, at Mayo, Burma, Dr. Jean Drury-White, wife of Mr. Roger de Coverley—a daughter.  
 GORDON-WILSON.—On Dec. 6, at Guildford, the wife of Dr. Clifford Gordon-Wilson—twin daughters.  
 HALLETT.—On Dec. 11, at Guildford, the wife of Mr. G. St. J. Hallett, F.R.C.S.—a son.  
 HOLLINS.—On Dec. 9, at Dorchester, the wife of Dr. C. Hollins—a daughter.  
 HOPKINS.—On Dec. 3, at Ismailia, Egypt, the wife of Lieutenant Philip Hopkins, R.A.M.C.—a daughter.  
 HOUGHTON.—On Dec. 7, at Leamington Spa, the wife of Dr. A. C. Houghton—a son.  
 IRVINE.—On Dec. 10, at Hove, the wife of Dr. L. C. D. Irvine—a daughter.  
 JACOBS.—On Dec. 9, in London, the wife of Dr. J. J. M. Jacobs—a son.  
 MORRISON.—On Dec. 7, at Singapore, the wife of Dr. Hugh Morrison—a son.  
 OWEN.—On Dec. 8, in London, the wife of Dr. M. W. L. Owen—a daughter.  
 PATON.—On Dec. 8, at Leicester, the wife of Dr. H. O. Paton—a son.  
 RIVETT.—On Dec. 8, at Leeds, the wife of Dr. P. A. H. Rivett—a daughter.  
 ROLFE.—On Dec. 9, at Hampstead, the wife of Dr. D. A. Rolfe—a daughter.  
 SHAW.—On Dec. 8, in London, the wife of Surgeon-Lieutenant J. D. Shaw, R.N.V.R.—a son.

### MARRIAGES

- HAMLYN—PRATT.—On Dec. 7, at Aldershot, Edward Hamlyn, M.B., captain R.A.M.C., to Enid Pratt.  
 HERDMAN—PEARCE.—On Dec. 10, at Harrow-on-the-Hill, John Phipps Herdman, B.M., to Sheila Kathleen Pearce.  
 REDDINGTON—GOODALL.—On Dec. 7, in London, Mortimer Reddington, F.R.C.S., to Kathleen Mary Goodall.  
 RUFFMAN—CUMBERLEGE.—On Dec. 5, at Newcastle-on-Tyne, Alan Ruffman, M.B., to Yvonne Rhoda Cumberlege.

### DEATHS

- COLLINS.—On Dec. 12, in London, Sir William Job Collins, K.C.V.O., M.D., M.S., B.Sc. Lond., F.R.C.S., aged 87.  
 HERON.—On Dec. 7, David Heron, F.R.C.S.E.  
 MCTURK.—On Dec. 8, at Newton Stewart, James McTurk, L.R.C.P.E.  
 MILNER.—On Dec. 8, at Torquay, Vincent Milner, M.B. Edin.  
 NELIGAN.—On Dec. 8, at Birmingham, Anthony Richard Neligan, M.D. Lond., D.T.M. & H., of Droitwich.  
 WHITTINGDALE.—On Dec. 11, John Flasby Lawrance Whittingdale, O.B.E., M.B. Camb.

## Notes and News

### APPEAL TO WOMEN SPECIALISTS

THE Central Medical War Committee is experiencing difficulty in securing enough men to meet the requirements of the Services and accelerate the release of specialist officers, whose demobilisation is lagging far behind that of medical officers generally. At the suggestion of the Minister of Health the committee is now appealing for women volunteers, not above the age of 40, qualified in the specialities of gynaecology, anaesthetics, pathology, or radiology, to serve in the Army or R.A.F. There is at present a special need for gynaecologists for work among the families of Servicemen overseas, particularly in the B.A.O.R. The period of service for recruits joining the Forces in 1947 will be two years, but volunteer specialists above the age of 30 may, if they wish, serve for 18 months only. Offers should be addressed to the secretary of the committee at B.M.A. House, Tavistock Square, W.C.1, or, in Scotland, to the secretary of the Scottish Central Medical War Committee at 7, Drumsheugh Gardens, Edinburgh.

### GAZELLE BOY

EVER since Peter the Wild Boy was found walking on all fours, climbing trees, and feeding on grass and moss near Hamelin in 1725 and brought to England to be a protégé of George I and to be exhibited to the nobility as an example of one nurtured by a wild beast (in his case a she-bear was the most popular postulated foster-mother), tales have cropped up at intervals about wolf boys, mainly from India, particularly Lucknow, where a gullible British resident at the Indian court had many such boys produced for his inspection. Most of them were idiots, but at least one had been brought up as an impostor.<sup>1</sup> In 1903 a "baboon boy" was captured in South Africa<sup>2</sup>; but he was described as "remarkably intelligent," and so there may be some truth in the suggestion that he had been fostered by a baboon, which, after all, is a primate. But the latest story of the "gazelle boy" from Iraq, who, from constant practice in running with the herd, was credited with a speed of 40 m.p.h., turns out to be a complete hoax. When his photograph was published in the daily press some thought they could detect a lighter shade on the boy's arm, suggesting that he had worn a shirt. Now it appears that the tale was based on the escape and recapture of a mentally deficient boy from an asylum in Syria.

### TWO NEW BRITISH JOURNALS

THE Nutrition Society is to sponsor a new quarterly, the *British Journal of Nutrition*, and it is hoped that the first number will appear within the next six months. Papers may now be submitted to the chairman of the editorial board, Dr. S. K. Kon, National Institute for Research in Dairying, Shinfield, near Reading, Berks. The need for a journal of this kind has been apparent for a long time, and there will be no lack of excellent material.

The newly founded Society for General Microbiology, of which Sir Alexander Fleming, F.R.S., is president, will issue the first number of its new *Journal of General Microbiology* in January. The society was founded for the study of bacteria, micro-fungi, microscopic algae, protozoa, and viruses, including their structure, development, physiology, nutrition, genetics, cytology, ecology, antibiotic activity, and reaction to chemotherapeutic agents. The journal will consist of three numbers in the year and it is hoped to increase that number later. The annual subscription is 50s. Papers for publication should be sent to Dr. A. A. Miles, National Institute for Medical Research, Hampstead, London, N.W.3.

Both journals will be published by the Cambridge University Press, Bentley House, 200, Euston Road, London, N.W.1, to whom all non-editorial correspondence should be addressed.

### DISINFESTATION OF AIRCRAFT

THE growth of air travel has added greatly to the difficulties of quarantine precautions. It is important, for example, to prevent mosquitoes infected with the yellow-fever virus from reaching areas, such as India, to which the disease has not yet spread despite the existence there of suitable vectors. Aircraft are now disinfested as a routine almost everywhere in the tropics. The method consists in releasing a mist of

concentrated insecticide, which permeates the air-space inside the aeroplane without harm to the passengers. Garnham, in East Africa,<sup>1</sup> has shown that, given an exposure of at least fifteen minutes, a number of pyrethrum or D.D.T. preparations are effective; a simple paraffin extract of Kenya pyrethrum (1 lb. to the gallon) is efficient, but, like all pyrethrum preparations, it must be used fresh.

One snag is that mosquitoes may retire into out-of-the-way places, such as the hollow interiors of the wings or behind panelling; but these places can be disinfested by increasing the dose or by directing the sprayer into the blind spaces. Perhaps a more serious risk, to which Garnham draws attention, lies in the incapacity of these mists to penetrate fabrics, so that mosquitoes settling inside coat-sleeves are protected. Moreover, removal and shaking of the coat is not enough, for tests have shown that mosquitoes hidden there resist quite rough handling.

### SPANISH INTO ENGLISH

IN a pocket dictionary,<sup>1</sup> appropriately dedicated to Dr. Josep Trueta, Mr. Maurice McElligott, F.R.C.S.I., has provided a convenient tool for doctors who wish to read articles in the original Spanish. Yet it is to be doubted whether those who make this attempt are unduly confounded by the medical terms, many of which are nearly identical with their English equivalents: "ectropión," "metabolismo," and "septicemia" are examples taken at random, though there are several on every page of the book. In a second edition he might omit some of these samples of the lingua franca of medicine in favour of terms and expressions likely to puzzle, even though they have no medical bearing in other contexts. In arrangement and typography the book is thoroughly attractive, and the author's assurance of its accuracy appears in the preface.

### BATTLE SCHOOL FOR FIRST-AIDERS

PLAINLY it is impossible to teach first-aid workers the theory behind all they learn. This being so, instruction tends to take the form of rigid dogma, teachers and pupils counting themselves content if the catechism is accurately remembered; and the same is true of the usual formal exercises. Top marks in a test under these conditions is no guarantee of even a passable showing in the rough and tumble of reality. This consideration prompted the founding of the Casualties Union, which is dedicated to realism in training. The union teaches the first-aiders to use his intelligence as well as his memory; the training he is offered is based on war-time experience that he can no more identify and treat injuries by the 1, 2, 3 in the little book than can the doctor recognise and relieve the condition of his patients by recall of the classical description in the textbook. The union has been at pains to train actors in the rôle of "casualties," and to make them look the part; the autumn number of the union's journal, for example, contains articles on the faking of flesh wounds and a formula for washable blood. It only remains for the casualty to be found in a realistic environment—on the road, pinned under a beam, or in a smoke-filled room—and the stage is set for a first-class exercise. The aims of the union, whose branches are multiplying in the home counties, will be applauded by all who are interested in better first-aid. The hon. secretary's address is The Bend, Send, Surrey.

### University of Cambridge

An election to the Pinsent-Darwin studentship in mental pathology will be made next March. The studentship has an annual value of not less than £225 and is tenable for three years. Applications should be submitted, before Feb. 28, to the secretary, Pinsent-Darwin Studentship, Psychological Laboratory, Cambridge.

### University of Sheffield

Dr. Quentin Gibson has been appointed lecturer in physiology in the university.

### Royal College of Physicians

Prof. F. C. Bartlett, F.R.S., will deliver the Oliver-Sharpey lectures at 5 P.M. on Tuesday, Jan. 21, and Thursday, Jan. 23. His subject will be the Measurement of Human Skill.

1. Garnham, P. C. C. *E. Afr. med. J.* 1946, 23, 272.

1. Spanish-English Medical Dictionary. London: H. K. Lewis. Pp. 250. 12s. 6d.

1. See *Lancet*, 1927, i, 984, 1105.  
2. *Ibid.*, 1940, i, 863.

**University of Edinburgh**

On Dec. 13 the following degrees were conferred :

*M.D.*—M. W. Archdall, \*L. F. Brown, \*E. M. Donaldson, \*Jack Greenstein, \*A. F. Lang, Tormod Macleod, \*I. R. Milne, R. W. G. Ransome-Wallis, †G. D. F. Steele.

*M.D. of the Polish School.*—A. J. Baranski, J. F. Majeranowski. *M.B., Ch.B.*—H. I. O. Armstrong, G. H. Blair, John Calder, G. R. Duffes, J. T. Y. Forrest, Mary G. Forsyth, G. R. C. D. Gibson, A. C. Jacob, Muriel G. James, D. L. Kirk, W. H. Lloyd, J. M. Loughran, N. C. Low, Alexander MacLennan, Jean C. I. Melville, Catherine S. Paterson, J. P. Payne, J. C. Pheimsler, Kenneth Robertson, C. M. C. Smeit, Anne M. Stewart, I. C. Wilson, J. H. Young.

*M.B., Ch.B. of the Polish School.*—Bohdan Adamski, Stefan Dykowski, Mojzesz Gonszor, Adam Jarosz, Antoni Kepinski, Jerzy Klimczynski, Tadeusz Klosowski, J. K. Kozlowski, J. G. Lipski, Wladyslaw Mitus, Zbigniew Prokopowicz, Anna M. Sokolowska, Mieczyslaw Szamocki, Zdzislaw Teleszynski, Józef Wladyslaw, Hanna H. Wozniak, Stefan Wozniak, Witold Zaleski, Wladyslaw Zarski.

\* Commended.

† Highly commended.

**Royal College of Surgeons of England**

At an ordinary meeting of the council on Dec. 12, with Sir Alfred Webb-Johnson, the president, in the chair, Mr. R. M. Handfield-Jones, St. Mary's Hospital, was admitted as a member of the court of examiners. Prof. Ian Aird, F.R.C.S.E., British Postgraduate Medical School, was admitted ad eundem to the fellowship.

The Hallett prize was presented to Mr. R. P. Melville (Sydney). Mr. J. G. Turner and Prof. Evelyn Sprawson were elected Charles Tomes lecturers for 1947. Mr. P. H. Mitchiner was appointed editor of the forthcoming college publication.

A gift of 50,000 francs towards the restoration fund was received from the Association française de Chirurgie.

A diploma of membership was granted to E. N. Rees.

Diplomas of fellowship were granted to the following candidates :

A. G. Tresidder, John Penry, D. B. Cater, Thomas Denness, W. G. France, J. A. R. Johnson, C. M. Dransfield, M. A. Margo, J. W. M. Leslie, J. A. Rhind, W. D. Doey, K. H. Taylor, J. A. S. Green, C. A. Jackson, R. G. Robinson, D. H. Thompson, T. H. Cullen, J. S. McConnachie, K. W. Martin, A. J. Walker, F. H. D. Hutter, G. K. Rose, G. E. Stein, L. R. S. Taylor, C. E. Drew, H. H. G. Eastcott, Arsen Kildjian, P. C. Watson, T. L. Kennedy, H. W. A. Baron, Ambrose Jolleys, C. O. Fung-Kee-Fung, A. M. Wood, L. L. Bromley, I. A. Alexander, A. H. M. H. Ashoor, G. H. Bartlett, S. K. Burcher, Mortimer Burdman, H. A. Daniels, J. B. Dowe, H. B. Hattam, L. H. Hiranandani, E. S. R. Hughes, Hassan Ibrahim, D. S. Iyer, D. R. Leslie, John Loewenthal, S. D. Loxton, A. B. McCarten, R. J. Maneksha, Raphael Marcus, K. W. Friddis, J. G. Pypar, R. F. Read, W. S. Rees, D. B. Robertson, D. R. Ryder, V. S. Sheth, F. N. Street, J. M. Tyler, S. A. Vincent, Muriel C. Waterfall, T. E. Wilson.

Diplomas in anaesthetics were granted jointly with the Royal College of Physicians to the following candidates :

E. F. Adams, S. N. Albert, G. S. Ambardekar, J. D. M. Barton, W. L. Bilsland, R. P. Bliss, N. H. Bloom, R. A. Bowen, D. M. Brown, C. A. Chealte, H. C. Churchill-Davidson, R. E. W. B. Comerford, R. L. Coulter, J. I. Davies, W. W. Deane, A. G. Doughty, G. L. Evans, Henry Fairlie, D. J. H. Goodhue, Helen E. Gordon, R. W. G. Grindlay, J. R. Hamerton, Godfrey Herington, M. H. W. Holloway, Gordan Houseman, M. S. Howe, J. McN. Inglis, R. G. G. Jones, W. A. Jones, F. M. Lancaster, R. A. Lattley, J. D. Loughrey, T. H. McCall, I. M. McCully, A. I. MacKenzie, Leonard Mather, Julia M. Middleton, Michael Nash, James North, J. R. Odell, H. F. Patrick, A. W. Raffan, G. A. Rawlins, D. F. Rees, G. J. Rees, T. B. L. Roberts, Eleanor H. Russell, I. T. Scott, J. J. Slove, James Straton, E. I. Tate, W. N. Vellacott, G. L. Way, J. H. Willis, F. G. Wood-Smith, D. S. Young.

**Royal College of Physicians of Edinburgh**

At a meeting of the college held on Dec. 5 Dr. D. M. Lyon was re-elected president. Dr. W. D. D. Small, Dr. L. S. P. Davidson, Dr. J. D. S. Cameron, Dr. H. L. Wallace, Dr. I. G. W. Hill, and Dr. D. K. Henderson were elected to form the council for the ensuing year. Dr. W. D. D. Small was nominated vice-president.

**Ophthalmological Society of the United Kingdom**

The society's annual congress will be held in Glasgow from March 27 to 29. Rhinology in Relation to Ophthalmology is among the subjects for discussion. The hon. secretary for the congress is Mr. E. F. King, 79, Harley Street, London, W.1.

**Cancer Instruction in the United States**

A committee of 24 doctors, representing 14 medical schools, has been formed, under the chairmanship of Prof. Frank E. Adair, to advise the National Advisory Cancer Council on the place of cancer in the medical curriculum. The aim is to make courses on the subject more comprehensive and better integrated.

**University College Hospital Medical School**

The centenary of the first public administration of ether in Europe is to be commemorated in a lecture by Dr. Massey Dawkins on Saturday, Dec. 21, at 4.45 P.M.

**British Institute of Radiology**

A series of six lectures on the Applications of Atomic Physics in Medicine will be given by Prof. W. V. Mayneord at the institute at 5 P.M. on successive Wednesdays, from Jan. 1.

**Prospects for Reablement**

Opening a new rehabilitation and occupational therapy centre at Bromley Hospital on Dec. 14, Sir Wilson Jameson, chief medical officer of the Ministry of Health, said there is a need for still more centres, whose staff should include an almoner or social worker, to cooperate with the Ministry of Labour's disablement resettlement officer and the employer; the general practitioner, too, must be kept informed. In future medical students may receive fuller instruction in physiotherapy and reablement. The idea of general-practitioner hospitals, linked to larger institutions, has, he concluded, now been accepted.

**Maudsley Hospital Postgraduate Medical School**

A course, in two parts, for the diploma in psychological medicine, will be given at the school in the New Year. The first part, in January and February, will be concerned with the anatomy and physiology of the nervous system, electroencephalography, biochemistry in relation to the nervous system, physiological psychology, psychology, and medical psychology. The second part, from March to June, will include lectures on psychiatry, psychopathology, and psychotherapy, and related biochemical, pathological, clinical, genetic, legal, and social questions. Six months' clinical instruction in psychiatry is included, and there will be twenty clinical demonstrations in neurology. Application for enrolment should be made to the dean, 107, Denmark Hill, London, S.E.5.

**Call for Blood-donors**

Over 12,000 new donors joined the blood-transfusion service in the three months up to Oct. 1; but nearly 150,000 more volunteers are needed. It is estimated that 400,000 blood donations will be required in 1947.

**Return to Practice**

The Central Medical War Committee announces that the following have resumed civilian practice :

Dr. BYRON EVANS, 59, Cathedral Road, Cardiff (Cardiff 9386).  
Dr. F. BASIL KIERNANDER, 78, Wimpole Street, W.1 (Welbeck 8874), and 7, Henley Avenue, Ilfey, Oxford (Oxford 7212).

The headquarters and London regional offices of the Central Council of Physical Recreation are now at 6, Bedford Square, W.C.2.

**Appointments**

CASSON, F. R. C., M.B. Lond., D.P.M.: clinical assistant, department of psychological medicine, National Hospital for Nervous Diseases, Queen Square.  
GORDON, ISRAEL, M.D. Edin., M.R.O.P., D.P.H.: deputy M.O.H., Ilford.  
GREEN, S. I., M.B. Lond., F.R.C.S.: surgical registrar, King's College Hospital, London.  
MCKENZIE, PETER, M.B. Glasg., D.P.H.: deputy physician-superintendent, City of Glasgow Fever Hospital.  
ROBINSON, W. L., M.B. Belf.: resident surgeon, St. Vincent, Windward Islands, Colonial Service.  
ROSS, G. I. M., M.B. Aberd., F.R.C.S.: medical officer, Gibraltar, Colonial Service.  
STENT, LOIS, M.D. Manc., D.BACT.: pathologist, Withington Hospital.  
STRANG, R. A., M.B. Glasg., D.P.H.: deputy M.O.H., Harrow.  
**Purley and District War Memorial Hospital:**  
GREIG, D. L., M.R.C.S., D.M.R.E.: radiologist.  
WARREN, C. P., M.B. Lond., D.C.P.: pathologist.  
**Royal Infirmary, Sunderland:**  
COWAN, I. C., B.Sc., M.B. Aberd.: M.O. 1/0 of physical medicine.  
KNOWLES, E. W., M.Ch. Orth. Lpool, F.R.C.S.: assistant orthopaedic surgeon.  
LEVY, H. B. M., M.C., M.S. Durh., F.R.C.S.E.: surgeon.  
LOWDEN, T. G., B.M. Oxf., F.R.C.S.: assistant surgeon.  
ROSS, J. M. H., M.B. Edin., F.R.C.S.E.: assistant surgeon.  
SANFORD, D. A., M.B. Lond., F.R.C.S., M.R.O.P.: surgeon.  
WEIR, J. A., M.B. Glasg., F.R.C.S.E.: assistant surgeon.

**Examining Factory Surgeons:**

DAVID, G. E., M.R.C.S.: Ystalyfera, Glam.  
DEWHURST, M. S., M.B. Camb.: Havant, Hants.  
MCCALLUM, STEWART, L.R.O.P.E.: Leek, Staffs.

## PALINDROMIC RHEUMATISM\*

F. PARKES WEBER  
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**PALINDROMIC** rheumatism is a convenient term for some clinical syndromes of uncertain causation and for component parts of more complicated "compound" syndromes.

Hench and Rosenberg (1944) described thirty-four cases of a "new" recurrent disease of joints and adjacent tissues: multiple afebrile attacks of acute arthritis and peri-arthritis. In some cases there were also recurring para-arthritic swellings of soft tissues in the neighbourhood, including in a few patients small temporary intracutaneous or subcutaneous nodules. The attacks developed suddenly, generally lasting only a few hours or days, but recurring repeatedly at short or long *irregularly* spaced intervals. They were manifested by pain, swelling, redness, and disability of one (sometimes more than one) small or large joint. Little or no constitutional reaction or abnormality was revealed by laboratory tests; and no significant functional, pathological, or radiographic evidence of disease was found even after scores of attacks, in spite of the transitory presence (in some cases at least) of an acute or subacute inflammatory polymorph exudate in the articular tissues and cavity.

The incidence was about equal in the two sexes. The patients on admission were aged 21-73 (average 42). The age at onset of the disease was 13-68 (average 34.9). The recurrence notably changed its frequency in four patients. The intervals between attacks differed materially in different cases and from time to time in the same case. As already mentioned, usually only one joint was involved in an attack. Almost any joint in the body was liable to be affected. Finger-joints (notably proximal interphalangeal joints) were especially frequently involved, and then, in order of frequency, came wrists, shoulders, knees, toes, and elbows. Tendon-sheaths were also occasionally affected by sudden similar attacks.

## TERMINOLOGY

Hench and Rosenberg (1944), who introduced the name "palindromic rheumatism," point out that "palindromic" is simply Greek for "recurrent," and they prefer the relatively vague and non-committal word † "rheumatism" (as in frequent medical and popular use) to the more exact word "arthritis." Indeed, the symptoms are not absolutely limited to the joints, for there are sometimes pararthritic (para-arthritic or para-articular) swellings and nodules, and the tendon-sheaths—and sometimes bursae, notably the olecranon bursa (see below)—may be involved.

It seems to me that the term "palindromic rheumatism" might well be used in a wider sense, to include attacks of intermittent or recurrent hydrarthrosis (whether strictly periodic or not), as described by Schlesinger (1899), Garrod (1910), and many others; the term might also be used for some at least of the cases described by Solis-Cohen (1914) in his paper on "angioneural arthroses commonly mistaken for gout or rheumatism," and for Kahlmeter's (1939) attacks of allergic (?) rheumatism. One may note, by the way, that the curious recurrent attacks described under the heading "urticaria tuberosa of Willan" (Nixon 1916) have analogies with angioneurotic oedema and para-articular phenomena of intermittent hydrarthrosis and palindromic rheumatism.

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† Many terms in medical as well as popular use are somewhat vague and, strictly speaking, inexact. Thus the term "aortic coarctation" is often used by medical writers to mean stenosis of the aortic isthmus, though it strictly signifies nothing more than aortic stenosis (stenosis of the aortic valves and orifice).

It is true that some of Solis-Cohen's cases were febrile, whereas the attacks in Hench and Rosenberg's patients were afebrile, as were most of the intermittent hydrarthrosis attacks referred to by Garrod and others. Most of the cases of intermittent hydrarthrosis were definitely periodic, whereas the intervals between the attacks in Hench and Rosenberg's cases were irregular. Though the differences between these various classes may be considerable, enough perhaps to separate them roughly into various clinical syndromes, the points of resemblance are, I think, sufficiently marked to justify their collection into various syndrome-groups under one heading, "palindromic rheumatism."

## ETIOLOGY

Can there be any common aetiological factor in all these cases? There is some resemblance between individual attacks of "palindromic rheumatism" and the acknowledged allergic joint symptoms of "serum disease." Many have noted an analogy with angioneurotic oedema, which a few of the patients also had. Schlesinger (1899) was struck by resemblances between angioneurotic oedema and intermittent hydrarthrosis, and suggested that some cases of intermittent hydrarthrosis were really angioneurotic oedema of synovial membrane. In the families of some patients with palindromic rheumatism (in my enlarged sense) there have been allergic manifestations, such as urticaria, angioneurotic oedema, asthma, and, I think, recurrent vomiting. Apart from allergy in family history, it may be noted that some of Kahlmeter's (1939) patients had urticaria, angioneurotic oedema, asthma, or migraine. It must be admitted that palindromic rheumatism (in my wider and more inclusive sense) is intimately allied to allergy or some process resembling allergy, even if no causal allergens for the attacks have yet been discovered. Focal sepsis has probably been a causal factor in some cases, owing to bacterial allergens being discharged at times into the blood-stream. One may suspect an inborn tendency as a factor in a few cases in which a family history of similar attacks and acknowledged allergic conditions was forthcoming. Frenkel-Tissot (1916) reported that in a group of four sibs, three had had intermittent hydrarthrosis (knee), and the other was subject to periodic attacks of migraine and occasional urticaria.

## SYMPTOMS

Garrod (1910) agreed with previous writers in dividing cases of intermittent hydrarthrosis into primary and symptomatic cases:

"In primary cases the periodic swelling comes on as an isolated event, sometimes after an injury; and the affected joints, which are in the great majority of instances the knees, recover completely or almost completely in the intervals, at any rate in the earlier stages. In symptomatic cases, on the other hand, the affected joints have already been damaged, more or less severely, by antecedent disease, such as the more obstinate forms of gonorrhoeal arthritis, or the crippling lesions of many joints commonly classed as rheumatoid arthritis or arthritis deformans. In other respects the cases of the two classes closely resemble each other, and the observation of a series of examples inclines one to the opinion that, as Linberger (1901) maintains, intermittent hydrarthrosis is a phase or symptom of various diseases rather than a disease sui generis."

A woman, aged 67, in hospital at present with old osteo-arthritis and pernicious anaemia, was under my care about 1919 (when she was aged 40) with recurrent, but not periodic, attacks of swelling, stiffness, and pain in the left knee, each attack lasting a few days. The radiologist (Dr. James Metcalfe) suggested "intermittent synovitis."

Garrod (1910) draws attention to abrupt changes in the features sometimes seen, possibly in connexion with

therapeutic measures, when the intermittent hydrarthrosis ceases and is resumed after a more or less long pause. The frequency may change, or the attacks may recur on the opposite side of the body. I was once shown an excellent example of such a change (a case of Dr. O. B. Bode). Of concurrent conditions, Garrod writes, pregnancy exercises the most conspicuous influence on the course of intermittent hydrarthrosis. In most recorded instances the articular attacks have ceased during pregnancy, but not always throughout the whole period of pregnancy. In certain cases hydrarthrosis attacks have shown relation to menstrual periods. Attacks have been more severe or less severe when they coincided with menstrual periods.

The small temporary pararthritic intracutaneous and subcutaneous nodules, investigated by Hench and Rosenberg in some of their cases, remind me of the little nodules which sometimes suddenly develop and spontaneously disappear in cases of rheumatoid arthritis, and which may represent an early stage of the well-known "chronic necrobiotic subcutaneous nodules of the rheumatoid arthritis type" (Weber 1946), though they become reabsorbed without the development of necrotic foci.

#### SOME MORE COMPLICATED "COMPOUND" SYNDROMES

Palindromic rheumatism, in my proposed extended sense, is also a convenient term for prominent features of certain more complicated syndromes, which are probably almost unique. I will give two examples.

The first case can be described as one of palindromic rheumatism without permanent changes in or round affected joints; with recurrent (allergic?) attacks of Ménière's syndrome, without resulting deafness; and with recurrent (allergic?) attacks of iritis, with pain but without permanent synechiæ or permanent changes in the eyes.

CASE 1.—A man, aged 28, with the above-mentioned complaints, was admitted to hospital on August 6, 1946, for investigation. He had been born in Burma of British parents, and had been married one year—no children.

*History.*—Seventeen years ago he had begun to have attacks of pain in the hip-joints, especially the right one. The pain had been felt in the joints (rather than about the joints or in the bones), sometimes radiating down the thigh from the affected hip-joint. The pain had been boring and especially sharp on moving. Besides the pain there had been a sensation of stiffness. No local tenderness; no definite periodicity, but on the average about six months' interval between attacks, which had lasted usually a few weeks. Nothing abnormal had been detected on radiography. The attacks had apparently been afebrile and not accompanied by constitutional symptoms. No definite diagnosis seems to have been made. Rest in bed for five months had been at first ordered, but had been followed by no obvious improvement. Rest had therefore not been regularly adopted for treatment. The pain had usually been in the right hip-joint, but sometimes in the left. Both sides had never been affected together. No other joints had ever been involved. Last attack had been about three weeks ago, right more than left hip. Both hip-joints had been affected, but one side had been completely free (after two weeks) before the other had become painful (for a week). Patient does not go to bed for the attacks, though occasionally owing to the pain he has had to rest.

The attacks of Ménière's syndrome had never come on at the same time as the joint-pains. The first sharp attack had been twelve years ago, accompanied by vomiting. Patient had woken up one morning unable to sit up or turn over in bed; he had vomited four or five times, but the vomiting had not been accompanied by a sensation of nausea; that attack had lasted thirty-six hours. The next attack had been a few months later. The interval between attacks had varied from a few months to two years up to three or four years ago; but since then the attacks had been more frequent though less severe, excepting for one severe (the last) attack six weeks ago. The average duration of the attacks had been 24–30 hours, but they might last up to three days. No causal factors had been discovered. Prodromal symptoms had been

a kind of light-headedness and tinnitus, slight at first but becoming more pronounced as the attack gradually developed. There had been no associated deafness either during or after the attacks—hearing not impaired. No associated headache; no associated incontinence. Of the vertigo, patient said that his surroundings seemed at first to revolve; but, when he lay down, objects seemed to pass back over his vertex from the front. The attacks appeared to be relieved by lying flat on the back—? aborted by pilocarpine gr.  $\frac{1}{10}$ .

Seven years ago he had developed the first of seven or eight attacks of iritis. That attack had been on the right side and had lasted about eight weeks. Patient had had only one attack on the left side; the two sides had never been affected simultaneously. The attacks had been accompanied by considerable eye-pain, especially on coming into the light from a dark room. They had occurred at about yearly intervals; average duration about a month. They had varied in intensity. No precipitating factor known. The last attack had been in January, 1946.

The eye, ear, and joint attacks had never accompanied one another; not more than one of the three kinds had occurred at a time.

Patient's general health apart from the above troubles had been good, and there had been no other serious complaint. There was nothing in the family history specially bearing on the subject. We heard privately that the family was "delicate." A sister had recently had pericarditis after "sinusitis" at the age of 23. Patient's mother had died young; cause uncertain. Patient had seen various specialists. A salt-free diet had not helped. Dr. Norman William Gardener had always treated patient for his eyes—with atropine ointment and by "steaming." Dr. Gardener is certain that the eye attacks were definitely iritis, possibly tuberculous. There had been definite iritic exudate (plastic iritis) but no permanent synechiæ. This iritis had affected only one eye at a time. He cannot remember whether there had been any sluggishness in pupillary reaction, change in colour of the affected iris, or any inequality of pupils before atropine treatment had been begun.

*On Admission to Hospital.*—Height 5 ft. 6½ in.; weight 8 st. 12 lb. Tall, hyposthenic type, rather delicate-looking. No evidence of anæmia. Teeth, tongue, tonsils, and throat: nothing special. No obvious enlargement of any superficial lymph-glands. No evidence of latent tetany. Cardiovascular system: nil special. Brachial blood-pressure 135/80 mm. Hg. Respiratory system: nil special. Abdomen: nil special. No achlorhydria (August 10, 1946). Central nervous system: nil special. Eyes: very slight lateral nystagmus; slight myopia. Hearing good on both sides. Nervous reflexes (deep and superficial) normal. Urine: acid; trace albumin; a few hyaline casts. But on another occasion nothing abnormal was found; sp. gr. 1020, acid. No other abnormal urinary symptoms. Radiograms of both hip-joints and of skull (Dr. F. G. Wood, August 6, 1946): nothing abnormal. Blood Wassermann reaction negative (July 17, 1946). Blood-sugar 110 mg. per 100 c.c.m. Blood-uric acid (August 16, 1946) 3.2 mg. per 100 c.c.m. Sedimentation-rate (August 7, 1946): first hour 6 mm.; two hours 17 mm. (hourly average 7 mm.). Blood-count (August 17, 1946): red cells 4,950,000 per c.c.m.; Hb 96%; colour-index 0.97; leucocytes 7000 per c.c.m. On August 21, 1946, the leucocytes were 7900 per c.c.m. (polymorphs 76%; lymphocytes 23%, eosinophils 1%).

Patient is now under observation at home, apparently at present in good health.

The symptoms in this case are clearly enough defined to constitute a definite triad syndrome, but no other exactly similar case seems to be known. It is difficult to avoid the conclusion that each of the three syndromes constituting this compound triad syndrome is allergic, though no focal sepsis or allergen has been discovered.

Quincke (1921), among the numerous unusual localisations of his angioneurotic œdema, does not seem to have mentioned the internal ear and Ménière's syndrome. Duke (1923) suggested an allergic origin for some cases of Ménière's syndrome. He referred to a man and a woman with definite allergic history in whom Ménière's attacks seem to be caused by certain articles of food. The attacks were relieved by adrenaline and by the

avoidance of the foods in question; attacks could be reproduced by eating such foods, or by intracutaneous injection of extracts. Williams (1945, 1946) has recently elaborated an allergic explanation, linking Ménière's disease or, rather, syndrome—which he terms endolymphatic hydrops of the ear—with vasomotor rhinitis, &c., as manifestations of "physical allergy" in the head.

In regard to the recurrent attacks of iritis, I think they are most probably also allergic. Though I know of allergic cataract (so-called dermatological cataract) occurring in subjects with allergic dermatoses (eczema-prurigo syndrome, with or without asthma, névrodermite), and of allergic conjunctivitis—e.g., that associated with hay-fever—there is apparently no ophthalmological literature recording recurrent iritis as in this patient (compare Ridley and Sorsby 1940). If the patient's joint attacks had been "real" (? streptococcal) rheumatism instead of palindromic rheumatism, the attacks of iritis might have been supposed to be rheumatic iritis, and therefore allergic in so far as acute rheumatism is now generally supposed to represent an allergic response towards the pathogenic agent of acute rheumatism (? some hæmolytic streptococcus or virus). It may be noted, however, that Parry (1939) recorded recurrent attacks of iridocyclitis in a young woman, apparently allergic and due to hypersensitivity to egg-white.

In short, this case strongly supports Schlesinger's original views of 1899, according to which the condition would be angioneurotic œdema or, as he preferred to call it, hydrops hypostrophos—i.e., recurrent œdema—sometimes of the synovial membrane of a hip-joint, sometimes of one iris, and at other times of one internal ear, the cochlea beginning to be affected before the semicircular canals. The iris attacks, it must be admitted, are rather chronic, but doubtless in some localisations angioneurotic œdema may be relatively chronic. An allergic reaction may doubtless be chronic if there is persistent action of some known or unknown allergen in an allergic subject. Recurrent acute reactions can give rise to chronic (persistent) changes. I believe that Loeffler's "transitory pulmonary infiltrations with eosinophilia" are nothing else than angioneurotic œdema, but apparently attacks are not always quite so transitory—compare the case of a man, aged 19, with a history of hay-fever, shown by A. Elkeles and N. R. Butler at the Clinical Section of the Royal Society of Medicine on April 12, 1946, as an example of "recurrent transitory pulmonary infiltrations with eosinophilia (chronic type of Loeffler's syndrome)."

The second case is one which the late Lord Dawson discussed with me in 1942 as a puzzling rarity.

**CASE 2.**—The patient was a tall strong-looking man, aged about 60, who since 1936 had had attacks of swellings of the hands or feet, usually only one side at a time. The forearms, knees, and legs had been similarly affected. Sometimes also there had been sudden enlargement of an olecranon bursa (no evidence of gout discovered). There had also been subcutaneous nodules along the ridge of the ulna from the elbow; these had been situated over the periosteum and not in it, though somewhat adherent to it. Sensation of tightness in an arm, leg, or shoulder had sometimes given warning of an impending attack. The attacks had never been accompanied by fever or definite pain (contrast this with true attacks of gout). The attacks had lasted a few days and slowly passed off.

I saw him during one attack, which was of three or four days' duration and was beginning to subside. Some fingers of both hands were involved, in one hand more than in the other. The skin over the swelling was red and shiny in some parts, but some patches or streaks were pale, as if blood had been driven out of the surface capillaries by the pressure of serous effusion. Patient had also a chronic smooth bony enlargement (not painful or tender) of the upper end of one fibula, which is difficult to explain.

**Previous Data.**—A symptomless stone in the gall-bladder had been discovered on routine radiography. Liver efficiency was normal. Gastric achlorhydria was reported, but some free acid returned after gastric lavage. Blood-uric acid 3.6 mg. per 100 c.cm. Blood-sugar normal. Radiography showed no articular changes and nothing abnormal in the bones, but the swelling in the fibula had apparently not been examined. Brachial systolic blood-pressure about 130 mm. Hg.

On one occasion an enlarged olecranon bursa had been tapped and had yielded a serous fluid, giving a pure culture of *Staph. aureus*. No definite evidence of allergy had been discovered by skin tests. One antrum was opaque and had been cleared and curetted for a polypoid condition, but that had had no effect on patient's "attack." A pure growth of *Staph. aureus* had been obtained from the antrum. 'Atophan' had seemed to diminish the attacks at first, but not later.

The attacks had never laid the patient up, but if his fingers had been much swollen during an attack he could hardly use them, and could not write. He took an ordinary diet, as he had found that diet made no difference. He had also left off taking dilute hydrochloric acid with meals, as he thought that also had made no difference. While he had been in South Africa he had remained free from attacks; but, after he had left, they had begun again. Exposure to cold had sometimes definitely brought on an attack.

This case seems to come half-way between palindromic rheumatism and angioneurotic œdema. According to Schlesinger's views of 1899 the patient would be suffering from recurrent angioneurotic œdema (or hydrops hypostrophos, as he called it) of the peri- and para-arthritis tissues of his fingers and limbs and notably sometimes of the synovial lining and wall of one of his olecranon bursæ. The appearance of subcutaneous nodules over the ulnar ridge from the elbow downwards, as in some cases of rheumatoid arthritis, is a feature of the case (cf. Weber 1946). The swelling of the upper end of one fibula is unexplained.

#### SUMMARY

In spite of obvious objections which might be raised by the fastidious in nomenclature, it is convenient to retain the rather loose term "palindromic rheumatism" proposed by Hench and Rosenberg (1944). Perhaps, however, it would be better to enlarge the scope of the term, to include nearly related syndromes, such as intermittent hydrarthrosis (hydrops articulorum intermittens), which Schlesinger (1899) suggested was a recurrent angioneurotic œdema (hydrops hypostrophos he termed it) of the synovial membrane and soft parts of joints.

Palindromic rheumatism, in the extended sense that I propose, constitutes also a convenient term for the central features of certain more complicated ("compound") syndromes, two remarkable examples of which are described.

I am indebted to Dr. E. Schwarz for permission to publish the record of case 1.

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**Postscript.**—An elderly medical friend told me of his recent experience. He had a slight "cold" accompanied by cough and slight sore throat. About a week later he was suddenly attacked by sharp pain and swelling

in the left patellar bursa, accompanied by local heat and redness, with slight fever. He did not stop in bed, and in a week's time he felt quite well again. Then, however, he developed tenosynovitis about the left ankle, which gradually passed off. He had since early life been subject to migraine-like attacks, though not unilateral. With this exception he had enjoyed good health. As a young man he had had tenosynovitis in the wrist from fencing, and on the inner side of the knee when learning to ride. In this instance I suggest that the bursal swelling in front of the knee and the tenosynovitis were local allergic-like phenomena of the nature of angioneurotic oedema. He may have become hypersensitive towards some "agent" introduced by the "cold."

Slight traumata may be supposed to act locally by causing the formation of some histamine-like substance, which in hypersensitive subjects produces a local oedematous-inflammatory reaction and, if the process be frequently repeated, chronic fibrous thickening, as manifested in the permanently thickened bursa of "housemaid's knee," thickening of the olecranon bursa, and the chronic changes of Dupuytren's contraction and Landouzy's acquired form of "camptodactylia."

## BODILY CHANGES DURING ABREACTION

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WHEN a traumatic experience is dissociated from normal consciousness it forms an unconscious emotionally charged complex. There is a natural tendency for such a complex to erupt into consciousness and, by so doing, to cause such symptoms as hysterical attacks and battle dreams. These symptoms are due to repetitions, more or less complete, of the original incident; and it is by such repetitions that the emotional charge is gradually dissipated until a point is reached where the experience becomes acceptable to consciousness and the symptoms subside. Often, however, spontaneous recovery does not occur, and the emotional charge has to be artificially reduced. This is usually done by abreaction under narcosis.

The essence of abreaction is that, with conscious control in abeyance, an uninhibited reliving of the traumatic incident can occur. It is found that the reliving process, once begun, proceeds automatically and is accompanied by full expression of the emotions and at least partial repetition of the bodily movements associated with the original incident. Thus it differs fundamentally from the mere recall of a forgotten event. Moreover, observation shows it to be, in many respects, an extraordinarily faithful repetition of the original incident. These complexes, therefore, may be described as psychosomatic experiences which, by reason of their being dissociated from normal consciousness, have remained in the unconscious, unchanged—like food that the stomach cannot digest. The result is that, when they reappear in consciousness, they may do so in toto in their original form, the experience of the body being repeated as well as that of the mind, at least in so far as the physiological mechanisms of the organism allow. These mechanisms are, however, much more extensive and specific in their field of operation than seems generally to be realised. I have therefore thought it worth while to make a full report of a case of localised specific somatic reaction, while referring to similar cases observed by myself and others to show that this is not a unique phenomenon.

### CASE-RECORD

A man, aged 35, was admitted to hospital because of attacks of somnambulism accompanied by aggressive behaviour. He

was a good type of Army officer who had had a conventional upbringing in a stable middle-class family. He had had nightmares in early childhood, but no instability had been suspected by his relations until he had walked in his sleep several times in his last year at a preparatory school. The condition had recurred at the age of 16, when he had been forcibly restrained. After leaving school he had joined the regular Army and gone abroad. Except for a few sporadic episodes he had remained well for some years. In 1935, however, he had been admitted to hospital with a minor septic condition and retained five months because of somnambulism, which had recurred soon after his admission. As a result he had been invalided from the Service in 1936. He had remained nearly symptom-free until he had rejoined the Army in 1940.

During his detention in hospital in 1935 physical methods of various kinds had been used to restrain him. In his frequent nocturnal encounters with a bodyguard set to watch him he had sustained both physical and psychical traumata while he was in a dissociated state. These dissociated experiences had remained more or less latent for several years; but, as soon as treatment was undertaken, the strength of the repressive mechanism which had maintained that condition was undermined, and the automatic discharge of those experiences began—i.e., there was a recurrence of somnambulisms in which he re-enacted (often in a truly alarming manner) the traumatic incidents he had experienced in hospital ten years previously. On one such occasion his hands had been tied behind his back during sleep, as a precautionary measure. Waking in a dissociated state to find himself thus constricted, he had struggled unsuccessfully to free himself. He then had managed to evade his bodyguard and had escaped into the surrounding countryside, from which he had returned a few hours later.

The following detailed account is given of the re-enactment of this incident:

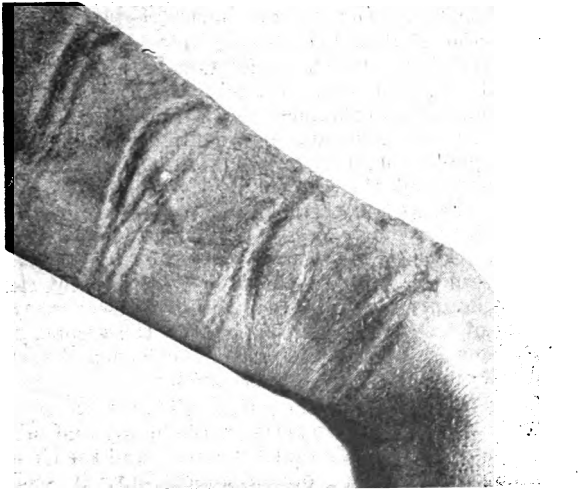
On the night of April 9, 1944, the patient was observed by the nurse on duty to be tossing and turning violently on his bed. He was holding his hands behind his back and appeared to be trying to free them from some imaginary constriction. After carrying on in this way for about an hour, he got up, and, with his hands still in the same position, crept stealthily into the hospital grounds. According to orders I had given for the safety of the staff, he was not followed. After twenty minutes he returned in a state of more or less normal consciousness. As he was being put to bed the nurse noticed deep weals like rope marks on each arm, the patient being apparently unaware of their presence. Next day the marks were still visible and were observed by myself and others. The patient had only a vague recollection of what had happened the previous night. By the evening of April 11 the marks had disappeared, except for some residual subcutaneous haemorrhagic staining.

On the night of April 11 the incident was abreacted under narcosis. At 11.10 P.M. I gave him 5 c.cm. of 'Evipan' intravenously. He slept for fifteen minutes. Then he talked in a meandering way, tossed about on the couch, got on to the floor, and started crawling round the room in a partially dissociated state. Suggestions directed to stimulate the dissociated experience were without effect (this lack of suggestibility was characteristic of him). Soon he returned to normal consciousness without any change in the appearance of his forearms having been observed. He remarked to me that he had "nearly got there"—i.e., reached the dissociated experience—but had then "come awake again."

At 12.15 A.M. I gave him another 3 c.cm. of evipan. He slept for a few minutes and then began reciting poetry. (This was a common prelude to his somnambulism.) Ten minutes later he began to toss and turn on the couch, with his hands behind his back. As he appeared to be in a completely dissociated state, I turned the light full on him. I watched him writhing violently for at least three-quarters of an hour. After a few minutes weals appeared on both forearms; gradually these became indented; and finally some fresh petechial hemorrhages appeared along their course.

Then he got up and crept stealthily through the door into the hospital grounds. I followed him. When he began running, still with his hands behind his back, I lost trace of him in the dark for about ten minutes. When I found him again he was in a partially dissociated state, from which he regained normal consciousness about ten minutes later. He then gave a clear account of everything that had happened and related the incident to his experiences in hospital in India.





Photograph of patient's right forearm with indentations resembling rope marks, which appeared during abreaction under narcosis.

Next morning the marks were still clearly visible and were photographed (see figure).

*Possibility of Trickery.*—The first time the marks were observed trickery cannot be ruled out; the patient could have tied a piece of rope round his forearms while he was alone in the garden and discarded it on returning to the ward. On the second occasion, however, strict observation during the reappearance of the marks made trickery impossible; so it is difficult to see how the occurrence can be explained in any way other than as a genuine psychosomatic phenomenon. Moreover, for any such trickery there must be a motive, and neither I nor my colleagues could detect any possible motive, conscious or unconscious, for such behaviour. He was a man of excellent character in all respects. In the course of a long and arduous treatment I came to know him well and I have since maintained a social contact.

#### OTHER CASES

This type of localised somatic manifestation is not so unusual as is generally supposed.

During the abreaction of a man who had been concussed and buried by a fly-bomb a year previously, I found on the left ankle, on which a beam had fallen in the original incident, a swelling which increased the circumference of the ankle by  $\frac{1}{2}$  in.; and over the left orbit, where he had been struck on the same occasion, an ovoid swelling which increased the circumference of his head by  $\frac{1}{8}$  in.; at both points he had acute pain for several hours afterwards.

During the abreaction of a merchant seaman, who had been immersed in very cold water for a long time, there appeared (besides much generalised autonomic disturbance) localised ischaemia of the extremities.

In a woman, aged 35, the abreaction of a riding accident, which had happened at the age of 10 years, was followed by petechial haemorrhages and bruising along the line of the tenth rib on the right side, the side on which she was said to have fractured some ribs. This abreaction was also followed characteristically by several hours of acute pain at the site of the original injury.

I could add to the list from my own limited experience, and no doubt others could add much more. I have heard of striking instances from colleagues, but relatively few cases seem to have been published. It is well known that somatisations of this nature, though not often so dramatically convincing, are fairly common in the course of psycho-analytical treatment.

#### DISCUSSION

These phenomena show that when an experience, in which there has been somatic as well as acute psychological trauma, is dissociated from normal consciousness, the

complex resulting from it may retain the living image, as it were, of the somatic and the psychical experience; and that, when such a complex is discharged into consciousness—even after remaining in a latent (unconscious) state for many years—the somatic component of the original experience may be re-expressed in somatic terms.

The mechanism through which this is effected is obscure, and its final elucidation must remain in the sphere of the neurophysiologist rather than the clinician. But the existence of some such mechanism has been proved beyond doubt by reliable clinical observations and carefully controlled experiments. Unfortunately the best publications relating to this work are nearly all in German, most of them untranslated, with the result that in this country there still exists much scepticism about matters in which perfectly sound scientific proof is not lacking. Skin-blisters, for instance, have been produced hypnotically at *specified points* on the body surface, with the exclusion of all possible sources of error. Localised urticaria of *specified areas* of the body has been produced by similar means; so also have oedema and cutaneous gangrene. Many cases of spontaneous haemorrhage of a psychogenic nature have been described, and the phenomenon has been subjected to exact scientific demonstration by Schindler (1927), who reviewed the whole subject. The question of religious stigmata has been critically reviewed by Jacobi (1923). One can conclude that neural pathways undoubtedly exist by which psychic contents may be projected on to the body in a *highly specific manner*; and it is reasonable to suppose that, in such cases, the psychic content or image, with its emotional charge, acts as the afferent side of a reflex arc the efferent counterpart of which is supplied by the autonomic nervous system.

Somatisation during abreaction differs from the above-mentioned phenomena in that the emotionally charged image or complex is derived from a previous experience which was in itself psychosomatic; the link between psyche and soma is therefore already in existence. So it is not surprising to find that somatisation during abreaction is relatively common and may occur independently of a well-marked constitutional predisposition.

This finding is of general significance in that such traumatic experiences are not restricted to adult life or to the battlefield. They may occur also in the formative years of early childhood and may involve regions of the body other than the skin and subcutaneous tissues. Though the complexes resulting therefrom may differ in certain important respects from those described in the present case, there is no reason to suppose that there is any material difference in the principles of psychosomatic relationship to which they are subject.

#### CONCLUSION

These phenomena observed during abreaction demonstrate the particularly intimate association between mind and body in traumatic experiences which have not been accepted by and integrated with consciousness. They also indicate the important part played by the emotional charge, both in maintaining this psychic dissociation and in causing generalised or even highly specific bodily changes.

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## FURTHER OBSERVATIONS ON A VITAMIN-C SURVEY OF MEDICAL STUDENTS

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EARLIER reports have been made (Harrison, Mourant, and Wormall 1939, Francis and Wormall 1942) on vitamin-C surveys by saturation tests on the students of St. Bartholomew's Hospital Medical College. The results showed that, whereas the state of "saturation" of these subjects with regard to vitamin C was not significantly different in 1940 from that in 1939, there was a distinctly higher degree of "unsaturation" in 1941. Although the results in 1941 did not suggest that most of the subjects were very seriously deficient in vitamin C, the difference between the 1940 and 1941 results was sufficient to justify a continuation of the survey to determine whether a prolonged shortage of certain fresh fruits during the war would lead to any further increase in the degree of unsaturation of the subjects of our tests. Further observations were therefore made in 1943 and 1944, and the opportunity was taken to study some other aspects of saturation with vitamin C.

The main objects of the investigations described in this paper were (1) to compare the results of the saturation tests in 1943 and 1944 with those of 1939-41; (2) to determine how long any body "reserve" of the vitamin which might be built up by saturation would remain effective, so far as these saturation tests are concerned; (3) to emphasise the seasonal differences and the greater degree of unsaturation in spring compared with other seasons; and (4) to attempt to correlate the results of the saturation tests with observations on follicular hyperkeratosis among the subjects.

Four groups (A, B, C, and D), each originally of 35 students, were selected for these tests, and it was decided to carry out saturation tests on them according to the following scheme:

GROUPS TESTED				
November, 1943 ..	A	B	—	—
February, 1944 ..	A	—	C	—
May, 1944 ..	A	B	C	D

A slight modification of this scheme was, however, made later, for the results of the tests in February, 1944, indicated that there would be very little point in testing group B in May, 1944. As group A did not appear to "benefit" in February from saturation three months earlier, it seemed highly improbable that group B, saturated like group A in November, 1943, would show any benefit six months after saturation.

### EXPERIMENTAL

**Subjects.**—The subjects, some of whom took part in the 1941 tests, were all students of our medical college. Approximately a third of them had practically all their meals in college in Cambridge during term-time, one or two lived at home, and the rest in lodgings. During the vacations practically all lived at home. They were asked not to take any preparation containing synthetic ascorbic acid during these investigations, but at a later date it was found that a few of the subjects had taken preparations of this type. The results with these individuals, and those on a few subjects who left Cambridge before the completion of their tests, are not included in this report. This explains the differences in the numbers of subjects in the four groups, but as the

minimum in the important groups in the final tables is 31, it may be claimed that the results are of statistical value.

**Saturation Tests.**—These were made by the method of Harris and Abbasy (1937), and full details are given in our earlier publication (Francis and Wormall 1942). The amount of ascorbic acid excreted during a two-hour afternoon period following a dose of 5 mg. of the vitamin (B.D.H.) per lb. of body-weight at 9 A.M. or 10 A.M. was determined, and the subject was considered saturated when he excreted in the two-hour period at least 5 mg. per 14 lb. of body-weight. This is essentially the criterion proposed by Harris and Abbasy, except that their afternoon urine-collection period was two and a quarter hours; these authors also suggested that the number of test doses required beyond the second might be taken as an index of the relative deficiency of the past intake of vitamin C by the individual.

**Hair-follicle Tests.**—Since it is difficult to measure precisely the extent of hyperkeratosis in any one subject, it was thought desirable that these tests and the chemical tests should be carried out as almost entirely separate investigations. Thus M. P. D., who made the hair-follicle tests, was completely unaware, when he made these tests, of the results of the chemical tests. No comparison of the results was made until the two series were completed, and in this way, it is hoped, a completely unbiased set of results was obtained. Where possible the hair-follicle tests on any one subject were made at about the same time as the start of the saturation tests. In the February series, however, some of the former tests were made rather later (1-4 weeks) than the chemical tests, but from the observations made in this work, and from those of other investigators, it does not seem likely that any significant change in the hyperkeratosis is likely to have taken place during this interval.

Dr. George Graham, at whose suggestion these hair-follicle tests were made, suggested that it would be advisable for the subjects with hyperkeratosis in February and March to receive suitable ointment treatment in readiness for the May observations, but we were not able to adopt this suggestion owing to examinations and the Easter vacation. The possibility that the hyperkeratosis might persist three months after saturation with vitamin C and affect the results of the tests in May is discussed later in this paper.

The back of the thigh has been reported to be the first region of the body to show hyperkeratosis. This site was therefore chosen for an estimate to be made of the degree of hyperkeratosis in each subject. A piece of cardboard with a 2-in. square cut out of it was placed over the back of the thigh just below the fold of the buttock, and the number of diseased hair follicles in the square was counted. If none was visible the whole of the back of the thigh was examined to see whether "occasional" ones were present, and to make sure that the state of the hair follicles in the chosen area was typical. The results were recorded as follows:

+++	=	13-20	diseased	follicles	per	2-in.	square		
++	=	7-12	"	"	"	"	"		
+	=	1-6	"	"	"	"	"		
±	=	An	occasional	diseased	follicle	seen	on	the	leg
—	=	None							
Abs.	=	Absent or not available for the test							

### DISCUSSION

The results of the saturation tests and the hyperkeratosis tests for the individual subjects of the various groups are given in tables I, II, and III, with a summary of the saturation-test results in table IV. No tests were made on group B after November, 1943, for reasons given above, and details of the individual results with this group are therefore omitted, but the group results are included in table IV.

In a previous communication (Francis and Wormall 1942) it was shown that a distinct increase in "unsatura-

tion" with regard to vitamin C occurred among our students from July, 1940, to July, 1941, presumably owing to the decreased supplies of oranges and certain other fresh fruits. For this and similar comparisons observations were made where possible at about the same part of each year, for there is a marked seasonal variation in our state of saturation with vitamin C. The results presented in the present paper suggest that the subjects investigated in the latter part of 1943 and the first half of 1944 were not more "unsaturated" than were similar subjects in June and July, 1941. Several of the subjects showed, however, a high degree of unsaturation in 1943 and 1944, requiring 5, 6, or (in one case) 7 large test doses—i.e., 3.5-5 g. of the

vitamin—before they were saturated, and these high requirements approach those recorded in the literature for cases of scurvy. Without entering on the vexed question of the relationship between the occurrence of scurvy or subclinical scurvy and a higher degree of unsaturation as assessed by saturation tests it may be noted that some authors—e.g., Paterson and Daynes (1941)—have reported an increase in the incidence of scurvy in this country during the war. Our own surveys have certainly indicated a definite increase in the number of relatively unsaturated individuals during this period.

In these investigations it has been noted that there is a tendency for an individual who is relatively unsaturated in one set of tests to be relatively unsaturated again at

TABLE I—RESULTS OF VITAMIN-C SATURATION TESTS AND HYPERKERATOSIS TESTS IN GROUP A

TABLE II—RESULTS IN GROUP C

TABLE III—RESULTS IN GROUP D (MAY 1944)

Subject	TABLE I			TABLE II		TABLE III							
	Nov., 1943	Feb., 1944		May, 1944		Feb., 1944		May, 1944		Subject	Doses required	Hyperkeratosis	
	Doses required	Doses required	Hyperkeratosis	Doses required	Hyperkeratosis	Subject	Doses required	Hyperkeratosis	Doses required	Hyperkeratosis			
1	6	4	-	4	-	38	6	++	2	++	69	7	-
2	4	5	-	4	-	39	6	-	3	-	70	6	-
3	3	3	-	2	+	40	5	-	1	±	71	6	+++
4	3	4	+	4	-	41	5	-	2	-	72	6	+
5	3	4	±	3	+	42	4	-	4	-	73	5	-
6	3	4	-	4	-	43	4	+	3	+	74	4	+
7	3	4	++	3	+	44	4	-	2	-	75	4	++
8	2	3	-	2	±	45	4	±	4	-	76	4	+
9	2	4	+++	4	+	46	4	-	4	-	77	4	+
10	2	3	abs.	3	+++	47	4	+	3	±	78	4	+
11	2	4	-	3	++	48	4	-	2	+	79	4	±
12	2	3	±	2	-	49	3	+++	3	+	80	4	-
13	2	4	+	5	±	50	3	-	2	-	81	4	-
14	2	3	-	2	++	51	3	-	3	-	82	3	+
15	2	3	-	2	±	52	3	-	1	-	83	3	+
16	2	3	-	1	-	53	3	±	2	+	84	3	+
17	2	2	-	1	±	54	3	abs.	2	abs.	85	3	+
18	1	5	-	4	-	55	3	-	3	±	86	2	+
19	1	2	-	2	-	56	3	±	2	+	87	2	±
20	1	2	-	2	-	57	3	abs.	4	+++	88	2	-
21	1	4	±	3	±	58	3	±	2	±	89	2	-
22	1	3	+	2	+	59	3	±	3	+	90	2	-
23	1	4	-	2	±	60	2	-	2	-	91	2	±
24	1	3	±	2	-	61	2	abs.	2	+	92	2	abs.
25	1	1	+	2	+	62	2	-	2	-	93	2	+
26	1	3	-	4	±	63	2	+	1	±	94	2	+++
27	1	2	-	2	+	64	2	-	2	-	95	2	-
28	1	2	-	2	-	65	2	-	3	-	96	2	+
29	1	3	-	2	-	66	2	-	4	±	97	2	-
30	1	3	abs.	1	++	67	2	-	3	-	98	2	+++
31	1	2	+	1	±	68	2	+	1	+++	99	2	+
32	1	2	++	2	-						100	1	+
33	1	2	-	1	abs.						101	1	+
34	1	1	±	2	+						102	1	abs.
35	1	1	abs.	1	±								
36	1	4	++	3	+								
37	1	3	abs.	4	abs.								
Aver.	1.76	3.03	..	2.52	..	Aver.	3.26	..	2.48	..	Aver.	3.09	...

subsequent tests. This might well be expected where the interval between the tests is long, but it seems rather surprising when the interval is only three months. Thus relatively unsaturated subjects of group A who received sufficient ascorbic acid to saturate them in November, 1943, were three months later again relatively unsaturated compared with other members of their group or even

TABLE IV—SUMMARY OF SATURATION RESULTS

Period	Group	No. of subjects	Doses required to give "saturation"							Aver. no. of doses per subject
			1	2	3	4	5	6	7	
Nov., 1943	A	37	20	10	5	1	0	1	0	1.76
	B	23	6	15	2	0	0	0	0	1.83
	A+B	60	26	25	7	1	0	1	0	1.78
Feb., 1944	A	37	3	8	13	11	2	0	0	3.03
	C	31	0	9	11	7	2	2	0	3.26
	A+C	68	3	17	24	18	4	2	0	3.13
May, 1944	A	37	6	16	6	8	1	0	0	2.52
	C	31	4	13	9	5	0	0	0	2.48
	A+C	68	10	29	15	13	1	0	0	2.50
	D	34	3	14	4	8	1	3	1	3.09

compared with individuals who had not received the test doses in November; three months after the second saturation they were again more unsaturated than the others. In group C also, the more unsaturated subjects in February tended to be more unsaturated than the other members of their group three months later. Several reasons might be advanced to explain the tendency of these unsaturated subjects to become unsaturated again very quickly. These individuals might (1) regularly select, by choice or for some other reason, a diet relatively deficient in vitamin C; (2) show a high rate of utilisation or destruction of the vitamin in the tissues; (3) excrete abnormally large amounts in the urine owing to a relatively low renal threshold for ascorbic acid; or (4) show some deficiency in the absorption of the vitamin from the alimentary tract. Of these and other possible explanations the first two appear to be the most feasible, and in the case of a few of our subjects we have satisfied ourselves that the first is probably the factor concerned.

Vitamin C, unlike some of the other vitamins—e.g., A, D, and E—is not stored in the ordinary sense in the animal body, but there is undoubtedly, in the tissues of a saturated individual, a "reserve" which might be regarded as a useful "balance" against a future emergency. This need not imply, of course, that saturation with this vitamin is desirable or at all necessary for the proper functioning of the metabolic processes of the body. It is not our intention to discuss at length this question of saturation and the value of the saturation tests as designed by Harris and his colleagues (Harris and Abbasy 1937, Harris 1942); in our experience, however, these tests, because of their simplicity and the clear-cut results, appear to be eminently satisfactory for the purpose for which they were intended. Perhaps it is sufficient to quote Harris (1943): "The purpose of the saturation test is to say whether the intake has been above or below some accepted standard of intake, and if below how much below. Whether saturation is desirable or not is beside the point."

Opinions are divided on the question of the "reserve" value of the vitamin C in the tissues. Zilva (1941) considers that the body ascorbic acid of a saturated animal does not act in any well-marked degree as a reserve, and he does not consider that the body can store this vitamin (cf. also Zilva 1936). Other authorities believe, however, that the reserve may have a real value; and, although it is not our wish to enter this discussion, we decided that it would be of interest in our survey to determine how long any reserve acquired during the

saturation tests would remain effective, as judged by later saturation tests.

Information on this point is rather scanty, although Harris (1943), from observations over a period of years, has reached the conclusion that an interval of six months or more between successive saturation tests is sufficient to ensure that the effect of previous saturation in building up the "reserves" has worn off. Atkins (1943) found a difference of only three-quarters of a dose in the saturation-test requirements of two groups, one of which had been saturated four months previously.

The results of our investigations, summarised in table IV, show that the individuals (group A) saturated in November, 1943, were only slightly less unsaturated (0.23 of a test dose on an average) in February, 1944, than were other members of our student population—i.e., they had almost entirely lost in three months any "advantage" from the saturation. The tests made in May showed, however, that those saturated three months previously (groups A and C) were definitely less unsaturated (0.59 of a test dose) than were other individuals (group D). This difference between the results for the two three-month periods can perhaps be explained by the difference between the changes in the state of vitamin-C nutrition of the population, due primarily to seasonal variations in the dietary supply of the vitamin. The period covering these tests was one when we might reasonably expect, from our own earlier observations and from those of other investigators, a distinct increase in the number of doses required to give saturation over the period November to February, with a much smaller increase from February to May. The fact that the latter increase did not arise we attribute largely to the fact that there were a few issues of oranges during the spring of 1944.

The conclusions which might tentatively be reached from the results summarised in table IV are that any extra "tissue reserve" of vitamin C resulting from saturating doses will normally be largely lost by the body in the course of three months or less, if the dietary intake of the vitamin over this period is insufficient to meet the body requirements. Where the dietary intake is adequate there may be retention of part of the "reserve" for over three months. Perhaps it is only to be expected that the extra reserve should be dissipated in a "slump" period—i.e., that the more saturated individuals should use or lose vitamin C at a greater rate than those who are less saturated—but it was rather surprising to find that

TABLE V—COMPARISON OF SATURATION TESTS AND HYPERKERATOSIS TESTS IN GROUPS A AND C

Group	Hyperkeratosis reading	No. of subjects	February, 1944						Hyperkeratosis reading	No. of subjects	May, 1944						
			Saturation tests								Saturation tests						
			Doses required								Doses required						
A	-	19	0	6	7	4	2	0	3.1	-	13	1	7	0	5	0	2.7
	±	5	1	0	2	2	0	0	3.0	±	9	3	3	1	1	1	2.3
	+	5	1	1	1	2	0	0	2.8	+	9	0	5	3	1	0	2.6
	++	3	0	1	0	2	0	0	3.3	++	3	1	1	1	0	0	2.0
	+++	1	0	0	0	1	0	0	4.0	+++	1	0	0	1	0	0	3.0
C	-	17	0	6	4	4	2	1	3.3	-	14	1	6	4	3	0	2.6
	±	5	0	0	4	1	0	0	3.2	±	6	2	1	2	1	0	2.3
	+	4	0	2	0	2	0	0	3.0	+	7	0	4	3	0	0	2.4
	++	1	0	0	0	0	0	1	6.0	++	1	0	1	0	0	0	2.0
	+++	1	0	0	1	0	0	0	3.0	+++	2	1	0	0	1	0	2.5

this extra loss was so high. Two groups of subjects, one in a "saturated" condition and the other with an apparent "deficiency" of about 1200 mg. of ascorbic acid per subject in November, 1943, had both acquired practically the same degree of unsaturation three months later, after living on similar diets and under similar conditions. Over this period the previously saturated individual had thus used or lost, on an average, 12-15 mg. of ascorbic acid a day (almost half the daily requirement on the League of Nations standard) more than the individual who was not previously saturated. This observation is consistent with the view that the body economy is more wasteful of its vitamins when they are in good supply.

This question of a reserve produced by large doses of the vitamin is naturally one of practical importance. Although it is usually possible and more economical to give protection against scurvy by supplementing a deficient diet with small daily doses of the vitamin, it would undoubtedly be of interest to know how far these daily doses can be replaced by larger and less frequent ones. Information on this point will be difficult to obtain, but Zilva (1941), in a comparison of the data for man and guineapigs, has tentatively suggested that

TABLE VI—COMPARISON OF SATURATION TESTS AND HYPERKERATOSIS TESTS IN GROUP D

Hyperkeratosis reading	No. of subjects	May, 1944							Aver. no. of doses per subject
		Saturation tests							
		Doses required							
		1	2	3	4	5	6	7	
-	10	0	5	0	2	1	1	1	3.6
±	3	0	2	0	1	0	0	0	2.7
+	15	2	4	4	4	0	1	0	2.0
++	1	0	0	0	1	0	0	0	4.0
+++	3	0	2	0	0	0	1	0	3.3

doses of the order of 100 mg. of ascorbic acid, given at intervals of days or even weeks, may effect at least minimal protection against scurvy.

The development of follicular hyperkeratosis in individuals with scurvy has been noted by many authors (Nicolau 1918, Wiltshire 1919, Scheer and Keil 1934, Prunty and Vass 1943). Further, Crandon et al. (1940) found that the hyperkeratotic papules appearing in subjects on a diet deficient in vitamin C but not in the other known factors disappeared after the injection of this vitamin. There is, however, evidence that hyperkeratosis may be associated with vitamin-A and other deficiencies. Löwenthal (1933) reports the association of follicular papules with night blindness and xerophthalmia, all of which were cured together by the administration of vitamin A. Scheer and Keil (1934) state that the types of follicular lesions associated with hypovitaminosis A and with scurvy are indistinguishable in their earlier stages, but differentiation can be made at later stages. Frazier and Hu (1936) do not support this view, however, and they conclude that the cases associated with scurvy are due to diets generally deficient in vitamins, particularly vitamin A (cf. also Frazier et al. 1943).

A comparison of the results of our skin tests with those of the saturation tests for the same subjects (tables I, II, and III) does not show any definite correlation between hyperkeratosis and a deficiency of vitamin C. Thus quite often a subject who required 5, 6, or 7 large doses of the vitamin before he was saturated showed no sign of hyperkeratosis, and conversely some with well-marked hyperkeratosis became saturated at the second or even the first dose of the vitamin. A comparison of the

TABLE VII—SUMMARY OF TABLES V AND VI

Hyperkeratosis reading	No. of subjects	Saturation tests							Aver. no. of doses per subject
		Doses required							
		1	2	3	4	5	6	7	
-	73	2	30	15	18	5	2	1	3.1
±	28	6	6	9	6	1	0	0	2.6
+	40	3	16	11	9	0	1	0	2.8
++	9	1	3	1	3	0	1	0	3.1
+++	8	1	2	2	2	0	1	0	3.1

saturation-test requirements of those subjects showing different degrees of hyperkeratosis (cf. tables V, VI, and VII) also gives no indication of a close relationship between "unsaturation" with vitamin C and hyperkeratosis; thus the number of test doses required by subjects showing well-marked hyperkeratosis (++ or +++) usually differed little from the requirement of those showing no hyperkeratosis. Another method of analysis which has been used involves the division of the subjects into two arbitrary groups, "relatively saturated" and "relatively unsaturated," according to the number of test doses required. If those requiring three or more doses of the vitamin are classified as "unsaturated" and the others as "saturated," it is found that the number of subjects showing +, ++, or +++ in the hyperkeratosis tests is 37% for the "saturated" subjects and 35% for the "unsaturated." If the criterion for "unsaturation" is four or more test doses, the figures are 37% and 34% respectively, and 37% and 25% respectively if "unsaturated" is regarded as a requirement of five or more test doses. The differences between the figures for the two groups are certainly within the limits of experimental error, except in the case of the last comparison, where the small number of subjects in the "unsaturated" group renders the result less reliable, and it will be noted that in every case there was slightly more hyperkeratosis among the relatively saturated individuals.

Similar conclusions are reached when the figures for the individual groups are analysed separately, and the results for group D in May, a group of subjects not previously given saturating doses, were similar in this respect to those for groups A and C; this appears to overrule any objection to the results of the hyperkeratosis tests on groups A and C in May on the ground that the interval of three months between the two series of tests was not sufficient to allow the earlier hyperkeratosis to disappear.

It is not suggested that the results of this preliminary investigation rule out all possibility of a relationship between follicular hyperkeratosis and a deficiency of vitamin C, though in our subjects there were undoubtedly many cases of hyperkeratosis in individuals who, judged by saturation tests, were not at all "unsaturated" with regard to vitamin C. It is hoped that at some future date it will be possible to study this problem more fully, with a frequent examination of the subjects after saturation to determine in which cases the hyperkeratosis disappears after the saturation process.

#### SUMMARY

Vitamin-C saturation tests have been carried out on groups of medical students (31-34 in each group) in November, 1943, and February and May, 1944, to determine whether or not there is retention, at the end of three months, of any "body-reserve" of the vitamin resulting from the saturation tests.

An attempt has also been made to find out whether there is any relationship between "unsaturation" with

the vitamin, as measured by the number of large test doses required to produce saturation, and the occurrence of hyperkeratosis in these subjects.

Subjects saturated in November, 1943, required three months later almost the same number of test doses to give saturation as did other subjects who had not previously received these large doses of ascorbic acid.

In May, 1944, the subjects who had not been tested before required, on an average, 0.6 of a test dose more than did those who had been saturated three months previously.

These observations suggest that an individual saturated with ascorbic acid will not necessarily show three months later any advantage, so far as these saturation tests are concerned, over an individual who has not previously been saturated. Some advantage—i.e., retention of part of the "body-reserve"—may be shown where the intervening period involves little or no increase in the degree of unsaturation of the population.

Subjects who were relatively unsaturated in the November tests tended to be relatively more unsaturated again in the February and also in the May tests. Several possible explanations of this are discussed.

The average number of test doses required to effect saturation was 1.8 in November, 1943; 3.1 in February, 1944; and 3.1 in May, 1944. These values do not compare unfavourably with the value of 3.25 for June and July, 1941, but they were appreciably higher than the figures obtained in 1939 and 1940 (about 1.5).

No significant correlation was observed between the occurrence of hyperkeratosis in these subjects and the degree of "unsaturation" with ascorbic acid.

We are grateful to Dr. George Graham for his suggestions and advice in connexion with the hair-follicle tests and for his interest in this vitamin survey. We also want to thank Mr. L. J. Hudson for his technical assistance in the chemical tests, and Messrs. British Drug Houses Ltd. for a supply of ascorbic acid.

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"... Defining active anti-Nazis as those who opposed the régime through evidence of overt acts, and passive anti-Nazis as those who suffered through refusal to make concessions as proven by concrete events; and defining Nazis as members of the party, whether active or passive, enthusiasts or merely nominal members, significant psychological differences are discernible. . . . As compared with the others, studies of anti-Nazis revealed fewer instances of harsh, disciplinary fathers, more instances of mothers who openly demonstrated affection. Anti-Nazis were more frequently "only" children or favourite children. They had more frequently parents of different religions and different nationality. They had more frequent experience of travel (six months or longer) in foreign countries, which influenced their political or social viewpoints, and more frequently intimate friendships with people who were anti-militaristic or anti-Nazi. . . . The family background of anti-Nazis gave evidence, on the basis of points already enumerated, of more affection, less domination, more expression, higher self-esteem. They were more likely, for that reason alone, to differ from their uncritically compliant German fellow-men, trained so thoroughly in acceptance of authority and discipline."—Dr. D. M. LEVY, speaking to the New York Academy of Medicine on Nov. 20.

## FEMINISATION ASSOCIATED WITH CARCINOMA OF THE ADRENAL CORTEX

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M.B. Glasg.

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FROM the suprarenal cortex Reichstein (1936) isolated adrenosterone, which has androgenic properties. Cortisol, capable of producing hypertrophy of the mammary and lactation, was isolated by Brownell et al. (1935), and Callow and Parkes (1936) obtained extracts with oestrone-like and progesterone-like activity.

There is remarkably complete clinical evidence of pathological conditions of the suprarenal cortex directly or indirectly responsible for excess secretion of androgen or oestrogen. This is especially true of androgen. Such pathological conditions may be a cortical hyperfunction, with or without hyperplasia, or a cortical adenoma (a somewhat rare cause), or a carcinoma of the cortex.

Cortical carcinoma associated with excess secretion of androgen is relatively common. In the male there is no gross sexual change save in the prepubertal period, when isosexual precocity develops. In the female virilism is the result.

Carcinoma associated with excess of oestrogen in the female before puberty produces isosexual precocity. Such tumours in the male occasion feminisation and are very rare. The first case in the literature was reported by Bittorf (1919). Since then 5 further cases have been recorded: 1 by zum Busch (1927) which was alluded to by Parkes Weber (1926), 2 by Holl (1930), 1 by Lisser (1936), and 1 by Simpson and Joll (1938). The present case constitutes the seventh.

The second case described by Holl (1930) and that described by Simpson and Joll (1938) are of special importance. Holl's is the only recorded case in which the tumour was successfully excised, with subsequent complete regression of symptoms. The importance of Simpson and Joll's case is due to the biological assays of oestrogen excretion in the urine. After excision of the primary growth oestrogen in excess was not demonstrable in the urine, and this was associated with clinical improvement. With the appearance of secondary growths and coincident recrudescence of symptoms oestrogen was present in excess.

#### CASE-RECORD

A lance-corporal, aged 29, was admitted to a Middle East general hospital on March 23, 1945, with a history of 18 hours' intermittent shivering, headache, and general malaise. Next day he was afebrile and well. He was seen in consultation with the M.O. i/c ward on the 26th, when the case was presented as one of pyrexia of undetermined origin (resolved) associated with gross splenomegaly.

He had served four years and three months in the Middle East and, apart from repeated periods in hospital with "dermatitis" since January, 1942, he had been well.

In October/November, 1943, he first noticed enlargement of the breasts. They rapidly increased in size in a couple of months or so, without causing any symptoms. During the six months before admission, though there was definite and progressive increase, it was slight. At no time had he abdominal discomfort, and, apart from skin lesions, he had been perfectly well. His appetite was normal throughout, and his ability to perform heavy physical tasks was unimpaired. There had been progressive increase in his weight in the past year.

He began shaving at the age of 15/16 and subsequently shaved daily. The hair on the chest was always scanty and no recent change had been observed. He believed that the distribution of pubic hair had altered, tending to be more sparse towards the umbilicus.

He had always been a normal male in outlook before the onset of breast enlargement. He had had intercourse at intervals since the age of 19 until leaving for the Middle East, where he had been continent. In the year before examination his interest in members of the opposite sex waned. His

phantasies in this period became non-sexual, in contrast to those of the early part of his service in the M.E., and they were largely concerned with his future. Frank sexual dreams had become rare, and nocturnal emissions, previously frequent, excessively rare. He recollected none in the preceding six months.

He returned to the U.K. in January, 1945, when he married. His attitude towards the marriage, both before and after, was difficult to assess. He insisted, rather too vehemently, that his feelings for his wife had not changed, and an impression of "duty" was conveyed. During the first six days following marriage menstruation prevented coitus, but in the remaining 21 days before his return to the M.E. he had intercourse once. This apparently was achieved satisfactorily. There was no active distaste, but his response was rather apathetic. There was no further desire on his part. He presented no evidence of homosexual trends.

**Examination.**—He was peculiarly and attractively diffident in manner and contrived successfully to appear tidy in hospital "blues." Weight 80 kg. Complexion high, skin of fine texture. Comparison with previous photographs showed no change in the facies. The beard was a moderate normal growth. The hair on the chest was very scanty and restricted to mid-sternum. The distribution of pubic hair tended to the transverse feminine; dense over pubis and scanty towards the umbilicus. He was well nourished but not adipose. The fat distribution was consistent with that of the normal male, but there was the suggestion of increased deposition round the pelvic girdle, notably suprapubically.

The breasts were well developed. The nipples were rather prominent, with readily stimulated erectile tissue. There was no increased pigmentation either of nipples or areolæ. Montgomery's tubercles were well marked. On palpation the breasts had the consistence of those with chronic mastitis. No secretion was expressed. (Fig. 1 shows the bodily configuration.)

The penis and testes were of a large normal size. There was no evidence of atrophy of prepuce or glands. A minor bilateral dilatation of the spermatic venous plexus was present. The prostate, per rectum, was not enlarged.

A tumour was felt in the left subcostal area, occupying the left hypochondrium and lumbar area as far medially as the mid-Poupart line. (The mass had been mistaken for an enlarged spleen with more than a little justification.) It could be defined as a prolongation from above, lying behind gut and descending on inspiration. The lower pole was four finger-breadths below the tip of the ninth rib, and towards this pole there was apparent regular enlargement.

Blood-pressure was 120/80.

Examination of the remaining systems demonstrated no abnormality.

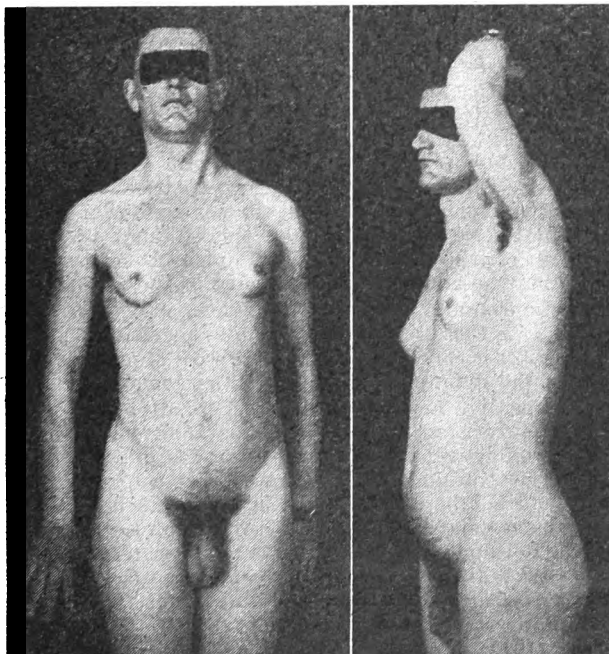


Fig. 1—Bodily configuration.

**Investigations.**—The radiological reports quoted below were made by Major W. G. Scott-Harden.

(1) "*Straight Plate* : the left kidney is displaced downwards by a large soft-tissue tumour; the tumour had not displaced the splenic flexure and does not fill the peripheral part of the left upper abdomen."

(2) "*Excretion Urography* : the upper calices and part of the renal pelvis are almost completely obliterated, with sharp delineation and no erosion" (fig. 2).

"*Opinion* : the appearances are consistent with a large left supra-renal tumour; infiltration of the upper pole of the left kidney cannot be excluded, although the urographic picture is quite in keeping with external pressure effects only."

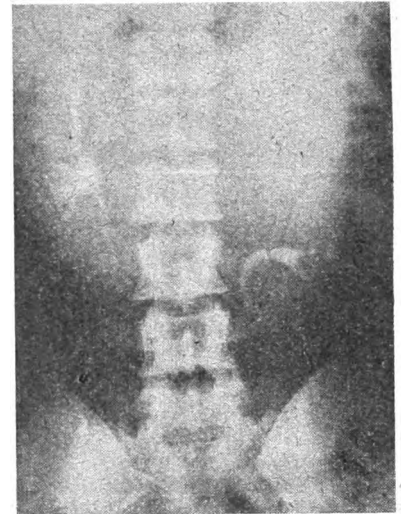


Fig. 2—Radiogram showing downward displacement of left kidney and obliteration of its upper calices and a part of its pelvis.

(3) "*Chest* : lung fields clear."

Other investigations gave the following results :—

Blood-cholesterol (April 1) .. .. . 154 mg./100 c.cm.  
 Blood-urea (April 1) .. .. . 20 mg./100 c.cm.  
 Friedman's test (April 1) .. .. . Positive.

(Neither a quantitative Friedman nor assay of oestrogen could be carried out.)

Glucose tolerance (May 10) :  
 Fasting : 100 mg./100 c.cm. 1/2 hour : 137 mg./100 c.cm.  
 1 hour : 117 mg./100 c.cm. 1 1/2 hours : 117 mg./100 c.cm.  
 2 hours : 110 mg./100 c.cm.

Blood-count (April 10) : Hb 103% (Sahli corrected), erythrocytes 5,290,000/c.mm., leucocytes 3200/c.mm. (polymorphs 68%, eosinophils 1%, mononuclears 4%, lymphocytes 27%).

Erythrocyte-sedimentation rate (Westergren) : April 17, 30 mm./1 hour; April 19, 26 mm./1 hour; April 22, 28 mm./1 hour.

Urinary chloride concentration (April 15) on modified Cutler diet was within normal limits.

Semen : volume and motility normal.

Urine normal on repeated analyses.

**Operation.**—On April 24, under nitrous oxide, oxygen, and ether anaesthesia, after 'Pentothal' induction (Major Gordon Neil), Lieut.-Colonel V. W. Dix excised the tumour through the left lumbar incision with superperiosteal resection of the last rib. No difficulty was encountered in separation of the tumour from the kidney. At the beginning of the operation intravenous saline drip was started.

**Postoperative Course.**—Recovery from operation was completely uneventful. The drip was discontinued at the end of 36 hours after a total of five pints. On May 14 (twenty days after the operation) Friedman's test was negative.

On June 6 (forty-three days after the operation), before evacuation to U.K. for deep radiotherapy, he was re-examined. He stated that his beard was of stronger growth, and at night he felt tempted to shave again. Interest in the opposite sex had revived, and erections had become frequent. (The first was on the eleventh day after operation.) He had three sexual dreams associated with emission, the first of them on the seventeenth day after operation. He referred, in a few terse phrases, to the lost opportunities of his honeymoon.

**Examination.**—He had the same rather diffident attractive manner noted at the original examination. No changes in the breasts were noted, save that there was a fairly profuse growth of downy periareolar hair. Erythrocyte-sedimentation rate 10 mm. Friedman's test negative.

**Pathology.**—Macroscopically the specimen was a large multi-lobulate tumour, consisting mainly of one large lobe and three secondary, one of which had been detached to facilitate removal at operation. It weighed 1420 g. and measured 21 cm. from upper to lower pole, or 23 cm. with secondary lobe in position; transverse diameter 15 cm.; anteroposterior diameter 10.5 cm.

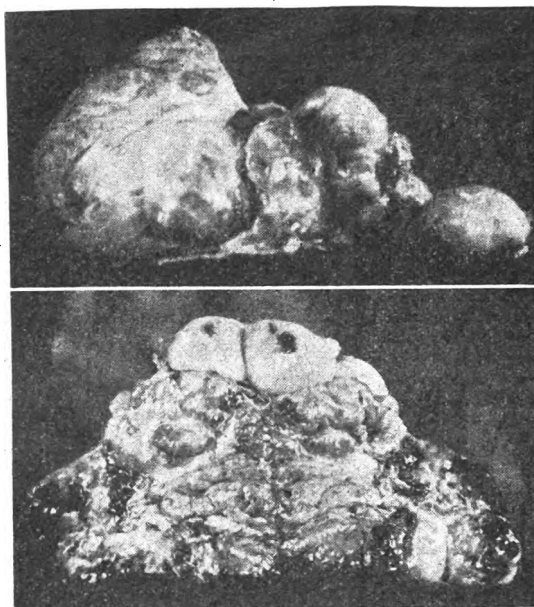


Fig. 3.—Carcinoma of suprarenal cortex: above, as removed at operation and measuring 23 cm. in length; below, on section, showing multilobulate form, variegated appearance, and multiple hæmorrhages.

The tumour had a well-defined capsule, thinned over numerous small nodes. This was intact save at the upper posterior pole of the main lobe, where at two small areas the tumour had infiltrated through the capsule. Over the surface of the capsule coursed large tortuous thin-walled vessels (fig. 3).

On section the multilobulate form of the tumour was evident. Towards the centre of the main lobe was a "fibrous core" from which radiated well-marked trabeculae. The cut surface had a variegated appearance. No normal suprarenal tissue could be identified. The greater part of the main lobe bore extraordinary similarity to the appearance classically associated with hypernephroma. The remainder of the tumour had a light-grey rather translucent colloid appearance. Multiple hæmorrhages had taken place (fig. 3).

Microscopically the appearances were those of an adenocarcinoma. The cells were arranged in groups or in columns. In parts there was resemblance in arrangement to the zones of the suprarenal cortex; notably the fasciculata and reticulata. Though there was considerable variation in size, shape, and nuclear characteristics, in the main the cells were fairly uniform, large, and polyhedral, with vesicular hyperchromatic nucleus, prominent nucleolus, and well-defined nuclear membrane. The cytoplasm was abundant, granular, and faintly eosinophilic. Vacuolation was a well-marked feature in some areas. Mitotic figures were readily found.

Among aberrant cell forms were (1) multinucleate giant cells, seen fairly often, and (2), rarely, large cells (30  $\mu$ ), mononucleate or multinucleate, with abundant cytoplasm staining deeply with eosin.

A homogeneous eosinophilic albuminous material separating the cell columns was a prominent feature. In certain areas, notably where cells were arranged in groups, this material occupied cyst-like spaces (fig. 4). Colonel W. F. Harvey and Dr. W. W. Adamson considered that this was due to œdema.

The blood-vessels were large endothelium-lined channels with thin ill-formed walls. Vine's ponceau fuchsin stain was negative.

#### DISCUSSION

Gynæcomastia is common to all cases described, and it is surprising how this was ignored by the patient in the present case and in those described by Bittorf (1919) and Simpson and Joll (1938).

Except in Holl's (1930) first case (a boy, aged 15, who first noticed a tumour in the right upper abdomen) the breast enlargement was the first sign. In Holl's second case it was associated with considerable pain and discomfort. With this exception, as in the present case, the enlargement was symptomless. The degree of develop-

ment varies. The most complete is that recorded by zum Busch (1927). The nipples were large and well developed, with increased pigmentation, and a milky fluid could be expressed on manipulation. At biopsy the appearances were typical of the fully developed secreting mammary gland. The present case showed no well-marked enlargement of the nipples, and there was no increased pigmentation or expressible secretion.

Experimentally, Gardner and Van Wagenan (1938), using œstrogens (theelin, theelol, œstradiol benzoate) in male monkeys (*Macacus rhesus*), produced hypertrophy of the mammae, which on section were of adult type. Though some of the alveoli contained secretion, the picture was not considered comparable with that of the secreting gland; nor was growth of nipples considered to be an index of the degree of breast development. Frazier and Mu (1935) claim to have produced, with repeated injections of œstrogens in male rabbits, enlargement of the mammae and lactation. Other observers claim that, whereas in the guineapig œstrogenic chemicals alone produce complete development, in the rabbit œstrone and progesterone are required (Turner 1932, Nelson 1936).

Since œstrone, progesterone, and cortilactin (this last capable of producing hypertrophy of the mammae and lactation) have been isolated from the suprarenal cortex, it seems reasonable to assume that there may be variation in the hormone secreted.

In the present case 17 months after onset of gynæcomastia the penis and testes were large and well developed, in striking contrast to the 3 recorded cases in which comparison is possible. In that described by Bittorf a few months after onset of breast enlargement in August, 1918, there was decrease in size of testes. When examined by Bittorf in April, 1919, the external genitals were small. Approximately a month later Mathias (1922) at autopsy found the testes extremely small, and on section there were hardly any interstitial cells, but there was good spermatogenic tissue. In Holl's second case the penis and testes became progressively smaller after the onset of gynæcomastia. In the case described by Simpson and Joll breast enlargement began in 1932, and in August, 1933, the genitals were smaller.

Experimental evidence indicates that such atrophy may be expected. Thus Frazier and Mu (1935) with repeated injections of œstrogens in male rabbits produced atrophy of the glans penis and testes. Del Castillo and Pinto (1937), using very large doses in adult male rats, produced an increase in weight of the testes with appearance of increased spermatogenesis. This action was in contrast to that produced by smaller doses, which mainly led to atrophy of the penis and testes. This anomalous action, which seems to parallel the œstrogenic action of heavy doses of androgens (Callow and Parkes 1937), can scarcely be accepted as the explanation. A more attractive explanation rests on the conception of Meyer et al. (1932) that œstrone (or testosterone) produces atrophy of the gonads in experimental animals by inhibiting the gonadotrophic activity of the pituitary.

In Simpson and Joll's case the Friedman was negative whereas in the present case, before operation, it was positive. It is conceivable that the excess of prolactin could explain the maintenance of size of the gonads.

The negative Friedman, twenty days after the operation, is surprising. There is no pathological evidence which would suggest that the prolactin was of other than hypophyseal origin. It is regretted that a quantitative test could not be carried out. In cases of seminoma of the testes associated with excretion of hypophyseal gonadotrophic hormone in excess in the urine, after removal and successful radiation the hormone continues to be excreted in excessive amounts (Beaumont and Dodds 1944).

An interesting case is recorded by McCullagh and Cuyler (1937) of a young woman, aged 17, with adrenopituitary syndrome (Cushing's) with positive Friedman.



After denervation of the left suprarenal and right hemi-adrenalectomy, without therapy to the pituitary, the Friedman became negative. The mechanism is obscure.

Lacassagne (1933) claimed inhibition of spermatogenesis in mice with exhibition of folliculin. In the present case the semen, on such examination as was carried out, was normal. Mathias (1922) reported good spermatogenic tissue on section of the testes in Bittorf's case. The prostate was not enlarged, nor was there dysuria, a finding also in Simpson and Joll's case. This is contrary to what one would expect from the experiments of Lacassagne (1933) in mice and of subsequent workers in other animals. This experimental action of oestrogen, however, has been shown to be inhibited by testosterone, and this may be the explanation in the present case—i.e., under influence of gonadotrophic hormone secretion of testicular androgen was maintained.

The distribution of the pubic hair in Holl's first case was feminine, but onset was at or about puberty. In his second case, though the distribution was essentially masculine, hair on chest and abdomen became very sparse. The distribution in Lisser's case was unchanged. In the present case hair had always been scanty on the chest, and there was no change; but the hair on the abdomen became more sparse.

The weight increased in Bittorf's case; the increase was well marked in Holl's second case and initially in Simpson and Joll's case, the increase in twelve months from the onset being 28 lb.

Pain or any discomfort whatever was surprisingly absent in the present case in view of the size of the tumour and the multiple hæmorrhages. It was prominent in two of the cases described: pain in the left flank was the cause of admission to hospital in Lisser's case; and left subscapular pain, approximately a year after the onset of breast enlargement, in Simpson and Joll's case compelled the patient to seek advice.

Waning of the libido and subsequent impotence, with

testicular atrophy, developed in Bittorf's case and in Holl's second case. In Bittorf's, impotence was complete seven months after the onset of breast enlargement. In that described by Simpson and Joll partial impotence was present approximately a year after onset. Holl's case was described as displaying no homosexual trends and completely disinterested in sex. Fifteen months from the start of breast enlargement the present case is known to have been potent. There was a gradual and progressive reduction in degree of heterosexuality, though he was still heterosexual before operation. How great that reduction was could be estimated after operation.

Greatly increased heterosexuality constituted the most striking change postoperatively. Return of interest in members of the opposite sex was rapid. Eleven days after operation there was an erection, and subsequently these became frequent. Seventeen days after, he had a frankly sexual dream with emission. Within the limited period of postoperative observation (forty-three days) no change in the breasts was noted. There was a distinct increase in beard growth and fairly profuse growth of downy areolar hair.

The postoperative course in Holl's second case was very striking. Before operation the patient was impotent and completely disinterested in sex. The penis and testes were small. The breasts were much enlarged, painful, and tender, with deeply pigmented and enlarged nipples. The facies were heavy and so changed that he was not recognised by his acquaintances. Seven days after operation the breasts were less painful and tender and, at the end of a month, erection and emission took place. Within a few months there was return of heterosexual desire, and sexual intercourse was resumed. Six months after the operation the penis and testes were of normal size, the breasts were small and not tender, and the nipples were consistent with those of a normal male.

If malignant change coincides with the start of breast enlargement, then the malignancy, clinically, of the tumour in the present case was low. Seventeen months after onset the tumour was still operable. Holl's second case, Bittorf's case, and Simpson and Joll's case must similarly have been of a low degree of malignancy; zum Busch's, Holl's first, and probably Lisser's cases pursued a rapidly fatal course with multiple secondaries.

#### SUMMARY

A case of carcinoma of the left suprarenal cortex with feminisation in the adult male is described. The clinical features of such cases are briefly discussed, as are certain variations in the present case from those previously recorded.

My thanks are due to Lieut.-Colonel V. W. Dix for a display of manual dexterity not readily forgotten; Lieut.-Colonel C. J. Gavey for many kindnesses; Colonel W. F. Harvey, R.C.P. laboratory, Edinburgh, for his consideration and excellent photomicrographs; Dr. W. W. Adamson for his opinion on the section; and Major W. G. Scott-Harden for the high quality of the clinical photographs.

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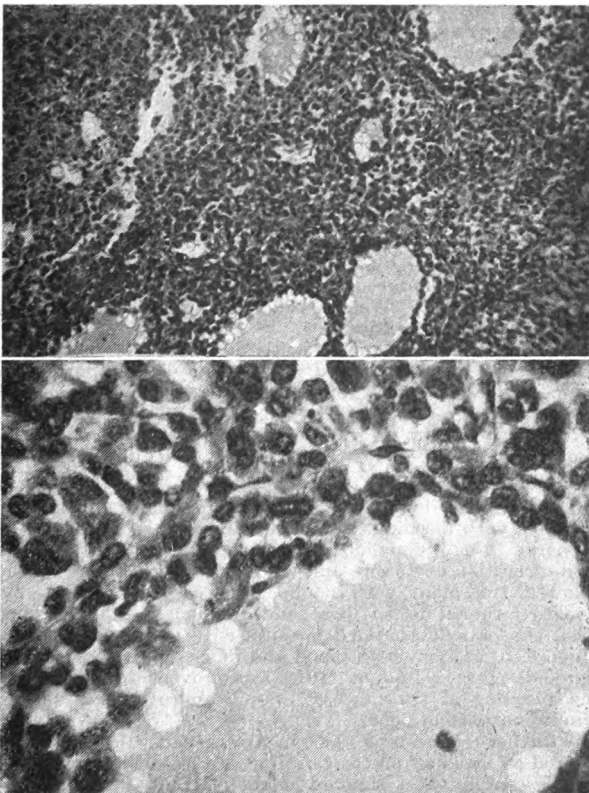


Fig. 4—Section of carcinoma of suprarenal cortex: above, low power; below, high power.

## ACUTE INFECTIOUS LYMPHOCYTOSIS IN ENGLAND

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ACUTE infectious lymphocytosis was described as a separate clinical entity in American children by Smith (1941). In 1942 three children with this disease were encountered in England and were briefly mentioned by Kilham and Steigman (1942). Besides these three sporadic cases, a small outbreak affecting six children with acute infectious lymphocytosis was seen in southern England in 1942.

*Clinical Picture.*—A paucity of clinical symptoms and a hyperlymphocytosis are characteristic of this communicable disease. No bacteria or viruses have been isolated, and Smith (1944) found an incubation period of 12–21 days. Biopsy of lymph-nodes (Smith 1944) shows a degeneration of the lymph follicles, with proliferation of the reticulo-endothelium of the sinuses.

Most of the patients seen in the U.S.A. had no symptoms, the diagnosis being established on routine blood-counts in certain convalescent homes, orphanages, &c. The disease is almost entirely confined to children; those few with symptoms have had mild upper respiratory symptoms, low-grade pyrexia, cervical adenopathy, irritability, abdominal pain, and meningeal irritation.

Laboratory examination shows 12,000–100,000 leucocytes, with 50–90% of small mature lymphocytes, and these findings may persist even up to several months. Bone-marrow smears show an increased percentage of small mature lymphocytes. No anaemia or thrombopenia develops, and the heterophil agglutination reaction is negative.

*Differential Diagnosis.*—This requires the exclusion of infectious mononucleosis (spleen, general adenopathy, angina, fever, atypical immature lymphocytes, and a positive heterophil agglutination); lymphocytic leukaemia (enlarged lymph-nodes and spleen, fever, lymphoblasts, development of anaemia and thrombopenia); and pertussis (clinical course and bacteriology).

*Transmission.*—The communicability of this disease is attested by the institutional outbreaks in the U.S.A., showing a high attack-rate. The exact mode of transmission is not known; treatment is symptomatic.

*English Cases.*—Three sporadic cases and a small outbreak of six cases were seen in 1942. The sporadic cases, in common with the first American cases of Smith (1941), had mild fever, malaise, fatigue, slight sore throat, and slight cervical adenopathy. The remaining six cases came from one village within a fortnight. The degree of cervical adenopathy was rather striking, but the benign course, protracted lymphocytosis, and the absence of significant bacteria, anaemia, thrombopenia, and heterophil antibodies were typical.

*Comments.*—This recently recognised disease in children is probably not really new; probably institutional outbreaks, described as mild atypical forms of infectious mononucleosis (Reyersbach and Lenert 1941), were really acute infectious lymphocytosis. Though the disease has been of special interest to pædiatricians, there is no assurance of age limitation, just as there is no assurance of geographical limitation. All cases clinically detected so far have been very benign.

### SUMMARY

The clinical entity of acute infectious lymphocytosis was observed in England in 1942.

Paucity of symptoms, benign protracted mature lymphocytosis, and the absence of anaemia, thrombopenia, or heterophil antibodies suggest the diagnosis.

It is hoped that recognition of this disease will lead to further knowledge of its incidence, range of severity, aetiology, epidemiology, and control.

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## Preliminary Communication

### TREATMENT OF ULCERATIVE COLITIS WITH THIOURACIL

WHILE the cause of ulcerative colitis remains unknown it is justifiable to test any empirical remedy, however devoid of logical basis it may appear, and success may give a clue to the aetiology.

The immediate improvement which followed the use of thiouracil in four cases described below warrants this preliminary note, which is intended to stimulate further trials.

CASE 1.—A married woman, aged 37, had had diarrhoea, with blood and mucus, on and off since 1935 and had been treated in several hospitals. In 1936 partial thyroidectomy was performed for Graves's disease, but the ulcerative colitis was unaltered. She attended the outpatient department of Addenbrooke's Hospital in November, 1944, during a relapse in which she passed 6–8 fluid stools daily, with blood and mucus. Sigmoidoscopy showed gross inflammation, with ulcers and bleeding. Hb 56%. She improved slowly with outpatient treatment, but motions were loose and contained excess of mucus for some months. In August, 1945, a severe relapse occurred and sphincter control was uncertain, but the patient refused admission to hospital. Slow improvement followed symptomatic treatment, but her daily life was greatly restricted by diarrhoea.

On March 1, 1946, during another relapse, outpatient treatment with thiouracil 0.6 g. daily was started, without other treatment. A preliminary attempt to measure the basal metabolic rate (B.M.R.) was unsuccessful, as the patient could not remain motionless during the test.

By March 8 the diarrhoea had almost ceased, and on March 12 the B.M.R. was estimated as +12%. On March 14 diarrhoea and bleeding had ceased, and the motions were semi-formed and did not exceed two daily. Thiouracil was reduced to 0.4 g. daily, and steady progress was maintained.

B.M.R. +16% on April 25 and -3% on June 3. By June 28 motions were normally formed and rarely exceeded one daily. Sigmoidoscopy showed a virtually normal mucosa with no bleeding or inflammation.

Thiouracil was reduced to 0.1 g. daily on July 26 and withdrawn on Oct. 12. Weight had risen from 9 st. 6½ lb. to 9 st. 12 lb. during treatment.

On Nov. 9, after a month without thiouracil, the patient was still passing one formed motion daily but reported the reappearance of some mucus. Sigmoidoscopy showed no inflammation or bleeding but an excess of mucus. B.M.R. +7% on Nov. 14. In view of the reappearance of mucus, thiouracil 0.2 g. daily was ordered, and observation is continuing.

CASE 2.—A widow, aged 54, with three months' history of diarrhoea with bleeding, attended Addenbrooke's Hospital in January, 1942. Sigmoidoscopy showed an inflamed mucosa with ulceration at 15 cm. and ready bleeding. Improvement followed treatment with kaolin and low-residue diet, but stools continued to be loose and frequent. In November, 1944, the patient attended hospital with another relapse, in which 6–10 motions with blood and mucus were passed daily. Sigmoidoscopy in January, 1945, again revealed inflammation and bleeding of the mucosa. Some improvement followed symptomatic treatment.

A further relapse took place in April, 1946. Barium enema showed an irregular mucosal outline and loss of haustration in the descending and sigmoid colon. Hb 90%. White cells 7000 per c.mm. (68% polymorphs). For two weeks the patient passed 3–9 motions daily (fig. 1).

On June 12 outpatient treatment with methyl thiouracil 0.6 g. daily (alone) was started. Within a week the patient reported feeling much better; bleeding had ceased, and diarrhoea was less. B.M.R. +10% on June 24. By June 26 motions were semi-formed and had decreased to one daily.

Methyl thiouracil had been reduced to 0.4 g. daily on June 19, and was further reduced to 0.1 g. daily on July 24. Fig. 1 shows progressive reduction in the number of motions until August 7, when the patient went on holiday. A slight relapse then took place, but from August 28, after her return, until Oct. 16, when methyl thiouracil was withdrawn, only one formed motion was passed daily.

On Nov. 13, after a month without methyl thiouracil, the patient was passing one formed motion daily, and sigmoidoscopy showed a normal mucosa. Weight had risen from 9 st. 5 lb. to 9 st. 9 1/2 lb. during treatment.

CASE 3.—A single woman, aged 20, had first had diarrhoea in January, 1946. About 6 fluid motions were passed daily for four weeks, with mucus but no observed blood. Stools continued loose until June, when a relapse of diarrhoea occurred. She was admitted to Addenbrooke's Hospital on Oct. 18, passing up to 5 fluid motions daily with mucus, and the test for occult blood was positive. Barium enema showed loss of haustration in the descending and sigmoid colon. Sigmoidoscopy revealed an inflamed granular mucosa, which bled readily, and much adherent mucopus. B.M.R. +15%. Hb 104%. White cells 11,000 per c.mm. (73% polymorphs).

On Nov. 1 all other treatment was stopped and thiouracil 0.6 g. daily was started. The number of motions fell rapidly (fig. 2), and stools became more formed. Thiouracil was reduced to 0.4 g. daily on Nov. 14 but was restored to

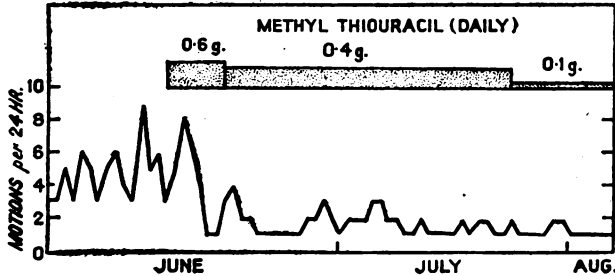


Fig. 1—Chart in case 2.

0.6 g. daily on Nov. 19 because of a slight increase in stools. Sigmoidoscopy showed no appreciable change.

On Nov. 20 an acute tonsillitis due to hæmolytic streptococcus developed, and thiouracil was withdrawn on Nov. 21 to allow sulphathiazole to be given for the tonsillitis. It was considered unwise to administer both drugs for fear of depressing the leucocyte-count unduly.

Thiouracil 0.6 g. daily was resumed on Nov. 25, and by Nov. 29 one or two semi-formed stools were being passed daily.

CASE 4.—A single woman, aged 26, had been well during nursing training from March, 1944, until December, 1945, when she reported sick with diarrhoea of six weeks' duration. Blood and mucus were passed, and sigmoidoscopy showed patches of swollen hyperæmic mucosa about the size of a shilling high up in the sigmoid; excess mucus was present, and the mucosa bled readily. Hb 47%. Symptomatic and iron treatment improved the anæmia and general condition. On admission to the Middlesex Hospital, under Dr. G. D. Hadley, in April, 1946, she was passing 3-5 motions daily with small quantities of blood and mucus. Hb 89%; weight 9 st. 8 lb.

In June she was worse, having 10-12 motions daily with colicky pain and tenesmus. Laboratory examination of the stools showed no pathogenic organisms or parasites. Sigmoidoscopy (Mr. W. Turner Warwick) revealed a red granular mucosa, which bled readily. Treatment with phthalyl sulphathiazole 1 g. four-hourly to a total of 40 g. produced some improvement, but blood and mucus persisted in 5 or 6 daily motions. Sigmoidoscopy on June 29 showed little change.

In July phthalyl sulphathiazole was given again, together with a mixed vaccine of *Bact. coli* and *Strep. faecalis*. Definite improvement followed; motions decreased to 3 or 4 daily, were formed, and contained little blood or mucus. The patient went home on August 15 but relapsed quickly and was readmitted to hospital on Sept. 19. Weight 7 st. 13 lb. Hb 84%. Sigmoidoscopic appearances as before. Desiccated

pig's ileum was given for two weeks from Oct. 6 without evident benefit (fig. 3).

On Oct. 24 thiouracil 0.6 g. daily was started, and in the ensuing five days motions steadily diminished to 1 or 2 daily. By Oct. 31 the motions were formed, with only traces of blood or mucus, and thiouracil was reduced to 0.3 g. daily. B.M.R. -13% on Nov. 4 (it had been -5% on Feb. 22, 1944, during a survey of normal subjects). Sigmoidoscopy on Nov. 6 showed that the mucosa of the rectum was still friable and bled easily, but the mucosa of the colon above the rectum was much improved and bled only very slightly.

Progress was well maintained until Nov. 19, when thiouracil was reduced to 0.15 g. daily. Within twenty-four hours a slight relapse occurred with 3 or 4 unformed stools and some bleeding. Sigmoidoscopy showed slight but definite worsening of the mucosal appearances, and thiouracil was increased to 0.6 g. daily on Nov. 21. By Nov. 28 improvement was restored. Observation continues.

It is impossible at this stage to do more than point to the immediate amelioration of symptoms after administration of thiouracil in four cases of ulcerative colitis in relapse. It is evident that the normal formation of motions and cessation of diarrhoea in cases 3 and 4 preceded any obvious improvement in sigmoidoscopic appearances, and in cases 1 and 2 it was after four months' treatment that the mucosa appeared normal.

The optimal size and duration of thiouracil dosage must be determined by further trials, but the present impression is that reduction has been too rapid.

It has not been forgotten that ulcerative colitis is a chronic disease characterised by spontaneous and unpredictable remissions, and further long-term observations alone can show whether thiouracil treatment can alter the natural course of the disease.

Sufferers from ulcerative colitis are also readily influenced by spectacular remedies and suggestion, but in these cases thiouracil was given without comment or display of undue interest.

The mode of action of thiouracil can only be a matter for speculation at present, but it is clear that it did not

produce frank hypothyroidism in these cases and so render the bowel transit sluggish.

It may well be significant that thiouracil and

methyl thiouracil are chemically similar to synthetic 5-methyl uracil (thymine) which Spies et al.<sup>1</sup> found effective in treating the macrocytic anæmia and diarrhoea of tropical sprue. Of particular interest is their observation that stools became semi-formed and reduced to one daily as early as the fourth or fifth day of treatment.

SUMMARY

Administration of thiouracil in three cases, and methyl thiouracil in one case, of ulcerative colitis in relapse was followed by immediate improvement.

1. Spies, T. D., Frommeyer, W. B., García Lopez, G., Lopez Toca, R., Gwinner, G. *Lancet*, 1946, 1, 833.

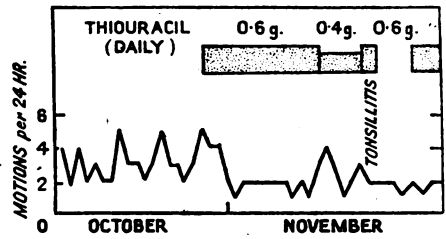


Fig. 2—Chart in case 3.

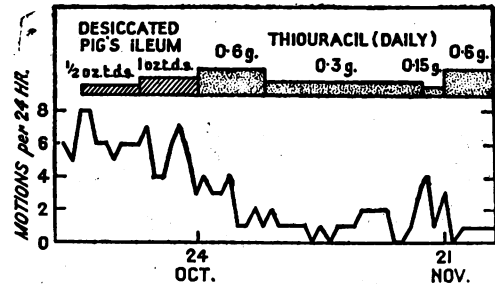


Fig. 3—Chart in case 4.

Hypothyroidism was not induced.

Further trials are needed to determine the necessary duration of treatment and to detect any effect on the natural course of the disease.

Thiouracil is chemically similar to synthetic 5-methyl uracil, which is effective in treatment of the anæmia and diarrhœa of tropical sprue.

I am greatly indebted to Dr. Leslie Cole for access to case 2, and to Dr. G. D. Hadley for details of case 4.

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## Reviews of Books

### Bacteria in Relation to Nursing

C. E. DUKES, M.Sc., M.D., D.P.H., lecturer in bacteriology to sister-tutors, King's College for Household Science, London. London: H. K. Lewis. Pp. 186. 12s. 6d.

NURSES often seem to be taught rules and precepts of paralysing rigidity. In such subjects as hygiene and applied bacteriology—which are so far from immutable that the knowledge of ten years ago is mostly out of date—greater emphasis might be put on guiding principles than on rule-of-thumb about the proper strengths of antiseptics and the cleansing of bedpans. This book is therefore a welcome attempt to put the principles of bacteriology in a form useful to sister-tutors in their lectures. The selection of the material, however, is open to criticism. Bacteriology is, at the same time, a branch of systematic botany, a science in its own right, a handmaid of clinical diagnosis, and the theoretical basis of much of what is called "hygiene." In the education of the nurse the importance of the last far outweighs all the others, and it is regrettable that Dr. Dukes gives so much space to nomenclature and technique; a nurse making media or hunting for tubercle bacilli is wasting time better spent in learning about epidemiology and the spread of infection in wards. It is a pity, too, that he omitted the excellent syllabus of lectures and demonstrations suggested in appendix F of the M.R.C. War Memorandum no. 11. Nevertheless this book fulfils a real need, and, backed by the practical examples of ward and theatre, and, it is to be hoped, by the coöperation of physician, surgeon, and bacteriologist, will enable a sister-tutor to prepare a satisfactory schedule of lectures on the principles on which the control of infection is based.

### The Dynamic State of Body Constituents

(2nd ed.) RUDOLF SCHOENHEIMER, M.D., late associate professor of biological chemistry, Columbia University. London: Oxford University Press. Pp. 78. 10s.

THE pioneer work of the late Rudolf Schoenheimer and his colleagues, using compounds containing heavy isotopes of carbon, hydrogen, and nitrogen, has led to the conception that the proteins and fats of the tissues, while apparently constant in composition and amount, are in reality perpetually being broken down and resynthesised. This too too solid flesh is in a continual dissolution and thaw. The lipids of the fat depots are undergoing surprising interconversions, while the proteins are in dynamic equilibrium with a pool of amino-acids and  $\alpha$ -keto-acids. The use of heavy isotopes has also thrown light on creatine synthesis and provided confirmatory evidence for the Krebs urea cycle. Schoenheimer died in 1941, and the lectures now reprinted were given just before his death, and first published in 1942. The second edition is most welcome, but it might have been as well to have indicated in footnotes where subsequent work has reinforced the evidence presented, and, more particularly, filled in the gaps.

### Men, Medicine and Myself

S. VERE PEARSON, M.D. Camb., M.R.C.P. London: Museum Press. Pp. 254. 12s. 6d.

AN autobiography can never give quite the pleasure to the reader that it does to the writer, but Dr. Pearson's comes near it. He lacks only one quality of the practised story-teller: he is devoid of *Schadenfreude*, he takes no pleasure in the misfortunes of others. That may be because he graduated early in the school of human

experience and then took out a perpetual postgraduate course. It was his good fortune to contract tuberculosis just when a revaluation of its curability had set in, and his own life-work covers the whole period of effective treatment. He had the luck too to be sent to Nordrach and his appreciation of Otto Walther after 40 years is a model of what a profile (as it would now be called) should be. Time has not dulled his memory nor allowed woolly sentiment to creep in. With this good start there is hardly a chapter in treatment that has not been illumined by the naturalist's curiosity which is to him the quality most needed in medicine; that and the ability to bring home to the lay mind the lesson of healthy living. Moreover he can spell every name except soldanella.

### The Principles of Anatomy

(2nd ed.) A. A. ABBIE, M.D., D.Sc., Elder professor of anatomy and physiology, University of Adelaide. London: Angus & Robertson. Pp. 273. 12s. 6d.

In their revolt against the treatment of anatomy as a routine and unintellectual preliminary subject, teachers are insisting more on knowledge of principles than on memorisation of topographical detail. For many years much of the anatomy taught in medical schools has been related mainly to the technique of surgery: indeed, the subject has tended more and more to become fit for a technical school rather than a university. Yet the intellectual content of this science is considerable and can be developed. Professor Abbie's little book provides the student with an introduction to anatomy and meets a demand. It is short and concise—but perhaps rather too short, for brevity compels him to be didactic and seemingly uncritical just where it is most necessary to keep the student's mind open and fluid. In a third edition much of the purely descriptive sections (which, in any case, are rather out of place in a book dealing with "principles") might be eliminated, and those dealing with muscle action, joint movement, and the endocrine system could with advantage be amplified. We would also plead for more realistic illustrations, which would give the reader a better opportunity of developing some sense of living plasticity rather than a false impression of diagrammatic rigidity.

### Psychology of Women

Vol. 1—*Girlhood*. HELENE DEUTSCH, M.D., assistant psychiatrist, Massachusetts General Hospital. London: W. Heinemann. Pp. 312. 21s.

AT a time when economic and political decisions turn partly on alleged psychological differences between men and women, many will turn to a book with this title, in the hope of finding in it a statement of the distinctively feminine attributes, as well as an explanation of their development. It does not provide such a statement, perhaps because it is restricted to girlhood (a second volume will deal with motherhood), and perhaps also because the writer approaches her topic throughout as a psycho-analyst, more intent on interpreting the dynamic origins of psychological phenomena than on determining what these phenomena are. The psycho-analytical explanation which she sets out with persuasive lucidity centres on "the three essential traits of femininity—narcissism, passivity and masochism." The earlier part of the book examines, in a natural sequence, prepuberty, early puberty, adolescence, and menstruation. Chapters less obviously connected with phases of development follow, having as their theme eroticism, passivity, masochism, the "masculinity-complex," and homosexuality in women. The argument is frequently illustrated by case-histories and the recorded conduct and sentiments of famous persons, like George Sand and Marie Bashkirtseff. Dr. Deutsch is no doctrinaire psycho-analyst: she was trained by Freud and worked closely with him for years, and has therefore felt free to modify some of his tenets in accordance with her clinical experience. Readers who are not psycho-analysts will find the book sensible and illuminating, and its account of children's fantasies credible. In spite of the pathological material on which it is based, it is largely concerned with the means whereby women grow up well adjusted to their real surroundings, and it gives full weight, among the dynamic influences that form women's personality, to the human and social features of their environment.

# THE LANCET

LONDON: SATURDAY, DEC. 28, 1946

## Brain-power

THE present man-power shortage is particularly acute in the professions and the upper ranks of industry, commerce, and the public service. This state of affairs is due partly to the seven years' gap in recruitment to some callings and partly to reduction in the number of university students during the war; but it derives also from greater efforts to make industry efficient and to develop the social services. In their latest broadsheet<sup>1</sup> P.E.P. estimate that ideally the annual intake to the professions should exceed the pre-war level by 80% in 1946-50, and by 55% in 1951-55. For the next ten years teaching alone will need 23,000 recruits a year; and there ought to be substantial increases in the number of nurses, scientists, dentists, social workers, and medical auxiliaries. The Barlow Committee has advised that the annual output of pure scientists should be twice the pre-war total of 2500; and there should be about the same increase in technologists. According to the Teviot Committee, the annual output of dentists, which was 340 before the war, should be raised to 800 as soon as possible. By comparison, the medical profession is well served: the Goodenough Committee's 1944 estimate was that a 20% increment would be enough; and the committee held that this could be achieved in six years by a 15% increase on the pre-war annual output of 2000 doctors. Professions in which the pre-war intake will suffice, after the war-time fall in recruitment has been made good, include accountants, company secretaries, and librarians. Those in which present numbers are enough comprise opticians, pharmacists, and possibly also solicitors.

Nobody can say how much demand there will be for university graduates in arts, but P.E.P. suggest that in order to balance the tendency towards specialisation more young men and women should study the humanities. The risk of encouraging them to take an arts degree is that those who are not absorbed elsewhere may reluctantly turn their hand to teaching, with unhappy results for themselves and for that profession. Much of course will depend on industry's liking for men and women with university qualifications. Owing to the replacement of smaller undertakings by large ones, managers are now usually appointed on their merits, and it has become unusual for a firm to recruit its senior staff in their teens. The Cambridge University Appointments Board found that 73% of employers favour a preliminary university education, because it induces an independent and critical outlook, capacity for responsibility, and social ease. With opportunities for higher education depending more and more on ability; rather than on the parents' capacity to pay, industry may in any case have to look to the universities if it wants brains.

Recruitment to the professions and administration should be planned with three aims: the recruits should be of high quality; the supply should be adjusted to

the demand; and there should be fair distribution between the various callings. All this can best be achieved by offering advice and information about careers; by financial aid for suitable people who cannot meet the cost of education; by improving methods of selection; by balancing salaries and conditions between the major callings; and by tapping all sources. Perhaps only the Government can give wide enough publicity to training and prospects of employment; but the Ministry of Labour has not yet taken the steps to issue "reports on trends of employment in relation to higher appointments" which the Hankey Committee recommended. An annual Government prediction, imperfect though it might be, could be no wider of the mark than that of parents who act on rumours of excellent prospects in some particular profession. If the best recruits are to be secured, the opportunity for training must depend solely on ability; and the P.E.P. report urges that selection should be both by intelligence, as judged by written examination, and by character, as assessed by interview, some university scholarships being awarded for outstanding personal qualities combined with good intelligence. Factors influencing the intake of recruits to the various callings include the financial rewards, the prospects of promotion, and the conditions of service; but happily there are also other incentives—the interest of the work, the sense of purpose it bestows, the esteem in which it is held, and the scope it offers for initiative and responsibility. These considerations, which do not weigh equally with all young men and women, must be reviewed in occupations where entrants are too few or of poor quality. Thus the McNair Committee recommended an increase in salaries and improvement in the status of teachers, and the Government have lately taken action on similar lines in relation to the nursing profession. The Teviot Committee reported that "dental appointments should compare with those available to medical personnel more favourably than they do at present, as regards status, remuneration, and opportunities."

The P.E.P. survey underlines the urgency of marshalling the country's brain-power, including that of the refugees now among us. In the final count, however, success will depend on the careful sieving of the nation's youth, the training of all who are suitable, and a balanced allotment between occupations. Here, as in other tasks where resources are scanty, priorities must be decided. Teachers in universities and schools should, perhaps, come first, but other competing demands are not easily settled: what, for example, of the rival calls for pure scientists and doctors? It would be useful to have from time to time an estimate of the relative force of the various claims on our stock of trained intelligence.

## Liver-function Tests

THE object of tests of liver function is twofold: to express the extent of liver damage quantitatively, and to aid in the diagnosis between jaundice due to obstruction of large ducts and that due to a diffuse hepatitis. The functions of the liver are many, and the tests based on them are so numerous that the clinician may well wonder which will serve his purpose best. Until recently, evaluation of the tests was based on findings obtained in typical examples of a given disease. If these results were consistent, then similar

1. Britain's Need for Brainpower, *Planning*, no. 259: obtainable from P.E.P., 16, Queen Anne's Gate, London, S.W.1. Pp. 19, 1s. 7d.

data in atypical forms of the disease would influence the physician in his ultimate diagnosis. The assessment of tests has therefore rested in the first place on the clinical diagnosis of so-called typical cases, backed by a proportion of observations made at operations or necropsies. Such a basis is not entirely satisfactory, so the correlation of liver tests with the histological appearances of material obtained by liver puncture has a special value. Such a correlation has now been attempted by SHERLOCK.<sup>1</sup>

SHERLOCK has considered serum bilirubin, phosphatase, cholesterol, protein, albumin-globulin ratio, the intravenous galactose test, and the intravenous hippuric-acid synthesis test in the light of liver biopsies. She finds that in hepatitis the serum-bilirubin level parallels cell damage, but in duct jaundice it depends on the degree of duct obstruction rather than on damage to the parenchyma. The hippuric-acid synthesis test shows deficient function in most forms of jaundice, but since this does not parallel the histological picture the test is unsatisfactory. Total protein was also not considered a useful test, though, as SHERLOCK remarks, it is often low in all forms of jaundice; this reduction should provide a useful pointer to the need for plasma transfusion in surgical cases. The albumin-globulin ratio was usually low in hepatitis, from a decrease in albumin with a normal or raised globulin. In duct jaundice the albumin-globulin ratio was also sometimes low, from a decrease in albumin rather than an increase in globulin; this is probably an index of associated cell damage. (Some cases of obstructive jaundice do have a raised serum globulin, probably those in which there is an added infection.) The galactose-tolerance test correlated best with the histological findings, and according to SHERLOCK this test was positive in 15 out of 18 cases of obstructive jaundice. This contrasts with MACLAGAN's<sup>2</sup> 59% of normal results. The difference may be due to the fact that in all SHERLOCK's cases the duct obstruction was complete; the value of the test in partial duct obstruction would then be correspondingly less. In view of this, the bromsulphone-phthalein test, less popular here than in the United States, might also be worthy of investigation with histological controls.

Only one test offered some hope of distinguishing between hepatitis and duct obstruction. SHERLOCK found the phosphatase raised, but not above 30 units, in most cases of toxic hepatitis, and above 30 units in nearly all cases of complete duct obstruction. In the latter group it was more or less independent of liver-cell damage; but it may be supposed that in incomplete obstruction phosphatase would often be less than 30 units, so the test would be inconclusive in that difficult group of cases presenting variable jaundice, pain, dyspepsia, and possibly fever. The so-called empirical tests therefore deserve more consideration. In a recent series,<sup>3</sup> the cephalin-cholesterol flocculation test<sup>4</sup> was positive, and the thymol turbidity test<sup>5</sup> greater than eight units in 22 of 29 cases of hepatitis, the 7 weak reactions occurring in cases which cleared up in a week or two. These same tests were negative in 90% of patients

with obstructive jaundice, even when this was severe and of three or four weeks' standing or associated with moderately extensive metastases. The few positives were associated with severe infection, very extensive malignant metastases, or long-standing obstruction.

It seems that, apart from the empirical ones, these tests of liver function have little value in the differential diagnosis of jaundice. The serum-bilirubin and galactose-tolerance tests have a quantitative value in hepatitis, though their prognostic significance is not great since in most instances the damage indicated, whether great or small, is quickly made good. In surgical jaundice a positive galactose test may suggest that a given case is a poor operative risk, but, since in the absence of surgery the outlook is dim, the surgeon might well decide to ignore the biochemical findings.

### Pituitary Control of Water Excretion

NEARLY fifty years ago it was recognised that extracts of the pituitary gland contain substances which influence the renal excretion of water, and for the last twenty-five years Prof. E. B. VERNEY, F.R.S., has been working on the problem. His Sharpey-Schafer lecture at Edinburgh, published in our issues of Nov. 23 and 30, summarised his results, which do much to explain the rôle of the posterior pituitary in the regulation of urinary excretion.

If a dog is given 250 ml. of water by stomach-tube it will usually respond by a diuresis reaching its maximum in about 50 minutes; but if, after the ingestion of water, it is subjected to muscular exercise or emotional stimuli, the rate of water excretion usually falls suddenly, the maximum not being regained for some 40-50 minutes. The obvious interpretation of this was that the emotion or exercise produced vasoconstriction in the kidney, either directly through the nervous system or through the secretion of adrenaline. This interpretation, however, has been proved wrong: in the first place, the response occurs equally after denervation of the kidney; secondly, the fall in urinary output which follows clamping the renal artery lasts only as long as the obstruction persists; and, thirdly, the fall induced by adrenaline is just as temporary. Where, therefore, are we to seek the cause? VERNEY has clearly shown that the time-water-output curve can be exactly imitated by giving the animal an appropriate dose of posterior-pituitary extract, and it seems probable therefore that the change in water output following exercise or emotion is conditioned by a sudden outpouring of an antidiuretic hormone by the posterior pituitary gland. This probability is supported by VERNEY's further work. He finds that when an isotonic solution of sodium chloride is injected into the exteriorised common carotid artery the rate of urinary excretion is unchanged; but with hypertonic solutions there is an inhibition of urinary flow of the same form as that obtained by injection of pituitary extract. (With sodium chloride, saccharose, and glucose in an equivalent strength of "hypertonicity" the inhibition is approximately the same: urea, on the other hand, has no effect, because it diffuses easily from extracellular fluid to cells.) If the pituitary gland has been previously removed, or the internal carotid artery has been tied, infusion of hypertonic solutions has

1. Sherlock, S. P. V. *J. Path. Bact.* 1946, 58, 523.
2. MacLagan, N. F. *Proc. Ass. clin. Path.* 1945, 1, 22.
3. Maizels, M. *Lancet*, Sept. 28, p. 451.
4. Hangar, F. M. *J. clin. Invest.* 1939, 18, 261.
5. MacLagan, N. F. *J. exp. Path.* 1944, 25, 234.

no antidiuretic effect. From all this VERNEY postulates that there are in the brain "osmoreceptors" which are closely connected by nerve-paths with the pituitary, and, according to tonicity of the blood supplying them, are continually regulating the secretion of the antidiuretic hormone and hence of the urine flow. The exact site of these osmoreceptors is still uncertain.

The renal mechanism through which the posterior pituitary acts has not yet been revealed by VERNEY's experiments. It has been generally assumed that the action of the posterior-pituitary secretion is mainly on tubular reabsorption, but it remains to be seen whether in addition there is not some alteration of renal circulation like that demonstrated by TRUETA and his colleagues<sup>1</sup> after various types of nerve stimulation. One obvious difference is that the Trueta phenomenon disappears after physiological denervation of the kidney by splanchnic block, whereas posterior-pituitary extract continues to act on the denervated kidney.

## Annotations

### GUIDE TO BOARDING OUT

RULES always need explanations if they are to be obeyed willingly and intelligently. On paper, the regulations for the boarding out of children should have sufficed at least to prevent tragedies in practice, but they were such dull official reading that they failed to touch the imagination, or to bring home their responsibilities to some authorities. As a result of Sir Walter Monckton's report, in 1945, on the death of Dennis O'Neill, the Home Office and the Ministry of Health have revised the boarding-out rules, and the work of many local authorities has been reviewed. The new rules have been incorporated in an explanatory memorandum<sup>1</sup> which includes such of the Curtis Committee's recommendations<sup>2</sup> as can be applied without legislative changes. Thus the hoped-for "children's officer" does not yet appear, though the boarding-out visitor is charged with many of her duties. While the child is in a reception home the visitor who will later supervise him is instructed to get to know him "as a new friend," and to tell him about the plans being made for him, describe the foster-home when it is found, and encourage him to look forward to being received into it. She must also get to know the foster-parents as a friend, and must make it clear to them that they share the responsibility for the child with the local authority, and help them to fulfil their undertakings. The child must be examined by a doctor before being boarded out, and a doctor—who may be the medical officer of the local authority or the family doctor of the foster-parent—must be appointed to attend him when ill, and to examine him yearly. The local authority is responsible for all medical and dental care, and must be notified if the child is seriously ill or hurt; the visitor must make sure that the foster-parents can get into touch with her quickly in case of need. Her attitude to the child is carefully outlined; she must—

"... attempt to find for each child the environment most suited to his temperament and aptitudes, endeavouring to make the first placing a successful and lasting one. She will consider, for example, whether the child in question needs a careful and orderly home, or will be happier where standards are not too rigid; whether he has a stronger

preference for town or country life, and whether he is accustomed to, and would miss, the company of other children of his own age. For a dull child she will try to find a foster-home where he will not suffer by comparison with more intelligent children, while for a child of high intelligence or with some special ability she will seek an environment in which his interests and potentialities will be understood and encouraged. Some foster-parents will be at their best with a delicate, nervous, or physically neglected child, while others will be able to understand and manage the active undisciplined boy or the precocious adolescent girl."

This is the sort of guidance which will help boarding-out visitors to recognise their opportunities; but it implies, of course, that they have a wide choice of foster-homes at their disposal. This is not always so, and it is perhaps a pity that the memorandum does not draw attention to another suggestion of the Curtis Committee—that opportunities for boarding out in comfortable middle-class homes should be more fully explored.

The child's needs and wishes are well considered throughout the memorandum. Two pieces of advice serve to show that these are assessed by contemporary standards: the child is to have regular pocket-money and is to be encouraged to learn how to spend it as well as how to save it; and the foster-parent is to let the visitor know when extra financial help is needed "for holidays and for festive occasions, for a bicycle, or for special clothing for games or other purposes."

### INFECTIOUS LYMPHOCYTOSIS

IN 1941 Smith<sup>1</sup> in America drew attention to a benign and probably infectious lymphocytosis appearing as an acute or chronic disease in children. The acute cases had a vague and varied symptomatology, but a sharp lymphocytosis was always present. The chronic cases usually followed an infection of the upper respiratory tract; there was a low, persistent pyrexia, vague malaise and anorexia, and often spasms of peri-umbilical pain; a persistent lymphocytosis lasted a month or more; eventually the whole disturbance settled down, and there were no complications. Duncan<sup>2</sup> described an acute case in a girl of 5 years, beginning with acute abdominal pain and rigidity; there was no enlargement of lymphatic glands, liver, or spleen; there were 29,600 lymphocytes per c.mm., sternal puncture showed increased cellularity with 86% lymphocytes, platelets were rather low, but red cells and hæmoglobin were normal; the Paul-Bunnell (heterophile antibody) reaction was not significant. The acute symptoms subsided in a few days, but the pyrexia and the lymphocytosis persisted for a month. Later Duncan<sup>3</sup> reported 2 cases in young adults, and added a morbilliform rash to the clinical picture. Another acute case in an adult—this time a U.S. naval recruit of twenty-nine—is reported by Yuskis,<sup>4</sup> and here again there was a morbilliform rash, mainly on hips, thighs, and legs, and lasting three weeks.

Lorenz and colleagues<sup>5</sup> report 2 more cases in children with peak counts of 47,500 and 58,000 lymphocytes per c.mm., and clinically only mild respiratory affection; sternal marrow was normal in these patients, with no lymphocytosis; the Paul-Bunnell reaction was positive up to a titre of 1 in 80, but this is too low for a diagnosis of infectious mononucleosis. In this issue Steigman reports a small outbreak involving 6 children in one village in southern England; here cervical lymph-glands were notably enlarged and there was protracted lymphocytosis, but all recovered without incident. According to Smith<sup>6</sup> the disease is con-

1. Trueta, J., Barclay, A. E., Daniel, P., Franklin, K. J., Prichard, M. M. L. *Lancet*, 1946, ii, 237.

1. Home Office and Ministry of Health. Memorandum on Boarding Out of Children and Young Persons. H.M. Stationery Office. Pp. 18. 4d.

2. See *Lancet*, Nov. 2, p. 648.

1. Smith, C. H. *Amer. J. Dis. Child.* 1941, 62, 231.

2. Duncan, P. A. *Ibid.* 1943, 66, 267.

3. Duncan, P. A. *New Engl. J. Med.* 1945, 233, 177.

4. Yuskis, A. S. *J. Amer. med. Ass.* 1946, 132, 638.

5. Lorenz, M., Hardy, L. M., Alt, H. L. *Ibid.*, 1946, 131, 832.

6. Smith, C. H. *Ibid.*, 1944, 125, 342.

tagious and infectious, with an incubation period of 12-21 days.

There are already several known causes of lymphocytosis in children. Kato pointed out that from three months to four years of age lymphocytes are normally more numerous than polymorphs. A well-marked lymphocytosis has been recorded in whooping-cough, rubella, and mumps after the initial stage. Infectious mononucleosis is common in children, and it is likely that several cases of infectious lymphocytosis have been classified with this disease—for example, Thelander and Shaw's 7 cases of infectious mononucleosis with signs of meningeal irritation, which had a lymphocytosis and negative Paul-Bunnell tests.

Here, then, is a benign almost certainly infectious condition, mainly affecting children, with a very variable clinical picture, sometimes simulating acute abdominal or nervous disease at onset, and sometimes only a mild respiratory tract affection; pyrexia may be protracted, and the blood shows a pronounced lymphocytosis. The Paul-Bunnell reaction is not significant. The differential diagnosis from infectious mononucleosis (glandular fever) may turn on the Paul-Bunnell reaction—not an entirely reliable sign—but the blood picture in infectious lymphocytosis shows only small lymphocytes, with no glandular fever cells or excess of monocytes. In lymphatic leukæmia the patient is much more ill and has a rapidly increasing anæmia, and sternal puncture always shows a massive lymphocytic infiltration.

The prognosis in infectious lymphocytosis is excellent, even if the course is long; no specific treatment has been proposed. The cause has not been identified; it has, as usual, been ascribed to a virus, but no supporting evidence has appeared yet.

#### NUTRITION IN CEYLON

THE peasants of the Middle East, we are told,<sup>1</sup> "constitute the bulk of the population and . . . produce most of the basic wealth, have few schools, almost no medical facilities, till soil that is not their own, have little purchasing power, and exist under standards that are tragically low." This dismal statement applies also to Ceylon, as is shown in a publication of the department of medical and sanitary services.<sup>2</sup> The basic wealth of the country is derived from the chief exports—tea, rubber, and coconuts. The food that is grown in Ceylon can support barely a third of the population. For her rice Ceylon depends on Burma and for other food-stuffs on India. During the late war, when Burma was occupied and India was facing a famine, Ceylon had to turn to Australia for wheat and other foodstuffs. She has few or no cottage industries to help the peasant population and occupy their time when idle. That the diet is bad there can be no doubt. The state of nourishment is so poor that it is impracticable to use modern European and American standards. Any standards accepted must be based on those ensuring reasonable (not "abounding") health, and often these low standards are not achieved. In 1944, 40% of the families examined were obtaining too few calories (standard, 2000 a day), 65% too little protein, and 54% too little calcium. Toad-skin and Bitot's spots in the children examined pointed to gross deficiency of vitamin A, and there was evidence of a lack of the B vitamins. The average cost of the diet before the war was 15 cents a day. It had risen to 38 cents in 1944, and nearly two-thirds of the people spent less than this amount. The death-rate is 20 per 1000 and the infantile mortality close on 140 per

7. Thelander, H. E., Shaw, E. B. *Amer. J. Dis. Child.* 1941, 61, 1131.

1. Allen, H. B. *Rural Education and Welfare in the Middle East.* H.M. Stationery Office, 1946. 1s. 6d.

2. *Ceylon Health News*, 1945, 12, no. 2.

1000 live births. Despite these figures the population has risen and is still rising. In no direction are there any grounds for complacency, though there is a little comfort in the fact that things are not as bad as they were in 1937. That the prospects are so unpleasing is not because man is vile but because man, the entrepreneur, has exploited the land and its resources and paid no real attention to the welfare of those who produce most of the basic wealth of the island. It will need a long-term plan of primary, secondary, and adult education, agricultural improvement, supply of medical services, and improvement of the standard of living, with or without a short-term policy of world agriculture organisation, to remedy the deplorable state of the public health in Ceylon.

#### DOCTORS DIFFER

A BOOK with this title seems in tune with the times; and though Dr. Harley Williams<sup>1</sup> deals with historic rather than current differences—and not merely differences of opinion but of quality and character—his argument is opportune, for he shows that through the differences of doctors medicine grows. There is nothing new about this: the energy generated by opposites moves many things in nature, as British party politics show. But he sets about it with enthusiasm, and his rattling pen and vivid fancy get the circulation going in his ten subjects and put them before us as live men—though not necessarily quite the men who walked the earth under those ten names. He is deeply read in the debates of Elliotson and Wakley over mesmerism, in the lives of old Hugh Owen Thomas and young Robert Jones, of plodding Mackenzie and quicksilver Osler, of Macewen and Victor Horsley, and urbane Robert William Philip and country-loving Trudeau. His portraits are in the main kindly, even flattering. Sometimes indeed he must have shared the perplexity of Mrs. Gaskell faced with the task of writing acceptably of the Brontës: the great can be so awkward. Is it true, for example, as Dr. Williams puts it, that "some admiring nurses subscribed secretly and bought a fish-kettle for Macewen to boil his forceps"? Or did the sister exclaim, one day, "He's been on about that fish-kettle for weeks. For heaven's sake let's buy him one"? If this kind of doubt afflicts the reader from time to time it will not impair his enjoyment of stories which revive the times as well as the men. He does less than justice perhaps to Thomas Wakley, founder of this journal; and in his relish of the composites of Philip he seems for a moment to shed some of his own years and to become one with the irreverent students who enjoyed them.

#### CONTROL OF RATS AND MICE

THE immense importance of rats and mice as carriers of disease and destroyers of food is perhaps not sufficiently realised in this country. *Rattus rattus*, the "black" or "ship" rat, was the earliest invader of Europe, coming from the East shortly after the Crusades, probably by ship. This settler spread rapidly, but was eventually almost entirely replaced by *Rattus norvegicus*, the larger, short-nosed, short-tailed common brown rat, as a result of a strange revolution in the rat world which took place towards the end of the seventeenth century. Prof. G. M. Trevelyan<sup>1</sup> claims this change-over as the chief cause of the decline of the plague of 1665, because the brown rat did not carry the plague-flea to nearly the same extent as its predecessor. It is certain that between them they have been responsible for an incalculable number of deaths from plague and typhus, and also for the spread of such infections as rat-bite fever and Weil's disease. The 40,000,000 rats in England at present are

1. *Doctors Differ.* By Harley Williams. London: J. Cape. Pp. 253. 12s. 6d.

1. *English Social History*, London, 1944, p. 290.



chiefly a nuisance because of the large amounts of human food which they eat or damage.

A pamphlet<sup>2</sup> prepared by Mr. S. A. Barnett for the Ministry of Food stresses the need for a systematic search for rats or mice before any attempt is made to exterminate them. The brown rat follows man in both town and country, living in sewers, factories, and warehouses, and burrowing under hedge-banks and ricks. The black rat, an active climber, is confined mainly to ships and dockyard areas, but is also found inland. The house mouse (*Mus musculus*) adapts itself less well, and usually nests as near as possible to the source of food. In tackling an infested area the nesting sites must be found, then the feeding-places, and finally the runs between the two. Evidence of the last is given by smears left on floors and beams, by droppings, by holes in walls and tooth-marks on metal (rats can, and do, gnaw through lead pipes half an inch thick); also by foot-marks, damage to sacks, and disappearance of food. When a rough idea of the size of the infested area has been gained, a sketch map is drawn, and plain bait is laid along the known runs. It may take several days before the bait is accepted; then the poison is added. The bases recommended are damp sausage rusk, sugar meal, bread mash, and soaked wheat. Zinc phosphide 1 in 40, arsenious oxide 10%, red squill powder 10%, and 'Antu' 2% are the chief poisons suggested. Best results are obtained by treating rat-holes in the open, for then cyanide powders can be introduced and the holes securely blocked.

#### RESEARCH IN MELBOURNE

OUR knowledge of viruses owes much to the Walter and Eliza Hall Institute of Research in Pathology and Medicine, and the director's annual report for 1945-46 again tells of stimulating progress. Following the work of Habel in the United States the Melbourne team has found a simple method of cultivating mumps virus by amniotic inoculation, and mumps and influenza viruses apparently resemble each other in size, in hæmagglutinating behaviour, and in growth on the chick embryo. A suitable technique for titrating antibody by inhibition of hæmagglutination has been worked out and already observations have been made on the sera of convalescents. Mumps virus has been produced in quantity, and formalin-inactivated virus was found to produce significant amounts of antibody when inoculated into young adults. Field tests among school-children are under way and it is hoped that it may yet be possible to produce a single-dose vaccine. Work on the influenza viruses continues, and in October, 1945, the first Australian epidemic of influenza B was recognised.<sup>1</sup> There were few cases among Servicemen or in the general adult population, but half the children at some schools were attacked. Two boys had consecutive attacks of B and A influenza with an interval of 2-3 weeks between—the first time this has been recorded. Active investigation of the phenomenon of red-cell agglutination by virus has already produced results which may have important theoretical and practical implications. It appears that the hæmagglutinin of vaccinia and ectromelia viruses is a stable complex of a phospholipid (probably lecithin) with an antigenically specific product of the virus. It also seems likely that the action of viruses of the influenza group may uncover new antigenic groupings on the cell surface. A better skin-testing reagent has been devised for the diagnosis of herpes simplex; the substance is easy to produce and does not cause non-specific reactions in non-herpetic people.

While much of the report is necessarily concerned with virus work the institute has been active in other fields. In association with American workers North Queensland

tick typhus is being studied, and trials on the preventive effect of gamma globulin in measles continue. The department of experimental medicine is tackling the epidemiology of ectromelia in mice, and work has started on the serology of oriental schistosomiasis and malaria. With the opening of a clinical research unit at the Royal Melbourne Hospital there will be new opportunities which Dr. F. M. Burnet, F.R.S., and his colleagues can be relied on to seize.

#### NEONATAL DIARRHOEA

In the last few weeks there has been a small but highly fatal outbreak of neonatal diarrhoea in the maternity wards of two hospitals in Leicestershire, and as a result the much milder outbreaks and isolated cases arising elsewhere have been viewed with unnecessary alarm. Figures for neonatal deaths alone are not available, but it is reassuring that the number of deaths from gastro-enteritis under 2 years of age has been no higher than the average in the first 11 weeks of this quarter. Nevertheless, the Leicester experience, in which nearly half the affected children have died, shows that the advent of chemotherapy and the antibiotics, and modern methods of studying viruses, have done little to reduce the case-mortality from this disease, though thanks to improvements in social conditions and infant care generally we no longer see the great epidemics of infantile diarrhoea which swept the country 50 years ago.

Apart from the diarrhoeas of known origin which affect children and adults alike—food-poisoning and bacterial dysenteries—and the diarrhoeas secondary to parenteral infections, there are at least two forms of infantile gastro-enteritis of undetermined causation prevalent in this country. The first is usually mild (though infants, especially if bottle-fed, may die of it), affects adults at least as often as children, occurs sporadically in hospitals and other institutions over months or even years, and is known to the public as gastric flu. The second is highly fatal, with a case-mortality rising as high as 80-90%, attacks infants in the early weeks of life, appears gradually or suddenly in maternity wards and nurseries, and is the true epidemic neonatal diarrhoea. An example of the mild type is the recent outbreak at Cowley Road Hospital, Oxford. There a mild gastro-enteritis has been prevalent in this temporary maternity home since the beginning of July, but, though 29 babies are known to have been affected up to Nov. 29, when the home was closed, there have been no deaths, and only one baby has been ill enough to need hospital treatment. A significant feature of this outbreak has been an attack-rate of about 60% among the mothers of the affected babies and of 19 out of 21 among the midwives and nurses in the home. The main symptom has been diarrhoea of 2-4 days' duration, and repeated examination of stools has so far failed to reveal any causative organism.

At Leicester General Hospital it seems possible that both types have been present, for there have been sporadic cases of mild diarrhoea among the mothers since early September, and there were 13 severe cases in the babies, 5 of them fatal, in the three months up to Dec. 4. Then within a few days there was a typical explosive outbreak of the fatal type, involving 25 babies in a few days, with 12 deaths.

The cause of both types remains unknown. According to Crowley and colleagues,<sup>1</sup> who studied three outbreaks in 1941, the choice lies between (a) infection with an organism of the salmonella or dysentery group, or with a normally non-pathogenic bacterium, or with a pathogenic organism that does not develop well in culture; (b) a toxin formed by an organism in the intestine; (c) a bacterial toxin ingested with the food; (d) a systemic infection with an unknown organism; (e) infection with a virus; or (f) a protozoon. Those called on to deal with

2. Infestation Control: Rats and Mice. H.M. Stationery Office, 1946. Pp. 36. 1s. 6d.

1. Burnet, F. M. *Lancet*, 1946, i, 807.

1. Crowley, N., Downie, A. W., Fulton, F., Wilson, G. S. *Lancet*, 1941, ii, 590.

or investigate outbreaks will have in mind the incident reported last year by Brown and colleagues,<sup>2</sup> in which the maternity department of a general hospital appeared to have been affected as a result of a widespread outbreak of minor gastro-intestinal upset in the surrounding neighbourhood. In this instance, as in many others, pathological and bacteriological findings were completely negative. In the outbreak reported by Freedman<sup>3</sup> this year the search for a causal organism included tests for protozoa, but without success except in a single case in which *Giardia lamblia* was isolated. On the other hand, this mild gastro-enteritis in a midwifery block was apparently cured and then controlled by the administration of mepacrine, which was given in doses of 0.1 g. t.d.s. for five days to all residents, including staff and mothers, whether ill or not. The baffling feature of most outbreaks of the mild and severe type is this failure to isolate a causal organism. Only very occasionally can these incidents be ascribed to infection with pathogenic bacteria or protozoa. The most plausible explanation is, of course, that the infecting agents—and there may be several of them—are viruses, of which one at least is relatively non-pathogenic for adults but highly virulent in infants. Another possibility is that the common bacteria of the human intestinal tract—*Bact. coli*, *Strep. faecalis*, and the like—may have unsuspected pathogenic potentialities, particularly in the unstable condition of the infant's intestinal tract during the first few weeks of life. Such hypotheses are not easily put to the test in the anxious atmosphere of a maternity ward suddenly threatened with a wholesale loss of infant lives, yet on the satisfactory solution of this problem largely depends the future of institutional midwifery.

As regards prevention in maternity nurseries, Sakula<sup>4</sup> urges breast-feeding whenever possible, strict attention to the hygiene of bottle-feeding, and the avoidance of overcrowding, with an ample staff of well-trained nurses under the supervision of a paediatrician. But outbreaks do arise even where these precautions are most strictly followed.

#### CHEST DISEASE IN RAND MINERS

IN South Africa measures are being taken to protect the miner against silicosis and pulmonary tuberculosis, and the success obtained is reflected in the report on the work of the Miners' Phthisis Medical Bureau for 1941-44. The much stricter physical selection of recruits for the mines, better ventilation, improved machine drills, &c., have combined to reduce the dust hazard and have halved the incidence of silicosis since 1927. The average length of service underground preceding diagnosis of silicosis has risen from eleven years in 1927 to twenty-one years in 1944, reflecting the general improvement in mining conditions. The miners are examined every three years, after an initial examination when a certificate is given to show that the candidate is free from any disease of the lungs and is in other respects physically fit for underground work. This initial examination is a stiff one, and about 1 in 5 of the applicants are not accepted.

Compensation is run on the following lines. If a miner is found to be suffering from silicosis he is given the choice of taking an award and stopping work underground or continuing to work and postponing the award. If the disease advances in severity from ante-primary or primary to secondary stage he is given a pension. In 1944 the Miners' Union complained that the number of silicotics transferred to the secondary (and therefore pensionable) stage was steadily falling. This seems to have been due to several factors, such as stricter initial examination, improved mining conditions, and fewer cases complicated by tuberculosis—in other words, the

state of things is improving. The report says emphatically that silicosis, once contracted, need not necessarily progress towards incapacity and death, and in fact many men certified as silicotics before 1916 are still in the early stages and in relatively good health. That silicosis is not a disease peculiar to those working underground is illustrated by 39 drill-sharpeners working above ground; all these men had X-ray appearances similar to those found in silicosis and arising from the presence of significant quantities of silica and iron oxide dust in the air which they breathed. On the subject of treatment nothing new is said. The Rand doctors agree that not enough work has yet been done on the aluminium treatment of silicosis, and their main emphasis is laid on methods of prevention, such as improved dust control.

Tuberculosis is not a common disease among European miners in the Rand, and the incidence has fallen to 0.7 cases per thousand each year. The association of tuberculosis and silicosis, however, is more frequent, though this again has dropped, mainly owing to the fact that any miner found to have tuberculosis is obliged to stop underground work. In native workers the incidence of tuberculosis actually exceeds that of silicosis, thus confirming the well-known fact that native miners are unduly susceptible to tuberculous infection. No form of mass radiography has yet been introduced, though it is likely that this will be done in the near future.

#### EDITOR OF THE "BRITISH MEDICAL JOURNAL"

AT the end of this year Dr. Gerald Horner vacates the editorial chair of the *British Medical Journal*, which he has held since he succeeded Sir Dawson Williams in 1928. The doyen of medical journalism in this country, his experience in our small specialty dates from 1911, when he joined the staff of *The Lancet* as assistant editor. From 1915 to 1917 he served with the Royal Army Medical Corps, chiefly in France, and on demobilisation he accepted the post of second-in-command to Dawson Williams. The subsequent years have seen a vast increase in the number of the journal's readers, and they are indebted to Dr. Horner more than they know. His love of accuracy, his sincerity, and his fairness have set high standards for his fellow specialists, and his whole work bears the mark of a cultivated mind familiar with the great past of medicine, of which the present is an extension. We can only regret that the continuous labour of marshalling other people's words has too often hindered him from giving us his own. Leisure, we hope, will free a pen which can write beautifully with ink of almost any pH. Meanwhile on his retirement thousands of colleagues who have called on Dr. Horner or have corresponded with him will recall particularly his kindness and his constant desire to help.

We warmly welcome to the editorship Dr. Hugh Clegg, who joined the *British Medical Journal* in 1931 and has been deputy editor since 1934.

#### THE REGIONS

THE Minister of Health has lost no time in defining the hospital regions under the National Health Service Act. On Dec. 20, having examined comments from 200 bodies on the proposals published in our issues of Nov. 30 and Dec. 7, he laid an order before Parliament. Though amended here and there, the scheme in outline remains as it was, and London will be split into four metropolitan areas. Mr. Bevan has told local organisations that though the Welsh region will local a single unit it will be centred on Liverpool University as well as Cardiff.

Dr. N. M. GOODMAN, director of the health division, European regional office, UNRRA, has been appointed director of field services for the Interim Commission of the World Health Organisation, at Geneva.

2. Brown, G., Crawford, G. J., Stent, L. *Brit. med. J.* 1945, ii, 524  
3. Freedman, B. J. *Ibid.* 1946, ii, 552.  
4. Sakula, J. *Lancet*, 1943, ii, 758.

## Special Articles

## THE STILLBIRTH-RATE IN ENGLAND AND WALES IN RELATION TO SOCIAL INFLUENCES

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THOUGH the importance of reducing the death-rate of infants is receiving more and more attention, that of reducing the numbers of stillbirths, which is just as important, has not had nearly so much notice.

Each year in England and Wales there are about 20,000 stillbirths, 18,000 neonatal deaths (of infants under four weeks of age), and 15,000 deaths of infants aged from four weeks to a year. This total of 53,000 exceeds the combined deaths from heart disease and cancer in persons under sixty years of age, and is more than double the number of deaths from pulmonary tuberculosis at all ages. But it has a biological significance not fully indicated by a mere recital of comparative figures, because a child has at birth an expectation of life of some sixty years. These 53,000 are not able to fulfil that expectation. They represent a wastage of potential life which can be ill afforded in view of the declining birth-rate.

During the past forty years, as is well known, there has been a notable decline in infantile mortality. But this decline has not affected all age-periods within the first year equally. The changes that have taken place during the typical period 1930-38, with the corresponding figures for the stillbirth-rate, are as follows:

	1929-31	1937-39	Decrease
Stillbirths per 1000 total births ..	40.56	38.36	5%
Deaths per 1000 live births—			
at ages under 4 weeks ..	31.78	28.71	10%
"  4 weeks to 3 months ..	10.68	8.47	21%
"  3-6 months ..	9.28	7.50	19%
"  6-9 months ..	7.91	5.11	35%
"  9-12 months ..	7.24	3.74	48%

The bulk of the decrease has taken place at ages from four weeks to twelve months, whereas neonatal mortality and the stillbirth-rate have shown only slight decreases. It is well recognised that mortality at ages 3-12 months is closely associated with bad environmental conditions, and its decrease has been attributed to improved housing, hygiene, and the educative value of child-welfare services. The Registrar-General (1937) has shown that this mortality in 1930-32 was 6.7 in the most favoured social and economic group in the country, and 31.4 in the least favoured—a figure over 4½ times as great. This gradient of the mortality with social class indicates its sensitivity to environmental conditions. But neither neonatal deaths nor stillbirths exhibit nearly so marked a correlation, and for this reason research is urgently necessary into the causes and factors predisposing to this wastage of life. This paper is concerned with stillbirths only, with particular reference to social influences.

## STILLBIRTH-RATE IN ENGLAND AND WALES

Stillbirths (which have been notifiable to the local medical officer of health since 1915) have been registered in this country since July, 1927, in accordance with the Births and Deaths Registration Act, 1926, which includes the following definition: " ' Stillborn ' and ' stillbirth ' shall apply to any child which has issued forth from its mother after the twenty-eighth week of pregnancy and which did not at any time after being completely expelled from its mother breathe or show any other signs of life." Registration was extended to Scotland in 1939. In Denmark stillbirths are also registered and the definition of a stillbirth is the same as in this country.

In 1939 the stillbirth-rate in England was 37, in Scotland 42, and in Wales 49; the rate in Denmark was only 26.5. These figures are typical of the differences between the four countries and show that there is room for considerable improvement not only in Wales and Scotland but also in England, where the geographical incidence varies widely. The stillbirth-rate was calculated for each county borough, London borough, urban district, and rural district in England and Wales for the twelve-year period 1929-40, during which time the rate did not fluctuate much in the whole country, and the results are summarised in table I. The first 1½ years of registration were omitted in case some stillbirths initially escaped registration.

The statistical experience in Wales and London affords an interesting contrast. Every region in Wales returns a higher rate than the average for England and Wales, and with one exception (Holborn) every London borough

TABLE I—UNWEIGHTED MEAN STILLBIRTH-RATES WITH STANDARD ERRORS IN CERTAIN GROUPS OF REGIONS, 1929-40

District	No. of regions	Stillbirth-rate
London boroughs .. .. .	28	31.95 ±0.51
County boroughs (England) .. .. .	79	41.56 ±0.48
County boroughs (Wales) .. .. .	4	50.68 ±4.73
Urban districts (E) .. .. .	47	38.31 ±0.65
(W) .. .. .	12	51.91 ±1.51
Rural districts (E) .. .. .	47	37.63 ±0.61
(W) .. .. .	13	52.58 ±0.95

The City and Temples, Rutland and Radnor urban districts, and Middlesex rural district were omitted from the above analysis owing to the smallness of their experience.

returns a rate below the average. It is clear from the table that the stillbirth-rate does not increase with increasing density of population. In this respect it is dissimilar to infant mortality, and this implies that different causal factors are involved.

The trend in the rate has already been described (Sutherland 1946), and it may be of interest to recapitulate its main features. There was a slight rise until 1932 or 1933, followed by an increasingly rapid decline. This decline has not been halted during the war years; on the contrary, it has accelerated greatly since 1939, particularly in areas with high incidence. The rate in Wales as a whole declined by 34% between 1938 and 1944. In England the decrease was 27%. There has been a similar decrease in Scotland. Possible causes of this decline are discussed below.

## CERTIFIED CAUSES OF STILLBIRTHS

In Scotland, but not elsewhere, a statement of the supposed cause of stillbirth is required on the certificate. Table II gives an analysis of the registered causes of stillbirths in that country in 1943, when the registration procedure had become well established. The table is instructive in two respects: (1) 7% of the stillbirths

TABLE II—CERTIFIED CAUSES OF STILLBIRTHS—SCOTLAND 1943

Cause	No.	(%)
General diseases of the mother .. .. .	116	(3%)
Toxæmias .. .. .	338	(10%)
Fœtal deformities .. .. .	596	(17%)
Difficulties in labour .. .. .	910	(26%)
Accidental hemorrhage .. .. .	239	(7%)
Other defined causes .. .. .	621	(18%)
Ill-defined causes—e.g., prematurity .. .. .	431	(12%)
Unknown causes .. .. .	243	(7%)
	3494	

are inexplicable in terms of present medical knowledge, and 12% are assigned to vague causes, such as prematurity or atelectasis, which terms describe the fœtus but do not explain why the child was stillborn; and (2) the categories "difficulties in labour" and "accidental hæmorrhage," which include 33% of the stillbirths, represent those which greater obstetric skill may help to prevent. It is thus clear that, though it has an

important part to play, obstetric skill is by no means all-important, and that in 19% of cases the practitioner registering the stillbirth is unable to assign it to a definite medical cause. This shows that the problem is more than purely medical or obstetrical. Basic causes must be sought elsewhere, and in this connexion consideration must be given to the deaths in the first month of life, because it is generally accepted that the problem of neonatal mortality is allied to that of stillbirths. But an examination of the certified causes of neonatal deaths does not help to elucidate the causation of stillbirths, because in early infancy the certification must often be vague.

#### BIOLOGICAL FACTORS

There are several biological factors affecting the still-birth-rate, of which the most important are the age and parity of the mother. It is convenient to regard these two together, since a woman's parity is not independent of her age. When the births are classified according to the number of previous children born, the stillbirth-rate within each group shows a well-marked association with the age of the mother. There is a possible slight decrease up to the age of 25, but thereafter the rate increases more and more steeply. When the data are allocated according to the age of the mother, there is in each age-group an appreciable decline between the rates for the first and second child. For the third and subsequent children born to mothers of the same age the rate shows a tendency to rise again, but not so high as the rate for the first child, except in the case of young mothers with unusually large families. To sum up broadly, primiparæ have a higher stillbirth-rate than multiparæ of the same age, and the rates for both increase after the age of 25. A representative series of values is given in table III.

An interesting example of the importance of age and parity is afforded by the statistical experience in the London boroughs. It is generally accepted that in better-class districts the mothers are older and the proportion of first births high, as compared with poor-class neighbourhoods, where the mothers are younger and have larger families. The London boroughs were classified into four groups according to "social index," which is a measure, based on the Registrar-General's five social classes, of the general social and economic level of the borough (Cheeseman 1938). Group 1 comprises Hampstead, Holborn, Kensington, Lewisham, Paddington, Stoke Newington, Wandsworth, and Westminster, which have the highest social indices. Group 4 consists of Bermondsey, Bethnal Green, Finsbury, Poplar, Shoreditch, and Southwark. Groups 2 and 3 are intermediate. The stillbirth-rate in the four groups for three successive triennia are as follows:

Year	Group			
	1	2	3	4
1928-31 ..	35.1 ..	32.9 ..	32.6 ..	30.9
1932-34 ..	33.1 ..	31.3 ..	31.4 ..	31.3
1935-37 ..	33.6 ..	32.3 ..	32.0 ..	30.9

In group 1 the rate is consistently higher than in group 4, with 2 and 3 falling between. The inverse relationship with social status is seemingly due to the age and parity distribution of the mothers being relatively unfavourable in the better-class districts, and favourable to a low rate in the poor-class districts. Any adverse effect of environment is masked by these biological factors.

#### SOCIAL INFLUENCES

The possible causes of the decrease in the stillbirth-rate during the war years may now be considered. First, such a pronounced decline cannot be attributed entirely to improved obstetrics. Hospitals and maternity homes were overcrowded, there was a shortage of doctors, and those available were overworked. Moreover, it has been shown that, according to the Scottish data, improved obstetrics could only affect about a third of the still-

births. Yet the decline in Wales has been of this order, and there is no evidence that Welsh obstetrics became perfect during six years of war. Secondly, the decline is not due to changes associated with the biological factors, because table IV shows that it has affected both male and female births, legitimate and illegitimate, and mothers of all ages and parities. Figures later than

TABLE III—STILLBIRTH-RATES FOR LEGITIMATE SINGLE BIRTHS BY AGE AND PARITY OF THE MOTHER, ENGLAND AND WALES, JULY, 1938, TO DECEMBER, 1940

Age of mother (years)	Number of previous children				All multiparæ	All parities
	0	1	2	5		
20-24	29	18	22	26	19	26
30-34	54	26	30	38	31	38
40-44	105	55	55	67	64	68
All ages	39	24	30	46	32	36

those quoted are not yet available. A decline so universal in all respects must have a universal cause.

This cause must therefore be sought in the social and economic environment of the pregnant woman. In view of the rather static character of the stillbirth-rate and neonatal mortality during a period when there was an appreciable decline in the mortality in the later ages of infancy—a decline commonly ascribed to improvement in the general environment—this may seem *a priori* an unprofitable line of inquiry. But it must be appreciated that the word environment connotes a multiplicity of factors, some adverse, some (like the age-parity effects) favourable to a reduction in the stillbirth-rate. For that reason the influence of the individual factors must be studied separately. The necessity for doing so is indicated by the findings of Baird (1945), in Aberdeen, who has clearly shown that not only obstetric care but also social environment influences the stillbirth-rate, and that social environment is, if anything, the more important.

In many respects the environment of the expectant mother deteriorated during the war. The strain and anxieties of life increased, particularly in the towns, with overcrowding, bombing, queueing, separation of families, and other additions to the housewife's duties and responsibilities. Moreover, married women worked in industry to a greater extent than ever before. All these are factors which might well be expected to have increased the rate. To offset these influences are two which have improved notably and universally for the pregnant woman: general nutrition and antenatal care. Priority milk and eggs, supplementary vitamins, and, later in the war, other extra rations were made available universally, for the first time, to the expectant mothers of all income-groups; and, *pari passu* with this official concern of the Ministry of Health and Ministry of Food for maternal nutrition, went increased earnings, the expansion of antenatal clinic facilities, and widespread propaganda for their use. It is tempting to conclude that the foregoing factors were mainly responsible for the decline in the stillbirth-rate. The nutritional standard set throughout the country would explain why the worst areas of the country have shown the most improvement and, as a consequence, have rendered the experience of the whole country more uniform. Improved nutrition would raise the general level of health of the mother and make her better able to support the growing foetus. Further, the investigation of the People's League of Health (see *Lancet* 1942) has shown notable decreases in the incidence of toxæmia consequent on nutritional improvements. It has been shown above that in Scotland 10% of stillbirths are attributable to this cause.

It is clearly necessary to test the validity of these hypotheses by seeing if they can explain the pre-war geographical distribution of the rate. In view of the interplay of opposing factors the best method to employ is that of multiple regression. Two groups of areas were chosen for analysis: the 83 county boroughs in England and Wales, and the 48 English administrative counties (excluding London). For each the multiple regression tested whether the five chosen variables could account for the observed variation in the stillbirth-rate, and measured the importance of each variable independently.

Before the effect of social influences can be assessed, the variation due to biological factors must be allowed for. Many of these factors will make only a very slight contribution. The sex-ratio at birth shows little consistent geographical variation over long periods. In 1939 the mean age of mothers giving birth differed inappreciably in the twelve main divisions of the country. Proportions of illegitimate births are small and so cannot cause great variations. The important factor is the parity of the mother, and the main contrast is between primiparæ and multiparæ. The proportion of first births is only obtainable for the twelve main divisions of the country; so some other closely associated index must be used in the multiple regressions. Two possibilities were considered: the crude birth-rate, and the census figure of persons per family. Both give high negative correlations (-0.62 and -0.75 respectively) with the proportion of first births. The crude birth-rate was chosen as more relevant, since the census figure will be disturbed by relations living with the family.

Four variables were used to specify social and economic environment. The sensitivity of the mortality of infants aged 3-12 months to environment has already been illustrated, and so it was used as a general index of poor social and economic circumstances. It is known that unemployment, overcrowding, and poorly paid jobs are

TABLE IV—WAR-TIME CHANGES IN THE STILLBIRTH-RATE IN ENGLAND AND WALES

Year	Legitimate		Illegitimate		Age of mother			Parity of mother				All multiparæ
	M	F	M	F	20-24	30-34	40-44	No. of previous children				
								0	1	2	5	
1939	39	35	50	44	26	39	68	40	24	31	45	33
1940	37	34	48	48	25	37	66	37	23	28	46	31
1941	36	32	48	43	24	34	63	35	23	28	42	30
1942	34	32	41	41	..	..	..	..	..	..	..	..

Rates for 1941 and 1942 are based on occurrences, not registrations.

all factors relevant to infantile mortality, and indices of these three were used to assess the independent effects of specific aspects of the environment. The five variables were thus taken as:

$x_1$  = Crude birth-rate in 1931.

$x_2$  = Proportion of occupied males over the age of 14 years in social classes IV and V, 1931 (Registrar-General 1934).

$x_3$  = Mortality at 3-12 months (1933-37) (Registrar-General 1937).

$x_4$  = Persons per room in private families, 1931 (Registrar-General 1934).

$x_5$  = Men out of work as a percentage of those occupied, 1931 (Census of England and Wales 1931),

and the multiple regression of the stillbirth-rate (1929-40) on these five was calculated. The results were:

County Boroughs (England and Wales)

$$Y = 38.7 - 2.14x_1 + 32.7x_2 + 0.449x_3 + 13.0x_4 + 0.319x_5$$

$$R = 0.739 \quad 1-R^2 = 0.454.$$

Administrative Counties (England)

$$Y = 42.8 - 0.752x_1 + 5.63x_2 + 0.932x_3 - 19.9x_4 + 0.722x_5$$

$$R = 0.711 \quad 1-R^2 = 0.495.$$

The advantage of these equations is that they afford a means of estimating the stillbirth-rate from the five variables and with a higher degree of precision than if the information given by the variables had not been available. For the administrative counties the estimate is made with 26% more precision, and for the county boroughs with 30%.

In the equations the coefficient of each variable represents the increase expected in the stillbirth-rate for unit increase in that variable, independently of changes in the other variables. Since different units of measurement are used, the relative importance of the coefficients is not indicated by their absolute values. The appropriate test shows that for the county boroughs, the coefficients of  $x_1$ ,  $x_2$ ,  $x_3$ , and  $x_4$ , and for the administrative counties the coefficients of  $x_2$  and  $x_5$ , are all highly significant. The others are not significant.

The interpretation of these findings accords with the hypothesis outlined above. In the county boroughs the stillbirth-rate is affected both by unemployment and by the prevalence of poorly paid jobs, both of which are responsible for poor nutrition. Moreover, it is well known that, if food is short, it is the mother who stints herself to feed her husband and family; hence the consequences of unemployment and low pay fall most heavily on her. Physical overcrowding, on the other hand, which is not in itself a cause of malnutrition, shows no relation with the stillbirth-rate. The significant value for the coefficient of  $x_3$  indicates that, apart from overcrowding, unemployment, and poorly paid work, there are other environmental factors affecting the rate which still need investigation. The significant negative coefficient of  $x_1$  indicates clearly that the parity effect masks the importance of the social and economic environment.

In the smaller experience of the administrative counties the picture substantially agrees with that for the county boroughs. The effect of unemployment and of the unspecified environmental factors is plain. It is interesting that the coefficient for the poorly paid work is not significant. This may be due to the fact that in the administrative counties the workers in social classes IV and V are to a large extent agricultural, and so there might not be the same degree of malnutrition associated with low pay as in a more industrial area. Here too overcrowding does not show itself to be important. The coefficient of  $x_1$  is negative, and so, though it is not significant, it serves its purpose of making some allowance for variations in parity.

Antenatal care has not been assessed directly in the above analysis (though  $x_3$  may account for it to some extent). The omission is due more to the difficulty of measuring it than to neglect of its importance. Obviously it is important, as can be judged by a comparison of the stillbirth-rate in Wales with that in London. It was shown previously that the rate in the former was much greater than that in the latter. It is now apparent that the variables used in the regression equations are insufficient to explain this difference, since they give the following predictions for county boroughs in the two areas:

	Stillbirth-rate, 1929-40		Difference
	Predicted	Actual	
Croydon ..	33.4	31.2	-2.2
East Ham ..	40.1	32.6	-7.5
West Ham ..	48.5	31.7	-16.8
Cardiff ..	41.4	47.3	5.9
Merthyr Tydfil ..	54.5	63.4	8.9
Newport ..	42.1	40.9	-1.2
Swansea ..	43.1	51.1	8.0

The three county boroughs in Greater London all have rates less than those predicted, and three of the four

Welsh county boroughs have rates considerably in excess of expectation. It seems legitimate to assume that the difference can only be accounted for by better antenatal care and supervision, coupled with better obstetrics.

One example will indicate the value of antenatal care. In Newcastle-on-Tyne before the war an analysis was given each year by the medical officer of health of the births to mothers who had attended the antenatal clinics. Averaged over the period 1932-38 the stillbirth-rates were as follows:

Among mothers attending antenatal clinics ..	34.9
Among the residual births to Newcastle residents ..	40.6
Among the residual births registered in Newcastle ..	64.3
Among births delivered by midwives ..	26.0

In view of the fact that the antenatal clinics would tend to attract an undue proportion of primiparæ the contrast between the first two figures is notable. The third figure indicates how hospitals tend to attract difficult cases from outside the town. No conclusions should be drawn from the last figure, since it will probably be biased in favour of births to multiparæ. It may be noted, however, that the rate is lower than that for all multiparæ in England and Wales given in table 1. Though table 1 relates to a different period, this comparison under-estimates the actual difference in view of the secular trend.

Finally, it is instructive to ascertain the number of stillbirths which could be prevented if the rate in the country as a whole could be reduced to the level in London, which has the lowest stillbirth-rate, despite an age- and parity-distribution less favourable than the average.

If the rate in England and Wales in 1944 had been equal to that in London there would have been 2100 fewer stillbirths. This may seem a small saving, but it must be remembered that in this year there were better care and better nutrition for the pregnant woman than before the war. Wise administrative action had in all probability levelled many of the social and economic inequalities which existed in pre-war years, and was responsible for the considerable reduction in the average stillbirth-rate. But further saving is possible in view of the statistical experience in Denmark. If the stillbirth-rate in England and Wales in 1944 had been 19.4—the Danish figure—the number of stillbirths expected would have been 14,900. The actual number recorded was 21,200. There would thus have been a saving of 6300 lives. Thus the lives of 2000 children would be saved if the incidence in London applied to the whole country, and a further 4000 by attaining the Danish level. Added to this, there would be an appreciable reduction in neonatal deaths; since the problem of neonatal mortality is allied to that of the stillbirth-rate.

#### SUMMARY

The task of reducing the numbers of stillbirths is important in view of the falling birth-rate. Stillbirths have apparently shown themselves resistant to the improving environmental conditions which have been to a great extent responsible for the decline in infantile mortality between the ages of 3 and 12 months.

The general features of the stillbirth-rate in this country between 1928 and 1944 are surveyed. There was wide geographical variation before the war, and there has been a pronounced and universal decrease throughout the war which has reduced the variation considerably. Attention is called to the low rate in London and the high rate in Wales. The stillbirth-rate is closely related to the neonatal death-rate.

The certified causes of stillbirths are examined. About a third are due to factors which improved obstetrics should help to prevent, and a fifth are attributed to vaguely certified or unknown causes.

Biological variations in the rate are examined, the most important being the relations with the age and parity of the mother.

It is shown that neither obstetrical nor biological factors can explain the decrease in the rate during the war, and the influence of antenatal social factors is considered by means of multiple regression. When biological variations are allowed for it is found that the rate in the county boroughs is not affected by overcrowding but is influenced by the degree of unemployment and proportion of poorly paid workers. This agrees with the suggestion that the war-time decline is primarily due to the improved nutritional opportunity and the care that has been taken of the pregnant woman. A similar analysis for the English administrative counties shows the rate there to be correlated with the degree of unemployment but not with overcrowding or with the proportion of poorly paid workers. In both cases there is evidence that other environmental factors are important. The value of antenatal care is stressed and demonstrated.

To reduce the stillbirth-rate to the Danish level would cause the numbers of stillbirths in England and Wales to drop from 21,000 to 15,000, with a corresponding decrease in neonatal deaths.

I wish to thank Miss Marie Lindhardt, of the Danish National Health Service, for information concerning stillbirths in Denmark; and Dr. W. T. Russell for helpful criticism.

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## CARBOHYDRATE METABOLISM

ON Nov. 25 and 29 Prof. Carl Cori delivered two lectures at the London School of Hygiene on the fundamental work done in his department at Washington University, St. Louis, on the intricate mechanism of carbohydrate metabolism.

#### ISOLATION OF CRYSTALLINE ENZYMES FROM MUSCLE

The first lecture dealt chiefly with the study of three key muscle enzymes—phosphorylase, aldolase, and phosphoglycerinaldehyde dehydrogenase. All these enzymes were prepared in a pure crystalline state in very good yield. This work involved a gigantic intellectual as well as physical effort, but Professor Cori made it all sound very easy. In discussing the preparation of the enzyme phosphorylase he described, for example, how all attempts to crystallise this enzyme failed until it was found that it was essential to filter off a small precipitate which appeared at one stage of the purification of the enzyme from the original muscle extract. A further investigation of this precipitate led to its characterisation as an enzyme which split off the coenzyme, adenylic acid, from the phosphorylase and thus prevented the successful isolation of the latter enzyme. The "small precipitate" was termed a P-R enzyme, and its properties, which are trypsin-like, are being used as a tool in investigating the mode of linkage between coenzyme and apoenzyme.

After describing these "adventures in carbohydrate metabolism," as Professor Cori called them, he outlined his plans for further work in this field, especially research involving the use of isotopes. From such work Professor Cori expects answers to such questions as "What is the average life-time of an enzyme?" and "Where do the enzymes come from?" Already it appears, from detailed amino-acid analyses of these pure crystalline enzymes, that two enzymes which occupy neighbouring positions in the "Cori cycle" differ widely in amino-acid composition. It therefore seems unlikely that all these enzymes originate from some "protein-pool" and acquire their specificity merely by some physical rearrangement of the protein molecule. By simple arithmetic Professor Cori showed for what a vast number of enzymes there is room in a tissue-like muscle, since all the enzymes he has

isolated and is isolating represent only a small percentage of the protein in the aqueous muscle extract used, which in turn represents only a fraction of the total muscle proteins.

#### ENZYMATIC SYNTHESIS OF POLYSACCHARIDES

In his second lecture Professor Cori described how he had synthesised *in vitro* such natural products as glycogen and amylose, and showed that the products were in every way identical with the natural compound. Using the techniques of high polymer chemistry, he worked out in great detail the kinetics, autocatalytic behaviour, &c., of the reactions involved. He was able to determine the chain length of the polymer molecule at every stage of the synthetic process, as well as the necessary chain length of the initiating molecules.

At the end of this lecture Professor Cori touched on the wider significance of his work, when he discussed the old question, "What makes these metabolic cycles go round?" In other words, he brought up the question of the hormonal control of carbohydrate metabolism, which, he said, "has hitherto yielded inconclusive results." At this stage he divulged some new and highly interesting findings. As is well known, glucose enters the "metabolic mill" by virtue of its phosphorylation to glucose-6-phosphate, called the Robison ester. This reaction is catalysed by the enzyme hexokinase. When insulin and other hormones have been added to such an enzyme system in the past, no conclusive results could be obtained. In Professor Cori's laboratory muscle tissue was taken from animals which had been rendered diabetic by means of alloxan, and it was found that here the phosphorylation of glucose was impaired and that this inhibition could be countered by insulin. Furthermore, since it is known from the work of Houssay that the diabetes of depancreatised animals is ameliorated by removal of the pituitary, Professor Cori tried the effect of pituitary extracts on the hexokinase system. The results showed that some pituitary extracts inhibited the hexokinase system even further and that this effect was again counteracted by insulin. Much the same applied to adrenal extracts, as was to be expected from the work of Long on the influence of the adrenal cortex on diabetes. Here at last seems to be the long-awaited linkage between hormones and enzymes in the field of carbohydrate metabolism.

### BRITISH EMPIRE CANCER CAMPAIGN

#### ANNUAL GENERAL MEETING

The annual meeting of the Campaign was held in London on Dec. 19, under the chairmanship of Viscount Hailsham, the acting president. A message was received from the Duke of Gloucester, the president, who welcomed the Campaign's continued activity.

Sir Stanford Cade moved the adoption of the annual report which, he said, is the 23rd of a consecutive series recording nearly a quarter of a century's progress in cancer research. The Campaign correlates controlled research, helps individual workers in recognised centres, disseminates knowledge, and helps to destroy the fear of cancer. To further these aims a *British Journal of Cancer* is shortly to be published.

The best yardstick of progress is the yardstick of mortality. Deaths from cancer in accessible sites and in some internal organs have decreased, while in other sites the peak of the rise has not yet been reached. Some may think that cancer research is about to become solely a State responsibility. Nothing, however, is further from the truth. Pioneer and research work will still depend on the efforts of individual research-workers; and further work and further progress will depend on the subscribers.

The motion was seconded by Mr. E. R. B. Graham.

The Campaign's Garton medal and prize of £500 was presented to Prof. E. L. Kennaway, F.R.S.

The annual report will be summarised in a later issue.

Mr. R. LINDSAY-REA, surgeon to the Western Ophthalmic Hospital, London, has received a presentation from his colleagues on his retirement. He has been 25 years on the staff of the hospital.

## In England Now

### A Running Commentary by Peripatetic Correspondents

It is often said to be impossible to work for higher degrees while serving in the Forces. This is nonsense. With an Army grading in surgery and no civilian specialist qualifications, I realised that I must seriously set to work for my Fellowship. And when the demobbing of specialists was slowed down this became still more important. I started to work for the Primary in March, and managed to confound the examiners seven months later. During this time I was stationed in Germany, and had no fewer than ten moves. Only once or twice was I able to visit the anatomy department at Hamburg University. What dissection I did was in the operating-theatre and the post-mortem room.

Bones were a difficulty at first. I foolishly sold my skeleton when, as a student, I thought I had finished with anatomy for ever. But steadily a skeleton was assembled. One bone was found here, another there. The skull had been used in festivities at a sergeants' mess party; it had a glass eye and a fine set of false teeth. A first thoracic vertebra, with two first ribs attached, was very nice—but the ribs were both upside down. The wrist was articulated with its various bones in the right order, but there had been no attempt at correlating the various surfaces. In the foot the third and fourth metatarsals were interchanged. And the fibula! I had always regarded it as the most aggravating of bones, but this one baffled me completely. I puzzled over it for fully half an hour before I realised that it was articulated upside down. So much for German thoroughness. One whole suitcase had to be sacrificed to my skeleton, and clothes only served to stop the bones from rattling. It accompanied me wherever I went, and many a batwoman must have paled at the gills when she came to do my unpacking.

Books are a menace to cart around, especially tomes like Gray, and Best and Taylor. For the anatomy I made two real finds. One was Frazer's *Osteology*, and the other Jamieson's *Illustrations*. I had used neither before, and both helped immensely. After reading Frazer, in particular, I think I can appreciate how Keats felt when first he looked into Chapman's Homer. For the applied physiology I found Best and Taylor a scholarly work, beautifully written and a real pleasure to read.

The exam itself was quite straightforward—fair papers and gentlemanly vivas. But it strikes me as very hard that you cannot get special leave for exams, or at least have your privilege leave extended. It certainly benefits the Army to have its specialists well qualified. But no matter—I shall soon be demobbed, and I had a glorious bonfire of all my notes.

Nothing is more distasteful to the doctor than to have some outside body pressing him to act, or appear to act, otherwise than in his patients' interests. Hence the uneasiness at the official appeals for tightening up milk priority certification. Some of us disagree with the Ministry of Food when it doubts whether the sickness-rate has risen to the extent suggested by the increased number of milk priority certificates issued. But if there is really not enough liquid milk to meet all the priority certificates and to give the general public its 2-2½ pints a week it is doubtless right to revise the list of people receiving certificates. Otherwise there may be more sickness and a greater need for certificates next spring.

The doctor may feel there is no-one whom he can conscientiously take off his list, but if, whenever he is asked for a milk certificate, he says to himself: "Does Mr. Y really need as much milk every day as Mrs. X gets in a week?" perhaps something may be done. Take two actual cases. There is a woman who had a mastectomy four years ago and has had no recurrence of growth; she leads an active life and eats a normal diet; she never calls for professional attention, but she still asks for her milk certificate and still gets it; presumably because she is thin, nervous, and vociferous—especially vociferous. She does not even like the milk, and shares it with her cat, but she insists on having it, although she needs it less than many old people who have to exist on their bare rations. Then there is another

woman who had an operation twenty years ago, she says vaguely, for dropped stomach; she lives in a hotel where she enjoys a better diet than the average householder, including such luxuries as chicken and duck. Her difficulty is that she cannot digest the badly cooked vegetables and she needs ascorbic acid; but she has had throughout the war, and still has, a milk certificate. Her doctor is now retiring and the partner will no doubt drop her off the list. These are cases drawn at random from two different districts; they give a hint that, if the ruling for postoperative cases were strictly followed, there could be some saving of milk for more deserving people.

The Ministry of Food has apparently discovered that the overall consumption of priority milk works out at 12 pints a week per head—nearly 2 pints a day for every holder of a certificate. Yet the only category entitled to receive 2 pints a day is that of gastric and duodenal ulcer. These cases while in hospital actually receive 3 pints a day, but patients with priority certificates for 1 pint receive only 4 oz. of milk a day if on meat diet (at least, they do in our hospital, and Sister says it's "regulations.") So it does not seem that hospitals can be held responsible for the surprising average. Can the milkman, perhaps, throw some light on the mystery? It is not unknown for him to go on delivering the daily pint, when supplies are good, long after the certificate has expired. He is within his rights, when he has surplus milk, but this is a possible source of confusion to the statistician.

The shortage of milk has been made harder to bear by the *Drink More Milk* campaign of pre-war days, when milk-bars sprang up in the towns, and we all became milk-conscious. There were a few heretics who maintained that man, like other mammals, does not need milk when the period of suckling is over, but in view of the undeniable benefit to children and adolescents who take extra milk such arguments were easily refuted; and vague biological analogies are never very convincing. So many more people were drinking milk when war began, and the deprivation has consequently been more keenly felt.

Could not this demand be partly met by providing more powdered, evaporated, and tinned milk for the ordinary consumer? The easily assimilable milk proteins and the mineral salts are especially needed by two non-priority classes—(1) the sick whose certificates have not been renewed, thanks to the tightening up, or who do not come under any of the priority categories, and (2) the aged, whose digestions are failing and who receive no concessions or consideration under the rationing scheme. During the war there was sufficient shipping to carry food to troops in every part of the globe. Could not civilian needs for preserved milk be treated now with the same urgency? \* \* \*

There is undoubtedly a whole field of medicine yet to be developed as an adjunct to broadcasting technique—from the "syrup codein. phosph." draught of your coughing correspondent to a couple of 'Seconal' capsules or a shot of intravenous pethidine for the really anxious or distraught. Broadcasting in a discussion recently I felt that we were all greatly in need of some kind of premedication—alcohol being forbidden as too erratic in its effects. For the gabbler of the party (myself) phenobarbitone would have been insufficient; even a preliminary course of thiouracil to reduce me to myxoedema would have failed to allay my desire to get it over as quickly as possible. Headache—in a stuffy studio—was another complaint, though whether ergotamine tartrate or intensive psychotherapy would have made the better cure must await further research. A mild anorexia was evident only in the female member of the group, but I am convinced that hyperchlorhydria was universal and I am surprised that more ulcers do not perforate during or after broadcasts.

At present the B.B.C. makes no provision for ante-transmission neuroses. Perhaps in future we shall be vetted and doped according to well-established methods and our E.C.G.s and E.E.G.s taken throughout the broadcast. So far the only practical idea has come from a medical colleague who suggests the routine use of bismuth and tinct. opii for a complaint from which our group all suffered.

## Letters to the Editor

### THE B.M.A.'s DECISION

SIR,—Those who are leading the British Medical Association are men of good intent who really believe that what they do and think is best both for the profession and the people. But a time has come when they are alienating the sympathy of laymen from us.

It would almost seem that we are being led by an office file that first began to write itself in 1911. History has repeated itself. Then as now the council had bargained with a Welshman and had got as much as reasonable men could expect. Then as now some wanted more and gained control. Then as now moderate men went, or were driven, out of the council to be replaced by the less moderate. And then began that policy of the "strike that is no strike," though no-one but a member of the B.M.A. council can understand it. It has become the pigeon-holed policy of the association, brought out from time to time with enormous preparation, to be put into threatened action and then to fail. It failed in 1911–12. It failed again in 1922–23 or thereabouts. It will fail again now, because the strike is not the weapon of an intellectual profession.

The present policy of the B.M.A. may, for the moment, conform to the herded will of the medical profession; it does not conform with the profession of the art of medicine. That is progressive, and with the change of time changes also.

Perhaps the lamentable result of this plebiscite may be turned to advantage by eliminating the present Negotiating Committee. This has been absorbed by the B.M.A.—a thing that is likely to happen to committees organised by it. As the largest medical organisation it is asked to collect a number of persons to represent the profession. This it does, and does well; and then it stultifies its own work by absorbing them to itself and so fixing upon them the policy of its office file. It did so many years ago with the Insurance Acts Committee; and though laymen are wrong in supposing that it controls the G.M.C. the fact remains that the directly elected representatives on that body are nowadays the nominees of the B.M.A. council.

The members in the divisions can readily be induced to vote in the way their leaders wish. And so it comes about that a few people of fixed views, with an able secretariat, are able to dominate a great profession.

London, S.E.1.

T. B. LAYTON.

### THE NEGOTIATING COMMITTEE

SIR,—On the average, members of the Negotiating Committee have been qualified for close on 35 years. One of the members has actually been qualified more than half a century. Comment is needless. How differently this committee would be viewed if it contained a majority of younger men—from recent ex-Service personnel down even to fourth-year students.

SENEX.

### BLOOD-PRESSURE IN PREGNANCY

SIR,—Are many general practitioners spending sleepless nights puzzling over the increasing frequency of hypertension in pregnant women? True, one is told that it is more apparent than real, and that hypertension is commonly found nowadays only because doctors are more conscientious in taking blood-pressure than of old.

This is scant comfort, and I don't think it is correct. In my own practice I examine some hundred maternity cases yearly, and during the last six months it has been unusual to find a blood-pressure below 136 mm. Hg systolic and 70 mm. diastolic; the majority vary between 140/90 mm. and 150/100 mm. It isn't my sphygmomanometer, for in despair I have sometimes sent a case to a consulting obstetrician and his readings have been similar. In most cases the blood-pressure starts to rise about the twentieth week and then remains stationary; but it does rise and I don't know why. The patient, of course, blames the bread: I hesitate to do that.

It would be interesting to know if others have any views on the subject.

Exmouth.

E. A. NETTELL.



### PROVISION FOR A MAJOR BURNING DISASTER

SIR.—The recent tragedies at Atlanta and in Canada, with that of 1942 in Boston, involving between them more than 600 lives, must have set many wondering about the possibility of a similar happening here. A writer in the *Times* has pointed out that in many of our large towns we are by no means adequately protected by stringent fire-escape regulations.

On the medical side the disturbing question arises: How many of our hospitals could cope effectively with a sudden influx of, say, 5 to 50 severely burned patients? (In the Boston incident the two chief hospitals had to deal with 170 cases.) Would they be able to mobilise within an hour or so the personnel to set up immediate plasma "drips" for the bad cases? Would they have the large quantity of plasma or serum required, the sterile gowns, masks, and towels, the dressings, the penicillin cream, and—perhaps most important of all—the extra nurses needed for the frequent administration of fluids and other food to those with bandaged hands and faces?

Our experience here is that the care of one severely burned patient may demand as much as 4–5 hours of the time of a skilled medical man and a nurse during the first 24 hours; and we not infrequently use as much as 500 grammes of penicillin cream, and 10–20 crêpe bandages, for a single case. This adequate care during the first 24 hours is all-important both for the saving of life through the critical "shock period" and for the later process of repair of the burned tissues. The resources of any hospital are likely to be severely strained to provide such care.

I would suggest that the necessary arrangements for such an emergency should be thought out and agreed on and periodically revised by hospital staffs. The organisation of one or more burns centres in our larger cities would certainly be in the best interests of the many victims of everyday burning accidents as well as the victims of such occasional major disasters.

LEONARD COLEBROOK.

Medical Research Council Burns Unit,  
Birmingham Accident Hospital.

### TREATMENT OF TUBERCULOSIS

SIR.—Some of the statements made by Dr. Houghton and Dr. Corrigan (Dec. 14) ring so true and have such significance that they demand repetition. For example:

"The patient who enters a modern sanatorium can no longer contemplate a period of tranquillity and freedom from personal anxiety, but must face a series of collapse-therapy measures beginning perhaps with phrenic-nerve interruption or artificial pneumothorax or pneumoperitoneum, and advancing, in the case of failure of these measures, towards the irreversible procedure of thoracoplasty. The effect of this protracted ordeal on apprehensive personalities is often disastrous, and some patients are put to too much emotional strain during treatment. As we are well aware, this has a deleterious effect on the progress of the disease.

"Apart from surgery, the great benefits of which we do not wish to decry, the very facts of diagnosis and subsequent segregation constitute a severe threat to morale. A long stay in hospital, involving perhaps many months of rest in bed, does not tend to reinforce confidence, and sometimes creates more problems than it solves. To these emotional stresses may be added domestic and economic problems. *Long rest in bed is useless without a measure of mental serenity.*"

These observations may be viewed in the light of Dr. George Day's remark (Nov. 16) about his first three cases:

"In all three the disease was diagnosed early and brought early to treatment without avail."

We know that healthy girls can enter sanatoria as nurses, contract the disease, and die of it in the institutions meant to cure, in spite of treatment from the earliest recognisable sign.

Dr. Day's fourth patient had "bilateral excavation and a family history riddled with phthisis"; yet without any sanatorium or other recognised treatment "the cavities, one of which used to be the size of a tangerine orange, had disappeared completely. There was plenty

of firm-looking scar tissue but no sign of any activity." And he asks the question, "Why did she do better than our sanatorium patients?"

In considering the disadvantages of sanatorium life, do we not tend to gloss over segregation—the separation from healthy minds and bodies? Apart from loneliness, there are many other deleterious factors, particularly those occasioned by shortage of staff and food restrictions.

The number of people whom radiography shows to have recovered from tuberculosis, without any institutional care, is at least ten times the number treated for active disease. Presumably a proportion of those nowadays treated would eventually get well by themselves.

Are we right then to submit patients to the conditions described in the first-quoted paragraph? Would it not be better, particularly in view of the shortage of nurses, beds, and equipment, to do as we have done with other infectious diseases—treat the patients at home? They would at any rate be spared the "disastrous and irreversible procedures." Without the use of amphetamine, and with the lessened mental disturbance, we might see more of the tuberculous deriving the benefits noted in Dr. Day's fourth case.

Birmingham.

JAMES F. BRAILSFORD.

### FATAL USE OF A DANGEROUS UNIVERSAL DONOR

SIR.—The conclusions reached by Dr. A. D. Morgan and Dr. G. Lumb (Dec. 14) are, in my opinion, based on slender evidence.

In the first place, no real evidence is offered that the onset of anuria was not due to the administration of sulphadiazine; the absence of sulpha crystals in the urine does not eliminate this possibility. In this hospital, we recently had a case of sulphadiazine suppression of urine (transfusions of blood had not been given before the onset of oliguria), in which crystals of sulpha compounds were not demonstrated in the small amount of bloody urine passed, although tests for soluble sulphonamides were positive.

The reaction reported by Morgan and Lumb may have been due to the transfusion of blood; but the investigations mentioned were not sufficient to warrant the conclusion that the reaction was due to high-titre  $\alpha$  agglutinins in the donor's blood acting on the A antigen of the patient's cells. The following criticisms are made:

(1) There is no mention of any blood-transfusions previously given to the patient. Presumably none were known, but if any were ever given the possibility of isosensitisation against the Rh antigens must be considered. In this connexion, the diagnosis of the patient as Rh-positive should be considered as unreliable, since the test was made on blood removed from the patient after the transfusions of blood.

(2) Occasionally severe reactions are due to the rare but naturally occurring antibodies against the blood factors M, N, Lutheran, or P. No tests for these antibodies are recorded.

(3) The writers report that no agglutination occurred when the patient's cells were tested against his own serum. This test alone may not determine in-vivo sensitisation of the patient's cells unless the absence of an "incomplete" antibody had been demonstrated—e.g., by using Coombe's anti-human globulin serum.

(4) The patient's serum, removed after the onset of suppression, was tested against the cells of the three group-O donors, with negative results. However, in severe transfusion reactions due to the action of the patient's antibodies on donated cells, the specific antibodies are rapidly removed from the circulating plasma and absorbed by the donated cells. Ten days or so later these antibodies reappear. Hence the in-vitro testing of suspected cells against the patient's serum during the first few days following the transfusion-reaction often gives negative results. Positive results may be obtained with a pretransfusion sample of serum or with serum obtained 14 days or more after the transfusion, should the patient survive; but the tests should be performed in tubes at 37° C, as well as at room and refrigerator temperatures. The preliminary

routine cross-matching of patient's serum and donor's cells performed on a tile may sometimes not show this incompatibility.

(5) A transfusion reaction due to high-titre  $\alpha$  agglutinin in group-O blood given to a group-A patient would be unlikely or impossible if the patient's serum normally contained soluble A factor. This is usually the case when the saliva contains the A substance, but no mention is made whether the patient was a "secretor" of A substance; nor was the presence of this substance in the patient's serum apparently investigated. This possibility must be eliminated before concluding that the anuria was due to the high-titre  $\alpha$  agglutinin in the donor's plasma.

S. SEVITT.

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Head Injuries, Wheatley, Oxon.

#### DANGERS OF CALCIFEROL

SIR,—Your leading article of Dec. 14 is timely. We were on the point of writing to suggest that some restriction should be placed on the sale of calciferol. A sense of harmlessness surrounds the idea of vitamin therapy, but, in fact, the highly concentrated preparations may be most dangerous.

We have had some two hundred patients, mostly suffering from lupus vulgaris, under treatment with calciferol over the past twelve months and intend in due course to publish our observations and the results of our investigations. We feel, however, that the incidence of toxic symptoms is so high, and the character of the symptoms so serious, that some warning is necessary in view of the freedom with which calciferol is being presented to the profession and the public.

Symptoms of intolerance arise as often and seriously in adults as in children. A high proportion of these cases present the picture of an abdominal emergency, and the symptoms may deceive the élite. Urgent admission to hospital and operation may follow.

In all our cases of intoxication there has been a considerable increase in serum calcium and a raised blood-urea. Though the total calcium may not be raised in those with mild symptoms, the diffusible calcium is invariably raised. Macrae has recently stressed the importance of watching the blood-sedimentation rate. In animals we have found that calciferol severely damages the kidneys.

It seems desirable that all patients on calciferol should have written instructions to stop treatment and report immediately should they experience any untoward symptoms, and especially such abdominal symptoms as pain, anorexia, sickness, and extreme constipation. With such precautions, and careful and regular observation and biochemical control, serious harm is not likely to occur.

That calciferol is of importance in the treatment of lupus vulgaris and that it will play an important part in the control of the problem of lupus is quite certain. That it is of value in other ills is unproven, and it should not be prescribed in high dosage except with proper control.

JOHN T. INGRAM      J. DAWSON  
Leeds.                      S. T. ANNING      D. E. DOLBY.

#### PERFORATED PEPTIC ULCER TREATED WITHOUT OPERATION

SIR,—Mr. Hermon Taylor (Sept. 28) states that the conservative treatment of perforated peptic ulcers has a mortality of 14%, and that surgical intervention should be reserved for late cases—patients with gastric dilatation from pyloric stenosis—and for those who have ingested a large quantity of fluid just before or after the perforation.

Signs suggesting perforation are usually pronounced, but sometimes, as laparotomy shows, these signs appear without a perforation. At other times the so-called *gedeckte* (subacute or sealed) perforation, which was first described by the Viennese surgeon, Schnitzler, is found; here the ulcer is sealed off by adhesions to a neighbouring viscus, either before or immediately after the perforation. The symptoms are less acute, and the peritoneal signs are more or less limited; in many gas may be found under the diaphragm. In such cases,

if there is no deterioration in the first few hours, we defer operation until all signs of peritoneal irritation have disappeared.

In other cases the perforation is not sealed off by adhesions; the opening remains free and uncovered, as seen at laparotomy on late cases.

As we know, the contents of the stomach are sterile by virtue of its hydrochloric acid, so that peritonitis does not develop if the ulcer is closed by adhesions or suture. But if the opening remains, the highly infected contents of the intestines can discharge into the peritoneal cavity by antiperistaltic waves.

A surgeon expecting every perforated ulcer to be sealed off by adhesions will be disappointed, especially if he has not the wide experience of Mr. Hermon Taylor; and failure means the death of the patient.

The late results of simple suture of a perforated ulcer are not satisfactory; in 91% of these cases a new or recurrent ulcer is found later, so that the patient is exposed to the risk of a second operation or a new perforation.

Therefore with perforations seen after 12–24 hours we perform a partial gastrectomy; the mortality is 7.2% in the first twelve hours and 12% in the second, but in many of these late cases peritonitis has already developed. After 24 hours a suture operation only is performed. In all of Mr. Taylor's cases a partial gastrectomy would have been undertaken.

Surgical Clinic, University of Graz.      A. WINKELBAUER.

#### MALNUTRITION IN RELEASED PRISONERS-OF-WAR AT SINGAPORE

SIR,—The admirable analysis of malnutrition by Dr. Mitchell and Dr. Black (Dec. 14, p. 855) and similar recent studies make a further advance in the evaluation of the causal relationships of single and multiple deficiency states.

Signs of vitamin deficiency have often been noted several weeks after the patient has been on a full nutritional hospital diet with vitamin therapy. Cases 1 and 4 (Mitchell and Black) illustrate this point. Both patients had peripheral neuritis with tingling, numbness, reduced sensibility, and loss of superficial reflexes, with some degree of amblyopia. Both patients were given 6 compound vitamin tablets daily (containing altogether 150 mg. ascorbic acid, 60 mg. nicotinic acid, 6 mg. thiamine, and 6 mg. riboflavin), while case 1 was given in addition 10 mg. of thiamine daily intravenously and case 4 received 50 mg. of thiamine daily intramuscularly. After nine days' treatment case 1 became suddenly weaker in the legs with gross ataxia of both arms and legs, while case 4 was suddenly unable to walk or write. The authors mention that similar observations were described by Spillane and Scott<sup>1</sup> and also by Clarke and Sneddon.<sup>2</sup>

During recent years the importance of the interrelationship between various factors of the vitamin-B group has been urged several times, subclinical latent deficiencies becoming manifest after energetic treatment of the obvious deficiency. Pellagrins have been reported as showing signs of beriberi, or what has been described as riboflavin deficiency, after treatment with nicotinic acid<sup>3,4</sup>; signs of pellagra<sup>5</sup> and of riboflavin deficiency<sup>6</sup> have appeared after treatment with thiamine. Richards<sup>7</sup> demonstrated experimentally on rats that excess of thiamine may easily precipitate a masked deficiency of pyridoxine. Mitchell and Black's case 1 had 10 mg. of thiamine intravenously; case 4 had 50 mg. intramuscularly. As far as could be ascertained, the cases reported by Spillane<sup>8</sup> and by Clarke and Sneddon<sup>9</sup> were also given generous doses of thiamine, although these writers, especially Spillane, tried to balance the diet of their patients carefully. It is reasonable to submit that in grossly undernourished chronic cases daily intravenous

1. Spillane, J. D., Scott, G. I. *Lancet*, 1945, ii, 261.
2. Clarke, C. A., Sneddon, J. B. *Proc. R. Soc. Med.* 1946, 39, 357.
3. Spies, T. D., Vilter, R. W., Ashe, W. F. *J. Amer. med. Ass.* 1939, 113, 931.
4. Sydenstricker, V. P., Sebrell, W. H., Cleokley, H. M., Krus, H. D. *Ibid.* 1940, 114, 2437.
5. Lehman, J., Nielsen, H. E. *Nord. Med.* 1939, 1, 289.
6. Leitner, Z. A. *Brit. med. J.* 1945, i, 809.
7. Richards, M. B. *Ibid.* p. 433.
8. Spillane, J. D. *Proc. R. Soc. Med.* 1946, 39, 175.

doses of 10 mg. or intramuscular doses of 50 mg. of thiamine might be sufficient to precipitate masked deficiencies of other factors, and this may be the explanation of the suddenly increased weakness and ataxia in both cases.

At a time when the chemical industry produces increasingly potent synthetic vitamins at decreasing prices, and when both public and profession are becoming more and more vitamin-conscious, it would seem that the interdependence of the several factors—at present mainly demonstrated in the B group of vitamins—deserves greater consideration.

London, W.1.

Z. A. LEITNER.

### CORONARY DISEASE

SIR,—In support of the possible infective basis of coronary artery occlusion, Dr. G. E. Beaumont (Dec. 14) cites the development of leucocytosis and a raised erythrocyte-sedimentation rate (E.S.R.) in this condition. Surely it is generally accepted that these are manifestations of the myocardial infarction and the resulting destruction of tissue. I would suggest that any simple aseptic infarct in any site may, if large enough, lead to the development of fever, leucocytosis, and a raised E.S.R., and that therefore such phenomena following an occlusion do not in any way indicate an infective process.

Department of Pathology,  
University of Bristol.

M. SYMONS.

### A MORAL PROBLEM

SIR,—The issue is not so much whether the results of the German investigators should be published as whether science can ever truly profit from crime.

There can be no scientific honesty without moral courage, and no clear reasoning without freedom of thought. In the atmosphere of crime, lies, and suppression that pervaded Nazi Germany no true scientist could have produced anything worth while. And how could one trust the scientific findings of people so devoid of judgment and reasoning that they believed their government's propaganda that Poles, Russians, Frenchmen, and Jews were criminals who should die an abominable death because of their race?

No doubt some points in their findings might be of use to investigators. But there is a far more valuable lesson to be learnt from publication—namely, that with all their unheard-of facilities these Nazi criminals could make few observations of importance.

Mitcham.

MAX B. KLEIN.

SIR,—Perhaps it is fortunate for Mr. Mellanby that the slaughter of prisoners is not yet British custom. He has thus been spared decision in that moral dilemma which he finds so perplexing.

If the Germans obtained important information from their investigations he would think it right to use their findings. In fact, however, we have no reason to believe that anything of value was ever discovered by the Germans by these methods. The privileges of study in the prison camps were granted, in the main, as rewards for faithful service, to Party officials and S.S. men, and to leaders of the Hitlerjugend and Hitlermädel. By 1939 repeated purges of the medical profession had ensured that its surviving members should be honoured confederates in such company.

The experiments consisted largely in elaborate sexual assault. The atmosphere of pseudo-science in which the proceedings were staged, to the accompaniment very often of the music of Wagner and Beethoven, was no more than a ritualistic addition designed to lend piquancy to the occasion.

These things are not widely understood. Mr. Mellanby cannot be expected to assess with justice circumstances of which, by implication from his letter, he has no conception. Nevertheless, in appearing to discern dignity in monstrous evil, he does some small further injury to the outside world's already sufficiently feeble appreciation of what it is that has been destroyed in Germany.

Dartford, Kent.

I. MCD. G. STEWART.

## Public Health

### Rag Flock, Bedding, and Upholstery

THE bedding and upholstered articles on which people spend about a third of their lives should be clean. The Interdepartmental Committee on the Rag Flock Acts point out<sup>1</sup> that this country lags behind some others in the legislation and precautions adopted to ensure that the filling materials are free from infection and dirt. They received evidence that rag flock, the commonest filling material used, is still being made from dirty rags. One witness said that some of this material is collected by rag-and-bone men who go round from house to house with a barrow or cart and collect from tips and dumps. These men are usually employed, or paid for what they bring in, by dealers. No material, however dirty, is refused. "It calls for little imagination," said the witness, "to realise that most of these rags must of necessity contain much infection, filth, and excreta." In the factories where the rag flock is made the cleansing processes vary within fairly wide limits according to the facilities available and to the zeal and scrupulousness of the manufacturers. The provisions of the Factories Act as regards health and cleanliness apply of course to registered factories. In some places the rags are steeped in cold water, and sometimes hot water with or without detergents is used. In others the rags are subjected to agitation while being steeped, the temperature of the water being raised by steam under pressure. A number of rag-flock factories, however, have no washing plant and presumably the rags are not washed at all. To make rag flock the dried rags are disintegrated by passing them over a rapidly revolving cylinder studded with steel teeth. This is a dusty process, the dust being controlled more or less effectively by exhaust ventilation. Sometimes the rags are sprayed with small quantities of oil to reduce the loss of fibre in the dust, but the use of oil has the disadvantage of binding some of the dirt into the flock.

The present legislation dealing with the manufacture and use of rag flock is contained in the Rag Flock Act, 1911, and the regulations made under it in 1912; the Rag Flock Amendment Act, 1928, and the Public Health (London) Act, 1936, sec. 136. The latter section re-enacts the provisions of the previous Acts and regulations in substantially the same form. The Act of 1911 makes it an offence for any person to sell or have in his possession for sale flock made from rags or to use it for the purpose of making upholstery, cushions, or bedding or to have it in his possession unless it conforms to a prescribed standard of cleanliness. This standard was prescribed under the regulations of 1912 and consists of what is known as the "chlorine test," by which the amount of chlorides removed by washing under specified conditions does not exceed 30 parts of chlorine in 100,000 parts of flock. The duty of administering the Act and regulations is placed on the local authorities. The 1928 Act defined the term "flock manufactured from rags" and limited its application to material produced from woven, knitted, or felted materials.

### RECOMMENDATIONS

The committee could find no direct evidence that disease or ill health is being transmitted by unclean filling materials used in bedding and upholstery, but they think it safe to presume that disease might arise from the use of such materials. It is possible that the use of unclean filling materials is a contributory cause of certain respiratory ailments in which the sources of infection are not known. In any case the development of the public-health services is based on the attainment of cleanliness. The committee regard the present legislation dealing with the making and use of rag flock as inadequate to protect the public. In their opinion there should be a statutory prohibition against the sale of unclean rag flock intended for use as a filling material. All premises on which rag flock is made or stored or is used in making bedding, upholstery, or other household

1. Cmd. 6366. London: H.M. Stationery Office. Pp. 36. 92. The committee was appointed in 1938 with Lord Merthyr as chairman, and its medical members were Dr. W. G. Clark and the late Dr. G. H. Pearce.

furniture should be registered by the local authorities, who should be given power to suspend or revoke registration if the necessary conditions are not being satisfied. There should be the right of appeal against any decision of a local authority to the Minister of Health or the Secretary of State for Scotland. Rag-flock manufacturers and wholesale dealers should be required to keep records showing the destination of each consignment of flock sold by them and the date of sale. Bedding and upholstery makers using rag flock should also keep records of the sources of supply. Local-authority officers should be empowered to inspect the records and to enter any registered or unregistered premises to take samples for analysis. They should also have power to enter any premises on which finished articles of bedding or furniture are sold or offered or exposed for sale; the cost of repairing any damage caused by the opening up of the finished articles should be met by the local authority unless a conviction ensues. Any retailer of bedding and upholstery should be able to plead as a defence a warranty given by the maker in legal proceedings taken against him.

Most of the recommendations about rag flock should, in the opinion of the committee, be applied to all other filling materials such as kapok, feathers, down, wool, and various vegetable fibres. Whatever the filling material used there should be compulsory labelling of each article of bedding and upholstery so that its origin might be traced. Legislation controlling the use of filling materials should also be applied to the coverings and linings of upholstered articles. Evidence had been given to the effect that dirty sacking, tainted meat wrappers, and other contaminated articles are sometimes used as linings of bedding and upholstery. It is added that the filling materials of stuffed toys should have the same standard of cleanliness as that laid down for upholstered articles and bedding. The committee do not think it practicable to prescribe in detail the washing and sterilising processes to be applied in the manufacture of rag flock. In their opinion the proposed system of registration and inspection by the local authority will bring about the necessary standards of cleanliness. The "chlorine test" is regarded as unsatisfactory because it cannot be assumed that flock containing a high proportion of soluble chlorides is necessarily dirty, and further, the standard of 30 parts of chlorine to 100,000 parts of flock is too easily reached without adequate cleansing. The Fenton test at present under investigation by the British Standards Institution, in conjunction with the trade, is the best available test for rag flock and animal fibres. It is necessary, however, to devise other tests for cotton flocks and some other vegetable fibres.

The committee urge that new legislation on this subject should not be too long delayed because it is a matter which touches closely on the daily lives of the whole population.

#### Infantile Diarrhoea in Maternity Homes

The Registrar-General's figures for the first eleven weeks of the December quarter do not show any notable increase of mortality from enteritis and diarrhoea. Thus in 126 great towns (including London) the average number of deaths of children under 2 years of age per 1000 births for the December quarter 1946 to date was 5.8, whereas the comparative figure for the same period of 1945 was 6.8.

The outbreaks of gastro-intestinal illness recently reported from maternity homes and other institutions in various parts of the country are not all of the same clinical type. Up to date the most serious appears to have been at two hospitals in Leicestershire with between 40 and 50 cases among infants and 23 deaths. In its high case-mortality and relative lack of associated illness in adults this outbreak resembles incidents already recorded in the United States<sup>1</sup> in 1939 and in England<sup>2</sup> in 1943. This condition usually begins during the first three weeks of life with a sudden loss of weight which may precede obvious gastro-intestinal upset by several days. Pyrexia is not always present but the subsequent course suggests an intense toxæmia or shock. In any particular institution the beginning of such an outbreak may not be

explosive, there being intervals of a week or so between the first cases. Breast-feeding does not always protect, but the breast-fed infant appears to stand a much better chance of survival. Pathological and bacteriological investigations have hitherto proved entirely negative. The only effective measure of control is closure of the ward or nursery concerned.

In the outbreak reported in connexion with a maternity home at Preston the illness of the 18 fatal cases began at varying intervals after discharge from the home, and the trouble started as long ago as August. It is not yet possible to state the case-mortality of this outbreak, which presents some unusual clinical features that are being investigated by a team of paediatricians.

The illness among infants reported from institutions in several other areas differs clinically from that at Leicester or Preston and appears to be much less severe. Usually mothers and nursing staff have been affected as well as infants. In one outbreak at Hull it is possible, though not yet confirmed, that the cause was a salmonella.

## Parliament

### QUESTION TIME

#### Care of Children

Mrs. M. E. NICHOL asked the Prime Minister what steps were being taken to implement the interim report of the Care of Children Committee on training in child care, which was presented last March.—Mr. H. MORRISON, Lord President of the Council, replied: As soon as the interim report was received, interdepartmental consultations took place and a plan was worked out to meet the recommendation of the Curtis Committee for a central training council to promote basic training in child care for house mothers. This plan has required reconsideration in the light of the recommendation in the final report that the functions of the training council should be extended to cover more advanced training for other classes of persons who are concerned with the care of homeless children. There will be no delay in preparing and giving effect to this revised plan, but while a long-term plan for the training of staff will no doubt be advantageous, it will not meet the immediate difficulty caused by the acute shortage of staff in children's homes. When an attempt was made last summer to start, in accordance with the suggestion in the interim report, a course of training for senior staff it was found that the homes were unable to spare any members of their staff for the purpose.

#### Less Bacon and More Milk

Mr. JOHN STRACHEY announced on Dec. 16 that the bacon ration would have to be reduced from 3 to 2 oz. on Jan. 5 next. This was the effect of the acute world shortage of cereals, and could only be remedied as that shortage was overcome. On the other hand, the non-priority milk allowance to the ordinary consumer, which last autumn it was feared might not be maintained through the winter at even 2 pints, could be increased from 2 to 2½ pints on Dec. 22.

#### Extraction-rates for Flour

Mr. STRACHEY, replying to a question, stated that the following extraction-rates had been current during 1946:

Jan. 1—Feb. 23	80%	Sept. 1—Sept. 21	90%
Feb. 24—March 9	82½%	Sept. 22—Sept. 30	85%
March 10—May 11	85%	October	85%
May 12—June 30	90%	November	85%
July	90%	First week of December	85%
August	90%		

#### Penicillin Lozenges

Mr. JOHN LEWIS asked the Minister of Health if he would prohibit the use of penicillin for the production of lozenges, which, apart from civilian requirements, were absorbing 250 million units for the Service department requirements, in view of the fact that a lozenge containing only 500 units of penicillin was useless for the treatment of throat infection.—Mr. C. KEY replied: No, Sir. I am advised that lozenges of this strength are quite effective.

#### Dental Benefit

Commander A. H. P. NOBLE asked the Minister of National Insurance whether the Dental Benefit Service had now been resumed throughout the country following upon his recent

1. Frant, S., Abramson, H. *N. Y. St. J. Med.* 1939, 39, 784.  
2. Sakula, J. *Lancet*, 1943, ii, 758.

agreement with the Joint Advisory Dental Council.—Mr. JAMES GRIFFITHS replied: As part of the agreement the Joint Advisory Dental Council advised members of the profession generally to resume the practice of accepting insured persons for treatment in accordance with the Dental Benefit Regulations. It has always been a matter for each individual dentist to decide whether or not he will accept patients on this basis, and a certain number of dentists have never participated in the service. I am aware that certain dentists have indicated that they are not following the recent advice of the advisory council but I have no reason to believe that this is the attitude of any large proportion of dentists.

#### Future of King's Fund

Sir JOHN GRAHAM KERR asked the Minister of Health what, under the new National Health Service Act, were the intentions of the Government with regard to the King Edward's Hospital Fund.—Mr. A. BEVAN replied: The new Act does not alter any of the powers and duties of the Fund under its own statute. I hope that the Fund will continue its very valuable work—in whatever forms it may feel to be appropriate to the new service.

## Obituary

### WILLIAM JOB COLLINS

K.C.V.O., M.D., M.S. LOND., F.R.C.S.

Sir William Collins, whose death was announced in our last issue, died on Dec. 12 at the house in Albert Terrace, Regent's Park, where he was born 87 years ago and where his father, Dr. W. J. Collins, practised. His mother, Mary Anne Francisca Treacher, belonged to the Huguenot family of Garnault. The family took pride in their distaff descent, and some twenty years ago Sir William served as president of the Huguenot Society in London. From University College School he went with a Jeaffreson exhibition to St. Bartholomew's Hospital, where he graduated M.B. in 1881, winning the university scholarship and a gold medal in obstetrics. After holding house-appointments at Barts he became in 1884 demonstrator in anatomy. Before he qualified in medicine he had already taken his B.Sc. with honours in physiology, and he was unable to accept the current tenets of medicine unquestioningly.

As early as 1881 he was asking in our columns how far the commonly accepted notions of the specificity of disease should be modified by the doctrine of evolution:

—“The common ancestry of specific diseases, once recognised, would do much to remove the hard and fast line so often drawn between diseases and diseases in textbooks, and dissertations, but of which nature knows nothing.”

This theory he later elaborated in his essay on *Specificity and Evolution*, which Herbert Spencer, to whom it was dedicated, declared opened the way to a “considerable reform in pathology,” and in *The Man v. Microbe* (1903). Perhaps it was his background of heterodoxy which deflected him from what promised to be a brilliant surgical career; for after taking his M.S., M.D., and F.R.C.S., all in 1884 and 1885, he turned to the speciality of ophthalmology. He joined the staff of the Royal Eye Hospital and Western Ophthalmic Hospital as surgeon, and was also ophthalmic surgeon to the National Temperance Hospital. He published a monograph on cataract in 1897, and during the war of 1914–18 he described several interesting cases of gunshot wounds in the eye. As Doyne medallist and lecturer in 1918 he spoke on Ophthalmology and the War. A senator of his university for over 30 years, he twice held office as its vice-chancellor.

From his conception of the specificity of disease sprang his belief that diseases should be fought outside the body and not within it. With this belief went his eagerness

to improve the environment of the people, and he was among the last of the great Liberal Victorian social reformers. One of his heroes was Edwin Chadwick, whose biographer he later became, while Florence Nightingale and Sir William Morris, founder of the Charity Organisation Society, were his friends.

For many years a member of the London County Council, he was its chairman in 1897. In 1904 he was chairman of its first education committee, while its ambulance service was started almost entirely through his efforts. In 1909 a departmental committee and the L.C.C. itself recommended that the Metropolitan Asylums Board should provide the service. Sir William, a member both of the committee and the council, opposed this suggestion, and when neither would accept his views, nothing daunted, he introduced into Parliament, to which he had been elected in 1906, a Bill to confer the powers on the L.C.C. The Commons accepted it in preference to a Bill based on the recommendations of the departmental committee, and the L.C.C. reluctantly accepted its new obligations. The service was started in 1915 under the control of the chief officer of the fire brigade. Sir William became a vice-lieutenant of the county of London in 1925 and was also a justice of the peace.

An experienced and able negotiator, he sat on many royal commissions, notably those on vivisection (1906–12) and on vaccination (1889–96). An ideal chairman, he presided over a select committee on the hop industry (1908), the departmental committee on accidents to railway servants (1914–19), the Conciliation and Arbitration Board for Civil Servants (1917–18), and the Sussex Agricultural Wages Committee (1920–39). To bodies more nearly allied to medicine he was an equally valued counsellor, and he was chairman of the Chadwick Trust, member of the council of the King's Fund, president of the Sanitary Inspectors Association, and from 1899 to 1928 secretary of the League of Mercy. He was asked to help in the formation of the Central Council for District Nursing, and his skilful handling of the eager but sometimes conflicting interests involved brought order and system to the work of the council, of which he was chairman for more than thirty years. When he retired in 1944 the position of president was specially created for him. His work for the council is an example of his value as a co-ordinator. Through his contacts with the L.C.C. and with the King's Fund, the work of district nursing came to be linked both with the municipal and voluntary hospitals, while as trustee of the City Parochial Charities he was able by his excellent advocacy to direct funds to its exchequer.

As plenipotentiary for Great Britain he attended three international opium conferences held at The Hague between 1911 and 1914. His interest in the problems of addiction linked him to the Medico-Legal Society, over which he presided from 1901 to 1906, and his *Ethics and Law of Drug and Alcohol Addiction* which appeared in 1916 was a balanced survey. He believed in the “potency for good of reduced facilities for tipping,” but he advocated restriction and not prohibition.

“I knew Sir William Collins well,” Lord Addison writes, “and he was one of those in the old days who stimulated interest in many of us in public affairs as well as in surgery. Looking back on the time of my own acquaintance with him I should say that this fact was outstanding. In those days his wide public interests and sustained activities placed him almost in a class by himself, I should think, amongst surgeons.” He was knighted in 1902 and appointed K.C.V.O. in 1914. His acute brain and statesmanlike grasp of affairs served many good causes without a trace of self-interest, and he served them all well.

### JOHN ERNEST ALBERT LYNHAM

M.D. BELF., M.R.C.P., F.F.R.

Dr. J. E. A. Lynham, consulting radiologist to Mount Vernon Hospital, died on Dec. 14. He was educated at Queen's College, Galway, where his father, Dr. J. I. Lynham, was for many years professor of medicine, and at Queen's College, Belfast, where he graduated in medicine in 1907, taking his M.D. four years later. After two years as assistant medical officer at the Woolwich Infirmary he was in 1911 appointed assistant superin-

tendent to the Radium Institute, a post which he held till 1923. In 1914 he took his M.R.C.P., and in 1921 his D.M.R.E. at Cambridge. Meanwhile he had broadened his experience in his specialty by serving as an assistant in the electrotherapy department of the Royal Cancer Hospital. Later he took charge of the X-ray department at the Italian Hospital, and was appointed visiting radiologist to the Queen Mary's Hospital, Roehampton, while for twenty years he was associated with the Woolwich Memorial Hospital. His aptitude for able work in all branches of radiology left its mark in all these hospitals, but his published work showed his own main interest to lie in the radiological aspects of tuberculosis and cancer. Well known and liked by his colleagues, he was elected a fellow of the Faculty of Radiologists in 1939, and served a term as president of the electrotherapeutic section of the Royal Society of Medicine. During the war he worked continuously, refusing to take even short respites, and his always indifferent health deteriorated greatly during the last two years. A colleague writes: "Lynham was a man of exquisite charm. On occasion his Irish temperament exerted itself, and he was inclined to be a little impulsive and loved argument; but however his views differed from those of his colleagues he never showed malice towards anyone."

Dr. Lynham married Miss Harriet Hopkins in 1912, and she survives him with a son and daughter.

## Diary of the Week

DEC. 29 TO JAN. 4

### Wednesday, 1st

ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1  
8 P.M. *Surgery and Radiology*. Sir Stanford Cade, Dr. J. Ralston Paterson, Mr. W. R. Douglas: Treatment of Carcinoma of the Tongue.

BRITISH INSTITUTE OF RADIOLOGY, 32, Welbeck Street, W.1  
5 P.M. Prof. W. V. Mayneord: Applications of Atomic Physics in Medicine. (First of six lectures.)

### Thursday, 2nd

ROYAL SOCIETY OF MEDICINE  
8 P.M. *Neurology*. Prof. E. D. Adrian, F.R.S.: General Principles Governing Nervous Activity. (Hughlings Jackson lecture.)

SOCIALIST MEDICAL ASSOCIATION  
7.30 P.M. (296, Vauxhall Bridge Road, S.W.1.) Dr. A. T. M. Wilson: Social Aspects of Medical Psychology.

### Friday, 3rd

ROYAL SOCIETY OF MEDICINE  
5.30 P.M. *Anaesthetics*. Dr. Ronald Jarman, Dr. Francis Evans: Anaesthesia for Abdomino-perineal Operations.

## Births, Marriages, and Deaths

### BIRTHS

ADAMS.—On Dec. 11, at Twickenham, the wife of Dr. G. S. Adams—a son.  
CARTER.—On Dec. 16, in London, the wife of Dr. A. B. Carter—a daughter.  
JACOBS.—On Dec. 9, in London, the wife of Dr. J. J. M. Jacobs—a son.  
LENTON.—On Dec. 12, at Clifton, Bristol, the wife of Mr. P. H. Lenton, F.R.C.S.—a son.  
MCNEIL.—On Dec. 14, at Poona, India, the wife of Major Charles McNeil, R.A.M.C.—a daughter.  
MASON.—On Dec. 15, at Hull, the wife of Mr. J. I. C. Mason, F.R.C.S.—a son.  
MINETT.—On Dec. 14, at Northampton, the wife of Dr. Jack Minett—a son.  
PHILPS.—On Dec. 12, in London, the wife of Dr. Richard Philips—a son.  
SIMPSON.—On Dec. 17, in London, the wife of Dr. Thomas Simpson—a son.  
SLOAN.—On Dec. 6, at St. Albans, the wife of Dr. Oliver Sloan—a son.  
TEARE.—On Dec. 13, in London, the wife of Dr. Donald Teare—a son.  
TOPHAM.—On Dec. 13, at Edinburgh, the wife of Surgeon Lieut.-Commander L. G. Topham, R.N.—a daughter.  
YOUNG.—On Dec. 14, in London, the wife of Dr. W. B. Young—a daughter.

### MARRIAGES

ALMENT—BACON.—On Dec. 14, in London, Edward Anthony John Alment, M.R.C.S., to Elizabeth Innes Bacon.  
STOTT—CAMPBELL.—On Dec. 7, at Nakuru, Kenya, Hugh Stott, M.B., to Helen Campbell.

### DEATHS

DATE.—On Dec. 10, at Radlett, William Horton Date, M.P. Durh., late of Exeter, aged 80.  
LYNHAM.—On Dec. 14, at Kingston-on-Thames, John Ernest Albert Lynham, M.D. Belf., M.R.C.P., F.F.R.  
SUTTON.—On Dec. 17, at Ventnor, the Rev. Samuel Walter Sutton, M.D. Lond., aged 90.

## Notes and News

### VIENNA'S FOOD

ON Dec. 17 Dr. Harvey S. Collins, medical consultant in nutrition to UNRRA, described to a press conference the nutritional state of Vienna, which he previously reviewed in May.<sup>1</sup> Examination of over 7000 people, completed on Sept. 15, revealed that growth in children was retarded (particularly in those aged between 7 and 13 years) and that adults over 40 years of age were definitely under weight, the deterioration increasing with age. Oedema of the ankles was present in 6.3% of a sample population, but in only 0.3% was it attributable to malnutrition. Clinical evidence of vitamin-B deficiency was rare: 0.8% showed signs suggesting riboflavin deficiency, while 6.7% showed signs suggestive of nicotinic-acid deficiency; there was no clear evidence of vitamin-B<sub>1</sub> deficiency. No case of scurvy was recorded, but vitamin-C deficiency was suggested in 0.62%. Signs, probably due to vitamin-A deficiency, were found in 0.71%. There was little indication of vitamin-D deficiency in young children, presumably owing to the distribution of preparations containing this vitamin and preferential milk distribution.

From the middle of March until early November the official ration for the normal consumer remained at 1200 calories a day, and the average official ration, taking into account extras for workers, mothers, and others, was 1440 calories a day. Although the allocation of food to Vienna has this year been the lowest in any large European community, there has been no catastrophe. Probably this is because most citizens secured just enough extra food to prevent progressive deterioration. With the coming of winter, sources of extra supplies may diminish, as they did last year. This will, in part at least, be offset by the recent increase of the normal consumer's rations to 1550 calories, the maintenance of which after the end of this year will rest not with UNRRA but with the Austrian government and the occupying powers.

### PROFILES

DOES routine work stifle the creative urge? What is the right preparation for retirement? The Brains Trust has been approached more than once for an answer to these searching questions. Maybe the College of Physicians would be the better arbiter, at least for the medical man. An attractive collection of essays before us speaks for itself, or rather for Sir George Newman.<sup>2</sup> No routine can have been more exigent or more protracted than that of the first medical officer of the Ministry of Health. But the essays here reprinted which date from this period of his life reveal the workings of a spirit free to roam over the field of nature and the verities of truth. The rest of us may reach the same destination by other ways, but here is a modern example of Galileo's assurance *Eppur si muove*.

All but one of these ten essays appeared anonymously in the *Friends Quarterly Examiner* during the forty years of Sir George Newman's editorship. He has now acceded to their republication under his own name. They include studies of George Fox, Thomas Hodgkin, Joshua Rowntree, Rendel Harris, Jane E. Newman, Joseph Rowntree, and others.

### INTERNATIONAL SANATORIUM FOR STUDENTS

A QUARTER of a century ago (on Oct. 1, 1922, to be exact) Dr. L. C. Vauthier opened at Leysin the Swiss University Sanatorium, of which he is founder and director, for the treatment of tuberculous teachers and students belonging to Swiss universities or technical high-schools. Here they carried on their studies at regular hours and in regular doses suited to each case, and attended regular lectures from outside teachers. They had a library of 2000 volumes and free access to 15,000 volumes in the Leysin library. A year at the sanatorium counted as a scholastic term. It was claimed that the work was good for them, giving them a saner outlook, and preserving them from the demoralising effect of unemployment.<sup>1</sup> This arrangement was made possible by the fact that all teachers and students in Swiss universities and technical high-schools subscribed (teachers fr. 20, students fr. 10 a year) towards a university insurance fund. Any of them contracting tuberculosis could obtain treatment in the Swiss University Sanatorium on payment of the equivalent of 36s. a week. If there was room, students from other countries

1. See *Lancet*, 1946, i, 838.

2. *Quaker Profiles*. By Sir George Newman, G.B.E., M.D. London: Bannisdale Press. Pp. 134. 7s. 6d.

1. See *Lancet*, 1924, ii, 1087.

might be accommodated for 10s. a day.<sup>2</sup> Up to now, about 1000 teachers and students, of 42 different nationalities, have been treated, and the library has grown to 17,000 volumes, apart from 150 newspapers and reviews.

Dr. Vauthier now plans a far more ambitious scheme—an international sanatorium for tuberculous university students from any country. This also is to be built at Leysin at an altitude of over 4400 ft. above sea-level. It will accommodate 200 sick. The governments of Switzerland, Belgium, and Luxemburg are said to have contributed considerable sums towards the realisation of the project.<sup>3</sup>

#### AN OFFER TO NEGOTIATE

The Medical Services Guild, which is a constituent of the Confederation of Health Service Employees, was established ten years ago as a section of the National Union of County Officers. All its members must belong to their appropriate professional organisation, and its doctors all belong to the B.M.A. Dr. S. W. Jeger, M.P., chairman of the guild, and Dr. H. B. W. Morgan, M.P., Dr. Mary Barber, Dr. C. W. Brook, Dr. W. W. Fox, and Mr. Denis Whitlock, F.R.C.S.E., who are all members of its medical advisory committee, write that it is their "convinced opinion that in the event of the B.M.A. leadership refusing to negotiate with the Minister, it is incumbent upon the confederation to take a lead in representing the views of those who voted 'yes' in the recent referendum and we shall, therefore, welcome to membership all those who think like ourselves."

The confederation was set up this year by the amalgamation of the Mental Hospitals and Institutional Workers' Union and the Hospitals and Welfare Services Union, and it has a membership of nearly 50,000. It is affiliated with the Trades Union Congress, and its address is 38, Argyle Square, London, W.C.1.

#### NEW NUTRITION BULLETIN

The first issue of a new two-monthly *Nutrition Bulletin*, published by the Central Council for Health Education, is to appear next month. The *Bulletin* will deal not with the basic principles of nutrition but with the application of these principles to social betterment. It will thus be concerned with the growth of the various nutrition services, the principles underlying public instruction, the food habits of the community, and the place of diet in the national health. The theoretical literature on applied and social nutrition is also to be collected. Articles will be concise, topical, and non-technical. The *Bulletin's* purpose is to inform all who are directly or indirectly concerned in improving the nation's diet; and the advisory editorial group will carry on the tradition established by the *Bulletin* of the Children's Nutrition Council. The annual subscription is 3s.; and the council's address is Tavistock House, Tavistock Square, London, W.C.1.

#### HOSPITALS

The *Hospitals Year Book* for 1946—the fourteenth edition in the series—is now obtainable from the central bureau of information of the British Hospitals Association, 52, Green Street, Park Lane, London, W.1. Besides being, as usual, an invaluable work of reference it reviews hospital services during the last decade and gives an account of the forthcoming National Health Service. As the yearbook went to press before the Bill became law, a review, by Mr. J. P. Wetenhall, secretary of the association, of the hospital service under the Act has been published as a separate memorandum, which should be useful to those who need a clear accurate summary of the new provisions.

#### CLIMATE AND COMFORT

WHAT is the ideal climate? Prof. David Brunt, F.R.S., in a lecture to the Royal Institution, has suggested that it should allow a lightly clothed man to walk at four miles an hour in the sunshine without sweating, and to sit in the sunshine and stand or sit in the shade or indoors without shivering. With relative humidity of about 60%, the temperature, if these conditions are to be met, must be between 66° F and 68° F. For a healthy and active life, the mean temperature of the hottest month should not fall much below 60° F or exceed 70° F or at most 75° F, while in the coldest month it should not become difficult to maintain a comfortable indoor temperature. The largest single area approximately satisfying these criteria is Western Europe; in the British Isles the mean temperature of the hottest month lies between

58° F and 62° F, and that of the coldest month between 39° F and 44° F. Probably the best climate in the world is that of New Zealand, where the temperature in the hottest month varies between 62° F and 70° F, and that of the coldest month between 45° F and 52° F. The hottest temperatures which will allow of any activity are 86° F in air of relative humidity 85%, and 95° F in air of relative humidity 25%. Thus, broadly speaking, dry heat is better tolerated than damp heat; but heat-stroke is not uncommon among those exposed to the hot dry "poison wind" of Arabia—the simoom—which, by promoting excessive secretion and evaporation of sweat, causes exhaustion of the glands.

In England the "optimum" indoor temperature in summer is 66° F, and in winter 62°–64° F, as against 76° F and 72° F, respectively, in the United States. An oppressive damp hot climate, said Professor Brunt, is best countered by the open type of house, permitting free air movement, and, if possible, by drying the indoor air. The dry sunny hot climate, on the other hand, calls for a house with double walls and roof, divided by a wide air space and capable of preventing the intrusion of the hot outer air during the day, when ventilation can be increased by fans.

#### INDUSTRIAL WELFARE

In the promising change in outlook now spreading through industry, the Industrial Welfare Society is proving an effective catalyst. The annual report claims that during 1945–46 the society provided the means for the exchange of opinions and experiences; and this is confirmed by the popularity of its conferences and the use made of its information service. A generous interpretation of the Reinstatement in Civil Employment Act has been encouraged, and the fact that very few cases came before the reinstatement committees is evidence of the liberality and careful planning of most firms. Many employers are giving thought to the training of young workers, and are willing to release them for part-time non-vocational education, to establish initiation classes for beginners, to set up works training schools, and to send workers to conferences on industrial topics. Wage questions fall outside the society's scope, but job assessment, job description, and merit rating have been studied closely, and a booklet, "Assessing the Job," has been widely read and approved. The society has also been able to suggest equitable arrangements in problems of works discipline, and has reviewed the works handbooks and rules drawn up by many firms to show workers their rights and obligations.

The report notes that the year has been remarkable for the fact that—despite war-time upheavals, rationing of food and goods, and a change of jobs for a third of the working population—strikes have been relatively few, and industrial relations, measured by the experience of other countries and our own experience after the 1914–18 war, have been good. This, the society considers, has been largely due to the organisation of the trade-union movement. The report emphasises the value, in maintaining these good relations, of careful explanations by the management, including foremen, of the firm's policy, and the reason for this or that action. Several firms which have decided to move their factories to development areas have consulted the society about plans for welfare and personnel departments, and a booklet, "Canteens in Industry," has reached a sixth edition; incidentally, some 450 inquiries about canteens were answered—nearly double the number received in the previous year—and visits were made to 114 firms to advise on special canteen problems. The society has also issued a booklet on cloakrooms, wash-places, and toilets, and has considered seriously the question of colour in industry; the report does not give details on this last subject, but it evidently covers the painting of walls and machines in such a way as to conserve lighting and to throw important and potentially dangerous parts of machines into relief—a practice which can materially reduce accident-rates. Voluntary schemes of insurance against sickness and old age are regarded by the Minister of National Insurance as an important supplement to amounts paid by the State—a principle in which the society is taking a great interest. The Catering Wages Act has raised all-round standards for canteen workers, though the report notes that many members of the society have long given conditions above those laid down by the Act. Personnel and welfare officers have taken an outstanding share in smoothing labour problems in this first year of reconstruction. The report notes that many Service men and women have sought advice from the society about taking up personnel and welfare work, but that "circumstances unfortunately made it difficult to place many of these

2. See *Ibid.*, 1929, 1, 1150.

3. Palmieri, V. M. *Rif. med.* 1946, 60, 514.

first-class candidates." This seems to be another example of a curious characteristic of our times: all occupations, including medicine, report a shortage of personnel, but those seeking posts are repeatedly baffled by "circumstances" which keep them from work for which they are trained and fitted, or—if they are young—from training for occupations which are crying out for new candidates.

The society's address is 14, Hobart Place, London, S.W.1.

#### University of Cambridge

The following appointments have been made by the university to Addenbrooke's Hospital, from Oct. 1: Mr. N. R. Lawrie, Ph.D., biochemist; Dr. A. M. Barrett, morbid anatomist and histologist; and Dr. M. H. Gleeson White, bacteriologist.

#### University of Manchester

The following were successful in recent examinations:

**M.B., Ch.B.**—Joan Hampson (second-class honours); C. J. T. Archer, Kathleen Burn, H. S. Coulsting, Dorothy R. Davies, Vera A. Dearden, O. G. Dodge, C. J. Glancy, A. B. Haward, J. B. Howard, S. T. Lunt, Joseph Needoff, E. L. Peel, N. W. Preston, Kathleen Rampling, A. E. Sheiswell, Lorinda Wallace, Joan M. Waterfall.

#### University of Edinburgh

The university has replaced the single diploma in radiology, the D.M.R., by two separate diplomas—one in radiodiagnosis and the other in radiotherapy. Candidates are required to attend courses lasting 18 months and 2 years respectively before examination. The university has also established a diploma in industrial health, the course for which lasts one academic year; candidates must have obtained a certificate in public health before starting on the second term of the final course.

#### Faculty of Radiologists

The following candidates satisfied the board at the recent examination for the fellowship:

R. J. Keating, G. Simon (both in radiodiagnosis).

#### Royal Medical Foundation of Epsom College

The council will award next March a pension of at least £30 per annum to a necessitous medical man, aged 55 or over, who has been registered for at least five years. Forms of application, obtainable from the Secretary, Epsom College, Surrey, must be returned by Jan. 30.

#### London Hospitals Amalgamate

Four members of the governing body of Woodside Hospital for Functional Nervous Diseases, Muswell Hill, have been appointed to the board of the Middlesex Hospital. This follows the amalgamation of St. Luke's Hospital Foundation with the Middlesex Hospital, which will thus have 60 additional beds for the treatment of psychological conditions.

#### Edinburgh Postgraduate Board for Medicine

The following open lectures will be given at the Royal Infirmary on Tuesdays at 5 P.M.: Jan. 14, Prof. F. A. E. Crew, F.R.S., *Death in the Blue Book*; Jan. 23, Dr. Douglas Guthrie, *Is Medicine Still an Art?*; Feb. 11, Prof. A. G. Ogilvie, *Human Habitat and Social Geography*; Feb. 25, Lieut.-Colonel A. D. Stewart, *Hospitals and Hospital Administration*; and March 11, Prof. J. H. Gaddum, F.R.S., *Introduction of New Remedies*.

#### Staffing the Regional Boards

The Ministry of Health has asked local authorities for a statement of the numbers and types of staff employed at central offices or elsewhere for the purposes of their hospital service, or for groups of hospitals, whom they consider likely to be liable to transfer to the regional hospital boards under the National Health Service Act. Replies are asked for by Jan. 31, 1947. A separate inquiry is being addressed by the Board of Control to the authorities concerned with mental-hospital and mental-deficiency services.

#### Summer Schools in Health Education

The Central Council for Health Education is to hold two residential summer schools next year—one at Keble College, Oxford, from July 25 to August 8, and the other at Bede College, Durham, from August 20 to Sept. 3. The schools are intended primarily for those who have to do with the training and care of children and young people. Inquiries should be directed to the medical adviser and secretary of the council, Tavistock House, Tavistock Square, London, W.C.1.

#### London County Council

Dr. E. H. R. Harries will retire from the superintendency of the North-Eastern Hospital of the London County Council in January, when he reaches the age-limit. He has held the appointment since he entered the service of the L.C.C. in 1931, and he has also acted as their smallpox consultant since 1932. In 1935 Dr. Harries was Milroy lecturer to the Royal College of Physicians, to whose fellowship he was elected in 1942. His work as a teacher and counsellor has been widely recognised, and he has served as president of the fever hospitals group of the Society of Medical Officers of Health and on several committees of the Medical Research Council. He is also joint author of *Clinical Practice in Infectious Diseases*.

#### Empire Rheumatism Council

At the council's annual meeting in London on Dec. 18, Lord Horder, the president, welcomed the announcement that the plan for national action, propounded by the council in 1941, was to be operated in principle. The assurance that rheumatic patients would no longer be "the forgotten folk" of public-health administration, recorded, he said, a notable achievement which, even if it stood alone, justified the campaign. In the new health service each region was to have special treatment centres linked with peripheral local centres. The council, said Lord Horder, was investigating the causes of rheumatoid arthritis. Two whole-time registrars had been appointed to deal, in the first instance, with 100 cases. If results were encouraging, 1000 cases would be studied, possibly with the help of 4 additional registrars. It was hoped that from this survey, started three months ago, there might emerge lines for specific research.

## Appointments

BEATTIE, MYRA K., B.Sc., M.D. Belf.: assistant pathologist, Epsom Pathological Laboratory, West Park Hospital.

FREEMAN, D. E., M.B.N.U.I.: M.O., Colonial Service, British Solomon Islands Protectorate.

HART, F. D., M.D. Edin., M.R.C.P.: assistant physician, Westminster Hospital.

NEUBERT, F. R., M.D. Lpool, D.O.: ophthalmic surgeon, General Hospital, Guernsey.

#### St. Thomas's Hospital, London:

BATTLE, R. J. V., M.B.E., M.CHIR. Camb., F.R.C.S.: plastic surgeon.

BOURNE, J. G., M.B. Camb., D.A.: anaesthetist.

BOWEN, R. K., M.D., M.S. Lond., F.R.C.S.: obstetric physician.

CYBAX, J. H., M.D. Camb.: physician to physiotherapy department.

FLEMING, J. A. C., M.B. Edin., F.R.C.S.E., F.F.R.: director of radiotherapy.

FURLONG, R. J., M.B. Lond., F.R.C.S.: assistant orthopaedic surgeon.

HOVELL, J. H., M.R.C.S., L.D.S.: assistant dental surgeon.

MCCLAREN, J. W., M.A. Camb., M.R.C.S., D.M.R.E.: director of X-ray department (diagnostic).

MIDPRISS, T. W., M.S. Lond., F.R.C.S.: surgeon to outpatients.

NEVIN, R. W., M.B. Camb., F.R.C.S.: surgeon to outpatients.

PENMAN, G. G., M.D. Camb., F.R.C.S.: ophthalmic surgeon.

PERKINS, G., M.C., B.M. Oxf'd, F.R.C.S.: orthopaedic surgeon.

RICKFORD, R. B. K., M.D. Lond., F.R.C.S., M.R.C.O.G.: obstetric physician to outpatients.

RIDLEY, N. H. L., M.D. Camb., F.R.C.S.: ophthalmic surgeon to outpatients.

ROBINSON, R. H. O. B., M.B. Camb., F.R.C.S.: surgeon.

WALLACE, H. J., M.B. Camb., M.R.C.P.: assistant physician to skin department.

WILIE, W. D., M.B. Camb., M.R.C.P., D.A.: anaesthetist.

#### Hospital for Diseases of the Skin, London:

BURFORD, H. G., B.M. Oxf'd: registrar.

OWEN, J. R., M.R.C.P.: physician.

#### Middlesex County Council:

##### North Middlesex County Hospital:

FERRIMAN, D. G., D.M. Oxf'd, M.R.C.P.: physician.

PAGE, B. H., M.B. Camb., F.R.C.S.: surgeon.

##### West Middlesex County Hospital:

CHIVERS, ELVA M., M.B. Cape Town, D.A.: senior anaesthetist.

#### British Royal Hospital:

BARBOUR, R. F., M.B. Edin., M.R.C.P., F.R.C.P.E., D.P.M.: psychiatric physician.

CAMPBELL, A. M. G., D.M. Oxf'd, M.R.C.P.: physician.

CAPPER, W. M., M.B. Lond., F.R.C.S., M.R.C.O.G.: surgeon.

DAVIES, D. H., M.B. Camb., M.R.C.P.: physician.

EVANS, C. D., O.B.E., M.B. Camb.: dermatologist.

EYRE-BROOK, A. L., M.B. Brist., M.S. Lond., F.R.C.S.: orthopaedic surgeon.

HEMPHILL, R. E., M.D. Dubl., D.P.M.: psychiatric physician.

POCOCK, J. A., M.B. Camb., F.R.C.S.: surgeon.

#### Examining Factory Surgeons:

GRIEVE, M. F., M.B. Edin.: Jedburgh.

HASTINGS, BARBARA V., L.R.C.P.E.: Strathdon.

LOBBAN, A. W. C., M.B. Aberd.: Gamlingsay.











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